SOLICITATION NO. DACW37-02-B-0011

FLOOD CONTROL

RED LAKE RIVER

POLK COUNTY, MINNESOTA

SPECIFICATIONS
FOR

CROOKSTON FLOOD CONTROL STAGE 2

March 2002

US Army Corps of Engineers
St. Paul District

FLOOD CONTROL
RED LAKE RIVER
POLK COUNTY, MN

CROOKSTON FLOOD CONTROL, STAGE 2

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SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION DACW37-02-B-0011	2. TYPE OF [X] SEALED BID (IFB) [ ] NEGOTIATE *(RFP)*	3. DATE 16-Apr-2002	PAGE OF PAGES 1 OF 183

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

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST W81G67-1236-3169	6. PROJECT Crookston Stg 2

7. ISSUED BY CODE DACW37	8. ADDRESS OFFER *(If Other Than Item 7)* CODE
CONTRACTING USACE - ST PAUL 190 5TH STREET ST PAUL MN 55101-1638 TEL: FAX: 651-290-5706	**See Item 7** TEL: FAX:

9. FOR CALL:	A. NAME SUELLEN W. BUELOW	B. TELEPHONE *(Include area code)* *(NO COLLECT CALLS)* 651-290-5418

SOLICITATION

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

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

DACW37-02-B-0011

CROOKSTON FLOOD CONTROL, STAGE 2, CROOKSTON, MINNESOTA. Contractor will provide all plant, labor, materials and necessary to construct earthen levees estimated to be approximately 106,000 cubic yards, excavate approximately 123,000 cubic yards of soil for the levees and a high flow cutoff channel on the Red Lake River in Crookston, MN. Principal features of the project include, but are not limited to, clearing & grubbing, demolition and removals, common excavation, impervious fill, 2,000 feet of street reconstruction, dewatering system (installation, operation and removal), reinforced concrete culvert and storm sewer, storm & sanitary sewer manholes, sanitary sewer & services, water main and services, tractor and electric driven pump stations and piping, sluice and flap gates, modular block retaining (MSE) walls, riprap and bedding, geotextile, aggregate surfacing, seeding, sodding and landscaping. Estimated magnitude of construction in terms of physical characteristics and estimated price range is between $1 and $5 million. THIS PROCUREMENT IS ISSUED UNRESTRICTED UNDER THE SMALL BUSINESS COMPETITIVE DEMONSTRATION PROGRAM (PUBLIC LAW 100-656). NORTH INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE IS 234990; SMALL BUSINESS SIZE STANDARD IS $28.5

11. The Contractor shall begin performance within 10 calendar days and complete it within 604 calendar days after receiving [ ] award, [X] notice to proceed. This performance period is [X] mandatory, [ ] negotiable. *(See* 52.211-10 *.)*

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

13. ADDITIONAL SOLICITATION

A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8 by 14:00:00 *(hour)* local time 5/16/02 *(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 60 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:

SEE SCHEDULE

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)*	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

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BID SCHEDULE

BASIC ITEMS

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		1.00	Lump Sum		
	PRE-CONSTRUCTION DAMAGE SURVEY				
				_____.____	_____.____

CUTOFF CHANNEL NO. 3

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002		1.00	Lump Sum		
	CUTOFF CHANNEL NO. 3 - DEMOLITION				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003		1.00	Lump Sum		
	CLEARING AND GRUBBNG				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004		3,100.00	Cubic Yard		
	STRIPPING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0005	
	COMMON EXCAVATION

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AA		84,000.00	Cubic Yard		
	FIRST 84,000 CY				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AB	OVER 84,0000 CY	14,000.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0006	TOPSOIL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AA	SALVAGED	3,075.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AB	BORROW	25.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007	SEEDING MIXTURE CLASS 3	5.60	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0008	RIPRAP

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AA	FIRST 9352 TONS	9,352.00	Actual Tons	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AB	OVER 9352 TONS	1,651.00	Actual Tons	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009	BEDDING	1,310.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010	GRANULAR FILL	1,445.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011	GEOTEXTILE FILTER	9,815.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0012	IMPERVIOUS FILL	317.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013	ALL BONDS (BID, PERFORMANCE AND PAYMENT) FOR BASIC CONTRACT (CLINS 0001 THROUGH 0012)	1.00	Lump Sum	_____.____	_____.____

TOTAL BASIC ITEMS (CLINS 0001 THROUGH 0013) **_____.____** **_____.____**

OPTION ITEMS

THORNDALE AREA

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014		1,025.00	Cubic Yard		
	THORNDALE AREA - STRIPPING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY
0015		
	TOPSOIL	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AA		415.00	Cubic Yard		
	SALVAGED				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AB		1,250.00	Cubic Yard		
	BORROW				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016		3.09	Acre		
	SEEDING MIXTURE CLASS 2				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0017	
	IMPERVIOUS FILL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AA		910.00	Cubic Yard		
	FIRST 910 CY				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AB		390.00	Cubic Yard		
	OVER 910 CY				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018		523.00	Cubic Yard		
	AGGREGATE BASE CLASS 5				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019		1.00	Lump Sum		
	HEADWALLS W/FLAP VALVES				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020		1.00	Each		
	GATE VALVE AND BOX, 4"				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021		3.00	Each		
	REMOVABLE BOLLARDS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0022		1.00	Lump Sum		
	ALL BONDS (BID, PERFORMANCE AND PAYMENT) FOR THORNDALE AREA OPTION ITEMS (CLINS 0014 THROUGH 0021)				
				_____.____	_____.____

TOTAL THORNDALE AREA OPTION ITEMS (CLINS 00014 THROUGH 0022) _____.____ _____.____

WOOD'S ADDITION

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023		1.00	Lump Sum		
	WOOD'S ADDITION - DEMOLITION				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024		1.00	Lump Sum		
	CLEARING AND GRUBBING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025		14,240.00	Cubic Yard		
	STRIPPING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0026	
	COMMON EXCAVATION

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AA		19,550.00	Cubic Yard		
	FIRST 19550 CY				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AB		3,450.00	Cubic Yard		
	OVER 19550 CY				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0027	
	TOPSOIL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AA	SALVAGED	3,900.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AB	BORROWED	11,593.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028	SEEDING MIXTURE CLASS 1	14.80	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029	SEEDING MIXTURE CLASS 2	4.80	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0030	SEEDING MIXTURE CLASS 3	5.80	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0031	SODDING	17,994.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0032	TREES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0033	SHRUBS	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034	SELECT IMPERVIOUS FILL	15,921.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0035	IMPERVIOUS FILL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AA	FIRST 65188 CY	65,188.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AB	OVER 65188 CY	11,500.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0036	RANDOM FILL	4,340.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0037	INSPECTION TRENCH	4,225.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0038	AGGREGATE BASE CLASS 5

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0038AA	STREETS/RAMPS	1,787.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0038AB	TOP OF LEVEE	1,152.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0039	GRANULAR BEDDING	1,005.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040	CRUSHED ROCK BEDDING	1,005.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0041	RCP 12" CL 5	289.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0042	RCP 18" CL 4	523.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0043	RCP 24" CL 3	112.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0044	RCP 24" CL 4	1,195.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0045	RCP 30" CL 5	394.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0046	4" POLYETHLENE PIPE	90.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0047	STORM SEWER STRUCTURES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0048	STORM SEWER APRONS W/TRASHGUARDS	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0049	HEADWALLS W/FLAP VALVES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0050	CONNECT TO EXISTING STORM MANHOLE	3.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0051	CONNECT TO EXISTING STORM PIPE	3.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0052	ADJUST STORM MANHOLE CASTING	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0053	TRACTOR DRIVEN PUMP STATION NO. 1	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0054	TRACTOR DRIVEN PUMP STATION NO. 2	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0055	TRACTOR DRIVEN PUMP STATION NO. 3	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0056	TRENCH DRAIN PUMP STATION NO. 1	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0057	TRENCH DRAIN PUMP STATION NO. 2	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0058		1.00	Lump Sum		
	TRENCH DRAIN PUMP STAT # 1 ELEC. SERV				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0059		1.00	Lump Sum		
	TRENCH DRAIN PUMP STAT #2 ELEC. SERV				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0060		1,448.00	Linear Foot		
	TRENCH DRAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0061		64.00	Linear Foot		
	12" C900 PVC SANITARY SEWER PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0062		552.00	Linear Foot		
	15" RCP CL5 SANITARY SEWER PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0063		50.00	Linear Foot		
	18" RCP CL 5 SANITARY SEWER PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0064		100.00	Linear Foot		
	JACKED 15" RCP SANITARY SEWER PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0065	CLSM BEDDING	589.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0066	12" SANITARY SEWER GATE VALVE W/BOX	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0067	SANITARY SEWER STRUCTURES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0068	CONNECT TO EXISTING SANITARY SEWER	10.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0069	ADJUST SANITARY SEWER MANHOLE CASTING	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0070	4" PVC SANITARY SERVICE PIPE	85.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0071	1" COPPER WATER SERVICE	100.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0072	1" CORPORATION STOP	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0073	1" CURB STOP W/BOX	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0074	6" C900 PVC WATER MAIN	100.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0075	6" DIP HYDRANT LEAD PIPE	10.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0076	DIP FITTINGS FOR WATER MAIN	680.00	Actual Pounds	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0077	6" GATE VALVE W/BOX	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0078	HYDRANT	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0079	CONNECT TO EXISTING WATER MAIN	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0080	TYPE 41A WEARING COURSE	150.00	Actual Tons	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0081	TYPE 31 BASE COURSE	150.00	Actual Tons	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0082	GEOTEXTILE FABRIC	1,567.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0083	BITUMINOUS TACK COAT	53.00	Gallon	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0084	4" CORRUGATED POLYETHELENE PIPE	500.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0085	B618 CONCRETE CURB & GUTTER	822.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0086		410.00	Square Foot		
	4" CONCRETE WALK				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0087		51.00	Square Yard		
	6" CONCRETE DRIVEWAY PAVEMENT				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0088		9.00	Each		
	DISCONNECT WATER SERVICE AT WATER MAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0089		1.00	Lump Sum		
	MSE WALLS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0090		15.00	Cubic Yard		
	CONCRETE LIVE LOAD DISTRIBUTION SLABS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0091		6,400.00	Cubic Yard		
	SOIL CORRECTION AT REMOVED STRUCTURES				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0092		15.00	Each		
	REMOVABLE BOLLARDS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0093	GUARD POSTS	4.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0094	6" GATE VALVE W/TAPPING SLEEVE	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0095	6" INSERTING GATE VALVE	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0096	6" DIP RIVER CROSSING PIPE	106.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0097	CONNECT TO EXISTING FORCEMAIN	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0098	ALL BONDS (BID, PERFORMANCE AND PAYMENT) FOR WOODS ADDITION OPTION (CLINS 0023 THROUGH 0097)	1.00	Lump Sum	_____.____	_____.____

TOTAL WOODS ADDITION OPTION ITEMS (CLINS 0023 THROUGH 0098)	_____.____	_____.____

ASH STREET ROAD RAISE

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0099		1.00	Lump Sum		
	ASH ST ROAD RAISE - DEMOLITION				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0100		1.00	Lump Sum		
	CLEARING AND GRUBBING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0101		214.00	Cubic Yard		
	STRIPPING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0102		1,786.00	Cubic Yard		
	COMMON EXCAVATION				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0103	
	TOPSOIL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0103AA		100.00	Cubic Yard		
	SALVAGED				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0103AB		310.00	Cubic Yard		
	BORROWED				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0104	SODDING	3,688.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0105	LANDSCAPING PLANTER	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0106	SHRUBS	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0107	SELECT IMPERVIOUS FILL	157.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0108	RANDOM FILL	54.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0109	INSPECTION TRENCH	170.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0110	AGGREGATE BASE CLASS 5	2,135.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0111	GRANULAR BEDDING	344.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0112	CRUSHED ROCK BEDDING	10.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0113	RCP 12" CL 5	338.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0114	RCP 15" CL 5	240.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0115	RCP 18" CL 4	110.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0116	CMP 12"	17.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0117	CMP 12" SLOTTED DRAIN	44.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0118	STORM SEWER STRUCTURES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0119	ADJUST STORM MANHOLE CASTING	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0120	8" C900 PVC SANITARY SEWER PIPE	167.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0121	12" C900 PVC SANITARY SEWER PIPE	37.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0122	12" SANITARY SEWER GATE VALVE W/BOX	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0123	SANITARY SEWER STRUCTURES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0124	RECONSTRUCT SANITARY SEW MANHOLE-STRUC 311	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0125	CONNECT TO EXISTING SANITARY SEWER	5.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0126	4" PVC SANITARY SERVICE PIPE	30.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0127	1" COPPER WATER SERVICE	35.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0128	1" CORPORATION STOP	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0129	1" CURB STOP W/BOX	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0130	6" C900 PVC WATER MAIN	191.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0131	6" DIP HYDRANT LEAD PIPE	19.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0132		445.00	Actual Pounds		
	DIP FITTINGS FOR WATER MAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0133		4.00	Each		
	6" GATE VALVE W/BOX				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0134		1.00	Each		
	SALVAGE & REINSTALL HYDRANT				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0135		2.00	Each		
	ADJUST EXISTING WATER MAIN GATE VALVE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0136		4.00	Each		
	CONNECT TO EXISTING WATER MAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0137		1.00	Each		
	CONNECT EXISTING 1" SERVICE TO NEW WATER MAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0138		531.00	Actual Tons		
	TYPE 41A WEARING COURSE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0139		531.00	Actual Tons		
	TYPE 31 BASE COURSE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0140		3,600.00	Square Yard		
	GEOTEXTILE FABRIC				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0141		176.00	Gallon		
	BITUMINOUS TACK COAT				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0142		1,685.00	Linear Foot		
	4" CORRUGATED POLYETHELENE PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0143		1,685.00	Linear Foot		
	B618 CONCRETE CURB & GUTTER				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0144		7,833.00	Square Foot		
	4" CONCRETE WALK				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0145		522.00	Square Yard		
	6" CONCRETE DRIVEWAY PAVEMENT				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0146		1.00	Lump Sum		
	MSE WALLS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0147		1.00	Lump Sum		
	REMOVE & SALVAGE SIGNS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0148		1.00	Lump Sum		
	ALL BONDS (BID, PERFORMANCE AND PAYMENT) FOR ASH STREET ROAD RAISE OPTION (CLINS 0099 THROUGH 0147)				
				_____.____	_____.____

TOTAL ASH STREET ROAD RAISE OPTION ITEMS (CLINS 0099 THROUGH 0148) _____.____ _____.____

<u>SUMMIT AVE ROAD RAISE</u>

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0149		1.00	Lump Sum		
	SUMMIT AVE ROAD RAISE - DEMOLITION				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0150		1.00	Lump Sum		
	CLEARING & GRUBBING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0151		625.00	Cubic Yard		
	STRIPPING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0152	COMMON EXCAVATION	650.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0153	TOPSOIL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0153AA	SALVAGED	250.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0153AB	BORROWED	747.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0154	SODDING	6,259.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0155	SELECT IMPERVIOUS FILL	511.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0156	IMPERVIOUS FILL	4,319.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0157	RANDOM FILL	50.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0158	INSPECTION TRENCH	200.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0159	AGGREGATE BASE CLASS 5	2,065.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0160	GRANULAR BEDDING	871.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0161	CRUSHED ROCK BEDDING	10.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0162	RCP 12" CL 5	201.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0163	RCP 15" CL 5	268.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0164	RCP 24" CL 4	201.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0165	RCP 27" CL 5	187.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0166	RCP 30" CL 5	105.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0167	STORM SEWER STRUCTURES	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0168	RECONSTRUCT STRUCTURE 120	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0169	RECONSTRUCT STRUCTURE 121	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0170	8" C900 PVC SANITARY SEWER PIPE	329.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0171		235.00	Linear Foot		
	12" C900 PVC SANITARY SEWER PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0172		80.00	Linear Foot		
	15" C900 PVC SANITARY SEWER PIPE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0173		2.00	Each		
	8" SANITARY SEWER GATE VALVE W/BOX				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0174		3.00	Each		
	12" SANITARY SEWER GATE VALVE W/BOX				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0175		1.00	Lump Sum		
	SANITARY SEWER STRUCTURES				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0176		2.00	Each		
	CONNECT TO EXISTING SANITARY MANHOLE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0177		8.00	Each		
	CONNECT TO EXISTING SANITARY SEWER				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0178	CONNECT TO EXISTING SANITARY SEWER SERVICE	5.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0179	4" PVC SANITARY SERVICE PIPE	95.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0180	PVC WYE, 8" X 4"	4.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0181	PVC WYE, 12" X 4"	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0182	ADJUST SANITARY SEWER CASTING	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0183	1" COPPER WATER SERVICE	254.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0184	1" CORPORATION STOP	8.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0185	1" CURB STOP W/BOX	8.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0186	6" C900 PVC WATER MAIN	595.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0187	6" DIP HYDRANT LEAD PIPE	10.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0188	DIP FITTINGS FOR WATER MAIN	250.00	Actual Pounds	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0189	6" GATE WITH VALVE BOX	6.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0190	SALVAGE & REINSTALL HYDRANT	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0191	CONNECT TO EXISTING WATER MAIN	5.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0192	TYPE 41A WEARING COURSE	390.00	Actual Tons	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0193	TYPE 31 BASE COURSE	390.00	Actual Tons	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0194	GEOTEXTILE FABRIC	3,600.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0195	BITUMINOUS TACK COAT	168.00	Gallon	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0196	4" CORRUGATED POLYETHELENE PIPE	1,565.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0197	B618 CONCRETE CURB & GUTTER	1,690.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0198	4" CONCRETE WALK	6,792.00	Square Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0199		342.00	Square Yard		
	6" CONCRETE DRIVEWAY PAVEMENT				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0200		16.00	Cubic Yard		
	SALVAGE & REINSTALL ALLEY SURFACE				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0201		1.00	Lump Sum		
	MSE WALLS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0202		1.00	Lump Sum		
	REMOVE AND SALVAGE SIGNS				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0203		1.00	Lump Sum		
	ALL BONDS (BID, PERFORMANCE AND PAYMENT) FOR SUMMIT AVENUE ROAD RAISE OPTION (CLINS 0149 THROUGH 0202)				
				_____.____	_____.____

TOTAL SUMMIT AVE ROAD RAISE OPTION ITEMS (CLINS 0149 THROUGH 0203)	**_____.____**	**_____.____**

ELM STREET LEVEE

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0204		1.00	Lump Sum		
	ELM STREET LEVEE - DEMOLITION FFP				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0205		1.00	Lump Sum		
	CLEARING AND GRUBBING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0206		1,030.00	Cubic Yard		
	STRIPPING				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0207		1,900.00	Cubic Yard		
	COMMON EXCAVATION				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES
0208	
	TOPSOIL

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0208AA		375.00	Cubic Yard		
	SALVAGED				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0208AB	BORROW	1,126.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0209	SODDING	3,700.00	Square Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0210	SEEDING MIXTURE CLASS 1	1.56	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0211	SEEDING MIXTURE CLASS 2	.50	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0212	SEEDING MIXTURE CLASS 3	.04	Acre	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0213	SELECT IMPERVIOUS FILL	1,533.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0214	IMPERVIOUS FILL	5,348.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0215	RANDOM FILL	50.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0216	INSPECTION TRENCH	500.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0217	AGGREGATE BASE CLASS 5	111.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0218	GRANULAR BEDDING	154.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0219	CRUSHED ROCK BEDDING	10.00	Cubic Yard	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0220	RCP 15" CL 5	8.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0221	RCP 24" CL 3	236.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0222	24" DIP RIVER CROSSING PIPE	120.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0223	STORM SEWER STRUCTURE	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0224	HEADWALLS W/FLAP VALVES FFP	1.00	Lump Sum	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0225	4" C900 PVC SANITARY SEWER PIPE	48.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0226	4" SANITARY SEWER GATE VALVE W/BOX	1.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0227	CONNECT TO EXISTING SANITARY SEWER	2.00	Each	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0228	4" C900 PVC WATER MAIN	43.00	Linear Foot	_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0229		40.00	Actual Pounds		
	DIP FITTINGS FOR WATER MAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0230		1.00	Each		
	4" GATE VALVE WITH BOX				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0231		2.00	Each		
	CONNECT TO EXISTING WATER MAIN				
				_____.____	_____.____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0232		1.00	Lump Sum		
	ALL BONDS (BID, PERFORMANCE AND PAYMENT) FOR ELM STREET LEVEE OPTION (CLINS 0204 THROUGH 0231)				
				_____.____	_____.____

TOTAL ELM STREET LEVEE OPTION ITEMS (CLINS 0205 THROUGH 0232) _____.____ _____.____

<u>SUMMARY</u>

TOTAL BASIC ITEMS (CLINS 0001 THROUGH 0013)	_____.____	_____.____
THORNDALE OPTION (CLINS 0014 THROUGH 0022)	_____.____	_____.____
WOOD'S ADDITION OPTION (CLINS 0023 THROUGH 0098)	_____.____	_____.____
ASH STREET RD RAISE OPTION (CLINS 0099 THRU 0148)	_____.____	_____.____
SUMMIT AVE RD RAISE OPTION (CLINS 0149 THRU 0203)	_____.____	_____.____
ELM STREET LEVEE OPTION (CLINS 0204 THRU 0232)	_____.____	_____.____
TOTAL BASIC & OPTION ITEMS (CLINS 0001 THRU 0232)	_____.____	_____.____

BID SCHEDULE NOTES

1. EFFECTIVE MAY 31, 1998, ALL CONTRACTORS MUST REGISTER WITH THE DEFENSE CENTRAL CONTRACTOR REGISTRATION (CCR) IN ORDER TO RECEIVE ANY CONTRACT AWARD. (other than those made via the Government credit card program). Contractors may register on line at http://www.ccr.gov . See Clause 252.204-7004 in Section 00100.

2. FACSIMILE OF BIDS/PROPOSALS AND FACSIMILE OF MODIFICATIONS THERETO, WILL NOT BE ACCEPTED.

3. All Quantities are estimated except where unit is given as "EA" (EACH) or "LS" (LUMP SUM).

4. NOTICE TO LARGE BUSINESS: The U.S. Army Corps of Engineers, St. Paul District, is committed to participation of Small Business, Small Disadvantaged Business and Women-Owned Small Business in the performance of work under this solicitation and resultant contract.

Your attention is directed to the solicitation clauses 52.219-0008 entitled "Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns", 52.219-0009 I entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan," and 52.219-7003 entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts)".

If you are a large business and the apparent low bidder with a bid exceeding $1,000,000, submission of a Subcontracting Plan in accordance with above clauses will be required. The Contracting Officer will review the plan using the following goals to assure that it represents your best efforts to maximize subcontracting opportunities. Award will not be made until the Contracting Officer approves the Subcontracting Plan.

The following subcontracting goals are informational only and not legally binding but are considered reasonable and achievable during the resultant contract from this solicitation. The goals expressed in percent of total planned subcontracting dollars are:

Small	61.4%
Small Disadvantaged Business	9.1%
Women-Owned Small Business	5.0%
HUBZone Small Business	Maximum (%)Practicable
Veteran-owned Small Business	3.0%
Subcontract Reporting (SF 294 & SF 295)	100.0%

5. The apparent low bidder will be requested to provide the following information as soon as possible after bid opening:

a. A Financial Statement, to include a balance sheet and income statement, and

b. A Bank Certification of Financial Capability (line of credit).

This information will be treated as confidential. The financial statements should be not over 60 days old. If over 60 days old, a certification should be attached stating that the financial condition of the firm is substantially the same or, if not the same, the changes that have taken place.

6. All extensions of the unit prices shown will be subject to verification by the Government. In case of a discrepancy between the unit price and the extension, the unit price will govern.

7. The original bid/proposal and any modifications must be complete as to all the items on the schedule. Award will be made to that bidder whose bid is most advantageous to the Government, based on price and the price related factors included in the solicitation.

8. Unbalanced Bids. The government may reject as nonresponsive any bid that is materially unbalanced between contract line item numbers or sub-items on the bidding schedule. A bid is materially unbalanced when it is based on prices that are significantly less than cost for some work and prices that are overstated, in relation to cost, for other work. A materially unbalanced bid may be rejected if the Contracting Officer has a reasonable doubt as to whether the bid will result in the lowest overall cost to the government even though it may be the low evaluated bid. Additionally, a bid that is so unbalanced so as to be tantamount to an advance payment will be rejected as nonresponsive even if acceptance of the bid would result in the lowest overall cost to the government.

9. Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing in accordance with Section 00100, Contract Clause "Explanation To Prospective Bidders", not later than 10 days prior to bid opening. Questions can be faxed to the contract specialist at (651) 290-5706. Questions received after the deadline may not be answered prior to bid submittal.

10. Funding for this contract is contingent upon the conditions stated in Section 00800, Clause No. 52.232-5001, Continuing Contracts.

11. The addresses, phone numbers, and Internet address (if available) for references cited in these specifications are listed in the Corps of Engineer Guide Specification (CEGS) 01090 SOURCES FOR REFERENCE PUBLICATIONS. CEGS 01090 is available on the TECHNIFO page of the Corps of Engineers Huntsville District Internet site at: http://w2.hnd.usace.army.mil/.

12. Any forthcoming amendments will only be available on this web site. E-mail notifications will be sent upon issuance of any amendments to all registered firms. E-mail message notifications may not be reliable based on system constraints. It is therefore recommended that each registered firm check this web site periodically for updates. A paper hard copy of each amendment will not be mailed unless specifically requested in writing.

13. Bid Bonds

a. It is the responsibility of the bidder to include an acceptable bid guarantee with its bid. This bid note does not provide bidders with an all-inclusive checklist for submitting an acceptable bid bond – rather, it provides some “lessons learned” information as to the unacceptability of photocopied bid bonds.

b. This solicitation requires bidders to submit a bid guarantee along with their bids (see clause 52.228-1). One acceptable form of bid guarantee is a bid bond. For a bid to be responsive, the bid bond accompanying the bid must unequivocally bind the bonding company – if it does not, the bid <u>must</u> be rejected as nonresponsive. Please note that a nonresponsive bid may not be corrected after bid opening to make it responsive – it <u>must</u> be rejected. The Contracting Officer has the authority and responsibility to determine whether the bid bond and its accompanying documentation clearly show that the person(s) executing the bid bond on behalf of the surety have the authority to unequivocally bind the bonding company. In order for a bid bond to be acceptable, it must be accompanied by a valid power-of-attorney issued by the surety (the bonding company, not the insurance agency writing the bond).

c. Photocopied or faxed powers-of-attorney are not acceptable. In order for a power-of-attorney accompanying a bid bond to be acceptable, it must be: (i) an original power-of-attorney (containing original signatures and corporate seals), (ii) a copy of a power-of-attorney accompanied by an original certification (original means original signature and original corporate seal) by the secretary (or other authorized officer) of the surety stating that the copied power-of-attorney is still in full force and effect as of the date of the certification and has not been revoked, or (iii) a power-of-attorney with facsimile (stamped, printed or mechanically signed) signatures and facsimile corporate seals that: (A) contains language stating that the surety will be bound by facsimile seals and signatures and (B) <u>also</u> contains an ORIGINAL corporate seal at the certification block. (An original seal is (I) a raised, crimped seal, or (II) a paper or foil corporate seal that is manually attached to the power-of-attorney.)

14. For purposes of the clause entitled “52.219-4 -- Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999)”, the term “otherwise successful offer” means the lowest responsive bid from a responsible bidder prior to the application of any evaluation preference required by this clause.

The solicitation clause FAR 52.219-4 expressed that Small Disadvantaged Business (SDB) firms would receive both the HUBZone and SDB evaluation preference adjustments (See FAR clause 52.219-23). Guidance from the Office of the Under Secretary of Defense provides that DOD contracting activities, including the Department of the Army, shall suspend the use of price evaluation adjustments for SDB businesses in DOD Acquisitions, as prescribed in FAR subpart 19.11.

Therefore the clause 52.219-23 is not contained in this solicitation and no SDB evaluation preference adjustment will be utilized

SECTION 00100 Bidding Schedule/Instructions to Bidders

52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUN 99)

(a) Contractor identification is essential for complying with statutory contract reporting requirements. Therefore, the offeror is requested to enter, in the block with its name and address on the Standard Form 33 or similar document, the annotation "DUNS" followed by the DUNS number which identifies the offeror's name and address exactly as stated in the offer.

(b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:

(1) Company name.

(2) Company address.

(3) Company telephone number.

(4) Line of business.

(5) Chief executive officer/key manager.

(6) Date the company was started.

(7) Number of people employed by the company.

(8) Company affiliation.

(c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet Home Page at http://www.customerservice@dnb.com/. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@dnb.com.

(End of provision)

52.209-4001 BIDDER'S QUALIFICATIONS (APR 1984) FAR 9.105-1

Before a bid is considered for award, the bidder may be requested by the Government to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the work.

52.214-1 SOLICITATION DEFINITIONS--SEALED BIDDING (JUL 1987)

"Government" means United States Government.

"Offer" means "bid" in sealed bidding.

"Solicitation" means an invitation for bids in sealed bidding.

(End of provision)

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

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

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

(End of provision)

52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

52.214-5 SUBMISSION OF BIDS (MAR 1997)

(a) Bids and bid modifications shall be submitted in sealed envelopes or packages (unless submitted by electronic means) (1) addressed to the office specified in the solicitation, and (2) showing the time and date specified for receipt, the solicitation number, and the name and address of the bidder.

(b) Bidders using commercial carrier services shall ensure that the bid is addressed and marked on the outermost envelope or wrapper as prescribed in subparagraphs (a)(1) and (2) of this provision when delivered to the office specified in the solicitation.

(c) Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice.

(d) Facsimile bids, modifications, or withdrawals, will not be considered unless authorized by the solicitation.

(e) Bids submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

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

(End of provision)

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

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

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

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

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

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

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

(d) If an emergency or unanticipated event interrupts normal Government processes so that bids cannot be received at the Government office designated for receipt of bids by the exact time specified in the IFB and urgent Government requirements preclude amendment of the IFB, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

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

(End of provision)

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

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

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

(1) Lump sum bidding;

(2) Alternate prices;

(3) Units of construction; or

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

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

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

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.

52.214-4001 INQUIRIES - BID INFORMATION

(a) Inquiries:

Any questions regarding this solicitation should be directed to Suellen Buelow, Contract Specialist, at telephone number (651) 290-5418 (collect calls not accepted). It is requested that all technical questions on the plans and specifications be submitted to the Contract Specialist by facsimile transmission to (651) 290-5706.

The Planholder's List and bid results can be found on the St. Paul District web site at http://www.mvp.usace.army.mil (click on "Contracting/Bidders Info", then "Electronic Bid Solicitations").

(b) Bid Depository/Bid Opening Information:

Bids must be deposited prior to the date and time set for opening of bids. The bid depository is located in the Contracting Division, 6th Floor, of the St. Paul District, Corps of Engineers Centre, 190 Fifth Street East, St. Paul, Minnesota 55101-1638. A public bid opening will be held at the same location.

52.214-4002 ALL OR NONE QUALIFICATIONS (APR 1984) FAR 14.404-5

A bidder/offeror must quote on all items in this solicitation to be eligible for award. The Government will award on a "All or None" basis. Evaluation of bids/offers will be based, among other factors, upon the total price quoted for all items.

52.216-1 TYPE OF CONTRACT (APR 1984)

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

(End of clause)

52.225-11 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (DEC 2001)

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

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 end product (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 end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Denmark, Djibouti, Equatorial Guinea, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Iceland, Ireland, Israel, Italy, Japan.

Kiribati, Korea, Republic of, Lesotho, Liechtenstein, Luxembourg, Malawi, Maldives, Mali, Mozambique, Nepal, Netherlands, Niger, Norway, Portugal, Rwanda.

Sao Tome and Principe, Sierra Leone, Singapore, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a designated 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 designated country into a new and different construction material distinct from the materials from which it was transformed.

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.

North American Free Trade Agreement country means Canada or Mexico.

North American Free Trade Agreement country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) 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 NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

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

(2) The Contractor shall use only domestic, designated country, or NAFTA 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. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program 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 or Balance of Payments Program. (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 or Balance of Payments Program 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 or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.

(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)

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000)

(a) Definitions. Construction material, designated country construction material, domestic construction material, foreign construction material, and NAFTA country construction material, as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act--Balance of Payments Program--Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested--

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000)

(a) Definitions. Construction material, designated country construction material, domestic construction material, foreign construction material, and NAFTA country construction material, as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act--Balance of Payments Program--Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested--

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

52.232-38 SUBMISSION OF ELECTRONIC FUNDS TRANSFER INFORMATION WITH OFFER (MAY 1999)

The offeror shall provide, with its offer, the following information that is required to make payment by electronic funds transfer (EFT) under any contract that results from this solicitation. This submission satisfies the requirement to provide EFT information under paragraphs (b)(1) and (j) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration.

(1) The solicitation number (or other procurement identification number).

(2) The offeror's name and remittance address, as stated in the offer.

(3) The signature (manual or electronic, as appropriate), title, and telephone number of the offeror's official authorized to provide this information.

(4) The name, address, and 9-digit Routing Transit Number of the offeror's financial agent.

(5) The offeror's account number and the type of account (checking, savings, or lockbox).

(6) If applicable, the Fedwire Transfer System telegraphic abbreviation of the offeror's financial agent.

(7) If applicable, the offeror shall also provide the name, address, telegraphic abbreviation, and 9-digit Routing Transit Number of the correspondent financial institution receiving the wire transfer payment if the offeror's financial agent is not directly on-line to the Fedwire and, therefore, not the receiver of the wire transfer payment.

(End of provision)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(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 General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from:

USACE , St. Paul District
Attn: Contracting Officer
190 E. 5th Street
St. Paul, MN 55101-1638

(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:	Mike McDonald Building Inspector City of Crookston
Address:	124 North Broadway Crookston, MN 56713
Telephone:	218.281.5713

52.236-4002 WORK PERFORMED BY THE CONTRACTOR

The successful bidder must furnish the Contracting Officer within 10 days after the award, the items of work which he will perform with his own forces, the percentage of the total work this represents, and the estimated cost thereof. (See Section 00700, clause entitled "Performance of Work by the Contractor").

52.236-4005 UNAVAILABILITY OF UTILITY SERVICES

The responsibility shall be upon the Contractor to provide and maintain at its expense, adequate utilities for its use for construction and domestic consumption, and to install and maintain necessary connections and lines for same, but only at such locations and in such manner as may be approved by the Contracting Officer. Before final acceptance, temporary connections and lines installed by the Contractor shall be removed in a manner satisfactory to the Contracting Officer.

SECTION 00600 Representations & Certifications

CLAUSES INCORPORATED BY FULL TEXT

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that --

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to –

(i) Those prices,

(ii) The intention to submit an offer, or

(iii) The methods of factors used to calculate the prices offered:

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory --

(1) Is the person in the offeror's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provison _____ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision.

(c) If the offeror deletes or modifies subparagraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991)

(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 any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;

(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)

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (APR 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 subdivision (a)(1)(i)(D) 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.

(D) 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

(E) 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 subdivision (a)(1)(i)(B) of this provision.

(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 2001) ALTERNATE I (OCT 2000) & ALTERNATE II (OCT 2000)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 234990.

(2) The small business size standard is $28,500,000..

(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 offeror represented itself as 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).

(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 veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

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

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

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

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

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

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

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

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

(d) Notice.

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

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

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

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

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

(End of provision)

52.219-2 EQUAL LOW BIDS. (OCT 1995)

(a) This provision applies to small business concerns only.

(b) The bidder's status as a labor surplus area (LSA) concern may affect entitlement to award in case of tie bids. If the bidder wishes to be considered for this priority, the bidder must identify, in the following space, the LSA in which the costs to be incurred on account of manufacturing or production (by the bidder or the first-tier subcontractors) amount to more than 50 percent of the contract price.

_____

_____

(c) Failure to identify the labor surplus area as specified in paragraph (b) of this provision will preclude the bidder from receiving priority consideration. If the bidder is awarded a contract as a result of receiving priority

consideration under this provision and would not have otherwise received award, the bidder shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

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 (OCT 2000)

(a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.

(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 under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

[ ] (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 Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

[ ] (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

52.225-11 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (DEC 2001)

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

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 end product (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 end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Denmark, Djibouti, Equatorial Guinea, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Iceland, Ireland, Israel, Italy, Japan.

Kiribati, Korea, Republic of, Lesotho, Liechtenstein, Luxembourg, Malawi, Maldives, Mali, Mozambique, Nepal, Netherlands, Niger, Norway, Portugal, Rwanda.

Sao Tome and Principe, Sierra Leone, Singapore, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a designated 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 designated country into a new and different construction material distinct from the materials from which it was transformed.

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.

North American Free Trade Agreement country means Canada or Mexico.

North American Free Trade Agreement country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) 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 NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

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

(2) The Contractor shall use only domestic, designated country, or NAFTA 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. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program 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 or Balance of Payments Program. (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 or Balance of Payments Program 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 or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.

(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)

252.209-7001 DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) "Definitions."

As used in this provision --

(a) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for such acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means --

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtness of a firm.

(b) "Prohibition on award."

In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary or, in the case of a subsidiary, the firm that owns the subsidiary, unless a waiver is granted by the Secretary of Defense.

(c) "Disclosure."

If the government of a terrorist country has a significant interest in the Offeror or a subsidiary of the Offeror, the

Offeror shall disclosure such interest in an attachment to its offer. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include --

(1) Identification of each government holding a significant interest; and

(2) A description of the significant interest held by each government.

(End of provision)

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 FULL TEXT

52.202-1 DEFINITIONS (MAY 2001) --ALTERNATE I (MAY 2001)

(a) Agency head or head of the agency means the Secretary (Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, unless otherwise indicated, including any deputy or assistant chief official of the executive agency.

(b) "Commercial component" means any component that is a commercial item.

(c) Except as otherwise provided in this contract, the term "subcontracts" includes, but is not limited to, purchase orders and changes and modifications to purchase orders under this contract.

(d) Component means any item supplied to the Government as part of an end item or of another component, except that for use in 52.225-9, and 52.225-11 see the definitions in 52.225-9(a) and 52.225-11(a).

(e) Contracting Officer means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(f) Nondevelopmental item means--

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement;

(2) Any item described in paragraph (f)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or

(3) Any item of supply being produced that does not meet the requirements of paragraph (f)(1) or (f)(2) solely because the item is not yet in use.

(End of clause)

52.202-4001 DEFINITIONS (MAY 1995) EFARS Part 2.101

"Chief of Contracting Office" means the Chief of the Contracting Division at a District, or the Director of Contracting at a Division, Center, Laboratory, or other support activity.

"Command" means each USACE Division, each USACE District, The U.S. Army Engineering and Support Center (HNC), Transatlantic Programs Center (TAC), Transatlantic Programs Center (Europe) (TAE), Topographic Engineer Center (TEC), Cold Regions Research and Engineering Laboratory (CRREL), Construction Engineering Research Laboratory (CERL), Humphreys Engineering Center Support Activity (HECSA), and Waterways experiment Station (WES).

"Commander" means the commanding officer of each USACE district and each USACE division, and the director or commander of HNC, TAC, TAE, ETL, CRREL, CERL, HECSA and WES.

"Head of Contracting Activity (HCA)" for USACE means the Chief of Engineers.

Centers. For determining contracting authority levels for this regulation, Centers (HNC, and TAC) will equate to a Division. As a subordinate unit to TAC, TAE's contracting authority will therefore equate to that of a district.

Level higher than the contracting officer. When a District or TAE chief of contracting is the contracting officer, a "level higher than the contracting officer" means the Division or Center Director of Contracting. When an operating Division, Center or Laboratory Director/Chief of Contracting is the contracting officer a "level higher than the contracting officer" means the PARC.

Local Cooperation Agreements (LCAs). See Project Cooperation Agreements.

Project Cooperation Agreements. Formerly referred to as Local Cooperation Agreements, these are agreements under 31 U.S.C. 6305 and 42 U.S.C. 1962d-5b. They are not contracts as defined by the FAR.

"USACE and HQUSACE" means the United States Army Corps of Engineers and its headquarters, respectively.

52.203-3 GRATUITIES (APR 1984)

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

(2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.

(b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.

(c) If this contract is terminated under paragraph (a) of this clause, the Government is entitled--

(1) To pursue the same remedies as in a breach of the contract; and

(2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)

(d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

(End of clause)

52.203-7 ANTI-KICKBACK PROCEDURES. (JUL 1995)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract.

"Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor," as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from -

(1) Providing or attempting to provide or offering to provide any kickback;

(2) Soliciting, accepting, or attempting to accept any kickback; or

(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c)(1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may (i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or (ii) direct that the Prime Contractor withhold, from sums owed a subcontractor under the prime contract, the amount of any kickback. The Contracting Officer may order the monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including this subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed $100,000.

52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the 1996 National Defense Authorization Act for Fiscal Year 1996

(Pub. L. 104-106), the Government may--

(1) Cancel the solicitation, if the contract has not yet been awarded or issued; or

(2) Rescind the contract with respect to which--

(i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27 (a) or (b) of the Act for the purpose of either--

(A) Exchanging the information covered by such subsections for anything of value; or

(B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

(ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense punishable under subsections 27(e)(1) of the Act.

(b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

(c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract by the amount of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27 (a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit

specified in the contract at the time of contract award; or

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal action," as used in this clause, means any of the following Federal actions:

(1) The awarding of any Federal contract.

(2) The making of any Federal grant.

(3) The making of any Federal loan.

(4) The entering into of any cooperative agreement.

(5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before 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 in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a

special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(2) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(3) A special Government employee, as defined in section 202, title 18, United States Code.

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

(1) Section 1352 of title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan, or cooperative agreement from using appropriated funds to pay 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 in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure 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 in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of theperson's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or

pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(c) Disclosure.

(1) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(2) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(i) A cumulative increase of $25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

(iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(3) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding $100,000 under the Federal contract.

(4) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(d) Agreement. The Contractor agrees not to make any payment prohibited by this clause.

(e) Penalties.

(1) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(2) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(f) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

(End of clause)

52.204-4 PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER (AUG 2000)

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

Postconsumer material means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. Postconsumer material is a part of the broader category of “recovered material.” For paper and paper products, postconsumer material means “postconsumer fiber” defined by the U.S. Environmental Protection Agency (EPA) as--

(1) Paper, paperboard, and fibrous materials from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including: used corrugated boxes; old newspapers; old magazines; mixed waste paper; tabulating cards; and used cordage; or

(2) All paper, paperboard, and fibrous materials that enter and are collected from municipal solid waste; but not

(3) Fiber derived from printers' over-runs, converters' scrap, and over-issue publications.

Printed or copied double-sided means printing or reproducing a document so that information is on both sides of a sheet of paper.

Recovered material, for paper and paper products, is defined by EPA in its Comprehensive Procurement Guideline as “recovered fiber” and means the following materials:

(1) Postconsumer fiber; and

(2) Manufacturing wastes such as--

(i) Dry paper and paperboard waste generated after completion of the papermaking process (that is, those manufacturing operations up to and including the cutting and trimming of the paper machine reel into smaller rolls or rough sheets) including: envelope cuttings, bindery trimmings, and other paper and paperboard waste resulting

from printing, cutting, forming, and other converting operations; bag, box, and carton manufacturing wastes; and butt rolls, mill wrappers, and rejected unused stock; and

(ii) Repulped finished paper and paperboard from obsolete inventories of paper and paperboard manufacturers, merchants, wholesalers, dealers, printers, converters, or others.

(b) In accordance with Section 101 of Executive Order 13101 of September 14, 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition, the Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed or copied double-sided on recycled paper that meet minimum content standards specified in Section 505 of Executive Order 13101, when not using electronic commerce methods to submit information or data to the Government.

(c) If the Contractor cannot purchase high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock meeting the 30 percent postconsumer material standard for use in submitting paper documents to the Government, it should use paper containing no less than 20 percent postconsumer material. This lesser standard should be used only when paper meeting the 30 percent postconsumer material standard is not obtainable at a reasonable price or does not meet reasonable performance standards.

(End of clause)

52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

(a) The Government suspends or debars Contractors to protect the Government's interests. The Contractor shall not enter into any subcontract in excess of the $25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed $25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principles, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs). The notice must include the following:

(1) The name of the subcontractor.

(2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(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 $590.00 for each calendar day of delay until the work is completed or accepted.

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

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

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

52.214-26 AUDIT AND RECORDS--SEALED BIDDING. (OCT 1997)

(a) As used in this clause, records includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.

(b) Cost or pricing data. If the Contractor has been required to submit cost or pricing data in connection with the pricing of any modification to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to--

(1) The proposal for the modification;

(2) The discussions conducted on the proposal(s), including those related to negotiating;

(3) Pricing of the modification; or

(4) Performance of the modification.

(c) Comptroller General. In the case of pricing any modification, the Comptroller General of the United States, or an authorized representative, shall have the same rights as specified in paragraph (b) of this clause.

(d) Availability. The Contractor shall make available at its office at all reasonable times the materials described in reproduction, until 3 years after final payment under this contract, or for any other period specified in Subpart 4.7 of the Federal Acquisition Regulation (FAR). FAR Subpart 4.7, Contractor Records Retention, in effect on the data of this contract, is incorporated by reference in its entirety and made a part of this contract.

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement.

(2) Records pertaining to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to the performance of this contract shall be made available until disposition of such appeals, litigation, or claims.

(e) The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (e), in all subcontracts expected to exceed the threshold in FAR 15.403-4(a)(1) for submission of cost or pricing data.

52.214-27 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA - MODIFICATIONS - SEALED BIDDING. (OCT 1997)

(a) This clause shall become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for the submission of cost or pricing data at FAR 15.403-4(a)(1), except that this clause does not apply to a modification if an exception under FAR 15.403-1(b) applies.

(1) Based on adequate price competition;

(2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(3) Set by law or regulation.

(b) If any price, including profit, negotiated in connection with any modification under this clause, was increased by any significant amount because

(1) the Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data;

(2) a subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data; or

(3) any of these parties furnished data of any description that were not accurate, the price shall be reduced accordingly and the contract shall be modified to reflect the reduction. This right to a price reduction is limited to that resulting from defects in data relating to modifications for which this clause becomes operative under paragraph (a) above.

(c) Any reduction in the contract price under paragraph (b) above due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which:

(1) the actual subcontract; or

(2) the actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(d) If the Contracting Officer determines under paragraph (b) of this clause that a price or cost reduction should be made:

(1) the Contractor agrees not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted;

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer;

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract; or

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2) Except as prohibited by subdivision (d)(2)(ii) of this clause:

(i) an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if:

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the date of agreement on the price of the contract (or price of the modification) and that the data were not submitted before such date.

(ii) An offset shall not be allowed if:

(A) The understated data was known by the Contractor to be understated when the Certificate of Current Cost or Pricing Data was signed; or (B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the date of agreement on price.

(e) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid:

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data which were incomplete, inaccurate, or noncurrent.

52.214-28 SUBCONTRACTOR COST OR PRICING DATA - MODIFICATIONS - SEALED BIDDING. (OCT 1997)

(a) The requirements of paragraphs (b) and (c) of this clause shall:

(1) become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for submission of cost or pricing data at (FAR) 48 CFR 15.403-4(a)(1); and

(2) be limited to such modifications.

(b) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4(a)(1), on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modifications involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4(a)(1), the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1(b) applies.

(1) Based on adequate price competition;

(2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(3) Set by law or regulation.

(c) The Contractor shall require the subcontractor to certify in substantially the form prescribed in subsection 15.406-2 of the Federal Acquisition Regulation that, to the best of its knowledge and belief, the data submitted under paragraph (b) above were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(d) The Contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that, when entered into, exceeds the threshold for submission of cost or pricing data at FAR 15.403-4(a)(1).

52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)

(a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems,

assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

Definitions. As used in this contract--

HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

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 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 small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

Small disadvantaged business concern means a small business concern that represents, as part of its offer that--

(1) It has received certification as a small disadvantaged business concern consistent with 13 CFR part 124, subpart B;

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

(3) Where the concern is owned by one or more 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

(4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

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; and

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

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a veteran-owned small business concern, a service-disabled veteran-owned small business concern, a HUBZone small business concern, a small disadvantaged business concern, or a women-owned small business concern.

(End of clause)

52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (OCT 2000) ALTERNATE I (OCT 2000)

(a) This clause does not apply to small business concerns.

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

Commercial item means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

Commercial plan means a subcontracting plan (including goals) that covers the offeror's fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (e.g., division, plant, or product line).

Individual contract plan means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror's planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

Master plan means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

Subcontract means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The apparent low bidder, upon request by the Contracting Officer, shall submit a subcontracting plan, where applicable, that separately addresses subcontracting with small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns. If the bidder is submitting an individual contract plan, the plan must separately address subcontracting with small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be submitted within the time specified by the Contracting Officer. Failure to submit the subcontracting plan shall make the bidder ineligible for the award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. Service-disabled veteran-owned small business concerns meet the definition of veteran-owned small business concerns, and offerors may include them within the subcontracting plan goal for veteran-owned small business concerns. A separate goal for service-disabled veteran-owned small business concerns is not required. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to veteran-owned small business concerns;

(iv) Total dollars planned to be subcontracted to HUBZone small business concerns;

(v) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(vi) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to--

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) HUBZone small business concerns;

(iv) Small disadvantaged business concerns; and

(v) Women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business source list. Use of PRO-Net as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, or publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror in included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with—

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) HUBZone small business concerns;

(iv) Small disadvantaged business concerns; and

(v) Women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business, veteran-owned small business, HUBZone small business, small disadvantaged business and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause of this contract entitled ``Utilization of Small Business Concerns'' in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of $500,000 ($1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

(10) Assurances that the offeror will--

(i) Cooperate in any studies or surveys as may be required;

(ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;

(iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with paragraph (j) of this clause. The reports shall provide information on subcontract awards to small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, small disadvantaged business concerns, women-owned small business concerns, and Historically Black Colleges and Universities and Minority Institutions. Reporting shall be in accordance with the instructions on the forms or as provided in agency regulations.

(iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.

(11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated)

(i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small business, veteran-owned small business, HUBZone small business, small disadvantaged business, or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than $100,000, indicating--

(A) Whether small business concerns were solicited and, if not, why not;

(B) Whether veteran-owned small business concerns were solicited and, if not, why not;

(C) Whether HUBZone small business concerns were solicited and, if not, why not;

(D) Whether small disadvantaged business concerns were solicited and, if not, why not;

(E) Whether women-owned small business concerns were solicited and, if not, why not; and

(F) If applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact--

(A) Trade associations;

(B) Business development organizations;

(C) Conferences and trade fairs to locate small, HUBZone small, small disadvantaged, and women-owned small business sources; and

(D) Veterans service organizations.

(v) Records of internal guidance and encouragement provided to buyers through--

(A) Workshops, seminars, training, etc.; and

(B) Monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all ``make-or-buy'' decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, veteran-owner small business, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided--
(1) the master plan has been approved, (2) the offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer, and (3)

goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

(j) The Contractor shall submit the following reports:

(1) Standard Form 294, Subcontracting Report for Individual Contracts. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.

(2) Standard Form 295, Summary Subcontract Report. This report encompasses all of the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by North American Industry Classification System (NAICS) Industry Subsector. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant NAICS Industry Subsector and report all awards to that subcontractor under its predominant NAICS Industry Subsector.

(End of clause)

52.219-16 LIQUIDATED DAMAGES-SUBCONTRACTING PLAN (JAN 1999)

(a) Failure to make a good faith effort to comply with the subcontracting plan, as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion or, in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled “Small Business Subcontracting Plan,” the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of the Contracting Officer under this clause on behalf of all agencies with contracts covered by the commercial plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may have.

(End of clause)

52.222-3 CONVICT LABOR (AUG 1996)

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

(a)(1) The worker is paid or is in an approved work training program on a voluntary basis;

(2) Representatives of local union central bodies or similar labor union organizations have been consulted;

(3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and

(4) The rates of pay and other conditions of employment will not be less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and

(b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

(End of clause)

52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION. (SEP 2000)

(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 exceeding $100,000 and require subcontractors to include these provisions in any 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)

52.222-6 DAVIS-BACON ACT (FEB 1995)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is

attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b)(1) The Contracting Officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination.

(ii) The classification is utilized in the area by the construction industry.

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide

fringe benefits under a plan or program; provided, That the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

52.222-7 WITHHOLDING OF FUNDS (FEB 1988)

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

52.222-8 PAYROLLS AND BASIC RECORDS (FEB 1988)

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(b)(1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

52.222-9 APPRENTICES AND TRAINEES (FEB 1988)

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable

apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

52.222-11 SUBCONTRACTS (LABOR STANDARDS (FEB 1988)

(a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act-Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination-Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

(b)(1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.

(2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the Contracting Officer an updated completed SF 1413 for such additional subcontract.

52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

52.222-21 PROHIBITION OF SEGREGATED FACILITIES (FEB 1999)

(a) Segregated facilities, as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(b) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

(End of clause)

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: Crookston, MN

Goals for minority participation for each trade	Goals for female participation for each trade
1.2%	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:
Polk County; Crookston, Minnesota

52.222-26 EQUAL OPPORTUNITY (FEB 1999)

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of $10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) of this clause. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performing this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. However, it shall not be a violation of this clause for the Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation, in connection with employment opportunities on or near an Indian reservation, as permitted by 41 CFR 60-1.5.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. The Contractor shall also file Standard Form 100 (EEO-1), or any successor form, as prescribed in 41 CFR part 60-1. Unless the Contractor has filed within the 12 months preceding the date of contract award, the Contractor shall, within 30 days after contract award, apply to either the regional Office of Federal Contract Compliance Programs (OFCCP) or the local office of the Equal Employment Opportunity Commission for the necessary forms.

(8) The Contractor shall permit access to its premises, during normal business hours, by the contracting agency or the OFCCP for the purpose of conducting on-site compliance evaluations and complaint investigations. The Contractor shall permit the Government to inspect and copy any books, accounts, records (including computerized records), and other material that may be relevant to the matter under investigation and pertinent to compliance with Executive Order 11246, as amended, and rules and regulations that implement the Executive Order.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended; in the rules, regulations, and orders of the Secretary of Labor; or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraphs (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting officer may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999)

(a) Definitions. "Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Deputy Assistant Secretary," as used in this clause, means Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, or a designee.

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of $10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the

Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Deputy Assistant Secretary when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) of this clause.

(6) Disseminate the Contractor's equal employment policy by--

(i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;

(ii) Including the policy in any policy manual and in collective bargaining agreements;

(iii) Publicizing the policy in the company newspaper, annual report, etc.;

(iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and

(v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.

(7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all on-site supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.

(11) Validate all tests and other selection requirements where required under 41 CFR 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(13) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user rest rooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

(15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.

(h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16) of this clause. The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16) of this clause, provided the Contractor--

(1) Actively participates in the group;

(2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;

(3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;

(4) Makes a good-faith effort to meet its individual goals and timetables; and

(5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

(i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) of this clause, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Deputy Assistant Secretary shall take action as prescribed in 41 CFR 60-4.8.

(n) The Contractor shall designate a responsible official to--

(1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;

(2) Submit reports as may be required by the Government; and

(3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

52.222-35 AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (APR 1998)

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

All employment openings includes all positions except executive and top management, those positions that will be filled from within the contractor's organization, and positions lasting 3 days or less. This term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment.

Appropriate office of the State employment service system means the local office of the Federal-State national system of public employment offices with assigned responsibility to serve the area where the employment opening is to be filled, including the District of Columbia, Guam, the Commonwealth of Puerto Rico, and the Virgin Islands.

Positions that will be filled from within the Contractor's organization means employment openings for which no consideration will be given to persons outside the Contractor's organization (including any affiliates, subsidiaries, and parent companies) and includes any openings that the Contractor proposes to fill from regularly established “recall” lists. The exception does not apply to a particular opening once an employer decides to consider applicants outside of its organization.

Veteran of the Vietnam era means a person who--

(1) Served on active duty for a period of more than 180 days, any part of which occurred between August 5, 1964, and May 7, 1975, and was discharged or released therefrom with other than a dishonorable discharge; or

(2) Was discharged or released from active duty for a service-connected disability if any part of such active duty was performed between August 5, 1964, and May 7, 1975.

(b) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against the individual because the individual is a disabled veteran or a veteran of the Vietnam era. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans' status in all employment practices such as--

(i) Employment;

(ii) Upgrading;

(iii) Demotion or transfer;

(iv) Recruitment;

(v) Advertising;

(vi) Layoff or termination;

(vii) Rates of pay or other forms of compensation; and

(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended.

(c) Listing openings. (1) The Contractor agrees to list all employment openings existing at contract award or occurring during contract performance, at an appropriate office of the State employment service system in the locality where the opening occurs. These openings include those occurring at any Contractor facility, including one not connected with performing this contract. An independent corporate affiliate is exempt from this requirement.

(2) State and local government agencies holding Federal contracts of $10,000 or more shall also list all their employment openings with the appropriate office of the State employment service.

(3) The listing of employment openings with the State employment service system is required at least concurrently with using any other recruitment source or effort and involves the obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(4) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State employment service system, in each State where it has establishments, of the name and location of each hiring

location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State system, it need not advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(d) Applicability. This clause does not apply to the listing of employment openings that occur and are filled outside the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the Virgin Islands.

(e) Postings. (1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era, and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, Department of Labor (Deputy Assistant Secretary), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Act, and is committed to take affirmative action to employ, and advance in employment, qualified disabled veterans and veterans of the Vietnam Era.

(f) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(g) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

(End of clause)

52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)

(a) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental disability. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified individuals with disabilities without discrimination based upon their physical or mental disability in all employment practices such as--

(i) Recruitment, advertising, and job application procedures;

(ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff, and rehiring;

(iii) Rates of pay or any other form of compensation and changes in compensation;

(iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

(v) Leaves of absence, sick leave, or any other leave;

(vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;

(vii) Selection and financial support for training, including apprenticeships, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

(viii) Activities sponsored by the Contractor, including social or recreational programs; and

(ix) Any other term, condition, or privilege of employment.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) Postings. (1) The Contractor agrees to post employment notices stating--

(i) The Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified individuals with disabilities; and

(ii) The rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. The Contractor shall ensure that applicants and employees with disabilities are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled individual, or may lower the posted notice so that it might be read by a person in a wheelchair). The notices shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance of the U.S. Department of Labor (Deputy Assistant Secretary) and shall be provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified individuals with physical or mental disabilities.

(c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(d) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of $10,000 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

(End of clause)

52.222-37 EMPLOYMENT REPORTS ON DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1999)

(a) Unless the Contractor is a State or local government agency, the Contractor shall report at least annually, as required by the Secretary of Labor, on--

(1) The number of disabled veterans and the number of veterans of the Vietnam era in the workforce of the contractor by job category and hiring location; and

(2) The total number of new employees hired during the period covered by the report, and of that total, the number of disabled veterans, and the number of veterans of the Vietnam era.

(b) The above items shall be reported by completing the form entitled "Federal Contractor Veterans' Employment Report VETS-100."

(c) Reports shall be submitted no later than September 30 of each year beginning September 30, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date: (1) As of the end of any pay period during the period January through March 1st of the year the report is due, or (2) as of December 31, if the contractor has previous written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The count of veterans reported according to paragraph (a) of this clause shall be based on voluntary disclosure. Each Contractor subject to the reporting requirements at 38 U.S.C. 4212 shall invite all disabled veterans and veterans of the Vietnam era who wish to benefit under the affirmative action program at 38 U.S.C. 4212 to identify themselves to the Contractor. The invitation shall state that the information is voluntarily provided; that the information will be kept confidential; that disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment; and that the information will be used only in accordance with the regulations promulgated under 38 U.S.C. 4212.

(f) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary.

(End of clause)

52.223-6 DRUG-FREE WORKPLACE (MAY 2001)

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

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to deter- mine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession, or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract where employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall-- within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The Contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.

(5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) though (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.506, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

(End of clause)

52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) 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);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under 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);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--

(1) The Contractor shall notify the Contracting Officer; and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items, as defined in FAR Part 2, the Contractor shall--

(1) For competitive subcontracts expected to exceed $100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding $100,000 (including all options), the substance of this clause, except this paragraph (e).

52.225-9 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM—CONSTRUCTION MATERIALS (FEB 2000)

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

Component means any article, material, or supply incorporated directly into construction materials.

Construction material means an article, material, or supply brought to the construction site by the Contractor or a 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 end product (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 end product.

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.

United States means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) Domestic preference. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) and the Balance of Payments Program by providing a preference for domestic construction material. The Contractor shall use only domestic construction material in performing this contract, except as provided in paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the construction material or components listed by the Government as follows: None

(3) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(2) 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 requirements of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program 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 or Balance of Payments Program. (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(3) 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 or Balance of Payments Program 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)(3)(i) of this clause.

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

(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...	.....	.....	.....

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)

52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JUL 2000)

(a) The Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States under regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries are Cuba, Iran, Iraq, Libya, North Korea, Sudan, the territory of Afghanistan controlled by the Taliban, and Serbia (excluding the territory of Kosovo).

(b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the government of Iraq.

(c) The Contractor shall insert this clause, including this paragraph (c), in all subcontracts.

(End of clause)

52.226-1 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES (JUN 2000)

(a) Definitions. As used in this clause:

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo or community that is

recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any ``Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C., chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership constitutea not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, that is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1542(c).

"Interested party" means a prime contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

(b) The Contractor shall use its best efforts to give Indian organizations and Indian-owned economic enterprises (25 U.S.C. 1544) the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with efficient performance of its contract.

(1) The Contracting Officer and the Contractor, acting in good faith, may rely on the representation of an Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status. In the event of a challenge to the representation of a subcontractor, the Contracting Officer will refer the matter to the U.S. Department of the Interior, Bureau of Indian Affairs (BIA), Attn: Chief, Division of Contracting and Grants Administration, 1849 C Street, NW., MS 2626-MIB, Washington, DC 20240-4000.

The BIA will determine the eligibility and notify the Contracting Officer. No incentive payment will be made within 50 working days of subcontract award or while a challenge is pending. If a subcontractor is determined to be an ineligible participant, no incentive payment will be made under the Indian Incentive Program.

(2) The Contractor may request an adjustment under the Indian Incentive Program to the following:

(i) The estimated cost of a cost-type contract.

(ii) The target cost of a cost-plus-incentive-fee prime contract.

(iii) The target cost and ceiling price of a fixed-price incentive prime contract.

(iv) The price of a firm-fixed-price prime contract.

(3) The amount of the adjustment to the prime contract is 5 percent of the estimated cost, target cost, or firm-fixed-price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.

(4) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.

(c) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, will authorize an incentive payment of 5 percent of the amount paid to the subcontractor. The Contracting Officer will seek funding in accordance with agency procedures.

(End of clause)

52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold (however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.)

52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the simplified acquisition threshold at (FAR) 2.101.to exceed the dollar amount set forth in 13.000 of the Federal Acquisition Regulation (FAR).

(End of clause)

52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.

52.228-1 BID GUARANTEE (SEP 1996)

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

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

(c) The amount of the bid guarantee shall be 20 percent of the bid price or $3 million, 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.

52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government.

(b) Any surety fails to furnish reports on its financial condition as required by the Government;

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting officer has the right to immediately draw on the ILC.

52.228-11 PLEDGES OF ASSETS (FEB 1992)

(a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--

(1) Pledge of assets; and

(2) Standard Form 28, Affidavit of Individual Surety.

(b) Pledges of assets from each person acting as an individual surety shall be in the form of--

(1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;

(2) A recorded lien on real estate. The offeror will be required to provide--

(i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);

(ii) Evidence of the amount due under any encumbrance shown in the evidence of title;

(iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgated by the Appraisal Foundation.

(End of clause)

52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

(a) “Irrevocable letter of credit” (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand

and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of less than $25 million in the past year, ILCs over $5 million must be confirmed by another acceptable financial institution that had letter of credit business of less than $25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

_____

[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date _____

IRREVOCABLE LETTER OF CREDIT NO. _____

Account party's name _____

Account party's address _____

For Solicitation No. _____(for reference only)

TO: [U.S. Government agency]

[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States $_____. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

_____
[Confirming Financial Institution's Letterhead or Name and Address]

(Date) _____

Our Letter of Credit Advice Number _____

Beneficiary: _____ [U.S. Government agency]

Issuing Financial Institution: _____

Issuing Financial Institution's LC No.: _____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ [name of issuing financial institution] for drawings of up to United States dollars _____/U.S. $_____ and expiring with our close of business on _____ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

_____

[City, State]

(Date) _____

[Name and address of financial institution]

Pay to the order of _____ [Beneficiary Agency] _____ the sum of United States $_____. This draft is drawn under Irrevocable Letter of Credit No. _____.

_____

[Beneficiary Agency]

By: _____

(End of clause)

52.228-15 PERFORMANCE AND PAYMENT BONDS--CONSTRUCTION (JUL 2000)-

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

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991)

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of any after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds $250.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

(End of clause)

52.229-5 TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984)

The term "local taxes," as used in the Federal, State, and local taxes clause of this contract, includes taxes imposed

by a possession of the United States or by Puerto Rico.

(End of clause)

52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)

(a) Payment of price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

_____

(Name)

_____

(Title)

_____

(Date)

(d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or

(ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.

(e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) Title, liability, and reservation of rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) Final payment. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against
the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation because of undefinitized work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

52.232-17 INTEREST (JUNE 1996)

(a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid. reproduce, prepare derivative works, distribute copies to the public, and (b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this contract.

(2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.

(3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the

Federal Acquisition Regulation in effect on the date of this contract.

52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (MAY 2001)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments and contract financing payments under the terms and conditions specified in this clause. Payment shall be considered as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101 and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see subparagraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) Invoice payments. (1) Types of invoice payments. For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project:

(A) The due date for making such payments shall be 14 days after receipt of the payment request by the designated billing office. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date shall be the 14th day after the date of the Contractor's payment request, provided a proper payment request is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, shall be as specified in the contract or, if not specified, 30 days after approval for release to the Contractor by the Contracting Officer.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract):

(A) The due date for making such payments shall be either the 30th day after receipt by the designated billing office of a proper invoice from the Contractor, or the 30th day after Government acceptance of the work or services completed by the Contractor, whichever is later. If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date shall be the 30th day after the date of the Contractor's invoice, provided a proper invoice is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) On a final invoice where the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance shall be deemed to have occurred on the effective date of the contract settlement.

(2) Contractor's invoice. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in subdivisions (a)(2)(i) through (a)(2)(ix) of this clause. If the invoice does not comply with these requirements, it shall be returned within 7 days after the date the designated billing office received the invoice, with a statement of the reasons why it is not a proper invoice. Untimely notification will be taken into account in computing any interest penalty owed the Contractor in the manner described in subparagraph (a)(4) of this clause.

(i) Name and address of the Contractor.

(ii) Invoice date. (The Contractor is encouraged to date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., prompt payment discount terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to be notified in the event of a defective invoice.

(viii) For payments described in subdivision (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.

(ix) Any other information or documentation required by the contract.

(x) While not required, the Contractor is strongly encouraged to assign an identification number to each invoice.

(3) Interest penalty. An interest penalty shall be paid automatically by the designated payment office, without request from the Contractor, if payment is not made by the due date and the conditions listed in subdivisions (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday when Federal Government offices are closed and Government business is not expected to be conducted, payment may be made on the following business day without incurring a late payment interest penalty.

(i) A proper invoice was received by the designated billing office.

(ii) A receiving report or other Government documentation authorizing payment was processed and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) Computing penalty amount. The interest penalty shall be at the rate established by the Secretary of the Treasury under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) that is in effect on the day after the due date, except where the interest penalty is prescribed by other governmental authority (e.g., tariffs). This rate is referred to as the "Renegotiation Board Interest Rate," and it is published in the Federal Register semiannually on or about January 1 and July 1. The interest penalty shall accrue daily on the invoice principal payment amount approved by the Government until the payment date of such approved principal amount; and will be compounded in 30-day increments inclusive from the first day after the due date through the payment date. That is, interest accrued at the end of any 30-day period will be added to the approved invoice principal payment amount and will be subject to interest penalties if not paid in the succeeding 30-day period. If the designated billing office failed to notify the Contractor of a defective invoice within the periods prescribed in subparagraph (a)(2) of this clause, the due date on the corrected invoice will be adjusted by subtracting from such date the number of days taken beyond the prescribed notification of defects period. Any interest penalty owed the Contractor will be based on this adjusted due date. Adjustments will be made by the designated payment office for errors in calculating interest penalties.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in subdivision (a)(1)(ii) of this clause, Government acceptance or approval shall be deemed to have occurred constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. In the event that actual acceptance or approval occurs within the constructive acceptance or approval period, the determination of an interest penalty shall be based on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The following periods of time will not be included in the determination of an interest penalty:

(A) The period taken to notify the Contractor of defects in invoices submitted to the Government, but this may not exceed 7 days.

(B) The period between the defects notice and resubmission of the corrected invoice by the Contractor.

(C) For incorrect electronic funds transfer (EFT) information, in accordance with the EFT clause of this contract.

(iii) Interest penalties will not continue to accrue after the filing of a claim for such penalties under the clause at 52.233-1, Disputes, or for more than 1 year. Interest penalties of less than $1 need not be paid.

(iv) Interest penalties are not required on payment delays due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. Claims involving disputes, and any interest that may be payable, will be resolved in accordance with the clause at 52.233-1, Disputes.

(5) Prompt payment discounts. An interest penalty also shall be paid automatically by the designated payment office, without request from the Contractor, if a discount for prompt payment is taken improperly. The interest penalty will be calculated on the amount of discount taken for the period beginning with the first day after the end of the discount period through the date when the Contractor is paid.

(6) Additional interest penalty. (i) If this contract was awarded on or after October 1, 1989, a penalty amount, calculated in accordance with subdivision (a)(6)(iii) of this clause, shall be paid in addition to the interest penalty amount if the Contractor--

(A) Is owed an interest penalty of $1 or more;

(B) Is not paid the interest penalty within 10 days after the date the invoice amount is paid; and

(C) Makes a written demand to the designated payment office for additional penalty payment, in accordance with subdivision (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) Contractors shall support written demands for additional penalty payments with the following data. No additional data shall be required. Contractors shall--

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest was due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) Demands must be postmarked on or before the 40th day after payment was made, except that--

(1) If the postmark is illegible or nonexistent, the demand must have been received and annotated with the date of receipt by the designated payment office on or before the 40th day after payment was made; or

(2) If the postmark is illegible or nonexistent and the designated payment office fails to make the required annotation, the demand's validity will be determined by the date the Contractor has placed on the demand; provided such date is no later than the 40th day after payment was made.

(iii)(A) The additional penalty shall be equal to 100 percent of any original late payment interest penalty, except--

(1) The additional penalty shall not exceed $5,000;

(2) The additional penalty shall never be less than $25; and

(3) No additional penalty is owed if the amount of the underlying interest penalty is less than $1.

(B) If the interest penalty ceases to accrue in accordance with the limits stated in subdivision (a)(4)(iii) of this clause, the amount of the additional penalty shall be calculated on the amount of interest penalty that would have accrued in the absence of these limits, subject to the overall limits on the additional penalty specified in subdivision (a)(6)(iii)(A) of this clause.

(C) For determining the maximum and minimum additional penalties, the test shall be the interest penalty due on each separate payment made for each separate contract. The maximum and minimum additional penalty shall not be based upon individual invoices unless the invoices are paid separately. Where payments are consolidated for disbursing purposes, the maximum and minimum additional penalty determination shall be made separately for each contract therein.

(D) The additional penalty does not apply to payments regulated by other Government regulations (e.g., payments under utility contracts subject to tariffs and regulation).

(b) Contract financing payments. (1) Due dates for recurring financing payments. If this contract provides for contract financing, requests for payment shall be submitted to the designated billing office as specified in this

contract or as directed by the Contracting Officer. Contract financing payments shall be made on the [insert day as prescribed by Agency head; if not prescribed, insert 30th day] day after receipt of a proper contract financing request by the designated billing office. In the event that an audit or other review of a specific financing request is required to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the due date specified.

(2) Due dates for other contract financing. For advance payments, loans, or other arrangements that do not involve recurring submissions of contract financing requests, payment shall be made in accordance with the corresponding contract terms or as directed by the Contracting Officer.

(3) Interest penalty not applicable. Contract financing payments shall not be assessed an interest penalty for payment delays.

(c) Subcontract clause requirements. The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) Prompt payment for subcontractors. A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) Interest for subcontractors. An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause--

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) Subcontractor clause flowdown. A clause requiring each subcontractor to include a payment clause and an interest penalty clause conforming to the standards set forth in subparagraphs (c)(1) and (c)(2) of this clause in each of its subcontracts, and to require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) Subcontract clause interpretation. The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that--

(1) Retainage permitted. Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) Withholding permitted. Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) Withholding requirements. Permit such withholding without incurring any obligation to pay a late payment penalty if--

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) A copy of any notice issued by a Contractor pursuant to subdivision (d)(3)(i) of this clause has been furnished to

the Contracting Officer.

(e) Subcontractor withholding procedures. If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall--

(1) Subcontractor notice. Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) Contracting Officer notice. Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to subparagraph (e)(1) of this clause;

(3) Subcontractor progress payment reduction. Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under subparagraph (e)(1) of this clause;

(4) Subsequent subcontractor payment. Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and--

(i) Make such payment within--

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under subdivision (e)(5)(i)) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government; or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) Notice to Contracting Officer. Notify the Contracting Officer upon--

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying--

(A) The amounts withheld under subparagraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) Interest to Government. Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until--

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under subdivision (e)(5)(i) of this clause.

(f) Third-party deficiency reports. (1) Withholding from subcontractor. If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments

otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under subparagraph (e)(6) of this clause--

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under subdivision (f)(1)(i) of this clause.

(2) Subsequent payment or interest charge. As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall--

(i) Pay the amount withheld under subdivision (f)(1)(ii) of this clause to such first-tier subcontractor; or

(ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) Written notice of subcontractor withholding. A written notice of any withholding shall be issued to a subcontractor (with a copy to the Contracting Officer of any such notice issued by the Contractor), specifying--

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) Subcontractor payment entitlement. The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) Prime-subcontractor disputes. A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the United States is a party. The United States may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) Preservation of prime-subcontractor rights. Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) Non-recourse for prime contractor interest penalty. The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the United States for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER—CENTRAL CONTRACTOR REGISTRATION (MAY 1999)

(a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term “EFT” refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either--

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Contractor EFT arrangements. If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(g) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(j) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of Clause)

52.232-35 DESIGNATION OF OFFICE FOR GOVERNMENT RECEIPT OF ELECTRONIC FUNDS TRANSFER INFORMATION (MAY 1999)

(a) As provided in paragraph (b) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration, the Government has designated the office cited in paragraph (c) of this clause as the office to receive the Contractor's electronic funds transfer (EFT) information, in lieu of the payment office of this contract.

(b) The Contractor shall send all EFT information, and any changes to EFT information to the office designated in paragraph (c) of this clause. The Contractor shall not send EFT information to the payment office, or any other office than that designated in paragraph (c). The Government need not use any EFT information sent to any office other than that designated in paragraph (c).

(c) Designated Office:

Mailing Address:

U.S. Army Corps of Engineers
St. Paul District
190 East Fifth Street

St. Paul, MN 55101-1638

Telephone Number:

651/290-5233

Person to Contact:

Mr. Wayne Scheffel, CEMVP-RM-F

Electronic Address:

wayne.scheffel@usace.army.mil

(End of clause)

52.233-1 DISPUTES. (DEC 1998)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding $100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2)(i) The contractors shall provide the certification specified in subparagraph (d)(2)(iii) of this clause when submitting any claim -

(A) Exceeding $100,000; or

(B) Regardless of the amount claimed, when using -

(1) Arbitration conducted pursuant to 5 U.S.C. 575-580; or

(2) Any other alternative means of dispute resolution (ADR) technique that the agency elects to handle in accordance with the Administrative Dispute Resolution Act (ADRA).

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows: "I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor.

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of $100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over $100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative disput resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the request.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

(End of clause)

52.233-3 PROTEST AFTER AWARD (AUG. 1996)

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

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 20 percent 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.

52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

As prescribed in 36.502, insert the following clause in solicitations and contracts when a fixed-price construction contract or a fixed-price dismantling, demolition, or removal of improvements contract is contemplated and the contract amount is expected to exceed the small purchase limitation. The Contracting Officer may insert the clause in solicitations and contracts when a fixed-price construction or a fixed-price contract for dismantling, demolition, or removal of improvements is contemplated and the contract amount is expected to be within the small purchase limitation.

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of

(1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or

(2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to

(1) conditions bearing upon transportation, disposal, handling, and storage of materials;

(2) the availability of labor, water, electric power, and roads;

(3) uncertainties of weather, river stages, tides, or similar physical conditions at the site;

(4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by Surveys and Borings

(b) Weather conditions - Bidders should satisfy themselves before submitting bids as to hazards from weather conditions. Complete weather records and reports may be obtained from the local U.S. Weather Service.

(c) Transportation facilities - Before submitting a bid, bidders should obtain necessary data as to access of highway and railroad facilities. The unavailability of transportation facilities shall not become a basis for claims for damages or extensions of time for completion of work.

(d) Borings – Information shown on the drawings at drill hole locations is from logs or drill holes. While the borings are representative of subsurface conditions at their respective locations and vertical reaches, localized variation characteristics of subsurface materials of the region are anticipated and, if encountered, such variations will not be considered as differing materially within the purview of CONTRACT CLAUSE; DIFFERING SITE CONDITIONS. Graphic logs of borings located within the area to be excavated under contract are shown on the drawings. Ground water elevations are those encountered at the time when borings were taken and will fluctuate seasonally due to factors such as rainfall and river stages.

52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the worksite a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

52.236-8 OTHER CONTRACTS (APR 1984)

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities

(1) at or near the work site, and

(2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

52.236-12 CLEANING UP (APR 1984)

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

52.236-13 ACCIDENT PREVENTION (NOV 1991) – ALTERNATE I (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will

(1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities;

(2) avoid interruptions of Government operations and delays in project completion dates; and

(3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall-

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(f) Before commencing the work, the Contractor shall-

(1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. 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 in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause 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 this contract.

52.236-16 QUANTITY SURVEYS (APR 1984) - ALTERNATE I (APR 1984)

(a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government

shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The

Contractor shall retain copies of all such material furnished to the Contracting Officer.

52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by," or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

52.242-13 BANKRUPTCY (JUL 1995)

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

(End of clause)

52.242-14 SUSPENSION OF WORK (APR 1984)

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract. (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating

(1) the date, circumstances, and source of the order and

(2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a

change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after

(1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

(1) Relieve the Contractor of responsibility for providing adequate quality control measures;

(2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

(3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) of this section.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not

unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.
(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of clause)

52.248-3 VALUE ENGINEERING--CONSTRUCTION (FEB 2000)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that--

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for

(i) the affected portions of the existing contract requirement and

(ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action.

(1) The Contracting Officer will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer will notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

If the VECP is not accepted, the Contracting Officer will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Contracting Officer.

(f) Sharing.

(1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by

(i) 45 percent for fixed-price contracts or

(ii) 75 percent for cost-reimbursement contracts.

(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to--

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) Collateral savings. If a VECP is accepted, the Contracting Officer will increase the instant contract amount by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings will not exceed the contract's firm-fixed-price or estimated cost, at the time the VECP is accepted, or $100,000, whichever is greater. The Contracting Officer is the sole determiner of the amount of collateral savings.

(h) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of $50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(i) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering-- Construction clause of contract . . . . . , shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations." If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996) - ALTERNATE I (SEP 1996)

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(1) Stop work as specified in the notice.

(2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.

(6) As directed by the Contracting Officer, transfer title and deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b)(6) of this clause; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 120-day period.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination

inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1-year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid or remaining to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (g) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be modified, and the Contractor paid the agreed amount. Paragraph (g) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(g) If the Contractor and Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (f) of this clause:

(1) For contract work performed before the effective date of termination, the total (without duplication of any items) of--

(i) The cost of this work;

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(1)(i) of this clause; and

(iii) A sum, as profit on subdivision (g)(1)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to submit the termination settlement proposal or request for equitable adjustment within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.

(k) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.

(l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(m)(1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(n) Unless otherwise provided in this contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the

Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if--

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include

(i) acts of God or of the public enemy,

(ii) acts of the Government in either its sovereign or contractual capacity,

(iii) acts of another Contractor in the performance of a contract with the Government,

(iv) fires,

(v) floods,

(vi) epidemics,

(vii) quarantine restrictions,

(viii) strikes,

(ix) freight embargoes,

(x) unusually severe weather, or delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

52.250-4001 INDEMNIFICATION (MAY 2000)

(a) Notwithstanding any other provision of this contract:

the contractor shall indemnify and hold the Government harmless from any and all damage to persons or property that results from the contractor’s work under this contract.

the contractor shall be responsible for any and all damage to the property furnished by the Government f or the performance of this contract unless the sole and exclusive cause of the damage is the fault or negligence of the Government.

the contractor shall be responsible for damage to any Government plant, facilities or real estate that results from the performance of the work under this contract.

the contractor shall reimburse the Government for the cost of repairing or replacing any Government property damaged by the contractor as a result of the performance of the work under this contract. The Government may, in its sole discretion, allow the contractor to repair or replace any damaged Government property in lieu of reimbursing the Government.

the contractor shall be responsible for any environmental damage that results from the performance of the work under this contract.

(b) For purposes of this clause, the term “contractor” includes, without limitation, the officers, agents, and employees of the contractor and all materialmen, suppliers, consultants, and subcontractors (at any tier).

52.253-1 COMPUTER GENERATED FORMS (JAN 1991)

(a) Any data required to be submitted on a Standard or Optional Form prescribed by the Federal Acquisition Regulation (FAR) may be submitted on a computer generated version of the form, provided there is no change to the name, content, or sequence of the data elements on the form, and provided the form carries the Standard or Optional Form number and edition date.

(b) Unless prohibited by agency regulations, any data required to be submitted on an agency unique form prescribed by an agency supplement to the FAR may be submitted on a computer generated version of the form provided there is no change to the name, content, or sequence of the data elements on the form and provided the form carries the agency form number and edition date.

(c) If the Contractor submits a computer generated version of a form that is different than the required form, then the rights and obligations of the parties will be determined based on the content of the required form.

252.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

(a) "Definition. Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the contracting officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the contracting officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

252.203-7001 PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE-CONTRACT-RELATED FELONIES (MAR 1999)

(a) Definitions. As used in this clause—

(1) "Arising out of a contract with the DoD" means any act in connection with—

(i) Attempting to obtain;

(ii) Obtaining, or

(iii) Performing a contract or first-tier subcontract of any agency, department, or component of the Department of Defense (DoD).

(2) "Conviction of fraud or any other felony" means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of *nolo contendere*, for which sentence has been imposed.

(3) "Date of conviction" means the date judgment was entered against the individual.

(b) Any individual who is convicted after September 29, 1988, of fraud or any other felony arising out of a contract with the DoD is prohibited from serving--

(1) In a management or supervisory capacity on any DoD contract or first-tier subcontract;

(2) On the board of directors of any DoD contractor or first-tier subcontractor;

(3) As a consultant, agent, or representative for any DoD contractor or first-tier subcontractor; or

(4) In any other capacity with the authority to influence, advise, or control the decisions of any DoD contractor or subcontractor with regard to any DoD contract or first-tier subcontract.

(c) Unless waived, the prohibition in paragraph (b) of this clause applies for not less than 5 years from the date of conviction.

(d) 10 U.S.C. 2408 provides that a defense contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than $500,000 if convicted of knowingly—

(1) Employing a person under a prohibition specified in paragraph (b) of this clause; or

(2) Allowing such a person to serve on the board of directors of the contractor or first-tier subcontractor.

(e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as—

(1) Suspension or debarment;

(2) Cancellation of the contract at no cost to the Government; or

(3) Termination of the contract for default.

(f) The Contractor may submit written requests for waiver of the prohibition in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify—

(1) The person involved;

(2) The nature of the conviction and resultant sentence or punishment imposed;

(3) The reasons for the requested waiver; and

(4) An explanation of why a waiver is in the interest of national security.

(g) The Contractor agrees to include the substance of this clause, appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.

(h) Pursuant to 10 U.S.C. 2408(c), defense contractors and subcontractors may obtain information as to whether a particular person has been convicted of fraud or any other felony arising out of a contract with the DoD by contacting The Office of Justice Programs, The Denial of Federal Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

(End of clause)

252.203-7002 DISPLAY OF DOD HOTLINE POSTER (DEC 1991)

(a) The Contractor shall display prominently in common work areas within business segments performing work under Department of Defense (DoD) contracts, DoD Hotline Posters prepared by the DoD Office of the Inspector General.

(b) DoD Hotline Posters may be obtained from the DoD Inspector General, ATTN: Defense Hotline, 400 Army Navy Drive, Washington, DC 22202-2884.

(c) The Contractor need not comply with paragraph (a) of this clause if it has established a mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports.

(End of clause)

252.204-7003 CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992)

The Contractor's procedures for protecting against unauthorized disclosure of information shall not require Department of Defense employees or members of the Armed Forces to relinquish control of their work products, whether classified or not, to the contractor.

(End of clause)

252.204-7004 REQUIRED CENTRAL CONTRACTOR REGISTRATION.(MAR 2000)

(a) Definitions.

As used in this clause--

(1) Central Contractor Registration (CCR) database means the primary DoD repository for contractor information required for the conduct of business with DoD.

(2) Data Universal Numbering System (DUNS) number means the 9-digit number assigned by Dun and Bradstreet Information Services to identify unique business entities.

(3) Data Universal Numbering System +4 (DUNS+4) number means the DUNS number assigned by Dun and Bradstreet plus a 4-digit suffix that may be assigned by a parent (controlling) business concern. This 4-digit suffix may be assigned at the discretion of the parent business concern for such purposes as identifying subunits or affiliates of the parent business concern.

(4) Registered in the CCR database means that all mandatory information, including the DUNS number or the DUNS+4 number, if applicable, and the corresponding Commercial and Government Entity (CAGE) code, is in the CCR database; the DUNS number and the CAGE code have been validated; and all edits have been successfully completed.

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee must be registered in the CCR database prior to award, during performance, and through final payment of any contract resulting from this solicitation, except for awards to foreign vendors for work to be performed outside the United States.

(2) The offeror shall provide its DUNS or, if applicable, its DUNS+4 number with its offer, which will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(3) Lack of registration in the CCR database will make an offeror ineligible for award.

(4) DoD has established a goal of registering an applicant in the CCR database within 48 hours after receipt of a complete and accurate application via the Internet. However, registration of an applicant submitting an application through a method other than the Internet may take up to 30 days. Therefore, offerors that are not registered should consider applying for registration immediately upon receipt of this solicitation.

(c) The Contractor is responsible for the accuracy and completeness of the data within the CCR, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to confirm on an annual basis that its information in the CCR database is accurate and complete.

(d) Offerors and contractors may obtain information on registration and annual confirmation requirements by calling 1-888-227-2423, or via the Internet at http://www.ccr2000.com.

(End of clause)

252.205-7000 PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS (DEC 1991)

(a) Definition.

"Cooperative agreement holder" means a State or local government; a private, nonprofit organization; a tribal organization (as defined in section 4(c) of the Indian Self-Determination and Education Assistance Act (Pub. L. 93-268; 25 U.S.C. 450 (c))); or an economic enterprise (as defined in section 3(e) of the Indian Financing Act of 1974 (Pub. L. 93-362; 25 U.S.C. 1452(e))) whether such economic enterprise is organized for profit or nonprofit purposes; which has an agreement with the Defense Logistics Agency to furnish procurement technical assistance to business entities.

(b) The Contractor shall provide cooperative agreement holders, upon their request, with a list of those appropriate employees or offices responsible for entering into subcontracts under defense contracts. The list shall include the business address, telephone number, and area of responsibility of each employee or office.

(c) The Contractor need not provide the listing to a particular cooperative agreement holder more frequently than once a year.

(End of clause)

252.209-7000 ACQUISITION FROM SUBCONTRACTORS SUBJECT TO ONSITE INSPECTION UNDER THE INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY (NOV 1995)

(a) The Contractor shall not deny consideration for a subcontract award under this contract to a potential subcontractor subject to on-site inspection under the INF Treaty, or a similar treaty, solely or in part because of the actual or potential presence of Soviet inspectors at the subcontractor's facility, unless the decision is approved by the Contracting Officer.

(b) The Contractor shall incorporate this clause, including this paragraph (b), in all solicitations and contracts exceeding the simplified acquisition threshold in part 13 of the Federal Acquisition Regulation, except those for commercial items.

252.209-7003 COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (MAR 1998)

By submission of its offer, the offeror represents that, if it is subject to the reporting requirements of 37 U.S.C. 4212(d) (i.e., the VETS-100 report required by Federal Acquisition Regulation clause 52.222-37, Employment

Reports on Disabled Veterans and Veterans of the Vietnam Era), it has submitted the most recent report required by 38 U.S.C. 4212(d).

252.209-7004 SUBCONTRACTING WITH FIRMS THAT ARE OWNED OR CONTROLLED BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) Unless the Government determines that there is a compelling reason to do so, the Contractor shall not enter into any subcontract in excess of $25,000 with a firm, or subsidiary of a firm, that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country.

(b) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country. The notice must include the name of the proposed subcontractor notwithstanding its inclusion on the List of Parties Excluded From Federal Procurement and Nonprocurement Programs.

252.219-7003 SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DOD CONTRACTS) (APR. 1996)

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.

(a) *Definitions. Historically black colleges and universities,* as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

Minority institutions, as used in this clause, means institutions meeting the requirements of section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).

(b) Except for company or division-wide commercial items subcontracting plans, the term *small disadvantaged business,* when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions, in addition to small disadvantaged business concerns.

(c) Work under the contract or its subcontracts shall be credited toward meeting the small disadvantaged business concern goal required by paragraph (d) of the FAR 52.219-9 clause when:

(1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and

(2) It meets the requirements of 10 U.S.C. 2323a.

(d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.

(e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--

(f) The master plan approval referred to in paragraph (f) of the FAR 52.219-9 clause is approval by the Contractor's cognizant contract administration activity.

(g) In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned small businesses, the Contractor shall notify the Administrative Contracting Officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable.

(End of clause)

252.223-7006 PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND HAZARDOUS

MATERIALS (APR 1993)

(a) "Definitions".

As used in this clause --

(1) "Storage" means a non-transitory, semi-permanent or permanent holding, placement, or leaving of material. It does not include a temporary accumulation of a limited quantity of a material used in or a waste generated or resulting from authorized activities, such as servicing, maintenance, or repair of Department of Defense (DoD) items, equipment, or facilities.

(2) "Toxic or hazardous materials" means:

(i) Materials referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601(14)) and materials designated under section 102 of CERCLA (42 U.S.C. 9602) (40 CFR part 302);

(ii) Materials that are of an explosive, flammable, or pyrotechnic nature; or

(iii) Materials otherwise identified by the Secretary of Defense as specified in DoD regulations.

(b) In accordance with 10 U.S.C. 2692, the Contractor is prohibited from storing or disposing of non-DoD-owned toxic or hazardous materials on a DoD installation, except to the extent authorized by a statutory exception to 10 U.S.C. 2692 or as authorized by the Secretary of Defense or his designee.

(End of clause)

252.225-7012 PREFERENCE FOR CERTAIN DOMESTIC COMMODITIES (AUG 2000)

(a) The Contractor agrees to deliver under this contract only such of the following articles that have been grown, reprocessed, reused, or produced in the United States, its possessions, or Puerto Rico --

(1) Food;

(2) Clothing;

(3) Tents, tarpaulins, or covers;

(4) Cotton and other natural fiber products;

(5) Woven silk or woven silk blends;

(6) Spun silk yarn for cartridge cloth;

(7) Synthetic fabric, and coated synthetic fabric, including all textile fibers and yarns that are for use in such fabrics;

(8) Canvas products;

(9) Wool (whether in the form of fiber or yarn or contained in fabrics, materials, or manufactured articles); or

(10) Any item of individual equipment (Federal supply Classification 8465) manufactured from or containing such fibers, yarns, fabrics, or materials.

(b) This clause does not apply --

(1) To supplies listed in FAR section 25.104(a), or other supplies for which the Government has determined that a satisfactory quality and sufficient quantity cannot be acquired as and when needed at U.S. market prices;

(2) To foods which have been manufactured or processed in the United States, its possessions, or Puerto Rico;

(3) To chemical warfare protective clothing produced in the countries listed in subsection 225.872-1 of the Defense FAR Supplement; or

(4) To fibers and yarns that are for use in synthetic fabric or coated synthetic fabric (but does apply to the synthetic or coated synthetic fabric itself), if--

(i) The fabric is to be used as a component of an end item that is not a textile product. Examples of textile products, made in whole or in part of fabric, include--

(a) Draperies, floor coverings, furnishings, and bedding (Federal Supply Group 72, Household and Commercial Furnishings and Appliances);

(B) Items made in whole or in part of fabric in Federal Supply Group 83, Textile/leather/furs/apparel/ findings/tents/flags, or Federal Supply Group 84, Clothing, Individual Equipment and Insignia;

(C) Upholstered seats (whether for household, office, or other use); and

(D) Parachutes (Federal Supply Class 1670); or

(ii) The fibers and yarns are para-aramid fibers and yarns manufactured in the Netherlands.

(End of clause)

252.225-7031 SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992)

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

(1) "Foreign person" means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec 2415).

(2) "United States person" is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concerns, as determined under regulations of the President.

(b) Certification. By submitting this offer, the Offeror, if a foreign person, company or entity, certifies that it--

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec 2407(a) prohibits a United States person from taking.

(End of clause)

252.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)

(a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)

When the allowability of costs under this contract is determined in accordance with part 31 of the Federal Acquisition Regulation (FAR), allowability shall also be determined in accordance with part 231 of the Defense FAR Supplement, in effect on the date of this contract.

252.236-7000 MODIFICATION PROPOSALS - PRICE BREAKDOWN. (DEC 1991)

(a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.

(b) The price breakdown --

(1) Must include sufficient detail to permit an analysis of profit, and of all costs for --

(i) Material;

(ii) Labor;

(iii) Equipment;

(iv) Subcontracts; and

(v) Overhead; and

(2) Must cover all work involved in the modification, whether the work was deleted, added, or changed.

(c) The Contractor shall provide similar price breakdowns to support any amounts claimed for subcontracts.

(d) The Contractor's proposal shall include a justification for any time extension proposed.

252.236-7001 CONTRACT DRAWINGS, MAPS, 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:

Drawing Number: R13-P-00/006

CADD File Name: RL00P006.DGN

Title: DRAWING INDEX, GENERAL LEGEND & ABBREVIATIONS

252.242-7000 POSTAWARD CONFERENCE (DEC 1991)

The Contractor agrees to attend any postaward conference convened by the contracting activity or contract administration office in accordance with Federal Acquisition Regulation subpart 42.5.

(End of clause)

252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR part 31 and DFARS part 231, in effect on the date of this contract, apply.

252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)

(a) The amount of any request for equitable adjustment to contract terms shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.

(b) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:

I certify that the request is made in good faith, and that the supporting data are accurate and complete to the best of my knowledge and belief.

(Official's Name)

(Title)

(c) The certification in paragraph (b) of this clause requires full disclosure of all relevant facts, including--

(1) Cost or pricing data if required in accordance with subsection 15.403-4 of the Federal Acquisition Regulation (FAR); and

(2) Information other than cost or pricing data, in accordance with subsection 15.403-3 of the FAR, including actual cost data and data to support any estimated costs, even if cost or pricing data are not required.

(d) The certification requirement in paragraph (b) of this clause does not apply to----

(1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or

(2) Final adjustment under an incentive provision of the contract.

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

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

(1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of manufacture, fabrication, or assembly by the Contractor or any subcontractor.

(2) "Department of Defense" (DoD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.

(3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.

(4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through international waters.

(5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.

(6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.

(i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b)(1) The Contractor shall use U.S.-flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessels if--

(i) This contract is a construction contract; or

(ii) The supplies being transported are--

(A) Noncommercial items; or

(B) Commercial items that--

(1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it contracts for f.o.b. destination shipment);

(2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that --

(1) U.S.-flag vessels are not available for timely shipment;

(2) The freight charges are inordinately excessive or unreasonable; or

(3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum --

(1) Type, weight, and cube of cargo;

(2) Required shipping date;

(3) Special handling and discharge requirements;

(4) Loading and discharge points;

(5) Name of shipper and consignee;

(6) Prime contract number; and

(7) A documented description of efforts made to secure U.S.-flag vessels, including points of contact (with names and telephone numbers) with at least two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.

(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information --

(1) Prime contract number;

(2) Name of vessel;

(3) Vessel flag of registry;

(4) Date of loading;

(5) Port of loading;

(6) Port of final discharge;

(7) Description of commodity;

(8) Gross weight in pounds and cubic feet if available;

(9) Total ocean freight in U.S. dollars; and

(10) Name of the steamship company.

(f) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief --

(1) No ocean transportation was used in the performance of this contract;

(2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;

(3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or

(4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format:

ITEM DESCRIPTION	CONTRACT LINE ITEMS	QUANTITY

TOTAL_____

(g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(h) The Contractor shall include this clause, including this paragraph (h), in all subcontractors under this contract that--

(1) Exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation; and

(2) Are for a type of supplies described in paragraph (b)(3) of this clause.

(End of clause)

252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor --

(1) Shall notify the Contracting Officer of that fact; and

(2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

(b) The Contractor shall include this clause; including this paragraph (b), revised as necessary to reflect the relationship of the contracting parties--

(1) In all subcontracts under this contract, if this contract is a construction contract; or

(2) If this contract is not a construction contract, in all subcontracts under this contract that are for--

(i) Noncommercial items; or

(ii) Commercial items that--

(A) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);

(B) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(C) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(End of clause)

252.248-7000 PREPARATION OF VALUE ENGINEERING CHANGE PROPOSALS (MAY 1994)

Prepare value engineering change proposals, for submission pursuant to the value engineering clause of this contract, in the format prescribed by the version of MIL-STD-973 in effect on the date of contract award.

(End of clause)

SECTION 00800 Special Contract Requirements

52.000-4004 PARTNERING

The Government proposes to form a partnering relationship with the contractor. This partnering relationship will strive to facilitate communication and draw on the strengths of each organization in an effort to achieve a quality project, within budget, and on schedule. Participation will be totally voluntary. Partnering will not alter or supersede any provision of this contract nor will it provide either party with any additional contractual rights or obligations. Participation in partnering will not affect award of this contract. Any cost associated with this partnering will be agreed to by both parties and will be shared equally, with no change in contract price.

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

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 604 days after contractor receives the notice to proceed. The time stated for completion shall include final cleanup of the premises.

The completion date is based on the assumption that the successful offeror will receive the notice to proceed by May 23, 2002. The completion date will be extended by the number of calendar days after the above date that the Contractor receives the notice to proceed, except to the extent that the delay in issuance of the notice to proceed results from the failure of the Contractor to execute the contract and give the required performance and payment bonds within the time specified in the offer.

(End of clause)

52.212-4003 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (OCT 1989) ER 415-1-15

a. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSES: DEFAULT (FIXED-PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

1) 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.

2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

b. 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
WORKDAYS BASED ON (5) DAY WORKWEEK.

GEOGRAPHIC LOCATION -- Crookston, MN

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Days	20	16	10	3	4	5	4	4	3	3	7	17

c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled workday. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, 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 CLAUSES: DEFAULT (FIXED-PRICE CONSTRUCTION).

52.212-5000 EVALUATION OF SUBDIVIDED ITEMS (MAR 1995)--EFARS

Item Nos. 0005, 0006, 0008, 0015, 0017, 0026, 0027, 0035, 0038, 0103, 0153, and 0208 are subdivided into two or more estimated quantities and are to be separately priced. The Government will evaluate each of these items on the basis of total price of its sub-items.

(End of provision)

52.212-5001 VARIATIONS IN ESTIMATED QUANTITIES, SUBDIVIDED ITEMS

(MAR 1995)--EFARS

This variation in estimated quantities clause is applicable only to Items Nos. 0005, 0008, 0017, 0026, and 0035.

(a) Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price.

(b) Where the actual quantity of work performed for Items Nos. 0005, 0008, 0017, 0026, and 0035, is less than 85% of the quantity of the first sub-item listed under such item, the contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment shall be made in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

(c) If the actual quantity of work performed under Items Nos. 0005, 0008, 0017, 0026, and 0035 exceeds 115% or is less than 85% of the total estimated quantity of the sub-item under that item and/or if the quantity of the work performed under the second sub-item or any subsequent sub-item under Items Nos0005, 0008, 0017, 0026, and 0035

exceeds 115% or is less than 85% of the estimated quantity of any such sub-item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

(End of clause)

52-214-5000 ARITHMETIC DISCREPANCIES – EFARS

(a) For the purpose of initial evaluation of bids, the following will be utilized in 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)

52.217-4000 OPTION FOR ADDITIONAL WORK (Construction) (AUG 2000)

The Government may require the Contractor to perform the work identified as optional item(s) (CLIN(s) 0014 through 0232) at the price stated in the Schedule. The Contracting Officer may exercise the option(s) by written notice to the Contractor at any time before the required completion date stated in Section 00800, clause number 52.211-10 Alt 1, or any extensions thereto. The Contracting Officer shall provide the Contractor notice of the Government's intent to exercise the option at least 30 calendar days in advance of exercising the option. Notice of intent to exercise the option shall not constitute an exercise of the option and shall not bind the government to exercise the option. If the Government should exercise the option(s) within 60 calendar days of the required completion date or any extension thereto, the Government shall extend the required contract completion date to 60 calendar days after the date of the exercise of the option.

Exercise of the option shall be evidenced on Standard Form 30, citing this Section as the authority for exercising the option. Notice of intent to exercise the option shall be considered to have been given at the earlier of the occurrence of any of the following events: deposit of written notification in the mail, receipt by the Contractor of a facsimile notifying it of the Government's intent to exercise the option, or receipt by the Contractor of an e-mail notifying the Contractor of the Government's intent to exercise the option. The option shall be considered to have been exercised at the time the Government deposits written notification to the Contractor in the mail or, if earlier, at the time written notice is delivered to the Contractor.

52.219-14 LIMITATIONS ON SUBCONTRACTING (DEC 1996)

(a) This clause does not apply to the unrestricted portion of a partial set-aside.

(b) By submission of an offer and execution of a contract, the Offeror/Contractor agrees that in performance of the contract in the case of a contract for--

(1) Services (except construction). At least 50 percent of the cost of contract performance incurred for personnel shall be expended for employees of the concern.

(2) Supplies (other than procurement from a nonmanufacturer of such supplies). The concern shall perform work for at least 50 percent of the cost of manufacturing the supplies, not including the cost of materials.

(3) General construction. The concern will perform at least 15 percent of the cost of the contract, not including the cost of materials, with its own employees.

(4) Construction by special trade contractors. The concern will perform at least 25 percent of the cost of the contract, not including the cost of materials, with its own employees.

52.228-4022 REQUIREMENT FOR BID GUARANTEE (FAR 28.101-2)

Each bidder shall submit with its bid a Bid Bond (Standard Form 24) with good and sufficient surety or sureties acceptable to the Government or other security as provided in the clause BID GUARANTEE in the form of twenty percent (20%) of the bid price or $3,000,000 whichever is lesser. The bid bond penalty may be expressed in terms of a percentage of the bid price or may be expressed in dollars and cents.

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

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

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

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

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

(End of clause)

52.232-4004 INVOICE PROCEDURES

In accordance with CONTRACT CLAUSE titled "PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS", the contractor shall submit invoices as follows:

a. In order to qualify for a periodic payment, the Contractor must submit a proper invoice (request for payment) to the Contracting Officer's Representative (COR) and a determination must be made that supplies or services conform to the contract requirements. This determination will be made for the sole purpose of processing progress payments and will not constitute formal acceptance. The due date for making progress payments shall be as stated in the contract clause: PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS.

b. The submitted request for payment must be accompanied with documentation adequate to substantiate the amount requested. Substantiation shall be consistent will the clauses in the solicitation titled Quantity Surveys, Purchase Orders, Invoices, etc. satisfactory to the COR.

c. The Contractor must also include with the payment request a certification as described in the Clause "PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS".

d. Payment requests will be reviewed for propriety by the COR. Defective invoices will be returned to the Contractor for resolution with defects identified. Along with the returned invoice, the COR may include, at its option, an ENG FORM 93-PAYMENT ESTIMATE reflecting the substantiated and uncontested payment amount. The Contractor will then be given the option of signing and returning the FORM 93 for payment along with the original invoice and certification or resubmitting a revised invoice and certification. To expedite payment, the Contractor may request in writing that the COR retain the defective invoice and immediately process the payment request at the amount determined to be acceptable to the Government.

52.232-5001 CONTINUING CONTRACTS (MAR 1995)—EFARS

(a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922 (33 U.S. Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations, and from future contribution to the project having one or more non-federal project sponsors. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract.

(b) The sum of $1,000,000 has been reserved for this contract and is available for payments 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.

(c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not entitle the contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (f) and (i) below. No such failure shall constitute a breach of this contract, except that this provision shall not bar a breach-of-contract action if an amount finally determined to be due as a termination allowance remains unpaid for one year due solely to a failure to reserve sufficient additional funds therefore.

(d) 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 will promptly notify the contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.

(e) 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 the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(f) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. The contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, as in effect on the first day of the delay in such payment.

(g) 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 the "Suspension of Work" clause or in any other manner under this contract.

(h) 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.

(i) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, 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. Such a termination shall be considered a termination for the convenience of the Government.

(j) 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 the 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.

(End of clause)

52.236-4012 MATERIAL SOURCES

a. Concrete aggregate and stone protection materials meeting the requirements of these specifications can be produced from the sources listed in Section 00830 “Attachments”:

b. Materials may be furnished from any of the listed sources or at the option of the Contractor may be furnished from any other sources designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated.

c. After the award of the contract, the Contractor shall designate in writing only one source for each type of material or one combination of sources from which he proposes to furnish the materials. If the Contractor proposes to furnish materials from a source or from sources not listed, he may designate only a single source for each type of material or single combination of sources for materials. Samples for acceptance testing shall be provided as

required by the TECHNICAL PROVISIONS. If a source for materials so designated by the Contractor is not approved for use by the Contracting Officer, the Contractor may not submit for approval other sources but shall furnish the materials from approved sources selected from the list at no additional cost to the Government.

d. Approval of a source of materials is not to be construed as approval of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable as determined by the Contracting Officer. Materials produced from an approved source shall meet all the requirements of the TECHNICAL PROVISIONS of these specifications.

52.236-4014 PURCHASE ORDERS

Two legible copies of each purchase order issued by the Contractor or the Contractor's subcontractors for materials and equipment to be incorporated into the project, shall be furnished the Contracting Officer as soon as issued. Each purchase order shall (1) be clearly identified with applicable Department of Army contract number, (2) carry and identifying number, (3) be in sufficient detail to identify the material being purchased, and (4) indicate a definite delivery date. At the option of the Contractor, the copies of the purchase orders may or may not indicate the price of the articles purchased.

52.239-4001 YEAR 2000 COMPLIANCE (FAR 39.106) (JUL 1998)

The contractor shall ensure that, with respect to any design, construction, goods, or services under this contract as well as any subsequent task/delivery orders issued under this contract (if applicable), all information technology contained therein shall be Year 2000 compliant. Specifically, the contractor shall perform, maintain, and provide an inventory of all major components to include structures, equipment, items, parts, and furnishings under this contract and each task/delivery order which may be affected by the Year 2000 compliance requirement.

52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

(1) Relieve the Contractor of responsibility for providing adequate quality control measures;

(2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

(3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) of this section.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.
(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of clause)

52.246-4001 LABORATORY AND TESTING FACILITIES

The Contractor shall provide and maintain all measuring and testing devices, laboratory equipment, instruments, transportation, and supplies necessary to accomplish the required testing. All measuring and testing devices shall be calibrated at established intervals against certified standards. The Contractor's measuring and testing equipment shall be made available for use by the Government for verification of their accuracy and condition as well as for any inspection or test desired pursuant to Section 00700: INSPECTION OF CONSTRUCTION. The location of the laboratory shall be convenient to the site such that test results are available prior to proceeding with the next sequential phase of the work.

52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

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

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

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

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

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

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

(End of Clause)

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DIVISION 00 - DOCUMENTS

SECTION 00830

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01/02

-- End of Document Table of Contents --

SECTION 00830

ATTACHMENTS INDEX
01/02

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2	MATERIAL SOURCES

SECTION 00830

ATTACHMENT 1

WAGE RATES

GENERAL DECISION NUMBER	CONSTRUCTION TYPE	PAGE
MN 010061	Heavy	1 through 28

General Decision Number MN020061

General Decision Number **MN020061**
Superseded General Decision No. MN010061
State: **Minnesota**
Construction Type:
HEAVY
SEWER AND WATER LINE
TREATMENT PLANT
County(ies):

ANOKA	HENNEPIN	SCOTT
BENTON	HOUSTON	SHERBURNE
CARVER	ISANTI	ST LOUIS
CHISAGO	OLMSTED	STEARNS
CLAY	POLK	WASHINGTON
DAKOTA	RAMSEY	WRIGHT

TREATMENT PLANTS, HEAVY, SEWER & WATER LINES

Modification Number	Publication Date
0	03/01/2002

COUNTY(ies):

ANOKA	HENNEPIN	SCOTT
BENTON	HOUSTON	SHERBURNE
CARVER	ISANTI	ST LOUIS
CHISAGO	OLMSTED	STEARNS
CLAY	POLK	WASHINGTON
DAKOTA	RAMSEY	WRIGHT

ASBE0034G 06/01/2001

	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES		
INSULATOR/ASBESTOS WORKERS (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems)	28.09	11.49

ASBE0049G 06/01/2001

	Rates	Fringes
ST. LOUIS COUNTY:		
ASBESTOS WORKERS/INSULATORS (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems)	28.35	7.21

ASBE0133C 07/01/2000

	Rates	Fringes
CLAY & POLK COUNTIES:		
ASBESTOS WORKERS/INSULATORS (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems)	20.58	6.85

ASBE0205K 05/01/1998

	Rates	Fringes

ANOKA, BENTON, CARVER, CHISAGO, DAKOTA, HENNEPIN, HOUSTON,
ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, ST. LOUIS, STEARNS,
WASHINGTON & WRIGHT COUNTIES:

HAZARDOUS MATERIAL HANDLERS (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems)	18.21	3.30

BOIL0647E 10/01/1999

	Rates	Fringes
BOILERMAKERS	23.35	9.71

BRMN0001Z 05/01/2001

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE (City of Elk River), WASHINGTON & WRIGHT COUNTIES:		
BRICKLAYERS & STONEMASONS	27.37	8.09

BRMN0003E 05/01/2001

	Rates	Fringes
ST. LOUIS (South of a line between Townships #54 & #55, 2 miles north of Cotton) COUNTY:		
BRICKLAYERS	24.93	9.41

BRMN0003F 06/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (S. of a line between Townships 54 & 55 ((2 miles north of Cotton)):		
MARBLE SETTERS & TILE SETTERS	23.12	3.57

BRMN0007C 05/01/1998

	Rates	Fringes
HOUSTON COUNTY:		
BRICKLAYERS; BLOCKLAYERS; CAULKERS; CLEANERS; POINTERS; & STONEMASONS	19.43	3.80

BRMN0008I 09/01/1998

	Rates	Fringes
OLMSTED COUNTY:		
BRICKLAYERS; CAULKERS; CLEANERS; POINTERS; & STONEMASONS	22.08	3.80

BRMN0008J 10/01/1998

	Rates	Fringes
OLMSTED COUNTY:		
TILE SETTERS	19.70	

BRMN0012C 09/04/2000

	Rates	Fringes
POLK COUNTY:		
BRICKLAYERS	25.03	6.17

BRMN0015H 09/04/2000

	Rates	Fringes
CLAY COUNTY:		
BRICKLAYERS	25.03	6.17

BRMN0015I 09/04/2000

	Rates	Fringes
CLAY COUNTY:		
CEMENT MASONS	24.63	6.17

BRMN0016C 05/01/2000

	Rates	Fringes
ST. LOUIS (North of a line between Townships #54 & #55, 2 miles north of Cotton) COUNTY:		
BRICKLAYERS	23.26	9.23

BRMN1000A 05/01/2000

	Rates	Fringes
BENTON, SHERBURNE (Excluding city of Elk River) & STEARNS COUNTIES:		
BRICKLAYERS; BLOCKLAYERS & STONEMASONS	22.78	8.06

BRMN1000B 05/01/2000

	Rates	Fringes
BENTON COUNTY:		
CEMENT MASONS (Treatment Plants)	22.29	7.96
STEARNS COUNTY:		
CEMENT MASONS & PLASTERERS (Treatment Plants)	22.29	7.96

BRMN1000C 05/01/2001

	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLAY, DAKOTA, HENNEPIN, HOUSTON, ISANTI, POLK, RAMSEY, SCOTT, SHERBURNE, ST. LOUIS (Excluding Duluth and south of Township Line 55), STEARNS, WASHINGTON & WRIGHT COUNTIES:		
TILE SETTERS	25.99	8.95

BRMN1000D 05/01/1999

	Rates	Fringes
MARBLE SETTERS' FINISHERS & TILE SETTERS' FINISHERS	20.59	5.95

BRMN1000E 05/01/2000

	Rates	Fringes
ALL COUNTIES, EXCEPT the city of Duluth in ST. LOUIS COUNTY:		
MARBLE SETTERS	25.08	7.96

BRMN1000J 05/01/2000

	Rates	Fringes
TERRAZZO WORKERS	26.21	6.85
TERRAZZO BASE MACHINES	24.58	7.96
FLOOR MECHANICS; TERRAZZO WORKERS' FINISHERS	24.25	7.96

CARP0190I 05/01/1997

	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLAY, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES:		
LATHERS	22.45	7.04

CARP0190L 06/01/2000

	Rates	Fringes
HOUSTON AND OLMSTED COUNTIES		
LATHERS	24.09	4.04

CARP0361G 05/01/2001

	Rates	Fringes
ST. LOUIS (Alborn, Arnold, Bartlett, Birch, Brookstone, Canyon, Clinton, Culver, Duluth, Floodwood, Gowan, Island, Kelsey, Lakewood, Meadowlands, Munger, Palmers, Payne, Prasit, Shaw & Taft) COUNTY:		

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CARPENTERS (Treatment Plants)         20.54           9.91
-----------------------------------------------------------------
 CARP0361J  05/01/2001
                                     Rates           Fringes
POLK & ST. LOUIS COUNTIES
 LATHERS                              20.82           9.91
-----------------------------------------------------------------
 CARP0361M  05/01/2001
                                     Rates           Fringes
ST. LOUIS (Alborn, Arnold, Bartlett, Birch, Brookstone, Canyon,
 Clinton, Culver, Duluth, Floodwood, Gowan, Island, Kelsey,
 Lakewood, Meadowlands, Munger, Palmers, Payne, Prasit, Shaw &
 Taft) COUNTY:
 SOFT FLOOR LAYERS                    19.73           9.91
-----------------------------------------------------------------
 CARP0548F  05/01/2000
                                     Rates           Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLAY (Moorhead & up to 5 miles
 radius), DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, POLK (East
 Grand Forks & up to 5 miles radius), RAMSEY, SCOTT, SHERBURNE,
 STEARNS, WASHINGTON & WRIGHT COUNTIES:
MILLWRIGHTS (Treatment Plants)        26.24           7.58
-----------------------------------------------------------------
 CARP0596D  06/01/1999
                                     Rates           Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT,
 SHERBURNE (E. of Hwy #169, inclu. Zimmerman, Big Lake & Elk
 River), WASHINGTON & WRIGHT (S. of Hwy #12, inclu. Cokato,
 Buffalo & Monticello) COUNTIES:
SOFT FLOOR LAYERS                     21.73           8.32
-----------------------------------------------------------------
 CARP0596I  05/01/1997
                                     Rates           Fringes
TERRAZZO WORKERS FINISHERS            22.69           5.47
-----------------------------------------------------------------
 CARP0606G  05/01/2000
                                     Rates           Fringes
ST. LOUIS COUNTY (Excluding Alborn, Arnold, Bartlett, Birch,
 Brookstone, Canyon, Clinton, Culver, Duluth, Floodwood, Gowan,
 Island, Kelsey, Lakewood, Meadowlands, Munger, Palmers, Payne,
 Prasit, Shaw & Taft):
CARPENTERS; PILEDRIVERMEN & SOFT
 FLOOR LAYERS (Treatment Plants)      18.44           9.02
-----------------------------------------------------------------
 CARP0606I  05/01/2000
                                     Rates           Fringes
POLK COUNTY (Excluding East Grand Forks and an area 5 miles
 outside city limits):
CARPENTERS & PILEDRIVERMEN
 (Treatment Plants)                   15.53           6.87
-----------------------------------------------------------------
 CARP0930F  05/01/1998
                                     Rates           Fringes
CLAY COUNTY (Except Moorhead):
 CARPENTERS (Treatment Plants)        10.86           4.70
-----------------------------------------------------------------
 CARP1176B  06/01/1998
                                     Rates           Fringes
CLAY COUNTY (City of Moorhead & a radius of 5 miles NE & South
 of the city limits) & POLK COUNTY (East Grand Forks & an area
 5 miles outside city limits):
 CARPENTERS (Treatment Plants - Does
  not include Acoustical or Drywall
  Mechanics)                          16.75           3.05
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 PILEDRIVERMEN (Treatment Plants)     18.75           3.05
-----------------------------------------------------------------
 CARP1348C  05/01/2000
                                     Rates           Fringes
CLAY (Excluding Moorhead & up to 5 miles radius), POLK (Excluding
 East Grand Forks & up to 5 miles radius) & ST. LOUIS COUNTIES:
MILLWRIGHTS (Treatment Plants)        21.66          10.29
-----------------------------------------------------------------
 CARP1382D  06/01/2001
                                     Rates           Fringes
HOUSTON COUNTY:
 CARPENTERS & PILEDRIVERMEN
  (Treatment Plants)                  18.52           6.03
OLMSTED COUNTY:
 CARPENTERS & PILEDRIVERMEN
  (Treatment Plants)                  22.78           6.03
-----------------------------------------------------------------
 CARP9900M  05/01/2001
                                     Rates           Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT,
 SHERBURNE (Excluding St. Cloud & extending 5 miles beyond the
 city limits of St. Cloud), WASHINGTON & WRIGHT COUNTIES:
 CARPENTERS; INSULATORS; &
  PILEDRIVERMEN (Treatment Plants)    27.06           7.63
-----------------------------------------------------------------
 CARP9900N  05/01/2000
                                     Rates           Fringes
CARPENTERS & PILEDRIVERMEN (Heavy, Sewer & Water Lines):
 AREA 1                               22.77           8.50
 AREA 2                               20.29           7.53
 AREA 3                               17.22           9.02
 AREA 4                               19.84           7.53
 AREA 5                               21.05           9.02
 AREA 6                               21.09           8.98
 AREA 7                               21.49           8.98
 AREA 1 - ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI,
  RAMSEY, SCOTT, SHERBURNE (South of the northern boundary of
  T. 33-N and east of the western boundary of R. 27-W),
  WASHINGTON & WRIGHT (East of & Including Minnesota Highway #25)
  COUNTIES
 AREA 2 - BENTON, SHERBURNE (NW three-fourths, Including Clear
  Lake & Becker), STEARNS & WRIGHT (NW Part, including South
  Haven & Maple Lake) COUNTIES
 AREA 3 - CLAY & POLK COUNTIES
 AREA 4 - HOUSTON & OLMSTED COUNTIES
 AREA 5 - ST. LOUIS COUNTY (Northeast two-thirds, Including Cook,
  Cusson & Ely & Western Strip, Including Chisholm, Orr &
  Greaney)
 AREA 6 - ST. LOUIS COUNTY (Southern one-third, Including
  Fond Du Lac, Floodwood, Cotton & Proctor)
 AREA 7 - ST. LOUIS COUNTY (Duluth)
-----------------------------------------------------------------
 CARP9900Q  05/01/2001
                                     Rates           Fringes
BENTON, SHERBURNE (Extreme NW portion, Including St. Cloud &
 extending 5 miles beyond the city limits of St. Cloud) & STEARNS
 COUNTIES:
 CARPENTERS & PILEDRIVERMEN
  (Treatment Plants)                  19.91           6.63
-----------------------------------------------------------------
 ELEC0110K  05/01/2001
                                     Rates           Fringes
ANOKA (Except Anoka & Fridley Townships & the cities of Andover,
 Anoka, Columbia Heights, Coon Rapids, Fridley, Hilltop, Ramsey &
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Spring Lake Park), CHISAGO, DAKOTA, ISANTI, RAMSEY, SHERBURNE (East of Becker & Santiago Townships) & WASHINGTON COUNTIES:

ELECTRICIANS	28.28	13.19
CABLE SPLICERS	29.28	13.47

ELEC0110L 03/01/1998

	Rates	Fringes
SOUND, SIGNAL & COMMUNICATIONS WORK:		
Technician (Installation of Controller Only)	19.22	.58+a+b
Installer (Excluding Controller Work)	11.31	.34+a+b

FOOTNOTES:

a. 1 year's service - 5 days' paid vacation; 2 years' service - 10 days' paid vacation; 5 years' service - 12 days' paid vacation; 7 years' service - 14 days' paid vacation; 9 years' service - 16 days' paid vacation; 11 years' service - 18 days' paid vacation; 12 years' service - 20 days' paid vacation

b. 8 Paid Holidays: New Year's Day; Memorial Day; 4th of July; Labor Day; Thanksgiving Day; Day After Thanksgiving; the normal work day preceding Christmas Day; & Christmas Day

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ELEC0160D 04/01/2001

	Rates	Fringes
LINE CONSTRUCTION:		
Lineman; Cable Splicer; Dynamiter; Special Equipment Operator; & Technician	26.71	9.51
Equipment Operator	22.97	8.47
Groundman/Truck Driver; & Pole Treating Truck Driver	18.70	7.29
LINE CLEARANCE:		
Tree Trimmer; Tractor Operator	18.44	7.22
Groundman/Truck Driver	12.91	5.68
Groundman	11.99	5.43

ELEC0242G 06/01/2001

	Rates	Fringes
ST. LOUIS COUNTY (South part bounded on the north by the north line of Kelsey Township extended east & west):		
ELECTRICIANS	28.87	9.53

ELEC0292F 05/01/2000

	Rates	Fringes
AREA 1: ANOKA (Andover, Anoka, Columbia Heights, Coon Rapids, Fridley, Hilltop, Ramsey, Spring Lake Park), BENTON AND SHERBURNE COUNTIES (East of Hwy 25 to Hwy 10 and an imaginary line straight West to the Missippi River), CARVER, HENNEPIN, SCOTT, AND WRIGHT COUNTIES		
ELECTRICIANS:		
Electricians	27.50	12.18
Cable Splicers	28.50	12.62
AREA 2: BENTON AND SHERBURNE COUNTIES (West of Hwy 25 to Hwy 10 and an imaginary line straight West to the Mississippi River), AND STEARNS COUNTY		
ELECTRICAL CONTRACTS OVER $300,000:		
Electricians	23.80	10.97
Cable Splicers	24.80	11.43
ELECTRICAL CONTRACTS UNDER $300,000:		
Electricians	20.92	9.64
Cable Splicers	21.92	10.11

ELEC0294I 06/01/2001

	Rates	Fringes
ST. LOUIS COUNTY (North part bounded on the south by the south line of Ellsburg Township, extended east & west)		
ELECTRICIANS	25.80	10.45
CABLE SPLICERS	26.35	10.67

ELEC0343N 06/01/2001

	Rates	Fringes
OLMSTED COUNTY (City of Rochester & 10 mile radius):		
Electricians	22.99	9.12
Cable Splicers	23.99	9.26
HOUSTON & OLMSTED (Excluding City of Rochester & 10 mile radius) COUNTIES:		
ELECTRICAL INSTALLATIONS OVER $300,000.00:		
Electricians	22.99	9.12
Cable Splicers	23.99	9.26
ELECTRICAL INSTALLATIONS UNDER $300,000.00:		
Electricians	20.24	8.75
Cable Splicers	21.24	8.89

ELEC1426J 06/01/1998

	Rates	Fringes
CLAY & POLK COUNTIES:		
ELECTRICIANS:		
Electricians	14.70	4.64
Cable Splicers	15.45	4.73

ENGI0049Y 05/01/2001

	Rates	Fringes
POWER EQUIPMENT OPERATORS (Treatment Plants):		
GROUP 1	28.99	7.55
GROUP 2	28.65	7.55
GROUP 3	27.24	7.55
GROUP 4	26.90	7.55
GROUP 5	26.73	7.55
GROUP 6	25.22	7.55
GROUP 7	24.10	7.55
GROUP 8	22.09	7.55

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1 - Helicopter Operator; Truck & Crawler Crane with 200' of Boom & Over, including Jib ($.50 premium with 300' of Boom & over, including jib); & Tower Crane 250' & Over

GROUP 2 - Truck & Crawler Crane with 150' of Boom, up to but not including 200' of Boom, including Jib; & Tower Crane 200' & Over, Concrete Pump 164 ft Boom.

GROUP 3 - Traveling Tower Crane; Master Mechanic; Pile Driving Operator (when 3 drums are used); Truck & Crawler Crane, up to but not including 150' of Boom, including Jib; Derrick (Guy & Stiffleg); Tower Crane (Stationary) up to 200'; & All Terrain Vehicle Crane, Boom Truck over 100 ft.

GROUP 4 - Crawler Backhoe; Hoist Engineer (3 drums or more); Locomotive Operator; Overhead Crane Operator (inside building perimeter); & Tractor Operator with Boom

GROUP 5 - Air Compressor Operator 450 CFM or Over (2 or more machines); Pump Operator and/or Conveyor Operator (2 or more machines); Mechanic; Pumpcrete or Complaco type Machine Operator; Forklift; Boom Truck up to 100 ft; Concrete Mixer Operator; Drill Rig - Heavy Rotary or Churn when used for Caisson Drilling for Elevator Cylinder or Building Construction; Front End Loader (Over 1 cu. yd.); Hoist Engineer (1 or 2 drums); Straddle Carrier Operator; Power Plant Engineer (100 KW & over on multiples equal to 100KW & over); Tractor Operator over D2; & Well Point Pump Op.

GROUP 6 - Concrete Batch Plant Operator; Gunite Operator;

Tractor Operator D2 or similar size; & Front End Loader Operator, up to 1 cu. yd.
GROUP 7 - Air Compressor Operator 600 CFM or Over; Pump and/or Conveyor Operator; Brakeman; Pick-up Sweeper (1 cu. yd. & over Hopper capacity); Truck Crane Oiler; & Welding Machine Operator, Fireman temporary heat.
GROUP 8 - Mechanical Space Heater (Temporary Heat); Oiler or Greaser; & Elevator Operator

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ENGI0049Z 05/01/2001

	Rates	Fringes
POWER EQUIPMENT OPERATORS (Heavy, Sewer & Water Lines):		
ANOKA, CARVER, CHISAGO (S. of the northern boundary of T. 34-N & that part consisting substantially of the cities of Thomson, Cloquet, Scanlon & Carlton), DAKOTA, HENNEPIN, RAMSEY, SCOTT, SHERBURNE (S. of the northern boundary of T. 33-N & E. of the western boundary of R. 27-W), ST. LOUIS, WASHINGTON & WRIGHT (E. of & inclu. Hwy #25) COUNTIES:		
GROUP 1	25.57	7.55
GROUP 2	25.02	7.55
GROUP 3	24.84	7.55
GROUP 4	24.72	7.55
GROUP 5	21.68	7.55
GROUP 6	20.47	7.55
BENTON (E. of the western right-of-way of U.S. Hwy #10), CHISAGO (Exclu. area S. of the northern boundary of T. 34-N), HOUSTON, ISANTI, OLMSTED, SHERBURNE (Excluding area S. of the northern boundary of T. 33-N and E. of the western boundary of R. 27-W), STEARNS (E. of the western right-of-way of Minn. Hwy #15) & WRIGHT (Exclu. area E. of Hwy #25) COUNTIES:		
GROUP 1	23.61	7.55
GROUP 2	23.16	7.55
GROUP 3	22.99	7.55
GROUP 4	22.86	7.55
GROUP 5	20.29	7.55
GROUP 6	19.42	7.55
BENTON (Excluding E. of the western right-of-way of U.S. Hwy #10), CLAY, POLK & STEARNS (Excluding area E. of the Western right-of-way of Minn. Hwy #15) COUNTIES:		
GROUP 1	21.45	7.55
GROUP 2	20.52	7.55
GROUP 3	20.32	7.55
GROUP 4	20.21	7.55
GROUP 5	18.50	7.55
GROUP 6	17.90	7.55

POWER EQUIPMENT OPERATOR CLASSIFICATIONS
GROUP 1 - Helicopter Pilot; *Crane with over 135' Boom, excluding Jib; Dragline, Crawler, Hydraulic Backhoe and/or other similar equipment with Shovel-type Controls 3 cu. yds. & over Mfg. rated Cap.; & Pile Driving when 3 Drums are in use
GROUP 2 - Cableway; Concrete Mixer, Stationary Plant over 34E; Derrick (Guy or Stiffleg) (Power) (Skids or Stationary); Diver Dragline, Crawler, Hydraulic Backhoe and/or similar equipment with Shovel-type Controls, up to 3 cu. yds. Mfg. rated cap.; Dredge or Engineers, Dredge (Power) & Engineer; Front End Loader, 5 cu. yds. & over; Grader or Motor Patrol, Finishing Earthwork & Bituminous; Locomotive Crane; Master Mechanic; Mixer (Paving) Concrete Paving, Road; Mole, including Power Supply; Mucking Machine, including Mucking Operations, Conway or similar type; Piledriving; Refrigeration Plant Engineer; Tandem Scraper; Tractor - Boom type; Truck Crane - Crawler Crane; & Tugboat 100 HP & over
GROUP 3 - Dual Tractor; Elevating Grader; Pumpcrete; Scraper - Struck Cap. 32 cu. yds. & over; & Self-propelled Traveling Soil

Stabilizer
GROUP 4 - Air Track Rock Drill; Articulated Hauler Terex, Caterpillar or similar type; Asphalt Bituminous Stabilizer Plant; Automatic Road Machine (CMI or similar); Backfiller; Bituminous Roller (8 Tons & over); Bituminous Spreader & Finishing (Power); Boom Truck (Power operated Boom); Brokk or R.T.C. 750 Remote Control or Similar types with all attachments; Cat & Scraper; Cat Tractor with Rock Wagons or similar types; Challenger 75-D or 85-D when pulling Scraper or Bulldozer; Chip Harvester & Tree Cutter over 150 HP; Concrete Batch Plant; Concrete Mixer on jobsite over 14S; Concrete Mobile; Crushing Plant (Gravel & Stone) or Gravel Washing, Crushing & Screening Plant; Curb Machine; Directional Boring Machine; Dope Machine (Pipeline); Drill Rigs, Heavy Rotary or Churn or Cable Drill; Fork Lift or Straddle Carrier; Fork Lift or Lumber Stacker; Front End Loader, over 1 cu. yd.; Hoist Engineer (Power); Hydraulic Tree Planter; Launcherman (Tankerman or Pilot License); Lead Greaser; Locomotive; Mechanic; Milling, Grinding & Planing Machine; Morbark Tub Grinder or Similar Type; Multiple Machines, such as Air Compressors, Welding Machines, Generators, Pumps; Pavement Breaker or Tamping Machine (Power Driven) Mighty Mite or similar type; Pickup Sweeper, 1 cu. yd. & over Hopper Cap.; Pipeline Wrapping, Cleaning or Bending Machine; Power Plant Engineer, 100 K.W.H. & over; Power Actuated Horizontal Boring Machine, over 6"; Pugmill; Rubber- tired Farm Tractor, Backhoe Attach.; Scraper, up to 32 cu. yds.; Skid Steer Loader, over 1 cu. yd. with Backhoe Attachment; Slip Form (Power Driven) (Paving); Tie Tamper & Ballast Machine; Tractor, Bulldozer; Tractor Operator, over 50 HP with Power Take-off; Trenching Machine (Sewer, Water, Gas); Well Point Installation; & Dismantling or Repair Mechanic
GROUP 5 - Air Compressor, 600 CFM or over; Bituminous Roller (Under 8 tons); Bituminous Rubber-tired Roller; Bituminous Spreader & Bituminous Finishing Machine Tender (Power); Concrete Distributor & Spreader Finishing Machine, Longitudinal Float, Joint Machine, & Spray; Concrete Saw (Multiple Blade) (Power Operated); Form Trench Digger (Power); Front End Loader, up to & incl. 1 cu. yd.; Grader (Motor Patrol); Gunite Gunall; Hydraulic Log Splitter; Loader (Barber Greene or similar type); Payhauler or similar type; Post Hole Driving Machine/Post Hole Augar; Power Actuated Auger & Boring Machine; Power Actuated Jack; Pump; Self-propelled Chip Spreader (Flaherty or similar); Sheep Foot Compactor with Blade - 200 HP & over; Shouldering Machine (Power) Apsco or similar type inclu. self-propelled Sand & Chip Spreader; Stump Chipper & Tree Chipper; Tractor Operator, Bulldozer, 50 HP or less; & Tree Farmer (Machine)
GROUP 6 - Challenger 75-D or 85-D when pulling Disk or Roller; Conveyor; Dredge Deck Hand; Fireman or Tank Car Heater; Gravel Screening Plant (Portable not Crushing or Washing); Greaser (Truck or Tractor); Leverman; Mechanic tender; Mechanic, Space Heater (Temporary Heat); Oiler (Power Shovel, Crane, Dragline); Power Sweeper; Roller on Gravel Compaction; Self-propelled Vibrating Packer (35 HP & over); Sheep Foot Roller; Tractor, Wheel Type (over 50 HP); & Truck Crane Oiler
*CRANE OVER 135' BOOM, EXCLUDING JIB - $ .25 PREMIUM;
CRANE OVER 200' BOOM, EXCLUDING JIB - $ .50 PREMIUM

UNDERGROUND WORK:
TUNNELS, SHAFTS, ETC. - $ .25 PREMIUM
UNDER AIR PRESSURE - $ .50 PREMIUM

HAZARDOUS WASTE PROJECTS (PPE Required):
LEVEL A - $1.25 PREMIUM
LEVEL B - $ .90 PREMIUM
LEVEL C - $ .60 PREMIUM

IRON0512M 07/01/2001

	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES		
IRONWORKERS	28.45	10.79

IRON0563L 05/01/2001

	Rates	Fringes
ST. LOUIS COUNTY:		
IRONWORKERS	23.13	11.85

IRON0793F 05/01/2001

	Rates	Fringes
CLAY & POLK COUNTIES:		
IRONWORKERS	18.80	8.82

LABO0010J 05/01/2000

	Rates	Fringes
LANDSCAPERS: Seeding, Sodding & Planting of evergreen & deciduous shrubs & trees	12.38	4.36

LABO0132I 01/01/2000

	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLAY, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES:		
LABORERS, Asbestos Abatement	19.16	6.62

LABO0132M 05/14/2001

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES		
LABORERS (Treatment Plants):		
GROUP 1	24.48	5.70
GROUP 2	23.98	5.70
GROUP 3	25.48	5.70
FLAGPERSON	21.85	5.70

LABORERS CLASSIFICATIONS

GROUP 1 - Construction; Carpenter Tender; Concrete; Damp Proofer Below Grade; Drill Runner Tender; Dumpman - Dirt, Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker - Corker; Joist Handler; Material Handler - Power Buggy; Rebar; Snow Blower Operator; Signal Person; Asbestos and Hazardous Waste Technician; Hydro Blast or Waterblast; Chain Saw Operator; Concrete Saw, Drill Operator; Concrete Vibrator; Demolition & Remodeling, Excluding Demolition of an entire Structural System; Mason Tender; Mortar Mixer - Cement or any other substitute Material or Composition; Pipe Handler; Pneumatic & Electric Tool, Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator, etc.; Swing Stage Line Scaffold (Not including Patent" Scaffolding); Torchman - Gas, Electric, Thermal or similar device; & Remote Control Tamper

GROUP 2 - Caisson Work; Mounted Wall Saw Operator; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Pipe Rehab Technical, including Cleaning, Cutting, Cameraing, etc.; Refractory Worker; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; & Underpinning

GROUP 3 - Driller for Blasting purposes; Dynamite Blaster or substitute products Tovex TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc.

LABO0132P 06/01/1999

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
PLASTER TENDERS (Treatment Plants)	23.85	5.59

LABO0405D 05/01/1999

	Rates	Fringes
HOUSTON COUNTY:		
LABORERS (Treatment Plants):		
GROUP 1	15.49	4.89
GROUP 2	16.19	4.89
FLAGPERSON	13.66	4.89
OLMSTED COUNTY:		
LABORERS (Treatment Plants):		
GROUP 1	16.94	4.89
GROUP 2	17.64	4.89
FLAGPERSON	15.06	4.89

LABORER CLASSIFICATIONS

GROUP 1 - Construction; General; Carpenter Tender; Concrete; Damp Proofer Below Grade; Dumpman - Dirt, Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker - Corker; Firewatch; Joist Handler; Material Handler - Power Buggy; Rebar; Signalperson; Snow Blower Operator; Demolition & Wrecking, Including Remodeling; Chain Saw Operator; Concrete Saw, Drill Operator; Concrete Vibrator; Pipe Handler; Pneumatic & Electric Tool, Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator, etc.; Swing Stage Line Scaffold (not including "Patent" Scaffolding); & Remote Control Tamper

GROUP 2 - Pipe Rehab Technician, including Cleaning, Cutting, Cameraing, etc.; Caisson Work; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Refractory Worker; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; Underpinning; Mason Tender; Mortar Mixer - Cement or any other substitute Material or Composition; Driller for Blasting Purposes; Dynamite Blaster or substitute products Tovex TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc.

LABO0563C 05/01/2001

	Rates	Fringes
BENTON, CLAY (Except City limits of Moorhead) & STEARNS COUNTIES:		
LABORERS (Treatment Plants):		
Total Construction Projects Over $950,000:		
GROUP 1	18.02	6.72
GROUP 2	18.77	6.72
GROUP 3	19.02	6.72
FLAGPERSON	16.11	6.72
Total Construction Projects Under $950,000:		
GROUP 1	16.27	6.72
GROUP 2	17.02	6.72
GROUP 3	17.27	6.72
FLAGPERSON	14.54	6.72

LABORER CLASSIFICATIONS

GROUP 1 - Construction; Asbestos & Hazardous Waste Technician; Carpenter Tender; Chain Saw Operator; Concrete Saw, Drill Operator; Concrete Vibrator; Concrete; Damp Proofer Below Grade; Demolition & Remodeling, Excluding Demolition of an entire Structural System; Drill Runner Tender; Dump Person - Dirt, Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker-Corker; Hydro Blast or Waterblaster; Joist Handler; Mason Tender; Material Handler - Power Buggy; Mortar Mixer - Cement or any other Substitute material or Composition; Pipe Handler;

Pneumatic & Electric Tools, Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator, etc.; Rebar; Remote Control Tamper; Signal Person; Snow Blower Operator; Swing Stage Line Scaffold (Not including "Patent" Scaffolding); Torchperson - Gas, Electric, Thermal or similar device
GROUP 2 - Caisson Work; Mounted Wall Saw Operator; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Pipe Rehab Technician (Including Cleaning, Cutting, Cameraing, etc.); Refractory Worker; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; & Underpinning
GROUP 3 - Driller for Blasting Purposes; Dynamite Blaster or substitute products Tovel TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc.

LABO0580B 04/19/1999

	Rates	Fringes
CLAY (Moorhead) & POLK (East Grand Forks) COUNTIES:		
LABORERS (Treatment Plants)	14.05	4.34

LABORER CLASSIFICATIONS
Common; Concrete Bucket; Power Tool Operator; Mortar Mixer; Brick & Plasterers' Tender; Jackhammer Work; Hod Carrier; Non-Metallic Pipe Layer; Gas Line Wrapping or Taping; Cutting Torch for Demolition; Sandblaster & Gunnite Pot Tender; & Hose Tender

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LABO1091B 05/01/1998

	Rates	Fringes
ST. LOUIS COUNTY (South of T 55 N):		
LABORERS (Treatment Plants):		
GROUP 1	15.95	5.39
GROUP 2	16.10	5.39
GROUP 3	16.35	5.39
GROUP 4	16.65	5.39
FLAGPERSON	14.05	5.39

LABORER CLASSIFICATIONS
GROUP 1 - General; Carpenter Tender; Concrete Laborer; Damp Proofer Below Grade; Drill Runner Tender; Dumpman - Dirt, Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker - Corker; Joist Handler; Rebar; Snow Blower Operator; Signalperson; Material Handler (All types Power Buggy); Fire Control; Asbestos Removal; & Hazardous Waste
GROUP 2 - Chain Saw Operator; Concrete Saw, Drill Operator; Concrete Vibrator; Demolition & Wrecking, Excluding Remodeling; Gunite, Sandblasting Machine Operator; Mason Tender; Mortar Mixer - Cement or any other substitute material or composition; Pipe Handler; Pneumatic & Electric Tools, Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator, etc.; Swing Stage Line Scaffold (not including "patent" scaffolding); Torchman - Gas, Electric, Thermal or similar device; & Hydroblast
GROUP 3 - Caisson Work; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Refractory Worker; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; Underpinning; & Hod Carrier
GROUP 4 - Driller for Blasting Purposes; Dynamite Blasters or substitute products Tovex TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc.; Asbestos Abatement Worker; & Hazardous Waste Worker

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LABO1091D 05/01/1999

	Rates	Fringes
ST. LOUIS COUNTY (South of TR 55):		

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LABORERS:
 Asbestos Abatement                    18.16          6.80
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 LABO1097B  05/01/2001
                                     Rates          Fringes
POLK COUNTY (Excluding the city limits of East Grand Forks):
LABORERS (Treatment Plants):
 Projects Under $760,000 including Mechanical & Electrical:
  GROUP 1                              13.48          5.06
  GROUP 2                              13.67          5.06
  GROUP 3                              13.84          5.06
  FLAGPERSON                           11.88          5.06
 Projects $760,000 & Over, including Mechanical & Electrical:
  GROUP 1                              15.68          5.06
  GROUP 2                              16.08          5.06
  GROUP 3                              16.28          5.06
  FLAGPERSON                           13.98          5.06
        LABORER CLASSIFICATIONS
  GROUP 1 - Construction; Carpenter Tender; Concrete; Damp
Proofer Below Grade; Dump Person - Dirt, Asphalt, Concrete &
Cement; Heater Tender; Hot Tar Caulker - Corker; Joist
Handler; Material Handler - Power Buggy; Rebar; Signal Person;
& Snow Blower Operator; Chain Saw Operator; Concrete Vibrator;
Demolition & Wrecking, Excluding Remodeling; Mason Tender;
Mortar Mixer - Cement or Any Other Substitute Material or
Composition; Pipe Handler; Pneumatic & Electric Tool,
Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator,
Etc.; Swing Stage Line Scaffold (Not including "Patent"
Scaffolding); & Torch Person - Gas, Electric, Thermal or
similar device; Scrapping, Sweeping & Clean-up; Skid Steer,
Forklift (Incidental Use)
  GROUP 2 - Creosote Handler; Caisson Work; Concrete Saw Drill
Operator; Nozzle Operator - Gunite, Cement, Sandblasting;
Pipelayer; Sheeting Setter & Driver, Heavy Building
Excavation; Underground Work - Open Ditch or Excavation 8'
Below Grade; Underpinning; & High Pay/Low Pay - 40 ft. Over or
Under Ground Floor without Conventional Floor Areas; Pipe-
Rehab Technician, including Cleaning, Cutting, Camering, etc.;
& Wall Mounted Saw Operator

  GROUP 3 - Driller for Blasting Purposes; Dynamite Blaster or
substitute products; & Tovex TR, Water, Gas, Gel, Bristar,
Silent Dynamite, etc.
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 LABO1097D  05/01/2001
                                     Rates          Fringes
ST. LOUIS COUNTY (North of T 55 N):

LABORERS (Treatment Plants):
 GROUP 1                               19.67          5.81
 GROUP 2                               20.07          5.81
 GROUP 3                               20.37          5.81
 Flagperson                            17.77          5.81
 Refractory Worker                     21.67          5.81

        LABORERS CLASSIFICATIONS

  GROUP 1 - Construction; Carpenter Tender; Concrete; Damp
Proofer Below Grade; Dump Person - Dirt, Asphalt, Concrete &
Cement; Heater Tender; Hot Tar Caulker - Corker; Joist
Handler; Material Handler - Power Buggy; Rebar; Signal Person;
& Snow Blower Operator; Chain Saw Operator; Concrete Vibrator;
Demolition & Wrecking, Excluding Remodeling; Mason Tender;
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Mortar Mixer - Cement or Any Other Substitute Material or Composition; Pipe Handler; Pneumatic & Electric Tool, Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator, Etc.; Swing Stage Line Scaffold (Not including "Patent" Scaffolding); & Torch Person - Gas, Electric, Thermal or similar device; Scrapping, Sweeping & Clean-up; Skid Steer, Forklift (Incidental Use)

GROUP 2 - Creosote Handler; Caisson Work; Concrete Saw Drill Operator; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; Underpinning; & High Pay/Low Pay - 40 ft. Over or Under Ground Floor without Conventional Floor Areas; Pipe-Rehab Technician, including Cleaning, Cutting, Camering, etc.; & Wall Mounted Saw Operator

GROUP 3 - Driller for Blasting Purposes; Dynamite Blaster or substitute products; & Tovex TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc.

LABO1097G 05/01/1999

	Rates	Fringes
POLK COUNTY (Excluding the city limits of East Grand Forks); & ST. LOUIS COUNTY (N. of TR 55, but excluding a 20-mile radius of Grand Forks, North Dakota):		
LABORERS:		
Asbestos Abatement	18.16	6.80

LABO9900O 05/01/2000

	Rates	Fringes
LABORERS (Heavy, Sewer & Water Lines):		
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
GROUP 1	20.74	5.56
GROUP 2	20.94	5.56
GROUP 3	21.09	5.56
GROUP 4	21.19	5.56
GROUP 5	21.44	5.56
GROUP 6	22.74	5.56
GROUP 7	17.04	5.31
BENTON & STEARNS COUNTIES:		
GROUP 1	16.79	5.31
GROUP 2	16.99	5.31
GROUP 3	17.14	5.31
GROUP 4	17.24	5.31
GROUP 5	17.49	5.31
GROUP 6	18.79	5.31
GROUP 7	13.89	5.11
CLAY (Excluding City Limits of Moorhead) & POLK (Excluding City Limits of East Grand Forks) COUNTIES:		
GROUP 1	14.34	4.61
GROUP 2	14.54	4.61
GROUP 3	14.69	4.61
GROUP 4	14.79	4.61

GROUP 5	15.04	4.61
GROUP 6	16.34	4.61
GROUP 7	12.34	4.56

HOUSTON & OLMSTED COUNTIES:

GROUP 1	17.94	5.21
GROUP 2	18.14	5.21
GROUP 3	18.29	5.21
GROUP 4	18.39	5.21
GROUP 5	18.64	5.21
GROUP 6	19.94	5.21
GROUP 7	15.04	5.01

ST. LOUIS COUNTY (South of T. 55 N):

GROUP 1	19.87	5.56
GROUP 2	20.07	5.56
GROUP 3	20.22	5.56
GROUP 4	20.32	5.56
GROUP 5	20.57	5.56
GROUP 6	21.87	5.56
GROUP 7	16.32	5.31

ST. LOUIS COUNTY (North of T. 55 N):

GROUP 1	19.47	5.96
GROUP 2	19.67	5.96
GROUP 3	19.82	5.96
GROUP 4	19.92	5.96
GROUP 5	20.17	5.96
GROUP 6	21.47	5.96
GROUP 7	16.32	5.31

LABORER CLASSIFICATIONS

GROUP 1 - Construction; Bituminous Batcherperson (Stationary Plant); Bituminous Worker - Shoveler, Raker, Floater, Squeegee, Utility; Blaster Tender; Brick Tender; Carpenter Tender; Cement Coverperson Batch Truck; Cement Handler - Bulk, Bag; Concrete Batcherperson; Concrete Handler, Caisson, Footings, Columns, Piling, Slabs, etc.; Concrete Longitudinal Float Operator (Manual Bullfloat on Paving); Concrete Shoveler, Tamper & Puddler (Paving); Conduit Layer; Curb Setter; Damp Proofer Below Grade; Demolition of an entire Structural System, Excluding Remodeling; Drill Runner Tender; Dump Operator (Dirt, Paver, Dumping Batch Truck, etc.); Fabric Installer; Grade Checker; Hydrant & Valve Setter; Hydro Blast or Waterblaster; Joint Filler (Concrete Pavement); Kettleperson (Bituminous or Lead); Labor Wrecking Demolition; Mortar Mixer; Pipe Handler; Pipelayer ($1.00 Premium); Power Buggy Operator; Pump Operator (Less than 6"); Reinforced Steel Laborer; Reinforced Steel Setter (Paving); Retaining Wall Installation; Sand Cushion Bedmaker; Service Connection Maker (Water, Gas); Signalperson; Slip Lining of Utility Lines; Soil Stabilizer; Sound Barrier & Guard Rail Installation; Squeegeeperson; Stabilizing

Batcherperson (Stationary Plant); Temporary Heaters & Blower Tender; Top Person (Sewer, Water or Gas Trench); Traffic Controller (Traffic Barriers) & Transit/Level

GROUP 2 - Chain Saw; Compaction Equipment (Hand Operated or Remote Control); Concrete Drilling; Concrete Mixer Operator;

Concrete Sawer; Concrete Vibrator; Ditch & Other Work more than 8' Below starting level of manual work; Formsetter; Joint Sawer, Mortar; Pipe Fuser/Technician; Pneumatic Tools, Jackhammer, Paving Buster, Chipping Hammer, etc.; Remote Control Demo Machine & Related Accessories (Electric/Hydraulic); Stone Tender/Mason Tender; & Torchperson - Gas, Electric, Thermal or Similar Device

GROUP 3 - Brick or Block Paving Setter; Caisson Work; Cofferdam Work

GROUP 4 - Bottomperson (Sewer, Water or Gas Trench - More than 8' Below starting level or manual Work); Cement Gun Operator (1 1/2" or Over); Driller - Air Track or Similar; & Nozzle Operator (Gunite, Sandblasting, Cement)

GROUP 5 - Asbestos & Hazardous Waste Tech; Tunnel Laborer; Tunnel Miner; Tunnel Miner Tender; Underground Laborer; & Underpinning

GROUP 6 - Blasting Person (Dynamite or substitute Products); & Tunnel Miner Under Pressure

GROUP 7 - Flagperson

LABO9900Q 05/01/1998

	Rates	Fringes
LABORERS (Heavy, Sewer & Water Lines):		
CLAY (City Limits of Moorhead) & POLK (City Limits of East Grand Forks) COUNTIES:		
GROUP 1	13.26	4.29
GROUP 2	13.46	4.29
GROUP 3	13.61	4.29
GROUP 4	13.71	4.29
GROUP 5	13.96	4.29
GROUP 6	15.26	4.29
GROUP 7	11.26	4.24

LABORER CLASSIFICATIONS

GROUP 1 - Construction; Bituminous Batcherperson (Stationary Plant); Bituminous Worker - Shoveler, Raker, Floater, Squeegee, Utility; Blaster Tender; Brick Tender; Carpenter Tender; Cement Coverperson Batch Truck; Cement Handler - Bulk, Bag; Concrete Batcherperson; Concrete Handler, Caisson, Footings, Columns, Piling, Slabs, etc.; Concrete Longitudinal Float Operator (Manual Bullfloat on Paving); Concrete Shoveler, Tamper &

Puddler (Paving); Conduit Layer; Curb Setter; Damp Proofer Below Grade; Demolition of an entire Structural System, Excluding Remodeling; Drill Runner Tender; Dump Operator (Dirt, Paver, Dumping Batch Truck, etc.); Fabric Installer; Grade Checker; Hydrant & Valve Setter; Hydro Blast or Waterblaster; Joint Filler (Concrete Pavement); Kettleperson (Bituminous or Lead); Labor Wrecking Demolition; Mortar Mixer; Pipe Handler; Pipelayer ($1.00 Premium); Power Buggy Operator; Pump Operator (Less than 6"); Reinforced Steel Laborer; Reinforced Steel Setter (Paving); Retaining Wall Installation; Sand Cushion Bedmaker; Service Connection Maker (Water, Gas); Signalperson; Slip Lining of Utility Lines; Soil Stabilizer; Sound Barrier & Guard Rail Installation; Squeegeeperson; Stabilizing

Batcherperson (Stationary Plant); Temporary Heaters & Blower Tender; Top Person (Sewer, Water or Gas Trench); Traffic Controller (Traffic Barriers) & Transit/Level

GROUP 2 - Chain Saw; Compaction Equipment (Hand Operated or Remote Control); Concrete Drilling; Concrete Mixer Operator; Concrete Sawer; Concrete Vibrator; Ditch & Other Work more than 8' Below starting level of manual work; Formsetter; Joint Sawer, Mortar; Pipe Fuser/Technician; Pipe Rehab Technician, including Cleaning, Cutting, Cameraing, etc.; Pneumatic Tools, Jackhammer, Paving Buster, Chipping Hammer, etc.; Remote Control Demo Machine & Related Accessories (Electric/ Hydraulic); Stone Tender/Mason Tender; & Torchperson - Gas, Electric, Thermal or Similar Device

GROUP 3 - Brick or Block Paving Setter; Caisson Work; Cofferdam Work

GROUP 4 - Bottomperson (Sewer, Water or Gas Trench - More than 8' Below starting level or manual Work); Cement Gun Operator (1 1/2" or Over); Driller - Air Track or Similar; & Nozzle Operator (Gunite, Sandblasting, Cement)

GROUP 5 - Asbestos & Hazardous Waste Tech; Tunnel Laborer; Tunnel Miner; Tunnel Miner Tender; Underground Laborer; & Underpinning

GROUP 6 - Blasting Person (Dynamite or substitute Products); & Tunnel Miner Under Pressure

GROUP 7 - Flagperson

PAIN0061F 05/01/2000

CHISAGO, DAKOTA, RAMSEY & WASHINGTON COUNTIES:	Rates	Fringes
PAINTERS:		
GROUP 1	23.50	8.28
GROUP 2	17.63	8.28
GROUP 3	24.25	8.28

PAINTER CLASSIFICATIONS

GROUP 1 - Brush; Drywall Finisher; & Paperhanger
GROUP 2 - Drywall Sander
GROUP 3 - Sandblaster; Spray; Swing Stage; Boatswain Chair; Window Jack; Safety Belt; Erected Structural Steel; Bridges; & Application of Epoxy Materials & Materials containing over 50% Creosote

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PAIN0106I 05/01/2001

ST LOUIS COUNTY	Rates	Fringes
GLAZIERS	20.11	7.24+a

FOOTNOTE:
a. 1 to 4 years' service - 1 week's paid vacation; 5 to 11 years' service - 2 weeks' paid vacation; 11 years' service or more - 3 weeks' paid vacation

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PAIN0106J 05/01/2001

	Rates	Fringes
ST. LOUIS COUNTY:		
PAINTERS:		
REPAINT:		
Brush & Roller	21.23	7.73
Paperhanger, Spray, Steel, and Taper	21.83	7.73
New:		
Brush; Roller	22.73	7.73
Paperhanger, Spray, Steel, and Taper	23.33	7.73

PAIN0386I 05/01/2000

	Rates	Fringes
ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (South & East of a line drawn between the town of Santiago in Sherburne County and the town of Clearwater in Wright County) & WRIGHT COUNTIES:		
PAINTERS:		
Brush; Roller; & Wallpaper Hanger	24.31	7.72
Spray; Steel; Sandblaster; Swing Stage & Epoxy	25.06	7.72

PAIN0386J 05/01/2000

	Rates	Fringes
ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (South & east of a line drawn between the town of Santiago, Sherburne County and the town of Clearwater, Wright County) & WRIGHT COUNTIES:		
PAINTERS:		
Drywall Taper/Finisher	23.97	7.85
Sander	17.98	7.85

PAIN0681E 05/01/2001

	Rates	Fringes
HOUSTON & OLMSTED COUNTIES:		
CORPORATE CITY LIMITS OF ROCHESTER, OLMSTED COUNTY:		
PAINTERS:		
Brush & Roller	22.13	6.07
Paperhanger & Steel	22.38	6.07
Sandblasting & Spray	22.63	6.07
Stageman & Beltman	23.13	6.07
REMAINING AREA:		
$600,000 & over in volume including Electrical & Mechanical:		
PAINTERS:		
Brush & Roller	22.13	6.07
Paperhanger & Steel	22.38	6.07
Sandblasting & Spray	22.63	6.07
Stageman & Beltman	23.13	6.07
Under $600,000 in volume including Electrical & Mechanical:		
PAINTERS:		

Brush & Roller	18.81	6.07
Paperhanger & Steel	19.02	6.07
Sandblasting & Spray	19.24	6.07
Stageman & Beltman	19.66	6.07

APPLICATION OF EPOXY, CREOSOTE OR ALL OTHER HIGHLY TOXIC MATERIALS - $ .25 PREMIUM

PAIN0681H 05/01/2001

HOUSTON & OLMSTED COUNTIES:

	Rates	Fringes
DRYWALL FINISHERS	21.74	6.07
DRYWALL SANDERS	16.31	6.07

PAIN0880A 05/01/1999

	Rates	Fringes
SIGN PAINTERS	21.12	2.08+a+b

FOOTNOTES:

a. 8 Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; the Day After Thanksgiving; the last working Day Before Christmas; & Christmas Day

b. Vacation Pay: 3 yrs' service - 2 wks' paid vacation; 6 yrs' service - 3 wks' paid vacation; 15 yrs' service - 4 wks' paid vacation

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PAIN0884F 06/01/2001

PAINTERS:

BENTON, SHERBURNE (Western one-half, North & West of a line drawn between the city of Santiago in Sherburne County & the city of Clearwater in Wright County) & STEARNS COUNTIES:

	Rates	Fringes
Projects Under $8,000.00:		
GROUP 1	15.21	6.57
GROUP 2	15.21	6.57
GROUP 3	15.81	6.57
All Other Work:		
GROUP 1	19.01	6.57
GROUP 2	19.01	6.57
GROUP 3	19.76	6.57

CLAY & POLK COUNTIES:

Projects Under $8,000.00:		
GROUP 1	14.41	1.87
GROUP 2	14.41	5.85
GROUP 3	15.16	1.87
All Other Work:		
GROUP 1	18.01	1.87
GROUP 2	18.01	5.85
GROUP 3	18.76	1.87

PAINTER CLASSIFICATIONS

GROUP 1: Brush & Roller

GROUP 2: Drywall Taper & Finisher

GROUP 3: Spray; Two Component Paints; Epoxies; Sandblasting & Rigging; Bridge Painting; Work done on Swing Scaffolding, Safety Harness, Boatswain's Chair, Coverings & Erection of Scaffolding for same, Work on Erected Structural Steel, Storage Bins, Tanks, Abrasive Blasting; Steeple Jack Work which applies to Smokestacks, Elevated Tanks & Erected Towers over 35 ft. & Flag Poles; & Structural Supports

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PAIN1324E 06/01/1999

	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLAY, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, POLK, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES:		
GLAZIERS	24.31	7.89

PLAS0265D 06/01/2000

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
PLASTERERS	24.88	8.35

PLAS6330I 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (South of T 55N):		
CEMENT MASONS (Treatment Plants)	21.34	8.15

PLAS6330J 05/01/2000

	Rates	Fringes
HOUSTON & OLMSTED COUNTIES:		
CEMENT MASONS (Treatment Plants):	23.29	4.37

PLAS6330K 05/01/2000

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
CEMENT MASONS (Treatment Plants)	24.99	7.96

PLAS6330L 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (North of T 55N):		
CEMENT MASONS (Treatment Plants)	18.20	9.00

PLAS6330M 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY:		

PLASTERERS 19.62 8.70

PLAS6330N 06/01/2000

	Rates	Fringes
HOUSTON & OLMSTED COUNTIES:		
PLASTERERS	25.25	2.40

PLAS6330O 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (South of T 55N):		
CEMENT MASONS (Heavy, Sewer & Water Lines)	20.33	10.70

PLAS6330P 05/01/2000

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
CEMENT MASONS (Heavy, Sewer & Water Lines)	23.79	7.96

PLAS6330Q 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (North of T 55N):		
CEMENT MASONS (Heavy, Sewer & Water Lines)	18.20	9.00

PLAS6330R 05/01/2000

	Rates	Fringes
HOUSTON & OLMSTED COUNTIES:		
CEMENT MASONS (Heavy, Sewer & Water Lines)	22.69	4.75

PLAS6330U 07/01/1999

	Rates	Fringes
POLK COUNTY:		
CEMENT MASONS (Treatment Plants)	18.35	5.80

PLAS6330W 05/01/2000

	Rates	Fringes
BENTON, CLAY & POLK COUNTIES:		
PLASTERERS	17.75	4.65

PLUM0006E 08/01/2001

	Rates	Fringes
HOUSTON COUNTY:		
PIPEFITTERS; PLUMBERS; & STEAMFITTERS: Mechanical Contracts Up to		

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 $75,000.00                          22.93           8.35
 All Other Mechanical Contracts      28.66           8.35

OLMSTED COUNTY:

PIPEFITTERS; PLUMBERS; &

 STEAMFITTERS                        22.93           8.35
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 PLUM0011H  05/01/2001
                                   Rates           Fringes
ST. LOUIS COUNTY (South of an east-west line drawn through
 Cotton)

 PLUMBERS, PIPEFITTERS,
  and STEAMFITTERS                   26.35           9.15
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 PLUM0015E  05/01/2001
                                   Rates           Fringes
ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (East of a line
running northeasterly from the point of Wright County that lies
furthest north to that point of Mille Lacs County that is south
by west) & WRIGHT COUNTIES:

 PLUMBERS                            27.70           9.17+a

FOOTNOTE:
 a. Paid Holiday:  Labor Day
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 PLUM0015F  05/01/2001
                                   Rates           Fringes
BENTON & STEARNS COUNTIES

 PLUMBERS                            25.80           9.71+a

FOOTNOTE:
 a. Paid Holiday:  Labor Day
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 PLUM0034E  05/01/2001
                                   Rates           Fringes
CHISAGO, DAKOTA, RAMSEY & WASHINGTON COUNTIES

 PLUMBERS                            28.90           9.68+a

 FOOTNOTE:
  a. 1 Paid Holiday:  Labor Day
----------------------------------------------------------------

 PLUM0126E  11/01/2000
                                   Rates           Fringes
CLAY & POLK COUNTIES:

PLUMBERS & STEAMFITTERS:
 Mechanical Projects, excluding
  Sheet Metal, Fire Protection &
  Pipe Insulation of Up to
  $2,000,000                         24.12           7.78

 Mechanical Projects, excluding
```

```
3   Sheet Metal, Fire Protection &
4   Pipe Insulation of $2,000,000
5   & above                              26.52           7.78
6 ----------------------------------------------------------------
7
8  PLUM0417B  06/01/2001
9                                     Rates           Fringes
0 ANOKA, DAKOTA, HENNEPIN, RAMSEY, SCOTT & WASHINGTON COUNTIES:
1
2 SPRINKLER FITTERS                     29.42           11.17+a
3
4 FOOTNOTE:
5  a. 6 Paid Holidays:  Memorial Day; July 4th; Friday before
6  Labor Day; Labor Day; Columbus Day; & Thanksgiving Day
7 ----------------------------------------------------------------
8
9  PLUM0455F  05/01/2001
0                                     Rates           Fringes
1 CHISAGO, DAKOTA, RAMSEY & WASHINGTON COUNTIES
2
3  PIPEFITTERS & STEAMFITTERS           29.10           10.10
4 ----------------------------------------------------------------
5
6  PLUM0539G  05/01/2001
7                                     Rates           Fringes
8 ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (East of a line
9 running North-Easterly from the point of Wright Co.that lies
0 furthest North to that point of Mille Lacs that is South by West)
1 & WRIGHT COUNTIES:
2
3  PIPEFITTERS                          29.77           9.51
4 ----------------------------------------------------------------
5
6  PLUM0539L  05/01/2001
7                                     Rates           Fringes
8 BENTON, SHERBURNE (West of a line running North-Easterly from
9  point of Wright Co. lies furthest North to point of Mille Lacs
0  that is South by West) & STEARNS COUNTIES:
1
2 PIPEFITTERS                           23.72           11.83
3 ----------------------------------------------------------------
4
5  PLUM0589E  06/01/2001
6                                     Rates           Fringes
7 ST. LOUIS COUNTY (North of an East-West line drawn through
8 Cotton)
9
0  PIPEFITTERS; PLUMBERS; &
1   STEAMFITTERS                        23.62           11.42
2 ----------------------------------------------------------------
3
4  ROOF0096U  06/01/1998
5                                     Rates           Fringes
6 ROOFERS:
7  HOUSTON COUNTY                       16.01           3.92
8  OLMSTED COUNTY                       17.34           3.92
9
0 ----------------------------------------------------------------
1
2  ROOF0096V  07/01/2000
3                                     Rates           Fringes
4 ST. LOUIS COUNTY (South of Hwy 16, excluding city of Forbes):
5
6 ROOFERS                               22.20           7.15
```

ROOF0096W 05/01/2000

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI (South of State Highway #95, including Cambridge), RAMSEY, SCOTT, WASHINGTON & WRIGHT (South of County Road #39) COUNTIES:		
ROOFERS	24.94	7.63+a

FOOTNOTE:
a. 1 Paid Holiday: Labor Day

ROOF0096X 06/01/2000

	Rates	Fringes
BENTON, ISANTI (North of State Highway #95, excluding Cambridge), SHERBURNE, STEARNS & WRIGHT (North of Wright County Road #39, from South Haven to Monticello, including both towns) COUNTIES:		
ROOFERS	21.50	5.45

ROOF0096Y 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (Northern two-thirds):		
ROOFERS	18.20	5.20

ROOF0214B 04/01/1998

	Rates	Fringes
CLAY & POLK COUNTIES:		
ROOFERS	10.83	

SFMN0669D 01/01/2002

	Rates	Fringes
BENTON, CARVER, CHISAGO, CLAY, HOUSTON, ISANTI, OLMSTED, POLK, SHERBURNE, ST. LOUIS, STEARNS & WRIGHT COUNTIES:		
SPRINKLER FITTERS	26.36	8.05

SHEE0010U 05/01/2001

	Rates	Fringes
BENTON, SHERBURNE & STEARNS COUNTIES		
SHEET METAL WORKERS	24.91	9.79

SHEE0010V 06/01/2001

	Rates	Fringes
CLAY COUNTY		
SHEET METAL WORKERS	18.94	6.39

SHEE0010W 05/01/2000

	Rates	Fringes
ST. LOUIS COUNTY (Southern one-third):		
SHEET METAL WORKERS	24.28	9.88

SHEE0010X 05/01/2001

	Rates	Fringes
ST. LOUIS COUNTY (Northern two-thirds)		
SHEET METAL WORKERS	24.83	9.57

SHEE0010Y 05/01/2001

	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, WASHINGTON & WRIGHT COUNTIES		
SHEET METAL WORKERS	28.26	10.68+a

FOOTNOTE:
a. Paid Holiday: Labor Day

SHEE0010Z 05/01/2001

	Rates	Fringes
OLMSTED COUNTY		
SHEET METAL WORKERS	25.11	8.72

SHEE1000A 05/01/1999

	Rates	Fringes
HOUSTON COUNTY:		
SHEET METAL WORKERS:		
Sheet Metal Installations of $50,000.00 & Under	17.53	6.49
All Other Work	19.69	6.49

SHEE1000E 06/01/2001

	Rates	Fringes
CLAY COUNTY		
SHEET METAL WORKERS	19.79	6.05

TEAM0132F 05/01/2000

	Rates	Fringes
CHISAGO (Northern half) & ISANTI COUNTIES:		
TRUCK DRIVERS (Treatment Plants)	23.08	

TEAM0160I 05/01/2000

	Rates	Fringes
TRUCK DRIVERS (Heavy, Sewer & Water Lines):		
ANOKA, CARVER, CHISAGO (S. of T. 34-N), DAKOTA, HENNEPIN, RAMSEY, ST. LOUIS, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
GROUP 1	19.80	5.70
GROUP 2	19.25	5.70
GROUP 3	19.15	5.70
GROUP 4	18.90	5.70
BENTON, CHISAGO (N. of T. 34-N), CLAY, ISANTI, POLK & STEARNS		

COUNTIES:

GROUP 1	16.32	5.70
GROUP 2	15.81	5.70
GROUP 3	15.66	5.70
GROUP 4	15.66	5.70

HOUSTON & OLMSTED COUNTIES:

GROUP 1	18.00	5.70
GROUP 2	17.45	5.70
GROUP 3	17.35	5.70
GROUP 4	17.15	5.70

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Boom; Mechanic; Off-Road, including Articulated Dump Truck; Tractor Trailer; Truck Driver (Operation of Hand & Power Operated Winch); & Winches

GROUP 2 - Tri Axles (Including Four Axles)

GROUP 3 - Bituminous Distributor; Bituminous Distributor (One man operation); Tandem Axles; & Single Axles

GROUP 4 - Bituminous Distributor Spray Operator (Rear End Oiler); Dumpman; Pilot Car; Self-propelled Packer; Slurry Operator; Tank Truck Tender (Gas, Oil, Road Oil & Water); Tractor Operator (Wheel type used for any purpose)

THE FOLLOWING CLASSIFICATIONS SHALL COME UNDER THE APPROPRIATE AXLE RATE WAGE GROUP:
"A" Frame; Dry Batch Hauler; Ready-Mix Concrete; Slurry;

Tank (Gas, Oil, Road Oil & Water)

TEAM0221D 05/30/1998

	Rates	Fringes
LANDSCAPE - SOD, TREES, SHRUBS & BLACK DIRT:		
Single Axles & Farm Tractors	12.15	4.00
Tandem Axles	12.30	4.00
Truck-Train Combination	12.45	4.00

TEAM0346D 05/01/1998

	Rates	Fringes
ANOKA, CARVER, CHISAGO (Southern half), DAKOTA, HENNEPIN, RAMSEY, ST. LOUIS, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:		
TRUCK DRIVERS (Treatment Plants):		
GROUP 1 - Boom Truck Operator	19.55	4.50
GROUP 2 - Ready-Mix; Tractor-Trailer	19.00	4.50
GROUP 3 - Mechanic; Fork Lift Operator; & Tandem or 3 Axles	18.90	4.50
GROUP 4 - Farm Tractor; Single or 2 Axles; & Dumps	18.65	4.50

TEAM0405C 05/01/1999

	Rates	Fringes
HOUSTON COUNTY		
TRUCK DRIVERS (Treatment Plants)	15.49	

OLMSTED COUNTY

TRUCK DRIVERS (Treatment Plants) 16.94

TEAM0563C 05/01/1999

	Rates	Fringes
BENTON, CLAY (Except City limits of Moorhead) & STEARNS COUNTIES:		
TRUCK DRIVERS (Treatment Plants):		
Total Construction Projects of Over $950,000.00	15.59	
Total Construction Projects Under $950,000.00	13.84	

TEAM0580C 04/19/1999

	Rates	Fringes
CLAY (Moorhead) & POLK (East Grand Forks) COUNTIES:		
TRUCK DRIVERS (Treatment Plants)	14.05	

TEAM1097B 05/01/1999

	Rates	Fringes
POLK COUNTY (Excluding the city limits of East Grand Forks):		
TRUCK DRIVERS (Treatment Plants):		
Under $760,000.00, including Mechanical & Electrical	11.86	
$760,000.00 & Over, including Mechanical & Electrical	13.95	

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

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

In the listing above, the "SU" designation means that rates listed under that 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, D. C. 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, D. C. 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, D. C. 20210

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

END OF GENERAL DECISION

SECTION 00830

ATTACHMENT 2

MATERIAL SOURCES

Material Sources

Fine Concrete Aggregate

Forester Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	NW 1/4, Sec. 32 T 160 N, R 46 W Kittson County, MN
Trail Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	Sec. 25 T 150 N, R 40 W Polk County, MN
Anderson Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	Sec. 6 T 138 N, R 41 W Becker County, MN
Loeffler Pit Loeffler Concrete & Gravel (218) 265-2676	E 1/2, Sec. 17 T 160 N, R 46 W Kittson County,MN

Coarse Concrete Aggregate and Base Course

J & S Gravel Pit Northern Paving Co. (218) 281-5101	SE 1/4, Sec. 30 T 150 N, R 44 W Red Lake County, MN
Forester Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	NW 1/4, Sec. 32 T 160 N, R 46 W Kittson County, MN
Trail Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	Sec. 25 T 150 N, R 40 W Polk County, MN
Anderson Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	Sec. 6 T 138 N, R 41 W Becker County, MN
Loeffler Pit Loeffler Concrete & Gravel (218) 265-2676	E 1/2, Sec. 17 T 160 N, R 46 W Kittson County,MN

Riprap and Bedding

Trail Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491	Sec. 25 T 150 N, R 40 W Polk County, MN

Dave Dunham Pit Felton, MN (218) 494-3360	Sections 28 and 29 T 142 N, R 45 W Clay County, MN
Aggregate Industries, Inc. (Formerly CAMAS Kost Division) (218)236-9640	T 142 N, R 45 W W 1/2, Section 32 Clay County, MN

(NOTE: The Contractor may utilize off-site fieldstone from surrounding farm fields along with cobbles and boulders from sand and gravel operations in the surrounding area if such materials can be processed to meet the applicable contract requirements.

-- End of Section --

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01/02

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SECTION 01000

GENERAL
01/02

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

The work of this contract includes, but is not limited to, construction of levees, cutoff channel, pump stations, storm sewer systems, sanitary sewer, watermain, bituminous roads,MSE walls and landscape features.

1.2 ORGANIZATION OF SPECIFICATIONS

The specifications which govern the materials and equipment to be furnished and the work to be performed under this contract are listed in the Table of Contents. No attempt has been made in the specifications to segregate work to be performed by any trade, craft, or subcontractor. Any segregation between the trades or crafts shall be solely a matter for agreement between the Contractor, Contractor's employees, and subcontractors.

1.3 REFERENCES

Reference to the standards, specifications, or codes of any technical society, organization, or association, or local, state, or Federal authority shall mean the specific edition or revision listed.

1.4 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-04 Drawings

Utility As-Builts; FIO

The Utility As-Builts are described under PARAGRAPH: SURVEYS.

SD-08 Statements

Dewatering Plan; FIO

The submittal requirements are as described in PARAGRAPH: DEWATERING OPERATIONS.

Shoring plan; FIO.

The submittal requirements are described in PARAGRAPH: SHORING.

Haul Route Permits; FIO.

The submittal requirements are described in PARAGRAPH: HAUL ROUTES.

Utility Service Interruption Request; GA.

Submit request to interrupt utilities as described in PARAGRAPH: INTERRUPTION OF SERVICES.

Traffic Control Plan; GA

A traffic control plan shall be submitted as described in PARAGRAPH: ROADWAYS.

Levee Removal/Flood Protection Plan; GA

A plan for removal of levees and flood protection during construction operations shall be submitted as described in PARAGRAPH: Levee Removal.

SD-09 Reports

Preconstruction Damage Report; FIO

Preconstruction damage reports shall be submitted as described in PARAGRAPH: PRECONSTRUCTION DAMAGE SURVEY.

1.5 MEASUREMENT AND PAYMENT

The Contractor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract line items on the bidding schedule.

PART 2 PRODUCTS

2.1 APPROVAL OF MATERIALS OR ALTERNATES

Requests for approval of materials and products, or substitutes thereof, will not be considered prior to award of the contract.

2.2 WARRANTIES

Any items that are submitted for review or approval of the Contracting officer should include a copy of the manufacturer's standard warranty if one is available.

PART 3 EXECUTION

3.1 GROUNDS AND ROADWAYS

3.1.1 Availability of Grounds

The boundary limits of the grounds made available for the Contractor's use during the life of the contract are shown on the drawings. Any additional rights-of-way or grounds desired by the Contractor shall be obtained by the Contractor at its own expense, and copies of agreements for the use of such rights-of-way shall be furnished to the Contracting Officer before entering thereon. Such agreements shall clearly relieve the Government of any responsibility for damages resulting from the use of the grounds.

3.1.2 Drainage Facilities

Insofar as natural drainage from protected areas and agricultural fields is obstructed by contract operations, it shall be the Contractor's responsibility to make adequate provision for accommodating such drainage in a satisfactory manner during the life of this contract, either by temporary means or by use of the permanent construction and operation of the permanent facilities.

3.1.3 Roadways

3.1.3.1 Traffic Control Plan

A traffic control plan including, but not limited to, road closures, detour drawings, traffic signage lists and locations, and a schedule of traffic modifications shall be submitted for approval. The traffic control plan shall be in accordance with the Minnesota Manual on Uniform Traffic Control Devices. The Contractor shall coordinate with the City of Crookston and Mn/DOT to determine restrictions on road closures and detours. Known restrictions are listed below:

1) Ash Street and Houston/Loring Street shall not both be closed at the same time. At the end of each days work, two way traffic must be able to flow on the street that remains open. Provide flagmen or temporary signals to control traffic during work hours.

2) Oxcart Days is held each summer in the City of Crookston. Contractor shall coordinate construction operations to minimize the impact on vehicle and pedestrian traffic on Elm Street, 3rd Avenue and Central Park during the timeframe.

3.1.3.2 Traffic hazards

When continuous haul operations or other conditions created by the Contractor's operations result in interference or hazard to traffic on streets and highways, beyond that of ordinary public usage, the Contractor shall erect warning signs and provide flagging services as necessary to safeguard the public as required in SECTION 01500: TEMPORARY CONSTRUCTION FACILITIES.

3.1.3.3 Haul routes

The Contractor shall be responsible for securing all permits (including fees) required along haul routes. The Contractor shall be the sole permittee and shall be responsible for meeting all obligations of the

permits. A copy of each permit shall be submitted to the Contracting Officer. The Contractor, as between the Government and the Contractor, has sole responsibility for damage or deterioration of the Contractor's haul routes. Dust control shall be provided as stated in SECTION 01410: ENVIRONMENTAL PROTECTION.

3.2 DISPOSAL OF DEBRIS AND WASTE

The Contractor's attention is directed to SECTION 01410: ENVIRONMENTAL PROTECTION and to the following SECTION 00700: CONTRACT CLAUSES: PERMITS AND RESPONSIBILITIES; PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, EQUIPMENT, AND IMPROVEMENTS; OPERATIONS AND STORAGE AREAS; and CLEANING UP. Burning will not be permitted at the project site and debris or waste shall not be left on the site. Disposal of clearing and grubbing debris shall be by the following method:

3.2.1 Disposal Offsite for Useful Purposes

In the interest of conservation, it is required that the Contractor make a reasonable effort to dispose of the material offsite for some useful purpose. Timber may be cut into convenient lengths and utilized for making saw logs, posts, cordwood, wood chips for paper making or other uses, or other similar use.

3.2.2 Disposal in a Locally-Operated Sanitary Landfill

Contractor shall select the disposal site with the approval of the Contracting Officer. The Contractor shall secure the required permits for disposal and provide copies of the permit to the Contracting Officer.

3.2.3 Disposal of Solid Construction Debris and Waste

Disposal of solid construction debris and waste shall consist of removal from Government property and disposal in compliance with federal, state and local requirements for solid waste disposal. Contractor shall select the disposal site with the approval of the Contracting Officer.

3.3 EXISTING UTILITIES

3.3.1 General

The Contractor shall coordinate all utility relocation requirements. The Contractor shall make payment to the utility companies for all services, fees, and permits required to relocate and reestablish service for utilities relocated for the convenience of the Contractor's operations. The Contractor shall be responsible for all costs related to protecting existing utilities.

3.3.1.1 Utility Relocations

The existing utilities to be removed or relocated by the Contractor are shown on the drawings. Private utility companies are responsible for removing and relocating other existing utilities that penetrate through or under the new levees and existing utilities that conflict with new

facilities constructed under this contract. The Contractor shall coordinate with the City of Crookston and Mn/DOT and the utility companies to ensure that relocation of the utilities is performed without causing delay to the project.

3.3.1.2 Utility Coordination Meetings

The City of Crookston conducts weekly coordination meetings with utility companies that service the Project areas. The Contractor shall attend each meeting. The meetings are to be held each Wednesday morning at the City Hall in Crookston, Minnesota. If necessary, the meeting date, time, and location may occasionally be changed due to conflicts, to other dates, times, and locations within the City.

3.3.2 Buried Utilities

The approximate locations of known existing buried utilities are shown on the drawings to the extent of available information at the time the drawings were prepared. In general, no service connections are shown. Prior to commencing excavation, the Contractor shall accurately locate all such installations. In the event the Contractor damages any existing utility lines, report thereof shall be made immediately to the Contracting Officer. If the Contracting Officer determines that repairs shall be made by the Contractor, such repairs shall be performed immediately. The costs associated with repairs shall be borne by the Contractor.

3.3.3 Interruption of Services

Utility services shall not be interrupted except for brief periods to facilitate cut-ins. The Contractor shall provide temporary service and shall relocate existing utilities as required to construct the work shown and insure uninterrupted service. If interruption of services is unavoidable, the Contractor shall request approval in writing at least 30-calendar days prior to the proposed interruption. This submittal shall fully describe all details of proposed interruption and the reasons why alternatives are not feasible. The Contractor shall further coordinate with the owner of the utility and notify affected consumers at least 10-calendar days in advance of interruption of services. The Contracting Officer will not in general approve proposals which require interruption of services for more than 4 continuous hours.

3.3.3.1 Sanitary Sewer Forcemains

Interruption of service of sanitary sewer forecemains will not be allowed. Relocation of sanitary sewer forcemains shall be performed without interruption of service as described in SECTION 02532: FORCEMAINS.

3.3.4 Minnesota One Call Excavation Notice System

For contract work performed within the State of Minnesota, the Contractor shall meet the requirements of Minnesota Statutes, Chapter 216D "One Call Excavation Notice System." The Gopher State One Call notification center telephone numbers are:

Hotline: (651) 454-0002
Outstate: (800) 252-1166

3.4 SCHEDULING

3.4.1 General

It shall be the responsibility of the Contractor to schedule and execute the work, incorporating the necessary requirements set forth in these specifications. The Contractor shall develop and submit a schedule in accordance with SECTION 00800: SPECIAL CONTRACT REQUIREMENTS: SCHEDULES FOR CONSTRUCTION CONTRACTS.

3.4.2 Final Completion

The Project shall be completed and ready for final acceptance by October 15, 2003.

3.4.3 Notification

The Contractor shall inform the Government in writing within 5 days after receipt of notice to proceed and before work begins as to which hours of the day and days of the week work under this contract will be performed. The Contractor shall notify the Government at least 24 hours before work is to be conducted on overtime, in multiple shifts, on weekends, or on Federal Government holidays.

3.4.4 Work Hours

The City of Crookston has a noise ordinance. In accordance with the noise ordinance, work at the project site shall not be performed earlier than 7:00 a.m. and not later than 7:00 p.m. while working within the project limits except for Cutoff Channel 3. Verify working restrictions and requirements with MNDOT prior to starting work at the Thorndale locations.

3.5 CONSTRUCTION RESTRICTIONS

3.5.1 Blasting

Blasting will not be permitted.

3.5.2 Protection of Trees

Trees to be protected shall be determined and staked by the Contracting Officer. The following measures shall be implemented for tree protection and shall be addressed in the Environmental Protection Plan required under SECTION 01410:

a. The trees shall be protected from wounds to the bark and foliage.

b. The critical root zone shall be protected from compaction and grading.

c. Changes in temporary site drainage and ponding shall be minimized

to the extent possible that it effects the protected trees.

The critical root zone of trees designated to be protected shall be surrounded by a high visibility fence 4 feet in height, supplied and erected by the Contractor. The critical root zone shall be defined by an area extending 1.5 feet radius from each tree for each inch of Diameter at Breast Height (DBH). The fence shall be securely erected and installed prior to any movement through the project site by construction vehicles or equipment, and remain in place until construction and clean-up are completed. The critical root zone shall remain free of all construction activities including trenching, staging, stockpiling and storage of materials. Vehicles and equipment shall not drive or park within the critical root zone. Variation to the critical root zone size or configuration will only be permitted where it is absolutely necessary for construction of the project, and requires approval of the Contracting Officer. Short duration alterations of the critical root zone involving wood chips and limited equipment travel shall be submitted in writing for approval.

The Contractor shall not operate equipment in vegetated areas outside the work limits.

3.5.2.1 Restoration of Damaged Trees

Any existing tree designated to be protected that is damaged by the Contractor's operations shall be replaced. Trees will be considered damaged if the critical root zone in cohesive soils is compacted, if there are significant wounds that could contribute to rot, or if distress (evident by reduced growth or other observations of distress documented by a forester) is observed prior to closing the contract. Trees shall be replaced in kind on a caliper inch per caliper inch basis (DBH) (i.e. one 6-inch red oak shall be replaced with two 3-inch red oaks, three 2-inch red oaks, or six 1-inch red oaks). Replacement trees shall be planted in accordance with SECTION 02930: EXTERIOR PLANTING and guaranteed with the Contractor's standard warranty. Replacement tree size and location will be determined and staked by the Contracting Officer. Repair by pruning, aeration, soil conditioning, or other recommendation from a qualified forester will be considered as substitution for replacement by the Contracting Officer.

3.5.3 Pavement Removal and Replacement.

Where roads are cut, removed, or otherwise damaged in the prosecution of the work the Contractor shall replace all pavements or other surfacings so removed or damaged to their preconstruction condition, unless otherwise specified or indicated. After backfill is completed on paved streets, a temporary surface shall be laid down and the street opened to the traffic in order to provide access to abutting property. Restoration of the original street surface construction shall be completed no later than 60-calendar days after starting excavation. Should weather conditions preclude the restoration of the original surface material, temporary resurfacing utilitizing a bituminous mixture shall be installed with the final surface constructed no later than June 1 of the following construction season.

3.5.4 Borrow and Disposal Areas

3.5.4.1 Levee Fill Borrow Sources

Primary levee fill borrow sources are as follows:

a. Excavated material - Cutoff Channel 3
b. Emergency levee stockpiles - Myrtle street and Riverside Avenue, source for select impervious fill.
c. Excavated material stockpile - Cutoff Channel 1, about one mile west of Cutoff Channel 3.

Each additional borrow area is subject to the approval of the Contracting Officer. Proposed borrow areas which involve the excavation of wetlands or wooded areas will not be approved by the Contracting Officer.

3.5.4.2 Borrow and Disposal Area Approval

Each borrow area and disposal area is subject to the approval of the Contracting Officer. Proposed borrow areas which involve the excavation of wetlands or wooded areas will not be approved by the Contracting Officer. Disposal areas which involve the placement of materials in wetlands or floodplains areas will require a minimum of 30-calendar days for review for approval and disapproval.

3.5.5 Contaminated Materials

The Contractor shall comply with all applicable federal, state, and local requirements if contaminated soils, materials, and/or groundwater is/are encountered during construction activities within the contract project work limits. If contaminated materials/areas are encountered, the Contractor shall immediately notify in writing the following regarding such: the Contracting Officer, and each appropriate federal, state, and local agency. All work associated with implementation of a contingency plan and handling and/or disposal of contaminated soils, materials, and or groundwater shall be performed in accordance with CONTRACT CLAUSE: CHANGES.

3.5.6 Accident Prevention Plan

The contractor's accident prevention plan, as required in CONTRACT CLAUSES: ACCIDENT PREVENTION, shall specifically address site safety and monitoring with regards to possible encounters with contaminated soils, materials, and/or groundwater. The Contractor's accident prevention plan shall also include a contingency plan to be implemented immediately upon encountering contaminated soils, materials, and/or groundwater.

3.5.7 Work In Vicinity of River Banks

To the greatest extent possible, Contractor shall not stockpile material or use heavy equipment within 100 feet of the existing river banks.

3.5.8 Environmental Assessment of Contractor Deviations

Any deviations, requested by the Contractor, from the drawings 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.

3.5.9 Levee Removal

The work shall be sequenced so that the level of protection afforded by existing levees is maintained for areas within the final constructed levee alignment. When existing levee integrity is removed, the Contractor shall be prepared to provide, if necessary, and shall provide when directed by the Contracting Officer, flood protection equal to the level of protection of the existing levees prior to starting construction. The Contractor shall submit a sequencing plan which:

a) Identifies areas where sequencing is necessary to maintain flood protection.

b) Indicates how the work will be sequenced in the identified areas so that the potential exposure to flood threat is minimized and,

c) Indicates how any reduction to levee protection, due to the Contractor's operations, will be restored when directed by the Contracting Officer.

3.6 OTHER CONTRACTS

The Contractor shall coordinate with other contractors in the performance of the work and schedule such work to provide for a minimum of delays and interferences. Coordination shall be through the Contracting Officer. Work listed below is currently required under separate contract or is scheduled to be awarded as a separate contract prior to completion of work under this contract. These contracts will be considered in the application of SECTION 00700: CONTRACT CLAUSE: OTHER CONTRACTS.

3.6.1 Other Contracts

Contracts for work within the project limits will be performed by others concurrent with this project.

3.7 GOVERNMENT-FURNISHED EQUIPMENT

(NOT USED)

3.8 SHORING

3.8.1 General

At locations where shoring is not specifically required by the contract documents to safeguard adjacent structures, the Contractor may at its own option employ shoring for protecting work areas within excavations in lieu of performing excavation to safe and stable side slopes. The Contractor

shall construct all shoring required in performing the excavations. Shoring shall be constructed in accordance with the safety requirements of EM 385-1-1.

3.8.2 Responsibility

The Contractor shall be responsible for design and maintenance of all shoring which the Contractor proposes to install. Shoring plan and design computations for all shoring used shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES at least 30 days prior to installation.

3.8.3 Removal

Unless otherwise authorized, all sheeting and bracing shall be removed when backfill is completed.

3.9 DEWATERING OPERATIONS

3.9.1 Scope

The Contractor shall design, furnish, install and operate dewatering systems in the execution of the contract work. The work involves the drawdown of water table and construction of temporary barriers (small cofferdams, earth dikes, sheeting, or other satisfactory types of barriers) to protect against the prevailing river stages and to permit, where specified or shown, placement of concrete, utilities, and fill in the dry.

3.9.2 Payment

No separate payment will be made for dewatering on this project and compensation for all dewatering operations will be included in the respective contract items to which the work pertains.

3.9.3 Requirements

Control of groundwater shall be accomplished in a manner that will provide suitable working conditions for construction, preserve the strength of the foundation soils, will not cause instability of excavations, and will not result in damage to existing structures. Suitable working conditions for construction will provide a dry or moist subgrade free of standing, percolating, or running water during placement and curing of concrete, and placement and compaction of backfill. Where necessary to these purposes, the water level shall be lowered in advance of excavation utilizing wells, wellpoints, or similar methods. For structure foundations, the water level (as measured in piezometers) shall be maintained a minimum of 2 feet below the prevailing excavation level.

3.9.3.1 Design

If conditions warrant, and if not otherwise specified in the contract documents, dewatering may consist of collection in sumps or trenches, and open pumping. Sumps, trenches and running water shall not jeopardize erosion or ground loss near foundations, pipes, or other structures. Open pumping will not be permitted if it results in boils, seepage in concrete

placement areas, loss of fines, softening of the ground, instability of slopes, or interference with orderly progress of the construction.

3.9.3.2 Regulations

Compliance with all regulations shall be incidental to the dewatering work. Disposal of water shall be in accordance with SECTION 01410: ENVIRONMENTAL PROTECTION and all applicable regulations. Dewatering water may be discharged through the City's storm water system. Well abandonment shall seal aquifers and confining layers in compliance with environmental regulations and permits.

3.9.3.3 Operation

Upon installation and commencement of dewatering operations, the system shall be operated continuously (24 hours/day, 7 days/week) until the structure and backfill are completed to the groundwater elevation. The Contractor shall be responsible for maintaining the system.

3.9.3.4 Removal

Upon completion of the work, well casing and screens shall be withdrawn, and all equipment shall be removed (including related temporary cofferdams, shoring, etc.)

3.9.4 Geologic and Hydrologic Information

Ground water elevations shown on the boring logs are those encountered at the time the borings were taken. Because groundwater elevations are dependent upon hydrologic conditions, variations in the water table should be expected. For work near the Red River of the North, refer to the hydrographs included with the contract drawings. It shall be the Contractors responsibility to perform the necessary dewatering operations irrespective of the water elevations at the time of the work. However, nothing in this clause prohibits the Contractor from receiving a time extension under the Default clause, the Time Extensions for Unusually Severe Weather clause, or any other clause in this contract.

3.9.5 Specific Requirements for Wells

3.9.5.1 Screens

Wells and wellpoints shall be installed with suitable screens and filters so that continuous pumping of fines does not occur. Pumps shall discharge into a settling tank to check for movement of sand. Wells shall be sealed in accordance with State Health Department requirements.

3.9.5.2 Setback

The following criteria shall be followed to the maximum extent possible. Where permanent site features restrict placement of dewatering devices, the Contracting Officer will allow a variance. Wellpoints shall be located a minimum horizontal distance away from structures (existing and proposed) equal to the depth of penetration below foundation elevation. Wells larger

than 3 inches diameter shall be located a minimum horizontal distance away from structures equal to the depth of penetration below foundation elevation plus half the depth of penetration above foundation elevation.

3.9.5.3 Roads and Levees

Wells larger than 3-inches diameter shall not be jetted through roadway and levee embankments. Wells larger than 3-inches diameter located on the up-gradient side of levees, dikes, dams or floodwalls shall be screened without a gravel filter pack. These wells shall be abandoned by plugging the hole with a cement-bentonite grout. The screens shall include a loose end cap to allow removal of screen and casing without hole collapse.

3.9.6 Dewatering Plan

At least 30-calendar days prior to commencing work on the installation or construction of dewatering protection, the Contractor shall submit for review by the Contracting Officer prints showing plans and details of the type of construction, including shoring proposed for installation at each location. The design shall be in accordance with sound engineering practice as approved. This submittal data shall include computations covering the analysis and design layout, proposed methods of protection of construction work that would be subject to exposure to channel flows exceeding the dewatering protection capacity, type and spacing of dewatering devices, number and size of pumps and other equipment, together with a description of the installation and operating procedures, including relationship to the construction operations. The plan shall be reviewed and signed by a Registered Professional Engineer. The plan shall include the following items:

1. layout (including the relationship to site improvements and construction operations)

2. type, sizes, depth and spacing of dewatering devices

3. number and capacity of pumps

4. design assumptions, analysis methods, and calculations
   - 4A. justification for pump capacity
   - 4B. justification for slot size on screens
   - 4C. justification for screen intake area
   - 4D. justification for filter pack gradation

5. description of installation equipment

6. description of operating procedures

7. description of discharge point (weirs, sedimentation basin, etc.)

8. type and location of monitoring equipment

9. removal and abandonment plans

3.9.7 Liability

Government review of the proposed dewatering system will not relieve the Contractor of full responsibility for the adequacy of the dewatering operations. The Contractor shall be responsible for dewatering effects on adjacent properties, including but not limited to blockage of easements, erosion or sedimentation of ditches, and encroachment onto private property by flooding from pump outlets and sedimentation basins.

3.9.8 Related Work

Shoring, trench support systems, cofferdams and diversion structures shall be coordinated with the dewatering effort to provide safe and reliable conditions.

3.9.9 Surface Water Management During Construction

The Red Lake River is prone to experience extremely high flood stages of relatively long duration. The Contractor shall be responsible for monitoring local weather conditions and flow conditions in order to anticipate flooding conditions prior to their occurrence. The Contractor shall keep the Contracting Officer informed regarding all flooding conditions on the project.

The Contractor should satisfy itself before submitting its bid as to hazards that arise from weather conditions and flooding. Red Lake River rating curves and hydrographs are included in the contract drawings.

3.10 SURVEYS

3.10.1 Field Layout

The Contractor shall layout the work from the Government established bench marks in accordance with SECTION 00800: CONTRACT CLAUSE LAYOUT OF WORK. The construction of each feature of work shall follow the alignments as indicated on the drawings. The Contractor shall have in place, at least 7 calendar days prior to commencing construction operations, sufficient stakes and markings to enable the Contracting Officer to observe the field layout of the alignment and limits of each feature of work. For each feature of work, these stakes shall define areal limits such that the Contracting Officer can easily determine, without additional surveys, if alignment and/or limit adjustments need to be made. For embankments, levees, and similar work, these stakes shall define centerline, stationing, outermost fill/cut limits, and work limits. For structures and similar work, the corners shall be staked. General site work shall be staked to define staging areas, storage areas, and other area limits as directed. The Contracting Officer may waive these requirements for certain areas. The layout shall be sufficient for the Contracting Officer to mark trees, vegetation and other features to be left undisturbed. No work shall take place without approval of field layout by the Contracting Officer.

3.10.1.1 Alignment Changes

The Government reserves the right to make changes in the alignment of any feature of work as may be found necessary during the course of the contract. If it becomes necessary, through no fault of the Contractor, equitable adjustment for completed work will be made. No alignment changes or abandonment shall take place without prior written notice from the contracting Officer.

3.10.2 Utility As-builts

An as-built field survey of all utilities shall be conducted after installation to determine the final locations and elevations of all utility structures such as manholes, catch basins, hydrants, gate valves, cleanouts, service connections, and other special controls or structures. Final elevations shall be determined for all sewer inverts and castings. Locations shall be shown using the same convention as the original contract drawings(typically stationing and offset from known centerline). If no convention is used in the contract drawings, locations shall be tied to at least 2 permanent landmarks.

3.10.3 Quantity Surveys

The Contractor shall perform quantity and tolerance verification surveys for all features of work in accordance with SECTION 00800: SPECIAL CONTRACT REQUIREMENTS: QUANTITY SURVEYS--ALTERNATE I. Unless changed by the Contracting Officer, the Contractor shall provide cross sections at 100 foot intervals to verify the required section. Areas where payment for material is specified by volume shall be surveyed by the Contractor, prior to commencement of construction of each feature and upon completion of each feature, in enough detail to accurately determine quantities and verify the required section. The Contractor shall also provide a copy of the survey notes and cross sections to the Contracting Officer within 10 days after completion of the survey.

3.11 PRECONSTRUCTION DAMAGE SURVEY

Prior to the start of contract construction operations in an area, the Contractor shall conduct preconstruction property damage surveys. These surveys shall be performed initially and repeated later as required.

3.11.1 Contacting

The Contractor shall have both letter and personal contact with residents, institutional operators, and/or business establishments that are within the project work limits or near enough for ground and noise vibrations to be considered objectionable. This contact shall be made prior to beginning potential vibration-producing activities. The Contractor shall submit a list of those individuals and companies contacted prior to vibration-producing activities.

3.11.2 Preconstruction Structure Surveys

Preconstruction surveys shall be performed by qualified specialists, as

approved, and retained by the Contractor for observing the condition of existing structures in the vicinity of the work at required intervals. Each survey shall include all existing structures located entirely or partially within 100 feet of the proposed work limits. Each structure shall be completely surveyed even if only part of the structure is located within the survey limits. The preconstruction survey shall produce a report including diagrams as necessary of accessing all existing foundations, floors, walls, partitions, and roofs as determined by the Contracting Officer. The report shall show and describe existing interior and exterior cracks, including elevations and photographs and video tapes of cracks/damage, and such other data as applicable to locate and define the amount and extent of existing damage. All existing structure deficiencies, major or minor, shall be identified and recorded. Crack displacement monitoring gages shall be installed as appropriate in structures within a radius of 100 feet of the contract work in order to help verify distress if any should develop. Crack displacement monitoring gages shall be read by the Contractor on a weekly basis.

3.11.3 Preconstruction Condition Surveys

The Contractor shall photograph and video tape facilities within the work limits, including, but not limited to, roads,borrow areas, side walks, trees, shrubs, and lawns prior to working in an area in order to document the preconstruction conditions. The Contractor shall also take photographs and video tape the conditions in the same areas upon completion of the project.

3.11.4 Preconstruction Survey Reports

The Contractor shall prepare and submit to the Contracting Officer, prior to the start of contract construction work/activities at each work site, two bound copies of each preconstruction damage report containing surveys, photographs, and video tapes, sketches and diagrams, field notes taken, descriptions and reports, all signed and witnessed by the persons involved in the survey. Thereafter, as contract work progresses, the Contractor shall resurvey as often as necessary, as required by the Contracting Officer, in order to verify the adequacy of the Contractor's construction methods for prevention of damage and to obtain sufficient evidence for use in defense against possible claims for damage from third parties. Data obtained by the Contractor from each resurvey shall be submitted to the Contracting Officer within 5 calendar days after the Contractor has obtained it.

3.11.5 Contractor Responsibility

Nothing contained herein shall relieve the Contractor of responsibility for claims arising from its construction operations. Failure to inspect any structure, whether or not required by the contract documents, or inadequacy of the inspections shall not relieve the Contractor of its responsibilities.

-- End of Section --

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SECTION 01090

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SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS
01/02

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 sponsoring organization, e.g. ASTM B 564 Nickel Alloy Forgings. However, when the sponsoring 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 organizations whose publications 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 sponsoring 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
Internet: http://www.aci-int.org
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AGRICULTURAL MARKETING SERVICE (AMS)

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Fax: 301-504-8098
Internet: http://www.ams.usda.gov/lsg
e-mail: james_p_triplitt@usda.gov
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Internet: www.aashto.org
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NOTE: AASHTO documents with numbers beginning with M or T are available only in Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1998 @$289.00\X

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Fax: 610-832-9555
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NOTE: The annual ASTM Book of Standards (66 Vol) is available for $3500.00. Prices of individual standards vary.

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e-mail: marketing@asce.org
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3246 Fall Creek Highway, Suite 1900
Grandbury, TX 76049-7979
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Fax: 817-326-6306
NOTE: AWPA Book of Standards is published yearly @$75.00; individual standards may be ordered separately for $12.00 to $28.00 each.

ASPHALT INSTITUTE (AI)

Research Park Dr.
P.O. Box 14052
Lexington, KY 40512-4052

Ph: 606-288-4960
Fax: 606-288-4999
Internet: www.asphaltinstitute.org
e-mail: asphalti@asphaltinstitute.org

CODE OF FEDERAL REGULATIONS (CFR)

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Fax: 202-275-7703
Internet: http://www.pls.com:8001/his/cfr.html

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Schaumburg, IL 60173-4758
Ph: 847-517-1200
Fax: 847-517-1206
Internet: http://www.crsi.org

CORPS OF ENGINEERS (COE)

Order from:
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Branch, TIC
3909 Halls Ferry Rd.
Vicksburg, MS 39180-6199
Ph: 601-634-2571
Fax: 601-634-2506
NOTE: COE Handbook for Concrete and Cement (Documents w/prefix CRD-C) (1949-present; 2 Vol) free to Government offices; $10.00 plus $8.00 per yr for 4 qtrly supplements to others). Individual documents, single copies free. Order from address above.

DEPARTMENT OF AGRICULTURE (USDA)

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ENVIRONMENTAL PROTECTION AGENCY (EPA)

Public Information Center
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Washington, DC 20460
Ph: 800-490-9198
FAX: 202-260-6257
Internet: http://www.epa.gov
NOTE: Some documents are available only from: National Technical Information Services (NTIS)
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Springfield, VA 22161
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Fax: 703-321-8547
Internet: http://www.fedworld.gov/ntis/ntishome.html

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Fax: 610-522-8441

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Glen Ellyn, IL 60137
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Note: First price is for the standard only. Second price is for the standard including the Revision Subscription Service.

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SECTION 01270

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02/02

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SECTION 01270

MEASUREMENT AND PAYMENT

02/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Quantity Surveys; FIO.

The Quantity Surveys are described in SECTION 01000: GENERAL: SURVEYS.

1.2 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.

1.2.1 Preconstruction Damage Survey

1.2.1.1 Payment

Payment will be made for costs associated with operations necessary for conducting preconstruction damage surveys. Work shall include, but not be limited to contacting property owners, photography, video photography, surveys, instrumentation, and preparation of reports.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.2.2 Demolition

1.2.2.1 Payment

Payment will be made for costs associated with operations necessary for demolition and removal of existing structures. Items to be demolished includes, but is not limited to storm sewer structures and piping, bituminous pavement, concrete pavement, concrete curb and gutter, foundations and slabs from removed homes, utility services, watermain, sanitary sewer piping and structures, and pipe bulkheads. Debris shall be taken off site for proper disposal.

1.2.2.2 Unit of Measure

Unit of measure: lump sum.

1.2.3 Clearing and Grubbing

1.2.3.1 Payment

Payment will be made for the costs associated with operations necessary to clear and grub within the work limits shown. Work shall include, but not be limited to, clearing, grubbing, removal of snags, and disposing of associated debris. No allowances will be made for clearing and grubbing outside the limits of construction unless authorized.

1.2.3.2 Unit of Measurement

Unit of measure: lump sum.

1.2.4 Headwalls with Flap Gates

1.2.4.1 Payment

Payment will be made for the costs associated with operations necessary for construction of headwall structures with flap gates. Where multiple structures are to be constructed, payment shall include all structures. Work shall include, but is not limited to excavation, concrete, reinforcement, formwork, backfill, riprap, bedding, geotextile filter, flap gate and other miscellaneous metals, and temporary shoring, dewatering, and traffic control as needed.

1.2.4.2 Unit of Measure

Unit of measure: lump sum.

1.2.5 Trees

1.2.5.1 Payment

Payment for trees will be made for costs associated with furnishing, installing, mulching, watering, and maintaining the trees shown and specified.

If the Government requires additional trees and associated beyond that shown or specified in the Contract, the Contractor will receive compensation for additional materials and work in accordance with the clause CHANGES.

1.2.5.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.6 Shrubs

1.2.6.1 Payment

Payment for shrubs will be made for costs associated with furnishing, installing, mulching, watering, and maintaining the shrubs shown and specified.

If the Government requires additional shrubs and associated materials and work beyond that shown or specified in the Contract, the Contractor will receive compensation for additional materials and work in accordance with the clause CHANGES.

1.2.6.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.7 Catch Basin Structures (Storm Sewer Structures)

1.2.7.1 Payment

Payment for catch basins will be made for costs associated with furnishing and installing catch basin structures, including but not limited to, excavation, concrete catch basin sections, masonry block, mortar and concrete, catch basin frame and cover, steps, bedding, backfill, shoring, and dewatering as necessary.

1.2.7.2 Unit of Measurement

Unit of Measure: lump sum

1.2.8 Manhole Structures (Storm Sewer Structures)

1.2.8.1 Payment

Payment for manholes will be made for costs associated with furnishing and installing manhole structures, including but not limited to, excavation, concrete manhole sections, masonry block, mortar and concrete, manhole frame and cover, manhole steps, bedding backfill, shoring, and dewatering as necessary.

1.2.8.2 Unit of Measurement

Unit of Measure: lump sum

1.2.9 Manhole Standard Over Existing Sewer (Storm Sewer Structures)

1.2.9.1 Payment

Payment for standard manholes over existing sewer will be made for costs associated with furnishing and installing manhole structures, including but not limited to, excavation, protection of existing sewer, concrete manhole sections, masonry block, mortar and concrete, manhole frame and cover, manhole steps, bedding backfill, shoring, and dewatering as necessary.

1.2.9.2 Unit of Measurement

Unit of Measure: lump sum

1.2.10 Gate Valve Manhole Over Existing Sewer (Storm Sewer Structures)

1.2.10.1 Payment

Payment for gate valve manholes over existing sewer will be made for costs associated with furnishing and installing manhole structures, including but not limited to, excavation, protection of existing sewer, concrete manhole sections, gate valve, masonry block, mortar and concrete, manhole frame and cover, manhole steps, bedding backfill, shoring, and dewatering as necessary.

1.2.10.2 Unit of Measurement

Unit of Measure: lump sum

1.2.11 Reconstruct Structures (Storm Sewer Structures)

1.2.11.1 Payment

Payment for reconstruct structures will be made for costs associated with reconstructing sanitary sewer or storm drainage manhole structures including but not limited to, excavation, removal and disposal of concrete manhole sections, providing concrete manhole sections, masonry block, mortar and concrete, manhole frame and cover, manhole steps, bedding backfill, shoring, and dewatering as necessary.

1.2.11.2 Unit of Measurement

Unit of Measure: lump sum

1.2.12 Closure Structures with Slide Gates (Storm Sewer Structures)

1.2.12.1 Payment

Payment will be made for the costs associated with operations necessary for construction of closure structures with slide gates. Work shall include, but is not limited to excavation, concrete manhole sections, concrete and mortar, bedding, backfill, manhole frame and cover, slide gate, miscellaneous metals, and temporary shoring and dewatering as needed.

1.2.12.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.13 Closure Structures with Flap Valves (Storm Sewer Structures)

1.2.13.1 Payment

Payment will be made for the costs associated with operations necessary for construction of closure structures with flap valves. Work shall include, but is not limited to excavation, concrete manhole sections, concrete and mortar, bedding, backfill, manhole frame and cover, flap valves, miscellaneous metals, and temporary shoring and dewatering as needed.

1.2.13.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.13.3 Storm Sewer aprons with Trash Guards

Payment will be made for the costs associated with operations necessary for construction of storm sewer aprons with trash guards. Work shall include, but not limited to excavation, concrete apron, metal trash guard, anchors, bedding, shoring, dewatering backfill, riprap, bedding and geotextile filter.

1.2.13.4 Unit of Measure

Unit of Measure: lump sum.

1.2.14 Tractor Driver Pump Stations

1.2.14.1 Payment

Payment will be made for the costs associated with operations necessary for construction of tractor driven pump stations. Payment will be made separately for each pump station structure. Work shall include, but is not limited to excavation, concrete manhole sections, bedding, backfill, miscellaneous metals, manhole frame and cover, pumps, discharge piping for pumps with restraints, and shoring and dewatering as needed.

1.2.14.2 Unit of Measurement

Unit of measure: lump sum.

1.2.15 Trench Drain Pump Stations

1.2.15.1 Payment

Payment will be made for the costs associated with operations necessary for construction of trench drain pump stations. Payment will be made separately for each pump station structure. Work shall include, but is not limited to excavation, concrete manhole sections, bedding, backfill, miscellaneous metals, manhole frame and cover,grating, pumps, discharge piping for pumps with restraints, electrical controls and facilities, and shoring and dewatering as needed.

1.2.15.2 Unit of Measurement

Unit of measure: lump sum.

1.2.16 Trench Drain Pump Station Electrical Services

1.2.16.1 Payment

Payment will be made for the costs associated with providing electrical service to each pump station location as specified. The Contractor shall also reimburse the City or electric utility company for the costs associated with providing the electrical service at each pump station location.

1.2.16.2 Unit of Measurement

Unit of measure: lump sum.

1.2.17 Reconstruct Sanitary Sewer or Storm Sewer Manhole

1.2.17.1 Payment

Payment will be made for costs associated with provided a reconstruct of sanitary sewer or storm sewer manhole. Work shall include but not be limited to, excavation, concrete manhole sections, masonry block, mortar and concrete, manhole frame and cover, manhole steps, bedding backfill, shoring and dewatering as necessary.

1.2.17.2 Unit of Measure

Unit of Measure: lump sum.

1.2.18 Sanitary Sewer Structures

1.2.18.1 Payment

Payment will be made for the costs associated with operations necessary for construction of sanitary sewer structures. Work shall include, but not limited to, excavation, concrete manhole sections, masonry block, mortar and concrete, manhole frame and cover, manhole steps, bedding backfill, shoring and dewatering as necessary.

1.2.19 Landscape Planter

1.2.19.1 Payment

Payment will be made for the costs associated with providing the landscape planter. Work shall include excavation, topsoil and mulch.

1.2.19.2 Unit of Measurement

Unit of measure: lump sum.

1.2.20 MSE Walls

1.2.20.1 Payment

Payment will be made for the costs associated with providing MSE Walls. Work shall include, but not be limited to, excavation, class 5 aggregate base, concrete retaining wall units, drainage aggregate, select granular fill, geogrid, geotextile, polyethylene pipe, chain link fence, concrete, masonry adhesive and backfill.

1.2.20.2 Unit of Measure

Unit of Measure: lump sum.

1.2.21 Remove and Salvage Signs

1.2.21.1 Payment

Payment will be made for the costs associated with removing and salvaging signs as shown and specified, including but not limited to, excavation, stockpiling and transporting signs and sign posts to the City shop as directed by the COR.

1.2.21.2 Unit of Measurement

Unit of measure: lump sum.

1.2.22 All Bond Costs (Bid, Performance and Payment)

1.2.22.1 Payment

Payment will be made for all costs associated with providing bid performance and payment bonds related to the project work.

1.2.22.2 Unit of Measure

Unit of Measure: lump sum

1.3 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.

1.3.1 Stripping

1.3.1.1 Payment

Payment will be made for costs associated with operations necessary to perform stripping within the work limits shown. Work shall include, but

not be limited to stripping vegetation, topsoil, and organic material within the limits shown, stockpiling of topsoil, and disposing of excess stripped materials. No allowances will be made for stripping outside the limits of construction unless authorized.

1.3.1.2 Measurement

Excavation shall be measured for payment by the cubic yard, in the original position, using the average-end-area method based on the original ground lines, as determined by the required survey and the lines and grade shown. The Contractor shall be responsible to perform the necessary quantity surveys. Materials removed outside the lines and grades shown will not be measured for payment. Material removed outside the lines and grades shown, but within the specified tolerance will not be measured for payment. Disposal of excess excavation will not be measured for payment. All costs therefore shall be included in the bid item to which the work pertains.

1.3.1.3 Unit of Measure

Unit of measure: cubic yard.

1.3.2 Common Excavation

1.3.2.1 Payment

Payment will be made for costs associated with excavation for the construction of proposed levees including excavation of existing levees. Disposition of excess excavated material and unsuitable and frozen materials will be incidental to the price bid for excavation. Common excavation does not include excavation for utility piping and structures, excavation for structures, off-site borrow excavation and any other excavation where measurement and payment is specified elsewhere.

1.3.2.2 Measurement

Excavation shall be measured for payment by the cubic yard, in the original position, using the average-end-area method based on the original ground lines as measured after stripping operations, as determined by the required survey and the lines and grade shown. Final surveys shall be used for any authorized over-depth excavation. The Contractor shall be responsible to perform the necessary quantity surveys. Except for authorized over-depth excavation, materials removed outside the lines and grades shown will not be measured for payment. Material removed outside the lines and grades shown, but within the specified tolerance will not be measured for payment. Excess excavated material will not be measured for payment. All costs therefore shall be included in the bid item to which the work pertains.

1.3.2.3 Unit of Measure

Unit of measure: cubic yard.

1.3.3 Trench Drain

1.3.3.1 Payment

Payment will be made for costs associated with construction of the trench drain. Payment shall include, but not be limited tom excavation, fine filter aggregate, 12-inch PVC pipe with geotextile, compaction, impervious cap, shoring and dewatering as necessary. Disposition of excess excavated material and unsuitable and frozen materials will be incidental to the price bid for trench drain.

1.3.3.2 Unit of Measure

Unit of measure: lineal foot.

1.3.4 Impervious Fill

1.3.4.1 Payment

Payment will be made for the costs associated with the furnishing and final placement and compaction of impervious fill for the construction of the levees.

1.3.4.2 Measurement

Impervious fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations or the placement of underlying fill material, where applicable, and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform the necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of impervious fill for payment.

1.3.4.3 Unit of Measure

Unit of measure: cubic yard.

1.3.5 Select Impervious Fill

1.3.5.1 Payment

Payment will be made for the costs associated with the furnishing and final placement and compaction of select impervious material for the construction of the select impervious fill levee cap.

1.3.5.2 Measurement

Select impervious fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations or the placement of underlying fill material, where applicable, and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor

shall be responsible to perform the necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of impervious cap for payment.

1.3.5.3 Unit of Measure

Unit of measure: cubic yard.

1.3.6 Random Fill

1.3.6.1 Payment

Payment will be made for the costs associated with the furnishing and final placement and compaction of random fill.

1.3.6.2 Measurement

Random fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations or the placement of underlying fill material, where applicable, and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of random fill for payment.

1.3.6.3 Unit of Measure

Unit of measure: cubic yard.

1.3.7 Topsoil

1.3.7.1 Payment

Payment will be made for the costs associated with furnishing, final placement, and grading of topsoil.

1.3.7.2 Measurement

Topsoil, whether salvage or borrow, shall be measured for payment by cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations or the placement of underlying fill material, where applicable, and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of topsoil

for payment.

Volumes occupied by structures will not be included in the measurement of topsoil for payment.

1.3.7.3 Unit of Measurement

Unit of measure: cubic yard

1.3.8 Aggregate Base Class 5

1.3.8.1 Payment

Payment will be for the costs associated with furnishing, sub-base preparation, final placement and compaction of aggregate base class 5.

1.3.8.2 Unit of Measurement

Unit of measure: cubic yard

1.3.9 Granular Fill

1.3.9.1 Payment

Payment will be made for the costs associated with the furnishing, final placement and compaction of granular fill.

1.3.9.2 Measurement

Granular fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations or the placement of underlying fill material, where applicable, and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of granular fill for payment.

1.3.9.3 Unit of Measure

Unit of measure: cubic yard.

1.3.10 Granular Bedding

1.3.10.1 Payment

Payment will be made for the costs associated with furnishing final placement and compaction of granular bedding.

1.3.10.2 Measurement

Granular bedding shall be measured by loose volume (truck box) based on the surface of the granular bedding being struck even with the top of box. Measurement shall not include volume for over excavated trenches.

1.3.10.3 Unit of Measurement

Unit of measure: cubic yard

1.3.11 Crushed Rock Bedding

1.3.11.1 Payment

Payment will be made for all costs associated with furnishing, final placement and compaction of crushed rock bedding.

1.3.11.2 Measurement

Crushed rock bedding shall be measured by loose volume (truck box) based on the bedding struck even with the truck box. Measurement shall not include volume for over excavated trenches.

1.3.11.3 Unit of Measurement

Unit of measure: cubic yard

1.3.12 CLSM Bedding

1.3.12.1 Payment

Payment will be made for all costs associated with providing CLSM bedding. Work shall include, but not be limited to, excavation, CLSM bedding forming, backfill, compaction, disposal of excess excavation, shoring and dewatering as necessary. CLSM material will not be measured for payment where contractor has over excavated.

1.3.12.2 Measurement

1.3.12.3 Unit of Measurement

Unit of measure: cubic yard

1.3.13 Riprap and Bedding

1.3.13.1 Payment

Payment shall be by ton (2,000 pounds avoirdupois) of material acceptabley placed within the tolerances specified. Payment shall constitute full payment for all work associated with placement as shown and specified.

Deductions. All stone permitted by the Contracting Officer to remain outside the tolerances specified 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 for the payment quantity at the rate of 100 pounds per cubic

foot, regardless of actual weight per cubic foot.

1.3.13.2 Measurement

Riprap and bedding shall be weighted on accurate, approved scales furnished or made available of the Contractor. Before being approved for use, the scales shall have been tested by the State of Minnesota, Department of Weights and Measures or by an approved scale servicing company so as to operate within a degree or error not greater than 1 percent and to be sensitive to a change in load of 1/5 or 1 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 work progresses. When materials are weighted 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, and require reweighing as often as the Contracting Officer may require.

Weighing operations shall be performed offsite, as approved, in the presence of a representative of the Contracting Officer, unless waived. Each load shall be accompanied by duplicate copies of delivery tickets certified by the weighmaster, as a minimum, each ticket shall contain the following information:

1) Date and time
2) Vehicle number
3) Gross weight
4) Vehicle tare weight
5) Net weight
6) Material weighed
7) Signature of weighmaster

1.3.13.3 Unit of Measurement

Unit of measure: TON

1.3.14 Inspection Trench

1.3.14.1 Payment

Payment will be made for costs associated with excavation, dewatering and backfilling inspection trenches with acceptable, compacted impervious material as specified and as shown. Stockpiling of acceptable material for later use and disposition of unacceptable materials will be incidental to the price bid for inspection trenches. Removal of utility services and debris encountered during inspection trench operations will not be measured for payment and shall be included in the price bid for Demolition.

1.3.14.2 Measurement

Inspection trenches will be measured for payment by the lineal foot. Inspection trenches excavated beyond the limits shown on the drawings and not authorized by the Contracting Officer will not be measured for payment.

1.3.14.3 Unit of Measure

Unit of measure: lineal foot.

1.3.15 Guard Posts

1.3.15.1 Payment

Payment will be made for costs associated with operations necessary for providing guard posts shown and specified which includes performing required excavation, concrete footing, fabrication, mounting, and other incidental operations.

1.3.15.2 Measurement

Guard posts will be measured by the number of units constructed, complete, in-place.

1.3.15.3 Unit of Measure

Unit of measure: each.

1.3.16 Removable Bollards

1.3.16.1 Payment

Payment will be made for costs associated with operations necessary for providing removable bollards specified which includes performing required excavation, concrete footing, fabrication, mounting, and other incidental operations.

1.3.16.2 Measurement

Removable bollards will be measured by the number of units constructed, complete, in-place.

1.3.16.3 Unit of Measure

Unit of measure: each.

1.3.17 Sodding

1.3.17.1 Payment

Establishment of turf in areas shown or specified to be sodded. Payment will include, but not be limited to costs for preparation, fertilizing, sodding, maintenance, watering, and work incidental to the sodding. No additional payment will be made for sodding outside of the limits of work unless authorized by the Contracting Officer.

1.3.17.2 Measurement

Sod will be measured on a square yard basis, in-place measure.

1.3.17.3 Unit of Measurement

Unit of measure: square yard

1.3.18 Seeding Mixture Class 1, Class 2 or Class 3

1.3.18.1 Payment

Payment will be made for costs associated with providing seed mixture specified within the limits indicated. Payment will include, but not be limited to soil, preparation, mulch, watering, maintenance, seeding and work incidental to seeding. No additional payment will be made for seeding outside the limits of work unless authorized by the Contracting Officer.

1.3.18.2 Measurement

1.3.18.3 Unit of Measurement

Unit of measure: Acre

1.3.19 Geotextile Filter

1.3.19.1 Payment

Payment will be made for all costs with operations necessary to provide geotextile filter. Payment will include, but not be limited to, furnishing, seam development and surface preparation.

1.3.19.2 Measurement

1.3.19.3 Unit of Measurement

Unit of measure: Square Yard

1.3.20 Getotxtile Fabric

1.3.20.1 Payment

Payment will be made for all costs with operations necessary to provide geotextile fabric. Payment will include, but not be limited to, furnishing, seam development and surface preparation.

1.3.20.2 Measurement

1.3.20.3 Unit of Measurement

Unit of measure: Square Yard

1.3.21 Reinforced Concrete Pipe (RCP)

1.3.21.1 Payment

Payment will be made for all costs to provide reinforced concrete pipe including but not limited to disposal of excess excavated material, pipe

leakage testing, excavation, backfill, shoring, dewatering and pipe jacking where indicated.

1.3.21.2 Measurement

Measurement shall be along the centerline of the pipe between, but not including, the manhole, catch basin or end section.

1.3.21.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.22 4" Polyethylene Pipe (Straight or Corrugated Wall)

1.3.22.1 Payment

Payment will be made for all costs associated with providing 4" polyethylene pipe (straight or corrugated wall), including but not limited to excavation and backfill.

1.3.22.2 Measurement

1.3.22.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.23 Connect to Existing Storm or Sanitary Manhole

1.3.23.1 Payment

Payment will be made for all costs associated with providing a connection to existing storm or sanitary manhole.

1.3.23.2 Measurement

1.3.23.3 Unit of Measurement

Unit of measure: Each

1.3.24 Connect to Existing Storm Sewer or Sanitary Sewer Pipe

1.3.24.1 Payment

Payment will be made for all costs associated with providing a connection to existing storm or sanitary pipe.

1.3.24.2 Measurement

1.3.24.3 Unit of Measurement

Unit of measure: Each

1.3.25 Adjust Storm or Sanitary Sewer Manhole Casting

1.3.25.1 Payment

Payment will be made for all costs associated with adjusting storm or sanitary sewer manhole casting to finish grade.

1.3.25.2 Measurement

1.3.25.3 Unit of Measurement

Unit of measure: Each

1.3.26 C900 PVC Sanitary Sewer Pipe

1.3.26.1 Payment

Payment will be made for all costs associated with C900 PVC sanitary sewer pipe. Work shall include, but not be limited to, excavation, backfill, pipe, compaction, disposal of excess excavated material, and shoring and dewatering as necessary.

1.3.26.2 Measurement

1.3.26.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.27 Gate Valve with Box (Water Main or Sanitary Sewer)

1.3.27.1 Payment

Payment will be made for costs associated with providing a gate valve with box. Work shall include, but not be limited to gate valve with box, blocking, granular, bedding, filter aggregate, excavation and backfill, and shoring and dewatering as necessary.

1.3.27.2 Measurement

1.3.27.3 Unit of Measurement

Unit of measure: Each

1.3.28 4" PVC Sanitary Service Pipe

1.3.28.1 Payment

Payment will be made for costs associated with providing a 4" PVC sanitary service pipe. Work shall include, but not be limited to excavation, backfill, pipe, connection, compaction, bedding, and shoring and dewatering as necessary.

1.3.28.2 Measurement

1.3.28.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.29 1" Copper Water Service

1.3.29.1 Payment

Payment will be made for costs associated with providing a 1" copper water service. Work shall include, but not be limited to excavation, backfill, compaction, copper service and connections, shoring and dewatering as necessary.

1.3.29.2 Measurement

1.3.29.3 Unit of Measurement

Unit of Measure: Lineal Foot

1.3.30 1" Corporation Stop

1.3.30.1 Payment

Payment will be made for all costs associated with providing a 1" corporation stop, as indicated.

1.3.30.2 Measurement

1.3.30.3 Unit of Measurement

Unit of Measure: Each

1.3.31 1" Curb Stop with Box

1.3.31.1 Payment

Payment will be made for all costs associated with providing a 1" curb stop with box, as indicated.

1.3.31.2 Measurement

1.3.31.3 Unit of Measurement

Unit of measure: Each

1.3.32 C900 PVC Water Main

1.3.32.1 Payment

Payment will be made for all costs associated with providing C900 PCVC watermain. Work shall include, but not be limited to, excavation, backfill, pipe, blocking, compaction, insulation, bedding, disposal of excess excavated material, hydrostatic testing, shoring and dewatering as necessary.

1.3.32.2 Measurement

1.3.32.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.33 6" DIP Hydrant Lead Pipe

1.3.33.1 Payment

Payment will be made for all costs associated with providing a 6" DIP hydrant lead pipe. Work shall include, but not be limited to, excavation, backfill, pipe, pipe wrap, compaction, blocking, shoring and dewatering as necessary.

1.3.33.2 Measurement

1.3.33.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.34 DIP Fittings for Water Main

1.3.34.1 Payment

Payment will be made for all costs associated with providing DIP fittings for watermain.

1.3.34.2 Measurement

1.3.34.3 Unit of Measurement

Unit of measure: Pounds

1.3.35 Hydrant

1.3.35.1 Payment

Payment will be made for all costs associated with providing a hydrant. Work shall include, but be limited to, excavation, backfill, compaction, hydrant, drainage pit with filter aggregate, blocking, shoring and dewatering as necessary.

1.3.35.2 Measurement

1.3.35.3 Unit of Measurement

Unit of measure: Each

1.3.36 Connect to Existing Water Main

1.3.36.1 Payment

Payment will be made for all costs associated with providing a connect to existing watermain.

1.3.36.2 Measurement

1.3.36.3 Unit of Measurement

Unit of measure: Each

1.3.37 Type 41A Wearing Course

1.3.37.1 Payment

Payment will be made for all costs associated with providing Type 41A wearing course.

1.3.37.2 Measurement

1.3.37.3 Unit of Measurement

Unit of measure: Ton

1.3.38 Type 31 Base Course

1.3.38.1 Payment

Payment will be made for all costs associated with providing Type 31 base course.

1.3.38.2 Measurement

1.3.38.3 Unit of Measurement

Unit of measure: Ton

1.3.39 Bituminous Tack Coat

1.3.39.1 Payment

Payment will be made for all costs associated with providing a bituminous tack coat.

1.3.39.2 Measurement

1.3.39.3 Unit of Measurement

Unit of measure: Gallon

1.3.40 B618 Concrete Curb and Gutter

1.3.40.1 Payment

Payment will be made for all costs associated with providing B618 concrete curb and gutter.

1.3.40.2 Measurement

1.3.40.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.41 4" Concrete Walk

1.3.41.1 Payment

Payment will be made for all costs associated with providing a 4" concrete walk. Work shall include, but not be limited to, excavation, backfill, concrete saw cut, bedding, form work, jointing, and finishing.

1.3.41.2 Measurement

1.3.41.3 Unit of Measurement

Unit of measure: Square Foot

1.3.42 6" Concrete Driveway Pavement

1.3.42.1 Payment

Payment will be made for all costs associated with providing 6" concrete driveway pavement. Work shall include, but not be limited to, excavation, backfill, concrete, sawcut, bedding, form work, jointing and finishing.

1.3.42.2 Measurement

1.3.42.3 Unit of Measurement

Unit of measure: Square Yard

1.3.43 Disconnect Water Services at Water Main

1.3.43.1 Payment

Payment will be made for all costs associated with providing a disconnect water service at watermain. Work shall include, but not be limited to, excavation, backfill, compaction, disconnect and removal of existing water service, turn off corporation stop and cap exposed end.

1.3.43.2 Measurement

1.3.43.3 Unit of Measurement

Unit of measure: Each

1.3.44 Concrete Live Load Distribution Slabs

1.3.44.1 Payment

Payment will be made for all costs associated with providing a concrete live load distribution slab. Work shall include, but not be limited to,

excavation, backfill, concrete, form work, finishing and bedding.

1.3.44.2 Measurement

1.3.44.3 Unit of Measurement

Unit of measure: Cubic Yard

1.3.45 Soil Correction at Removed Structures

1.3.45.1 Payment

Payment will be made for all costs associated with providing the soil correction at removed structures. Work shall include excavation, impervious fill compaction and disposal of excess excavated material.

1.3.45.2 Measurement

1.3.45.3 Unit of Measurement

Unit of measure: Cubic Yard

1.3.46 6" Gate Valve with Tapping Sleeve

1.3.46.1 Payment

Payment will be made for all costs associated with providing a 6" gate valve with tapping sleeve.

1.3.46.2 Measurement

1.3.46.3 Unit of Measurement

Unit of measure: Each

1.3.47 6" Inserting Gate Valve

1.3.47.1 Payment

Payment will be made for all costs associated with providing a 6" inserting gate valve.

1.3.47.2 Measurement

1.3.47.3 Unit of Measurement

Unit of measure: Each

1.3.48 DIP River Crossing Pipe

1.3.48.1 Payment

Payment will be made for all costs associated with providing DIP river crossing pipe. Work shall include, but not be limited to, excavation,

backfill, bedding, pipe, temporary by-pass (where applicable), compaction, shoring and dewatering as necessary.

1.3.48.2 Measurement

1.3.48.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.49 Connect to Existing Forcemain

1.3.49.1 Payment

Payment will be made for all costs associated with providing connect to the existing forcemain.

1.3.49.2 Measurement

1.3.49.3 Unit of Measurement

Unit of measure: Each

1.3.50 Corrugated Metal Pipe or Corrugated Metal Pipe slotted Drain

1.3.50.1 Payment

Payment will be made for all costs associated with providing corrugated metal pipe or corrugated metal pipe slotted drain. Work shall include, but not be limited to, excavation, backfill, bedding, concrete, compaction, pipe and dewatering as necessary.

1.3.50.2 Measurement

1.3.50.3 Unit of Measurement

Unit of measure: Lineal Foot

1.3.51 Salvage and Reinstall Hydrant

1.3.51.1 Payment

Payment will be made for all costs associated with providing the salvage and reinstallation of hydrant. Work shall include, but not be limited to, excavation, backfill, remove and reinstall hydrant, drainage pit, pipe, blocking, compaction, shoring and dewatering as necessary.

1.3.51.2 Measurement

1.3.51.3 Unit of Measurement

Unit of measure: Each

1.3.52 Adjust Existing Water Main Gate Valve

1.3.52.1 Payment

Payment will be made for all costs associated with providing adjusting the existing watermain gate valve box to finish grade.

1.3.52.2 Measurement

1.3.52.3 Unit of Measurement

Unit of measure: Each

1.3.53 Connect Existing 1" Service to New Water Main

1.3.53.1 Payment

Payment will be made for all costs associated with providing a connection of the existing 1" service to new watermain.

1.3.53.2 Measurement

1.3.53.3 Unit of Measurement

Unit of measure: Each

1.3.54 Connect Existing Sanitary Sewer Service

1.3.54.1 Payment

Payment will be made for all costs associated with providing a connection to the existing sanitary sewer service to new sanitary sewer.

1.3.54.2 Measurement

1.3.54.3 Unit of Measurement

Unit of measure: Each

1.3.55 PVC Wye

1.3.55.1 Payment

Payment will be made for all costs associated with providing a PVC wye.

1.3.55.2 Measurement

1.3.55.3 Unit of Measurement

Unit of measure: Each

1.3.56 Salvage and Reinstall Alley Surfacing

1.3.56.1 Payment

Payment will be made for all costs associated with providing for the

salvage and reinstall alley surfacing. Work shall include, but not be limited to, salvaging and stockpiling aggregate surfacing, placement, compaction, and finish grading of salvaged aggregate. Supplement salvaged aggregate with Class 5 aggregate base as necessary to provide the same thickness of surfacing in place prior to construction.

1.3.56.2 Measurement

1.3.56.3 Unit of Measurement

Unit of measure: Cubic Yard.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01320

PROJECT SCHEDULE
01/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Schedules

Initial Project Schedule; GA. Periodic Updates; GA.

Five copies of the initial project schedule shall be submitted. Two copies of periodic project schedule updates shall be submitted with each monthly pay request or as requested by the Contracting Officer.

SD-14 Samples

Software; FIO.

The Contractor shall furnish the Government copies of the scheduling software if required under paragraph COMPUTER SOFTWARE REQUIREMENTS.

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

PART 2 PRODUCTS

2.1 COMPUTER SOFTWARE REQUIREMENTS

The Contractor shall furnish the Government with the software to be used, unless waived by the Contracting Officer. The Contactor shall assist in installing the software in the Government resident office. The Contractor shall provide the software complete, including documentation and updates used in the Contractor's system. The software shall remain the property of the Contractor, but shall be in the possession of and for the exclusive use by the Government during the contract period. The Government shall have rights to install the software on 3 computers (resident office, area office, and district office).

PART 3 EXECUTION

3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a project schedule as described below shall be prepared. The scheduling of work shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall contribute in developing and maintaining an accurate project schedule. The approved project schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of progress payments.

3.2 BASIS FOR PAYMENT

The project schedule shall be the basis for measuring Contractor progress. The Contracting Officer will use an approved project schedule to evaluate Contractor progress for payment purposes. In the case where project schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the project schedule, then the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until the project schedule updates have been accepted.

3.3 SOFTWARE

Computer software systems utilized by the Contractor to produce the project schedule shall be capable of providing all requirements of this specification.

3.3.1 Use of the Critical Path Method

The project schedule shall clearly show the critical path. If a network analysis system is used, the Critical Path Method (CPM) of network calculation shall be used to generate the project schedule, provided in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

3.3.2 Level of Detail Required

The project schedule shall include an appropriate level of detail. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the project schedule.

3.3.2.1 Activity Durations

The Contractor shall breakout lump-sum or sum-job contract line items into subcategories, or activities. The number of activities shall be sufficient to allow the progress to be accurately determined between payment periods.

3.3.2.2 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle

of over calender 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing.

3.3.2.3 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government furnished property, and notice to proceed for phasing requirements.

3.3.2.4 Responsibility

All activities shall be identified in the project schedule by the party (Prime Contractor, subcontractor, Government agency, etc.) responsible to perform the work. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.5 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project schedule. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from notice to proceed to the contract completion date. The notice to proceed date shall be taken as the date that notice to proceed was acknowledged.

3.3.3.1 Constraint of Last Activity

Completion of the last activity in the project schedule shall be constrained by the contract completion date. If the early finish of the last activity falls after the contract completion date, then the critical path shall show a negative float.

3.3.3.2 Early Project Completion

If the project schedule shows project completion prior to the contract completion date, the Contractor shall identify activities that have been accelerated and activities that are scheduled in parallel to support the "early" completion. The Contractor shall assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.3.5 Default Progress Data Disallowed

The Contractor shall document the actual start and actual finish dates on the daily quality control report for every in-progress or completed activity and ensure that the data contained on the daily quality control reports is the sole basis for project schedule updating. Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual start and finish dates on the CPM schedule shall match those dates provided from Contractor quality control reports.

3.3.6 Out-of-Sequence Progress

The Contracting Officer shall be notified prior to work on any activities that are out-of-sequence with the project schedule. The Contractor shall update the project schedule to correct any out-of-sequence work.

3.3.7 Extended Non-Work Periods

Non-work periods of over 5 working days shall be identified by addition of activities that represent the delays.

3.3.8 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below.

3.4.1 Initial Project Schedule Submission

The project schedule shall provide a reasonable sequence of activities which represent work through the entire contract period and shall be at a reasonable level of detail.

3.4.2 Periodic Updates

Based on the result of progress meetings, the Contractor shall submit periodic project schedule updates. The Contractor shall furnish information and project schedule data, which in the judgement of the Contracting Officer, is necessary for verifying the Contractor's progress.

3.4.3 Standard Activity Coding Dictionary

The Contractor shall submit, with the initial project schedule, a coding scheme that shall be used throughout the project schedule for all activity codes contained in the project schedule. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. For example, a responsibility code value, "ELE", may be identified as "Electrical Subcontractor". Activity code values shall represent the same information throughout the duration of

the contract.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted for each project schedule submission:

3.5.1 Earnings Report

The Contractor shall submit a compilation of the Contractor's Total Earnings on the project through the most recent Monthly Progress Meeting. Activities shall be grouped by contract line item. The printed report shall contain, for each contract line item: activity number, activity description, original budgeted amount, total quantity, quantity to date, percent complete (based on cost), and earnings to date. A total project percent complete shall also be provided. If necessary to substantiate partial payment and requested by the Contracting Officer, the earnings report shall detail activities within a contract line item.

3.5.2 Network Diagram

A network diagram shall be required on the initial project schedule submission and on periodic submissions when requested by the Contracting Officer (not less than quarterly). 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 network diagram shall be constructed to meet the following conditions:

a. Continuous Flow. Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram.

b. Project Milestone Dates. Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

c. Critical Path. The critical path shall be clearly shown.

d. Banding. Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

e. S-Curves. Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project.

3.6.1 Meeting Attendance

The Contractor's project manager and the Contractor's authorized representative responsible for preparation of the project schedule shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after every third monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including actual start dates, actual finish dates, remaining durations, and cost-to-date shall be subject to the approval of the Contracting Officer. The Contractor shall address the following minimum set of items, on an activity by activity basis, during each progress meeting.

a. Start and Finish Dates. The actual start and actual finish dates for each completed activity. The actual start and projected finish dates for each activity in-progress.

b. Cost Completion. The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains defects.

c. Project Schedule Changes. All changes pertaining to notice to proceed on change orders, change orders to be incorporated into the project schedule, Contractor proposed changes in work sequence, corrections to project schedule for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

d. Other Changes. Other changes required due to delays in completion of any activity or group of activities include unusually severe weather, product procurement, or other delays or work stoppages which make re-planning the work necessary.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, the Contractor shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract.

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 an approved project schedule and other factual information. Delays that are caused by the Contractor's own actions will not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification 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 cause(s) of the change.

c. An analysis of the overall impact of the changes proposed.

d. If requested by the Contracting Officer, the Contractor shall provide an interim project schedule update with revised activities.

3.8 DIRECTED CHANGES

If notice to proceed is issued for undefinitized work, the Contractor shall submit proposed project schedule revisions to the Contracting Officer within 14 calender days of the notice to proceed being issued. The proposed revisions to the project schedule must be approved by the Contracting Officer 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 suggested revisions to the project schedule; and the Contractor shall update the project schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached.

3.9 OWNERSHIP OF FLOAT

Float available in the project schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

SUBMITTAL PROCEDURES

01/02

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-- End of Section Table of Contents --

SECTION 01330

SUBMITTAL PROCEDURES
01/02

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers as follows:

SD-01 Data

SD-04 Drawings

SD-06 Instructions

SD-07 Schedules

SD-08 Statements

SD-09 Reports

SD-13 Certificates

SD-14 Samples

SD-18 Records

SD-19 Operation and Maintenance Manuals

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental 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 SECTION 00700: 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 Contracting Officer'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 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 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 SECTION 00700: 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 MEASUREMENT AND PAYMENT

The work of this section will not be measured for payment. The Contractor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 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) representative and each item shall be stamped, signed, and dated by the CQC representative 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.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing 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 will also be given the submittal register as a diskette containing the computerized ENG Form 4288 and instructions on the use of the diskette. Columns "d" through "r" have been completed by the Government; the Contractor shall complete columns "a", "b", "c" and "s" through "u" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 7 calendar days after Notice to Proceed. The Contractor shall keep the submittal register up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 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. The submittal register shall provide for a reasonable timely distribution of shop drawings as they are prepared (particularly within a specific discipline, i.e.: structural, mechanical).

3.4 TRANSMITTAL FORM (ENG FORM 4025-R)

The sample transmittal form (ENG Form 4025-R) 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 will be furnished to the Contractor. 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.

3.5 SUBMITTAL PROCEDURE

3.5.1 Submittal Copies

The Contractor shall submit 6 copies of each submittal (both government approved and for information only) unless otherwise indicated. Each transmittal shall address only one submittal item. Transmittals returned for resubmission shall be resubmitted in their entirety. When approved by

the Contracting Officer, routine test reports and delivery tickets may be submitted with daily quality control reports in place of following submittal procedures under this section.

3.5.2 Schedule

Shop drawings shall be submitted with ample time to secure Government approval prior to the time the items covered thereby are to be delivered to the site. Additional time should be allowed for possible resubmittal. Materials fabricated or delivered without Government approval of the shop drawing will be subject to rejection. All submittals shall be made prior to commencement of applicable work, and allow adequate time for government review acceptable to the Contracting Officer.

3.5.3 Shop Drawings

Shop drawings shall be reproductions on high quality paper with clear legible print. Drawings shall generally be bordered a minimum of one inch and trimmed to neat lines. Shop drawing quality will be subject to approval. Each shop drawing, including catalog data, shall be identified with a title block including the name of the Contractor, contract number, name and location of project, and name of the item of work or structure to which the shop drawing applies. Catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. Catalog data must be supplemented as necessary to include all pertinent data to verify conformance to the contract documents. When catalog data includes non applicable data, the applicable data shall be clearly indicated.

3.5.4 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025-R 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.

3.6 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."

3.7 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. Five copies of the submittal will be retained by the Contracting Officer and 1 copy of the submittal will be returned to the Contractor.

3.8 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.

3.9 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)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

3.10 CONTRACTOR RECORD DRAWINGS

The Contractor shall maintain a separate set of marked-up full-scale contract drawings indicating as-built conditions. These drawings shall be maintained in a current condition at all times until completion of the work and shall be available for review by Government personnel at all times. All variations from the contract drawings, for whatever reason, including those occasioned by modifications, optional materials, and the required coordination between trades, shall be indicated. These variations shall be

shown in the same general detail utilized in the contract drawings. Revisions shall be shown on all drawings and details related to the changed feature. These drawings shall be neatly prepared with clear legible print. Deleted items shall be indicated in red and added items or changed locations shall be shown in green. These drawings shall be furnished to the Contracting Officer within 30 days after the required contract completion date.

3.10.1 As-Built Shop Drawings

The Contractor shall record changes to shop drawings to indicate as-built conditions. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted.

-- End of Section --

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ FIO ☐ GOV'T. APPROVAL

ITEM NO. *a.*	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)* *b.*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8)* *c.*	NO. OF COPIES *d.*	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE *g.*	VARIATION *(See instruction No. 6)* *h.*	FOR CE USE CODE *i.*
				SPEC. PARA. NO. *e.*	DRAWING SHEET NO. *f.*			

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; on 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.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections 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, column i 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)

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01000

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.4	Utility As-Builts		X									X											
			1.4	Dewatering Plan					X						X											
			1.4	Shoring plan					X						X											
			1.4	Haul Route Permits					X						X											
			1.4	Utility Service Interruption Request					X							X										
			3.1.3.1	Traffic Control Plan					X							X										
			1.4	Levee Removal/Flood Protection					X							X										
				Plan																						
			1.4	Preconstruction Damage Report						X					X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01270

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.1	Quantity Surveys		X									X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01320

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.1	Initial Project Schedule				X								X										
			1.1	Periodic Updates				X								X										
			1.1	Software								X			X											

SUBMITTAL REGISTER
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CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01410

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Environmental Protection Plan					X							X										

SUBMITTAL REGISTER
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CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01451

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Contractor Quality Control (CQC)					X							X										
				Plan																						
			1.2	Laboratory Quality Management					X						X											
				Manual																						
			1.2	Documentation of work									X		X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01500

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.1	Site Plan		X									X											
			1.1	Government Field Office		X									X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
01567

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Temporary Erosion And Sediment		X									X											
				Control Plan																						
			1.3	Application									X			X										
			1.3	Notice of Termination									X		X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
02220

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Work Plan					X							X										

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
02300

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Testing						X					X											
			1.2	Daily Report Forms;						X					X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
02315

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Testing						X					X											

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SPECIFICATION SECTION
02316

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.4	CLSM Mix Design						X						X										
			1.4	Testing						X					X											

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SPECIFICATION SECTION
02373

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Manufacturing Quality Control			X								X											
				Sampling and Testing																						
			2.1.1	Geotextile							X					X										

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SPECIFICATION SECTION
02378

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.1.1.1	Geotextile							X					X										
			1.2	Samples								X			X											

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SPECIFICATION SECTION
02388

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Material Sources					X							X										
			1.2	Gradation Test						X					X											
			1.2	Certified Weight Scale Tickets							X				X											

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CONTRACTOR

SPECIFICATION SECTION
02510

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Waste Water Disposal Method					X							X										
			1.3	Satisfactory Installation					X						X											
			3.3.1	Bacteriological Disinfection						X					X											

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SPECIFICATION SECTION
02531

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Portland Cement							X					X										
			2.3	Joints							X				X											
			2.3	Joints							X				X											
			1.3	Statements					X						X											

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SPECIFICATION SECTION
02532

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	River Crossing Pipe Shop Drawings		X										X										
			3.1.1	Forcemain Bypass and Relocation					X							X										
				Plan																						
			3.2	Hydrostatic Tests						X					X											

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SPECIFICATION SECTION
02620

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.2	Geotextile							X					X										
			2.1	Pipe for Subdrains							X					X										

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SPECIFICATION SECTION
02630

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Test Reports							X				X											

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SPECIFICATION SECTION
02722

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Testing						X					X											

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SPECIFICATION SECTION
02741

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Paving Schedule				X							X											
			1.2	Testing						X					X											
			1.2	Mix Design						X						X										

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SPECIFICATION SECTION
02754

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Concrete Mixture Proportions						X						X										
			1.2	Testing						X					X											

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SPECIFICATION SECTION
02763

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Equipment Lists	X										X											
			1.2	Mixing, Thinning and Application			X								X											
			1.2	Qualifications					X						X											
			1.2	Material Tests						X					X											
			1.2	Volatile Organic Compound (VOC) Content							X				X											

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SPECIFICATION SECTION
02770

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Concrete placement schedule				X							X											
			1.2	Concrete Mixture Proportions						X						X										
			1.2	Testing						X					X											
			1.2	Concrete									X		X											

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SPECIFICATION SECTION
02832

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Manufacturer's Data	X										X											
			1.3	Test Data	X										X											
			1.3	Calculations	X										X											
			1.3	Shop Drawings		X										X										
			1.3	Qualifications					X						X											
			1.3	Certificate of Compliance							X				X											
			1.3	Segmental Concrete Units								X			X											
			1.3	Reinforcement								X			X											

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SPECIFICATION SECTION
02920

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Manufacturer's Literature	X										X											
			1.2	Experience for Native Grasses					X						X											
			1.2	Soil Test						X					X											
			1.2	Seed Test						X					X											
			1.2	Water Test						X					X											
			1.2	Certificates of Compliance							X				X											
			1.2	Samples								X			X											
			1.2	Quantity Check									X		X											
			1.2	Maintenance Record									X		X											
			1.2	Seed Order for Native Grasses									X		X											

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SPECIFICATION SECTION
02930

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Plant Installation Schedule				X							X											
			3.8	Plant Establishment Period					X						X											
			1.2	Percolation Test						X					X											
			1.2	Maintenance Record									X		X											

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SPECIFICATION SECTION
02935

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Work Plan and Schedule					X						X											
			3.3.1	Maintenance Record					X						X											
			1.2	Contractor's record of each site visit					X						X											
			1.2	Soil Test						X					X											
			1.2	Percolation Test						X					X											

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SPECIFICATION SECTION
03100

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Design	X										X											
			1.2	Form Materials	X										X											
			1.2	Concrete Formwork		X									X											
			1.2	Form Releasing Agents			X								X											

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SPECIFICATION SECTION
03150

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Preformed Expansion Joint Filler	X											X										
			1.2	Sealant	X											X										
			1.2	Waterstops	X											X										
			1.2	Waterstops		X									X											
			1.2	Preformed Expansion Joint Filler			X								X											
			1.2	Sealant			X								X											
			1.2	Waterstops			X								X											
			1.2	Preformed Expansion Joint Filler							X				X											
			1.2	Sealant							X				X											
			1.2	Waterstops							X				X											

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SPECIFICATION SECTION
03200

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO. c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Concrete Reinforcement System		X										X										
			1.3	Adhesive Anchors			X								X											
			1.3	Proprietary Rebar Mechanical			X								X											
				Splices																						
			1.3	Welding					X						X											
			1.3	Product Technical Data							X				X											

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SPECIFICATION SECTION
03300

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			1.3	Concrete Mixture Design					X							X										
			1.3	Concrete Operation Plan					X							X										
			1.3	Cold Weather Plan					X						X											
			1.3	Hot Weather Plan					X						X											
			1.3	Joint Treatment Plan					X						X											
			1.3	Concrete Testing Reports						X					X											
			1.3	Manufacturer's Certificates							X				X											
			1.3	Qualifications							X				X											
			1.3	Batch Tickets							X				X											

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CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

SPECIFICATION SECTION
05055

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Detail Drawings		X										X										
			1.2	Materials Orders				X							X											
			1.2	Materials List				X							X											
			1.2	Shipping Bill				X							X											
			1.2	Structural Steel Welding Repairs				X							X											

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CONTRACTOR

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15050

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			1.3	Design Data	X											X										
			1.3	Hoist Design Criteria	X											X										
			1.3	Sluice Gates		X										X										
			3.1.3	Gate Vendor's Erecting Engineer					X							X										
			1.3	Operation and Maintenance Manual										X	X											

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TITLE AND LOCATION
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CONTRACTOR

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			1.4	Shop Drawings		X										X										
			1.4	Performance Test Reports						X					X											

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			1.4	Shop Drawings		X										X										

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15161

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			1.4	Shop Drawings		X										X										
			1.4	Installation and Erection Instruction			X								X											
			1.4	Operation and Maintenance Manual										X	X											

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(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

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15162

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			1.3	Pump Shop Drawings		X										X										
			1.3	Pump Installation and Erection			X									X										
				Instructions																						
			1.3	Operation and Maintenance Manual										X		X										

SUBMITTAL REGISTER
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CONTRACT NO.

TITLE AND LOCATION
Crookston Flood Control Project Stage 2

CONTRACTOR

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16250

ACTIVITY NO. a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSI-FICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.3	Bill of Materials and Catalog Cuts	X											X										
			1.3	Pump Panel Shop Drawings		X										X										
			1.3	UL Certification							X				X											
			1.3	Operation and Maintenance Manual										X		X										

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01/02

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SECTION 01410

ENVIRONMENTAL PROTECTION
01/02

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

The Contractor shall perform the work minimizing environmental pollution and damage 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.

1.1.1 Subcontractors

The Contractor shall insure that its subcontractors comply with the requirements of this section.

1.1.2 Definitions

For the purpose of this specification, environmental pollution and damage is defined as 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 man; or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants.

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following items shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES.

SD-08 Statements

Environmental Protection Plan; GA.

The Environmental Protection Plan shall be prepared in accordance with PARAGRAPH: ENVIRONMENTAL PROTECTION PLAN.

1.3 ENVIRONMENTAL PROTECTION PLAN

1.3.1 Implementation.

Prior to ordering required materials/equipment or commencing construction work, the Contractor shall:

a. Submit to the Contracting Officer an acceptable written Environmental Protection Plan;

b. Obtain the Contracting Officer's written acceptance of the Environmental Protection Plan; and

c. Meet with representatives of the Contracting Officer for the purpose of developing an understanding of the requirements and methods of administration of the Contractor's Environmental Protection Plan.

1.3.2 Compliance.

Not withstanding the requirements of this section and not withstanding approval by the Contracting Officer of the Contractor's Environmental Protection Plan, nothing herein shall be construed as relieving the Contractor of the requirement to comply with all applicable Federal, State, and local environmental protection laws and regulations.

1.3.3 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 on-site organization who is(are) responsible for ensuring that the Environmental Protection Plan is adhered to.

b. Meeting times and personnel attendance for communication and notification of personnel and subcontractors regarding environmental requirements, and name(s) of person(s) responsible for this training.

c. The Contractor shall prepare a listing of resources needing protection, (i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, and historical, archaeological, and cultural resources); and what methods will be used to protect these resources.

d. Name(s) of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

e. Procedures to be implemented to provide the required environmental protection, to comply with the applicable laws and regulations, and to correct pollution due to accident, natural causes, or failure to follow the procedures of the Environmental Protection Plan.

f. Methods and locations for waste disposal. Licenses or permits shall be submitted for solid waste disposal sites that are not an operating commercial facility. Evidence of disposal facility acceptance shall be submitted for any hazardous or toxic waste.

g. Drawings showing locations of any proposed temporary excavations

or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

h. Environmental monitoring plans for the job site, including land, water, air, and noise monitoring.

i. Traffic control plans.

j. Methods of protecting surface and ground water during construction activities.

k. 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.

l. Drawing of borrow areas.

m. Plans for restoration of landscape damage.

n. Preconstruction damage surveys and reports as specified in SECTION 01000: GENERAL.

1.4 PERMITS

Permits obtained by the Government related to the work of this contract are attached in SECTION 00830: ATTACHMENTS, or referenced in SECTION 01000: GENERAL. The Contractor is responsible for obtaining all applicable permits or licenses(those not obtained by the Government). The Contractor shall be responsible for implementing the terms and requirements of the permits held by the Contractor or the Government. A copy of permits referenced in SECTION 01000: GENERAL are available for inspection in the Office of the District Engineer, Army Corps of Engineers Centre, 190 Fifth Street East, St. Paul, Minnesota 55101-1638.

1.5 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the previously mentioned Federal, State or local 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 proposed corrective action and take such action when approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping (suspending) all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspensions. Failure of the Contracting Officer to notify the Contractor of any noncompliance with Federal, State, or local laws or regulations does not relieve the Contractor of the obligation to be in conformance with those requirements.

1.6 PREVIOUSLY USED EQUIPMENT

The Contractor shall thoroughly clean all construction equipment previously

used at other sites before it is brought into the work areas, ensuring that soil residuals are removed and that egg deposits from plant pests are not present; the Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

1.7 PAYMENT

No separate payment or direct payment will be made for work covered under 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 ENVIRONMENTAL RESOURCES.

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine its activities to areas defined by the drawings and specifications.

3.2 LAND RESOURCES

Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, earth or other material displaced into uncleared areas shall be removed.

3.2.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. 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.

3.2.3 Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Contracting Officer.

3.2.4 Disturbed Areas

The Contractor shall effectively prevent erosion and control sedimentation through approved methods including, but not limited to, the following:

a. Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.

b. Erosion and sedimentation control devices. The Contractor shall construct or install temporary and permanent erosion and sedimentation control features as indicated or required. Berms, dikes, drains, sedimentation basins, grassing, and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

c. Sediment basins. Sediment from construction areas shall be trapped in temporary or permanent sediment basins. The sediment basins shall be constructed in accordance with basin plans when shown on the drawings. The basins shall accommodate the runoff of a local 5 year storm, except that the design storm event required by the watershed district, watershed management board, or similar governing agency shall be used if available. After each storm, the basins shall be pumped dry and accumulated sediment shall be removed to maintain basin effectiveness. Overflow shall be controlled by paved weirs or by vertical overflow pipes. The collected topsoil sediment shall be reused for fill on the construction site, and/or stockpiled for use at another site. The Contractor shall institute effluent quality monitoring programs as required by State and local environmental agencies.

3.2.5 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. Borrow areas shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil intrusion into areas designated on the drawings and to prevent erosion of

soil or sediment from entering nearby waters. Spoil areas shall be developed in accordance with the grading plan indicated on the drawings. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

3.3 WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation when such application may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction shall be the Contractor's responsibility. All water areas affected by construction activities shall be monitored by the Contractor.

3.3.1 Washing and Curing Water

Waste waters directly derived from construction activities shall not be allowed to enter water areas. Waste waters shall be collected and placed in retention ponds where suspended material can be settled out or the water evaporates to separate pollutants from the water.

3.3.2 Cofferdam and Diversion Operations

Construction operations for dewatering, and removal of cofferdams, shall be controlled at all times to limit the impact of water turbidity on the habitat for wildlife and on water quality for downstream use. The Contractor shall plan its operations and perform all work necessary to minimize adverse impact or violation of the water quality standards applicable to this contract.

3.3.3 Stream Crossings

Stream crossings shall be controlled during construction. Crossings shall provide movement of materials or equipment which do not violate water pollution control standards of Federal, State, or local governments.

3.3.4 Fish and Wildlife

The Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning of construction operations.

3.3.5 Fuel Handling

The Contractor shall provide containment around fueling areas to ensure that spills do not reach waters of the state.

3.4 AIR RESOURCES

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with State air pollution statutes, rules, and regulations and all Federal

emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained. Monitoring of air quality shall be the Contractor's responsibility. All air areas affected by the construction activities shall be monitored by the Contractor.

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 air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, 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.

3.4.2 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

3.4.3 Odors

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

3.4.4 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall use methods and devices to control noise emitted by equipment to within the levels specified in the "Safety and Health Requirements Manual" referenced in the clause "Accident Prevention" in SECTION 00700: CONTRACT CLAUSES.

3.5 WASTE DISPOSAL

The Contracting Officer shall be informed of any waste disposal requirements identified during the work and not covered in the Environmental Protection Plan. Waste disposal plans shall be updated and submitted as required.

3.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling 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 Project Site and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.5.2 Chemical Wastes

Chemical waste shall be stored in corrosion resistant containers, removed from the work areas, and disposed of in accordance with Federal, State, and local laws and regulations.

3.6 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any have been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. The Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated 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; rocks 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.

3.7 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction.

3.8 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the neat lines of project features. Such restoration shall be in accordance with the Environmental Protection Plan. This work shall be accomplished at the Contractor's expense and at no additional cost to the Government.

3.9 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.

3.10 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and

contractual, and installation and care of facilities, devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

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SECTION 01451

CONTRACTOR QUALITY CONTROL

01/02

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SECTION 01451

CONTRACTOR QUALITY CONTROL

01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1996) 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	(2000) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Contractor Quality Control (CQC) Plan; GA

The quality control plan shall be prepared in accordance with PARAGRAPH: QUALITY CONTROL PLAN.

Laboratory Quality Management Manual; FIO

The manual as specified in PARAGRAPH: TESTS - TESTING LABORATORIES - CAPABILITY CHECK shall be submitted.

SD-18 Records

Documentation of work; FIO

a. Construction Quality Control Management Report

b. CQC Report

c. Preparatory Phase Checklist

d. Initial Phase Checklist

Daily records and weekly reports shall be prepared in accordance with PARAGRAPH: DOCUMENTATION

1.3 PAYMENT

The Contractor shall be responsible for the work for the work of this section, without any direct compensation being made other than the payment received for contract items.

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 on site and off site, and shall be keyed to the proposed construction sequence. The 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 quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 15 days after receipt of notice to proceed, the 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 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both on site and 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 or someone higher in the Contractor's organization.

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 01330: SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

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.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing 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 10 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 on site 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 contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the on site 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, graduate architect, or a graduate of construction management, with a minimum of 2

years experience in related duties on construction similar to this contract. or a person with a minimum of 5 years experience in related duties on construction work. 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 have no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the CQC 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

In addition to the above qualifications, the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered through the Government in the Minneapolis - St. Paul, Minnesota metropolitan area.

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 01330: 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 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 48 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 on site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure 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, on site 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 testing laboratory meeting the requirements listed under PARAGRAPH: CAPABILITY CHECK, or establish a testing laboratory at the project site meeting those requirements. 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. The Contractor shall submit a Quality Management Manual meeting the requirements of ASTM D 3740 and ASTM E 329 for each laboratory to be used, including on-site project laboratories.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $1000.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials 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. Coordination for each specific test, exact delivery location, and

dates will be made with the Contracting Officer.

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 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 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. Off-site 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.

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 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 following sample forms are enclosed at the end of this section:

a. Construction Quality Control Management Report

b. CQC Report

c. Preparatory Phase Checklist

d. Initial Phase Checklist

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.

3.12 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM FOR CONTRACTOR QUALITY CONTROL OF CONTRACT

The Contractor shall utilize the Contractor Quality Control (CQC) module of the Resident Management System (RMS). The RMS-CQC module is a computer program which is executable on IBM compatible computers with 80386, 80486 and Pentium processors. This module includes a daily CQC reporting form which must be used. The module shall be completed to the satisfaction of the Contracting Officer prior to any contract payment and shall be updated as required. The Contractor shall complete module elements including:

Prime Contractor staffing
Subcontractor information, including name, address, trade, and point of contact
Submittal information, including description, activity number, review period, expected procurement period
Quality control testing
Definable features of work
Installed property listing
Transfer property listing
Pay activity and activity information
Planned cumulative progress earnings
Scheduled employee education required by the specifications
Insurance expiration dates

3.12.1 Revisions

The Contractor shall acknowledge receipt of Government comments relating to the RMS-CQC module by specific number reference on his Daily CQC report. The daily CQC report shall also report when corrections are implemented.

3.12.2 Pay Activity

The sum of all pay activity values shall equal the contract amount. Bid items may include multiple activities, but activities shall only be assigned to one bid item.

3.12.3 ATTACHMENTS

1. Contractor Quality Control Management Report

2. CQC Report

3. Prepartory Phase Checklist

4. Initial Phase Checklist

-- End of Section --

CONSTRUCTION QUALITY CONTROL MANAGEMENT REPORT

Contractor Production

Contractor's Name

_____

_____

Daily Report No:_____ Date:_____
Contract No.:_____

Project Title & Location: _____

Weather:_____ Precipitation:_____in. Temp.:_____Min._____Max.

1. Contract/Subcontractors and Area of Responsibility:

NUMBER:	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION OF WORK

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair

CQC Report

1. Work performed today: (Indicate location and description of work performed by prime and/or subcontractors by letter in table above).

2. Results of control activities: (Indicate whether P - Preparatory, I - Initial, or F - Follow-up Phase. When a P or I meeting is conducted, complete attachment 1-A or 1-B, respectively. When network analysis system is used, identify work by use of I-J numbers)

3. Test performed as required by plans and/or specifications:

4. Material received:

CQC Report (Cont'd)

5. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

6. Off-site surveillance activities, including action taken:

7. Job safety: (Report violations; Corrective instructions given; Corrective actions taken).

8. Remarks: (Instructions received or given. Conflict(s) in Plans and/or Specifications)

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

CQC System Manager

PREPARATORY PHASE CHECKLIST

Contract No.: _____ Date: _____
Definable Feature: _____ Spec Section: _____

Government Rep Notified_____ Hours in Advance Yes ____ No ____

I. Personnel Present.

	Name	Position	Company/Government
1.			
2.			
3.			
4.			
5.			
6.			
7.			

(List additional personnel on reverse side)

II. Submittals.

1. Review submittals and/or submittal log 4288. Have all submittals been approved? Yes _____ No _____

If No, what items have not been submitted?
a._____
b._____
c._____

2. Are all materials on hand? Yes _____ No _____
a._____
b._____
c._____

3. Check approved submittals against delivered material. (This should be done as material arrives).

Comments:_____
_____

III. Material Storage.
Are materials stored properly? Yes _____ No _____
If No, what action is taken?
_____

Preparatory Phase Checklist (Cont'd)

IV. Specifications.

1. Review each paragraph of specifications.

_____
_____
_____

2. Discuss procedure for accomplishing the work.

_____
_____
_____
_____
_____
_____

3. Clarify any differences.

_____
_____
_____
_____
_____

V. Preliminary Work.
Ensure preliminary work is correct.
If not, what action is taken?_____
_____

VI. Testing.

1. Identify test to be performed, frequency, and by whom.
_____
2. When required? _____
3. Where required?_____
4. Review Testing Plan._____
5. Has test facilities been approved? _____

VII. Safety.
1. Review applicable portion of EM 385-1-1._____
_____
2. Activity Hazard Analysis approved? Yes _____ No _____

VIII. Corps of Engineers comments during meeting.

_____
_____
_____

_____
CQC System Manager

INITIAL PHASE CHECKLIST

Contract No.:_____ Date:_____

Definable Feature:_____

Government Rep Notified:_____ Hours in Advance Yes_____ No _____

I. Personnel Present:

Name	Position	Company/Government
1.		
2.		
3.		
4.		
5.		
6.		

(List additional personnel on reverse side)

II. Identify full compliance with procedures identified at preparatory. Coordinate plans, specifications, and submittals.
Comments: _____

III. Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken? _____

IV. Establish Level of Workmanship.
1. Where is work located? _____
2. Is a sample panel required? Yes _____ No_____
3. Will the initial work be considered as a sample? Yes_____No_____
(If yes, maintain in present condition as long as possible).

V. Resolve any Differences.
Comments:_____

Review job conditions using EM 385-1-1 and job hazard analysis.
Comments: _____

_____
CQC System Manager

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SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

01/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-04 Drawings

Site Plan; FIO.

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.

Government Field Office; FIO.

The Contractor shall submit a preliminary plan and description of the mobile office facilities which it proposes to furnish prior to proceeding with procurement thereof.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Temporary Electrical Facilities

The Contractor shall be responsible for coordination and costs for electrical power required for the Contractor's operations, including all costs for utility company hookup, installation/dismantling of transformers and distribution lines. In general, the Contractor shall establish it's own service connection with the utility company.

1.2.2 Sanitation

The Contractor shall provide and maintain within the construction area field-type sanitary facilities in accordance with EM 385-1-1. These facilities shall include but not be limited to toilet, washing, and drinking water facilities.

1.2.3 Telephone

The Contractor shall make arrangements and pay all costs for their telephone facilities desired. Government personnel will not take or deliver messages for the Contractor.

1.3 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 flag men, 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.

1.3.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.3.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.4 CONTRACTOR'S TEMPORARY FACILITIES

1.4.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office

facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.4.2 Staging Area

The boundary limits of the grounds made available for the Contractor's use during the life of the contract are shown on the drawings as Work Limits. Trailers, materials, or equipment shall not be placed or stored outside the work limits.

1.5 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.

1.6 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 work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42-inches high, supported and tightly secured to steel posts located on maximum 10-foot centers, generally located to encompass the active construction areas, as directed by the Contracting Officer. 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.

1.7 PAYMENT

The Contractor shall be responsible for the work of this Section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS

2.1 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

2.1.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by

and remain the property of the Contractor.

2.1.2 Project and Safety Signs

The Contractor shall furnish and erect a Project sign and a Safety sign in a location selected by the Contracting Officer at the project site within 15 days after receipt of the notice to proceed. The requirements for the signs and their content shall be as shown on the drawings at the end of this section. The data required by the safety sign shall be corrected daily. Signs shall be maintained throughout the construction period, and upon completion of the project, the signs shall be removed from the site. The PROJECT DESCRIPTION and PROJECT NAME shall be as follows:

PROJECT DESCRIPTION: Flood Control Project
Crookston, Minnesota

PROJECT NAME: Crookston Stage 2

2.2 GOVERNMENT FIELD OFFICE

The Contractor shall provide and maintain for the life of the contract an approved mobile office (mobile home style) meeting the following requirements as to space and facilities for the exclusive use of the government. The unit shall be ready for occupancy within 30 calendar days after notice to proceed. The unit shall provide a minimum of 400 square feet floor area and shall include two private offices, each having approximately 100 square feet of floor area and a storage closet. The unit shall have two entrance doors. The remaining space is to be utilized as one large office, a toilet room, a chest of drawers and a storage area for coats, etc. The unit shall be provided with a toilet room consisting of a stool and lavatory and an electric heater. The unit interior headroom shall be no less than a nominal 8'-0".

2.2.1 Location

The Contractor shall locate the portable mobile home type field office at or near the Contractor's field office site at a location approved by the Contracting Officer. Four parking spaces shall be reserved for Government vehicles at the Government trailer.

2.2.2 Construction.

The Government field office shall be similar in quality and age as the Contractor's field office, if provided. Exterior and interior finishes shall be free from color fade, chipping, or peeling. The unit shall be set level on blocking, be provided with plywood skirting, and be anchored to the ground for protection against wind damage. Exterior doors shall be provided with screens and outside hasps for use with padlocks. The unit shall be electrically wired for fluorescent ceiling lighting fixtures and weather proof porch lights at each entrance door, along with switches, duplex convenience outlets, and a master switch and fuse box as required. The entire unit shall be adequately insulated with fiberglass insulation and vapor barrier. Dead air crawl space shall be properly ventilated. Heating and air conditioning facilities shall be provided to maintain an

ambient inside temperature of 68 degrees F. The unit shall be weather proof, and furnished with a forced air type heating plant, either gas or oil with hot and cold air ducts adequate to supply even heat throughout the unit. Air conditioning shall be furnished with capacity as recommended by the manufacturer for the trailer size. A central air conditioning system shall be provided.

2.2.3 Utilities

The Contractor shall be responsible for service fees in connection with electrical power and heating (natural gas or oil service). The Contractor shall also be responsible for service fees in connection with the water supply, sanitary waste system, and telephone as indicated below. When available, city water and sewer system connections are preferred.

a. Sanitary Facilities. In the absence of a city sewer connection, holding tanks shall be provided. The lavatory shall discharge into an outside underground holding tank with a capacity of not less than 400 gallons and a vented drain. The Contractor shall provide year-round pumping of the holding tank as required. Subject to approval, a serviced chemical toilet may be used.

b. Potable Water. In the absence of a city water connection, a potable water storage tank of not less than 300 gallons capacity shall be furnished with adequate supply filling connections and screened vent, and shall be stainless steel or plastic with a drain cock of not less than ½ inch. Upon completion of the job, the Contractor shall remove the underground holding tank and backfill the excavation. The Contractor shall provide potable water for the storage tank if service connections are not provided.

c. Telephone. The Contractor shall be responsible for installation of telephone at the Government office. The telephone hook-up should be placed on a separate account from the Contractor's phone so that it can be transferred to the Government after installation. The Government will be responsible for the telephone service to the Government field office after installation.

2.2.4 Furnishings.

The following furnishings shall be provided for the Government office:

a. A hot and cold drinking water dispenser. The Contractor shall provide drinking water for the dispenser for the duration of the contract.

b. Bulletin board, minimum size 6 square feet.

c. A cabinet shall be supplied along a side wall with minimum nominal dimensions 2 feet wide, 3 feet high and 6 feet long. The cabinet shall include a finished wood or laminate counter. Two shelves, one above and one below the cabinet, shall be provided for storage.

d. Sign. The Contractor shall securely attach to the unit exterior

and adjacent to the main entrance door, as approved, a 24 inch by 36 inch sign with the Corps of Engineers castle insignia with wording as specified.

e. Stoop. A stoop with 8 inch risers and handrails shall be provided at each entrance door.

f. Windows. All windows shall be provided with sash and security screens along with shades, blinds or similar features that allow for the complete coverage of the windows on the inside.

g. Lavatory. A 5 by 24 inch metal shelf and 15 by 20 inchwood or metal framed plate glass mirror shall be provided above the lavatory.

2.2.5 Furniture

Office furniture shall be coordinated with respect to style, color, and upholstery. The following furniture shall be provided:

a. Two desks either wood or steel, double pedestal type, top approximately 60 inches by 34 inches, with lock.

b. Two swivel armchairs with tilting seat and adjustable spring back.

c. Two filing cabinets, four-drawer legal size, with lock.

d. One drafting table stool, non-tilting, rotary type with back and circular footrest.

e. One drafting table, metal and/or wood, 36 inches by 48 inches.

f. One conference table, 3/4 inch thick by 72 inches long by 36 inches wide with solid core construction top.

g. Eight chairs for conference table, either wood or steel construction, with cushioned seat and backrest.

h. One rack for hanging full size drawings.

2.2.6 Office Equipment

The following equipment shall be provided:

a. One desk top facsimile (FAX) machine with modem BPS speeds of 9600,7200,4800, and 2400; an effective scanning width of 11.7 inches and line scanning density of 8 pels/mm horizontal and an effective scanning width of 7.7 inches and line scanning density of 3.85 lines/mm vertical. Initially supply four reams of paper(500 sheets per ream).

b. One desk top copying machine with an indirect dual component dry tone process. Paper copy sizes shall be a maximum of 11 inches by 17 inches and a minimum of 4.25 inches by 5.5 inches. The machine shall have a halogen lamp light source and an automatic sheet feed (single cassette). Initially supply four reams (500 sheets per ream) of white

copying paper and furnish a complete maintenance service contract/agreement for the machine.

c. One personal computer, minimum 433 megahertz, 4 gigabyte hard drive, 64 megabyte of RAM, CD ROM Reader; 17" monitor (26 dot pitch maximum), mouse and keyboard. The software provided with the computer will be Microsoft "Windows 95" or better and Microsoft "Office Professional" or approved equivalent.

d. One laser printer, HP 4000N or approved equivalent.

2.2.7 Maintenance.

The Contractor shall maintain the field office for the life of the contract. The Contractor shall be responsible for maintaining and paying for all costs associated with the following services:

a. Supplies. Toilet paper, paper toweling, paper and supplies for the FAX and copy machines shall be provided. Supply water for the drinking water dispenser. Supply water for the lavatory if a service connection is not provided for potable water.

b. Maintenance of office equipment. Include a maintenance service contract/agreement for operation of the Fax and Copy machines.

c. Janitorial Service. The Contractor shall provide daily janitorial service and provide all janitorial and sanitary supplies as well as trash removal service.

d. Snow removal. Maintenance of site access including snow removal service is the responsibility of the Contractor.

e. Utilities. The Contractor is responsible for maintaining and paying all costs associated with utility services including water supply, sanitary waste system, electrical power and natural gas or oil service.

2.2.8 Additional Requirements

a. The Contractor shall locate the portable mobile home type field office as directed by the Contracting Officer.

b. Four (4) parking spaces shall be reserved for Government vehicles at the Government trailer. If the Contractor requires more space, the Contractor shall provide it at his own expense.

PART 3 EXECUTION

3.1 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site. 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 or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

3.2 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.

3.3 ATTACHMENTS

1. Project Sign

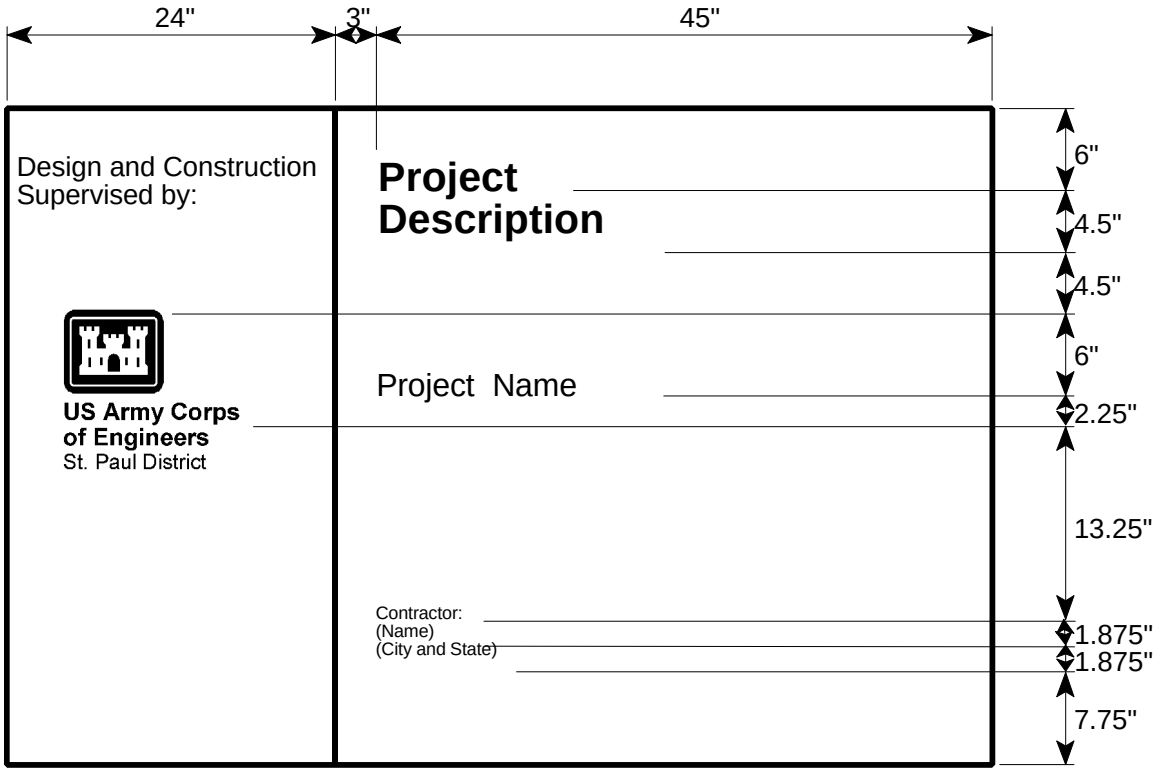
2. Safety Sign

3. Sign Erection Details

-- End of Section --

PROJECT SIGN

The graphic format tor this 4' x 6' sign panel follows the legend guidelines and layout as specified below. The large 4' x 4' section of the panel on the right is to be white with black legend. A 2' x 4' decal provided by the Corps shall be placed on the left side of the sign panel.



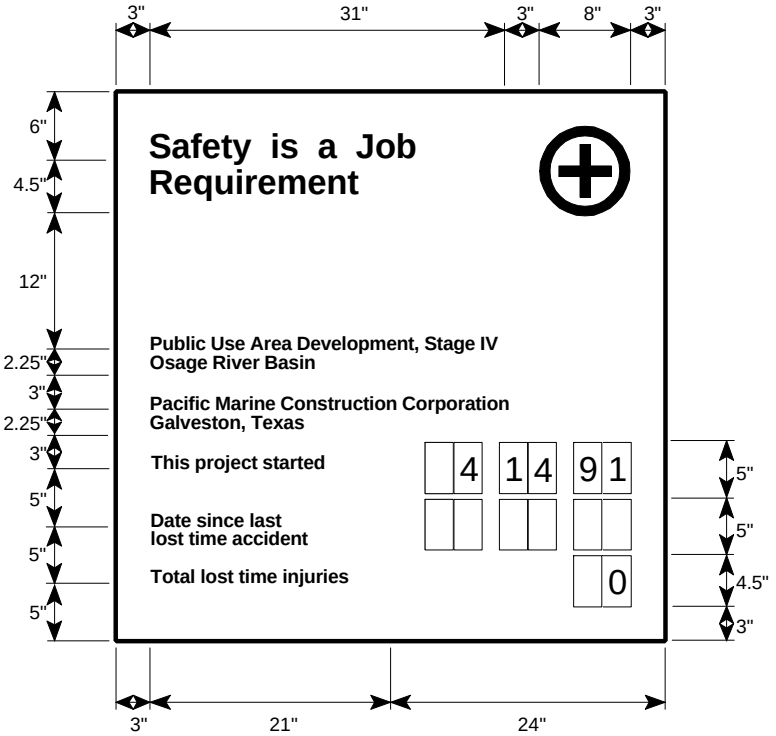
Project Description:
One to three line project title legend describes the work being done under this contract.
Color: Black; Typeface: 3" Helvetica Bold; Maximum line length: 42".

Project Name:
One to three line identification of project or facility.
Color: Black; Typeface: 1.5" Helvetica Bold; Maximum line length: 42".
Cross-align the first line of PROJECT NAME with the first line of the Corps Signature as shown.

Contractor:
One to five line identification of prim e contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state.
Color: Black; Typeface: 1.25" Helvetica Bold; Maximum line length: 21".

All typography is flush left and ragged right, upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps Standards (EP 310-1-6a and 6b).

SAFETY SIGN



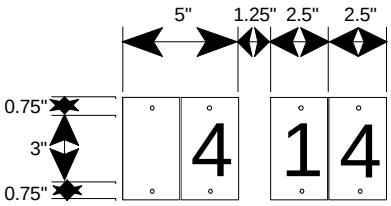
All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps Standards (EP 310-1-6a and 6b).

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with (8" od.) Safety Green First Aid logo. Typeface: 3" Helvetica Bold; Color: Black.

Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

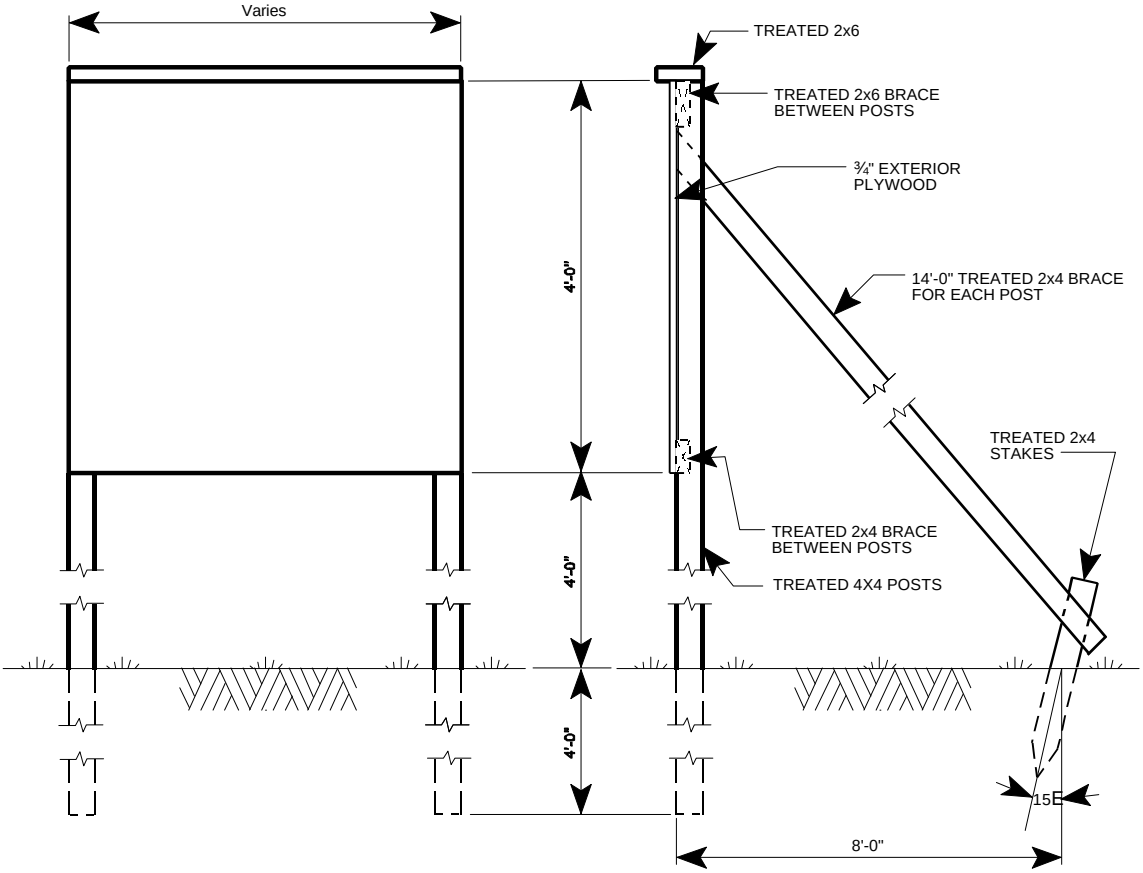
Legend Group 3: One- to two-line identification: name of prime contractor and city, state address. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

Legend Group 4: Standard safety record captions as shown. Typeface: 1.25" Helvetica Regular; Color: Black.



Replaceable numbers are to be mounted on white 0.060 aluminum plates and screw-mounted to background. Typeface: 3" Helvetica Regular; Color: Black; Plate size: 2.5" x 4.5".

SIGN ERECTION DETAILS



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01/02

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SECTION 01567

MINNESOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM
01/02

PART 1 GENERAL

1.1 GENERAL

This section covers best management practices to be implemented for prevention of storm water pollution as required by the National Pollutant Discharge Elimination System (NPDES). The Minnesota Pollution Control Agency is responsible for administering permits for NPDES in the state of Minnesota. The Government has determined that the project work included under this contract requires NPDES permitting. The requirements herein supplement those covered in SECTION 01410: ENVIRONMENTAL PROTECTION.

1.1.1 Definitions

The following terms apply to this specification and the general permit, unless redefined in subsequent paragraphs.

a. "Plan" means the Temporary Erosion and Sediment Control Plan.

b. "EPA" means the United States Environmental Protection Agency.

c. "MPCA" means the Minnesota Pollution Control Agency.

d. "NPDES" means the National Pollutant Discharge Elimination System.

e. "MPDES" means the Minnesota Pollutant Discharge Elimination System.

f. "Owner" as referred to in the general permit shall mean the Federal Government.

g. "Permittees" as referred to in the general permit shall mean the Federal Government and Contractor.

h. "General Permit" means the general permit authorization to discharge storm water associated with a construction activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.

j. "BMP" means Best Management Practices.

1.1.2 Contract Drawings

The following features are shown on or can be determined from the contract drawings:

a. The drainage patterns and approximate slopes anticipated after the major grading activities.

b. Areas of soil disturbance.

c. The location(s) where stabilization practices are expected to occur.

d. Typical details showing suggested Best Management Practices (BMP's) for erosion and sediment control.

e. Waters of the State.

f. Final site stabilization.

1.2 REFERENCES

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

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA/832/R-92/005	Storm Water Management for Construction Activities - Developing Pollution Prevention Plans and Best Management Practices

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT)

MNDOT 3885	Standard Specifications for Construction (1995 Edition), Erosion Control Blankets
MNDOT 3886	Standard Specifications for Construction (1995 Edition), Silt Fence
MNDOT 3887	Standard Specifications for Construction (1995 Edition), Flotation Silt Curtain

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330: SUBMITTAL PROCEDURES:

SD-04 Drawings

Temporary Erosion And Sediment Control Plan; FIO.

A specific Temporary Erosion and Sediment Control Plan shall be submitted in accordance with PARAGRAPH: PERMIT COMPLIANCE AND ADDITIONAL REQUIREMENTS.

SD-18 Records

Application; GA.

A copy of the Application for General Storm Water Permit for Construction Activity (MPCA Form PQ00641) shall be submitted to the Contracting Officer at the same time it is transmitted to the state.

Notice of Termination; FIO.

A copy of the notice of termination shall be submitted to the Contracting Officer at the same time it is transmitted to the state.

1.4 PERMIT COMPLIANCE AND ADDITIONAL REQUIREMENTS

The Contractor shall comply with the requirements of General Permit No. MNR100000. The following define additional requirements and clarify which requirements of the General Permit are to be performed by either the Contractor, the Government, or both.

1.4.1 Schedule

No contract project construction activities which requires an NPDES permit may commence until the MPDES permit is valid.

1.4.2 Temporary erosion and sediment control plan

The contract drawings show a typical details of suggested best management practices (BMP's) for erosion and sediment control taken from EPA/832/R-92/005. The BMP's, together with applicable portions of the site drawings and specifications form an initial plan for temporary erosion and sediment control. The Contractor shall finalize and implement the plan. The finalized plan, together with documentation, shall be in accordance with the general permit. The plan shall be maintained at the site and made available to federal, state, and local officials as requested. The Contractor shall determine the specific BMP's for erosion and sediment control (including the types, locations, and installation scheduling of erosion and sediment controls). These BMP's and corresponding material specifications and shop drawings shall be included in the Plan.

1.4.3 Application

The Application for General Storm Water Permit for Construction Activity must be signed by the Government and the Contractor. A blank copy of the application form is included at the end of this section. Immediately after contract award, the Contractor shall complete parts I, II and V of the application form, obtain signature by the Government, and submit the form to the state. The application shall be post marked at least 48 hours in advance of any ground breaking activities. The Contractor is responsible for payment of the application fee.

1.4.4 Permanent erosion and sediment control plan

The Government has developed the Permanent Erosion and Sediment Control Plan and will maintain availability of the plan to federal, state, and local officials as required in the General Permit.

1.5 MEASUREMENT AND PAYMENT

The contactor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS

2.1 SILT FENCE

Silt fence shall be manufactured and installed as shown on drawings. On level sites with minimal potential for sediment loading, the wire fabric may be omitted. Fabric for silt fence shall conform to requirements given in MNDOT 3886.

2.2 STRAW BALES

Straw shall be baled from oats, wheat, rye, barley, rice, or other coarse fiber vegetation that will percolate water. Hay baled from grass, alfalfa and clover is not acceptable.

2.3 OTHER PRODUCTS

Any products proposed for use that are not included on drawing Z2-22 shall be described fully, with catalog cuts and manufacturer's instructions for use, in the temporary erosion and sediment control plan. Other products, if proposed in the final plan, shall meet the following requirements:

Erosion control blankets shall meet MNDOT 3885
Floatation Silt Curtain shall meet MNDOT 3887

PART 3 EXECUTION

As between the Government and the Contractor, the Contractor shall be responsible for fulfilling the obligations of the general permit for the following sections:

Part I-C: Records
Part I-D: Erosion and Sediment Control During Construction
Part I-E: Inspection and Maintenance
Appendix A: Temporary Erosion and Sediment Control Plan

3.1 IMPLEMENTATION

The Contractor shall install the sediment and erosion control system in accordance with the plan submitted to the Contracting Officer. The BMP's shall be modified if inspection indicates distress to the system or reveals unforeseen circumstances, or if directed by the Contracting Officer. Any updates to the plan shall be recorded. Permanent stabilization shall be initiated as soon as practicable in any portion of the site where construction activities are complete.

3.2 MAINTENANCE

The Contractor shall be responsible for implementing and managing the erosion and sediment control BMP's before and during the construction activities; and ensure that the Plan will be implemented and stay in effect until the work has been completed, the entire work site has undergone final stabilization, and a Notice of Termination has been submitted to the Contracting Officer and the state permitting authority.

3.3 RECORDS

The contractor shall record on CQC reports: (1) dates when major stripping and grading activities occur, (2) dates when construction activities temporarily or permanently cease on a portion of the site,(3) when permanent stabilization practices are initiated, and (4) activities associated with inspection and maintenance.

3.4 ATTACHMENTS

1. Application for General Storm Water Permit for Construction Activity (MDNR Form PQ00641 with instructions) 4 Pages

2. NPDES General Permit No. MN R100000 21 Pages

-- End of Section --

Application for General Storm Water Permit for Construction Activity (#MNR100000)

Minnesota Pollution Control Agency
520 Lafayette Road North; St. Paul, MN 55155-4194

I. Construction Site Information

1. Name of project: _____
2. Brief description of where the construction activity occurs (please include address, if available):

   _____

   _____

3. Indicate ALL cities, counties, and townships where the construction activity will take place:

   _____

   _____

4. Name of waterbody(s) that will receive storm water from the construction site:

   _____

   _____

5. Project start date: _____ Project completion date: _____ Area to be disturbed by project: _____ (in acres)

II. Prerequisites for Applying for a Permit

For the following questions, please refer to the **NPDES General Storm Water Permit** (MNR100000).

A "**No**" answer for any question will result in this form being returned to the owner with no permit issued to authorize the construction activity. This application will need to be completed and returned to the MPCA before a permit to authorize the construction activity may be issued.

6. Has a **Temporary Erosion and Sediment Control Plan** been developed for this project in accordance with Appendix A and incorporated into this project's final plans and specifications? **Yes** ☐ **No** ☐
7. Has a **Permanent Erosion and Sediment Control Plan** been developed for this project in accordance with Appendix B and incorporated into this project's final plans and specifications? **Yes** ☐ **No** ☐
8. Has the Application Fee been enclosed? **Yes** ☐ **No** ☐

III. Owner Information

Name _____ Telephone _____

Address _____

City _____ State _____ Zip Code _____

Contact Person _____ Telephone _____

IV. Owner Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete (Minnesota Rules part 7001.0070).

I also certify under penalty of law that I have read, understood, and accepted all terms and conditions of the National Pollutant Discharge Elimination System (NPDES) General Storm Water permit (MNR100000) that authorizes storm water discharges associated with the construction site identified on the front side of this form.

I understand that as a permittee, I am legally accountable under the Clean Water Act, to ensure compliance with the terms and conditions of the NPDES General Storm Water Permit (MNR100000).

I also understand that MPCA enforcement actions (pursuant to Minnesota Statutes sections 115.07, 116.072, and 609.71 and Section 309 of the Clean Water Act) may be taken against my company if the terms and conditions of the NPDES General Storm Water Permit (MNR100000) are not met.

Printed Name | Title (Manager, CEO, etc.)

Authorized Signature | Date

V. General Contractor Certification

I certify under penalty of law that I have read, understood, and accepted all terms and conditions of the National Pollutant Discharge Elimination System (NPDES) General Storm Water permit (MNR100000) that authorizes storm water discharges associated with the construction site identified on this form.

I understand that for Parts I.B. through I.E, Appendix C, and Appendix D of the General Storm Water Permit (MNR100000) I am becoming a co-permittee with the owner of the facility for which I have been contracted to perform professional construction services. As a co-permittee I understand that my company is legally accountable, under the Clean Water Act, to ensure compliance with the terms and conditions of the General Storm Water Permit (MNR100000).

I also understand that MPCA enforcement actions (pursuant to Minnesota Statutes sections 115.07, 116.072, and 609.71 and Section 309 of the Clean Water Act) may be taken against my company if the terms and conditions of the NPDES General Storm Water Permit (MNR100000) for which I am a co-permittee, are not met.

Company or Firm | Telephone

Printed Name | Title (Manager, CEO, etc.)

Authorized Signature | Date

Address

City | State | Zip Code

Contact Person | Telephone

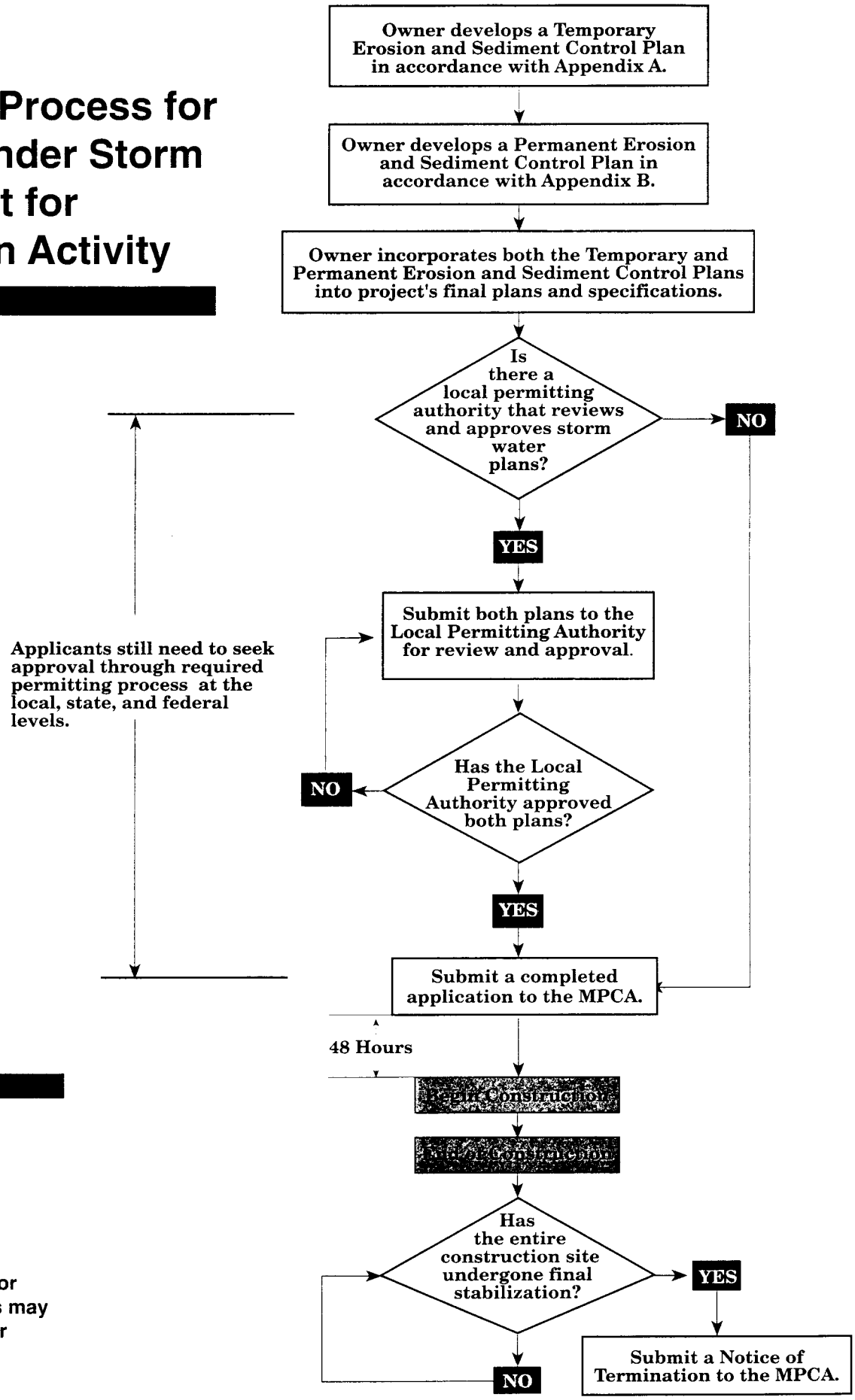
Submit to: MPCA, Water Quality Division, Industrial Section, 520 Lafayette Road North, St. Paul, MN 55155-4194

Application Instructions for General Storm Water Permit

CONSTRUCTION ACTIVITY

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Application Process for Coverage Under Storm Water Permit for Construction Activity



For additional information call:

(612) 296-7219 or
1-800-657-3804

People with speech or hearing impairments may call (612) 282-5332 or
1-800-627-3529

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Minnesota Pollution Control Agency

GENERAL PERMIT

AUTHORIZATION TO DISCHARGE STORM WATER ASSOCIATED WITH A CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PERMIT PROGRAM

ISSUANCE DATE: September 4, 1998 **EXPIRATION DATE: September 4, 2003**

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq., hereinafter, the "Act"); 40 CFR 122, 123, and 124, as amended, et seq.; Minnesota Statutes Chapters 115 and 116, as amended, and Minnesota Rules Chapter 7001;

This permit establishes conditions for discharging storm water to waters of the state from construction activities which disturb five or more acres of total land area.

This permit DOES NOT authorize:

1) Discharges or releases that are not **storm water** as defined on Page 18 (see "Prohibitions" on Page 14 of this permit).

2) The placement of fill into **waters of the state**.

Unless notified by the **Agency** to the contrary, applicants who submit a complete **application** form in accordance with the requirements of this **permit** are authorized to discharge **storm water** from construction sites under the terms and conditions of this **permit** 48 hours after the date the application is postmarked.

Coverage under this permit will remain in effect until construction is complete, the site has undergone **final stabilization**, all maintenance activities required in Part I.E. have been completed, and the **Permittee** has submitted a **Notice of Termination**, regardless of the above expiration date.

Signature: John N. Holck

John N. Holck, Manager
South District
Operations & Planning/Major Facilities

for

Peder A. Larson
Commissioner
Minnesota Pollution Control Agency

If you have questions on this permit, including the specific permit requirements, permit reporting or permit compliance status, please contact:

Minnesota Pollution Control Agency
Metro District, Storm Water Permit Program
520 Lafayette Road North
St. Paul, MN 55155-4194
Telephone (651) 296-3890
Fax (651) 297-8701

All boldfaced terms are defined in "Definitions, Pages 15 through 18
TDD (for hearing and speech impaired only): (651)282-5332
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I. REQUIREMENTS OF THIS PERMIT

A. PREREQUISITES FOR SUBMITTING A PERMIT APPLICATION

Failure to complete the following prerequisites prior to submitting the **application** will result in the **application** being returned, and the construction project NOT authorized by this **permit**.

1. The **owner** must develop a Temporary **Erosion** and **Sediment Control** Plan in accordance with "Appendix A." The plan requirements must be incorporated into the project's **final plans and specifications** and implemented as part of the project.

2. The **owner** must develop a Permanent Erosion and Sediment Control Plan in accordance with "Appendix B." The plan requirements must be incorporated into the project's **final plans and specifications** and implemented as part of the project.

The above plans are NOT to be submitted to the Agency but are to be retained by the owner in accordance with Appendices A and B; "Plan Retention."

B. APPLICATION FOR COVERAGE

1. The **owner** and **general contractor** are responsible for submitting a completed **application** form (or a photocopy thereof) to the Minnesota Pollution Control Agency (MPCA) for each project which disturbs five (5) or more acres of land.

2. The **owner** who signs the **application** is responsible for compliance with all terms and conditions of this **permit**. The **general contractor** who signs the **application** is a Co-Permittee for Parts I.B. through I.E., Appendix C, and Appendix D of this **permit**. and is responsible for compliance with those portions of this **permit**.

3. This permit will become effective 48 hours after the postmarked date of the completed **application** form containing "Yes" responses to questions 6, 7, and 8. A "No" response to question 6, 7, or 8 will result in the application being returned to the owner, and no permit will be issued to authorize the construction. No construction which requires an NPDES permit may commence unless authorized by an NPDES permit.

4. Permittees will receive a "Notice of Storm Water Permit Coverage" card acknowledging permit coverage within 30 days of the postmarked date of the completed **application**. (See I.D.3. for posting requirements.) A photocopy of this card must be provided by the **owner** to the **local permitting authority**, where applicable, within 14 days of receipt.

C. RECORDS

1. The project's **final plans and specifications** which incorporate the requirements of the Temporary Erosion and Sediment Control Plan and Permanent Erosion and Sediment Control Plan must be:

   a. available at the construction site in either the field office, or, inspector's vehicle, or contractor's vehicle, and,

   b. available to federal, state, and local officials (in accordance with Appendix D, Subpart C) for inspection for the duration of this permit.

2. The following plans/records must be made available to federal, state and local officials within 24 hours of request (in accordance with Appendix D, Subpart C.) for the duration of the permit:

   a. Temporary Erosion and Sediment Control Plan developed in accordance with Part I.A.1. (if a separate document from the project's **final plans and specifications**).

   b. Permanent Erosion and Sediment Control Plan developed in accordance with Part I.A.2.

   c. Records of all inspections (see Part I.E.). Records shall include:

      1) Date and time of inspections,
      2) Findings of inspections,
      3) Corrective actions taken (including dates and times)
      4) Documentation of changes to the Temporary Erosion and Sediment Control Plan made during construction.

   d. Date of all rainfall events.

3. The "Notice of Storm Water Permit Coverage" card shall be posted at any of the following locations:

   a. construction site entrance and visible from the nearest public roadway
   b. visible from the nearest public roadway, where no construction site entrance exists
   c. field office (if applicable)
   d. for linear utility and non-contiguous municipal projects, at the office responsible for project administration.

D. EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

1. Erosion Control

a. The **Permittee(s)** shall use, where possible, horizontal slope grading, construction phasing, and other construction practices that minimize **erosion**.

b. Unless precluded by snow cover, all **exposed soil areas*** with a continuous positive slope within 100 lineal feet from a **water of the state**, or from a curb, gutter, storm sewer inlet, temporary or permanent drainage ditch or other **storm water** conveyance system, which is connected to a water of the state, shall have **temporary protection** or **permanent cover** for the **exposed soil areas** within the following time frames:

Type of Slope	Temporary protection or permanent cover where the area has not been, or will not be, worked by the contractor for:
Steeper than 3:1	7 days
10:1 to 3:1	14 days
Flatter than 10:1	21 days

*For the purposes of this provision, **exposed soil areas** do not include stockpiles or surcharge areas of sand, gravel, aggregate, concrete or bituminous.

c. The bottom of any temporary or permanent drainage ditch constructed to drain water from a construction site must be stabilized within 100 lineal feet from a water of the state. Stabilization must be initiated within 24 hours of connecting the drainage ditch to **a water of the state**, existing gutter, storm sewer inlet, drainage ditch, or other **storm water** conveyance system which discharges to **waters of the state** and completed within five calendar days.

d. Prior to connecting any pipe to a **water of the state** or drainage ditch, the pipe's outlet must be provided with temporary or permanent **energy dissipation** to prevent erosion.

2. <u>Sediment Control</u>

a. **Sediment control best management practices (BMPs)**, which prevent **sediment** from entering a **water of the state**, gutter, storm sewer inlet, ditch or other storm water conveyance system, shall be established on all down-gradient perimeters before any up-gradient land disturbing activities begin, and shall remain in place until final stabilization has been established.

b. The Permittee shall minimize vehicle tracking of **sediment** or **soil** off site at locations where vehicles exit the construction site onto **paved surfaces**.

c. Where 10 or more contiguous acres of **exposed soil** are contributing to a discernible point of **discharge**, temporary sedimentation basins* must be provided prior to the runoff leaving the construction site or entering **waters of the state**.

These sedimentation basins shall comply with the following:

1) Basins shall provide 1800 ft^3 per acre drained of hydraulic storage below the outlet pipe. For roadways, the use of adjacent drainage ditches with riser pipes to accomplish this is acceptable.
2) Basin outlets shall be designed to prevent short circuiting and the **discharge** of floating debris. The outlet should consist of a perforated riser pipe wrapped with filter fabric and covered with crushed gravel. The perforated riser pipe should be designed to allow complete basin drawdown.

*While recommended, this provision will not be required for:

1) work on existing roadways where the 10 acre disturbed common drainage area is served by an existing storm sewer which is daylighted off the road's right-of-way, **or**,
2) proximity to bedrock or vertical relief precludes it, **or**,
3) final stabilization will be established within 30 days of the initiation of construction activity.

E. INSPECTIONS AND MAINTENANCE

1. Except where work has been suspended due to frozen ground conditions, the **Permittee(s)** shall inspect the construction site once every seven (7) days and within 24 hours after every rain event, which results in runoff leaving the construction site or entering **waters of the state**. The **Permittee** shall investigate and comply with the following inspection and maintenance requirements:

   a. Inspection Requirement: All **erosion** and perimeter **sediment control BMPs** to ensure integrity and effectiveness.

      Maintenance Requirement: All nonfunctional perimeter **sediment control BMPs** shall be repaired when the sediment reaches 1/3 of the height, or replaced, or supplemented with functional **BMPs** within 24 hours of discovery. All nonfunctional **erosion control BMPs** shall be repaired, replaced, or supplemented with functional **BMPs** as soon as field conditions allow access.

   b. Inspection Requirement: All temporary sedimentation basins to ensure effectiveness.

      Maintenance Requirement: When the depth of sediment collected in the basin reaches 1/2 the height of the riser, or 1/2 the storage volume, the basin shall be drained and the sediment removed. Drainage and removal shall be completed within 72 hours of discovery, or as soon as field conditions allow access.

   c. Inspection Requirement: Drainage ditches and other **waters of the state** for evidence of **sediment** leaving the site.

      Maintenance Requirement: Unless the project has received approval or certification for depositing fill into waters of the state, the **Permittee** shall remove all deltas and **sediment** deposited in drainage ways, catch basins, or **waters of the state**, and restabilize the areas where **sediment** removal results in **exposed soil**. The removal and stabilization shall take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access restraints. If precluded, removal and stabilization must take place within seven calendar days of obtaining access. The Permittee is responsible for contacting all local, regional, state and federal authorities prior to working in waters of the state, and receiving any applicable permits.

d. Inspection Requirement: Construction site vehicle exit locations for evidence of off-site **sediment** tracking onto paved **surfaces**.

Maintenance Requirement: Tracked **sediment** shall be removed from paved **surfaces**, which do not drain back into the construction site, within 24 hours of discovery.

2. Where parts of the construction site have undergone **final stabilization**, but work remains on other parts of the site, inspections of the stabilized areas may be reduced to once per month.

3. Where work has been suspended due to frozen ground conditions, the inspections and maintenance required in Part I.E.1. above shall take place as soon as weather conditions warrant or prior to resuming construction.

4. Unless required to remain in place by the **owner** or **local permitting authority**, all temporary synthetic, structural, and nonbiodegradable **erosion** and **sediment control BMPs** shall be removed after the site has undergone **final stabilization**.

5. After the entire project has undergone **final stabilization**, all temporary sedimentation basins to be used as permanent water quality management basins must be cleaned out by the **Permittee** to provide the sediment storage capacity required in Part I.D.2.c.2. **Permittees** are responsible for the maintenance of water quality management **BMPs** until construction is complete, the site has undergone **final stabilization**, and a **Notice of Termination** has been submitted to the **Agency**.

F. DURATION OF PERMIT COVERAGE

The **owner** and **general contractor** are responsible for complying with their respective portions of this permit until construction is complete, all maintenance activities required in Part I.E. are complete, the site has undergone **final stabilization** and a **Notice of Termination** is submitted to the **Agency**.

G. APPENDICES INCORPORATED BY REFERENCE

Appendices A, B, C, and D are incorporated into this permit by reference and are made both integral and enforceable parts of this permit.

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APPENDIX A

TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

(Completed prior to submittal of an application)

A. GOAL: The goal of the Temporary Erosion and Sediment Control Plan is to prevent **sediment** from entering **waters of the state** during construction. The **owner** shall incorporate **Best Management Practices (BMPs)** into the project's **final plans and specifications**, which are designed to meet this goal and comply with Parts I.D. and I.E. of this **permit**. While the general requirements are identified in Parts I.D. and I.E. of this **permit**, it is the **owner's** responsibility to select the appropriate **BMPs** which satisfy these requirements.

B. ASSIGNING RESPONSIBILITY

When developing bidding documents or other contracts, the **owner** must identify who will implement and manage the **erosion** and **sediment control BMPs** before and during construction; and ensure that the plan will be implemented and stay in effect until the construction project is complete, the entire site has undergone **final stabilization**, and a **Notice of Termination** has been submitted to the Agency. In addition, the **final plans and specifications** must clearly identify who will be responsible for the maintenance requirements identified in Part I.E. of this permit.

C. PLAN CONTENTS

The Temporary **Erosion** and **Sediment Control** Plan, if developed as a document separate from the project's **final plans and specifications**, must be prepared for the proposed project. The plan must contain appropriate **BMPs** which comply with Parts I.D. and I.E. of this permit and contain **standard plates** and/or specifications of these **BMPs**.

1. **Standard plates** and/or specifications must be provided for all **BMPs**, selected by the designer to be used on the project, and at a minimum, must include the following:

   a. perimeter sediment control
   b. placement and type of **temporary cover**

2. Where applicable, **standard plates** and/or specifications must also be provided for the following:

   a. horizontal slope grading
   b. proposed stabilized vehicle entrances
   c. temporary sedimentation basins
   d. storm sewer pipe outlet energy dissipation
   e. storm sewer inlet control
   f. **erosion** and **sediment control** requirements for stockpile areas

All **boldfaced** terms are defined in "Definitions", Pages 15 through 18.

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D. FINAL PLANS AND SPECIFICATIONS

The above **standard plates** and/or specifications are to be incorporated into the project's **final plans and specifications.** In addition, the **final plans and specifications** shall clearly denote:

1. Location and type or the procedures to establish the location and type of all **erosion** and **sediment control BMPs.**

2. Existing and final grades, including dividing lines and direction of flow for all **storm water** runoff drainage areas located within the project limits.

3. Locations of areas not to be disturbed or areas where construction will be staged to minimize duration of **exposed soil areas.**

4. All **waters of the state,** including existing wetlands identified on the National Wetlands Inventory Map, within one-half mile from the exposed construction area which will receive direct **storm water** runoff from the construction site during construction.

   Where waters of the state, including wetlands, which will receive the direct runoff will not fit on a plan sheet, they shall be identified with an arrow, indicating both direction and distance.

5. Timing for installation of all **erosion** and **sediment control BMPs** required in Part I.D.

E. PLAN RETENTION

The owner shall keep a copy of the Temporary **Erosion** and **Sediment Control** Plan and all changes to it for three years after completion of the construction project.

F. CHANGES TO THE TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

Changes in the plan made during construction to accommodate phased construction, sequenced work, timing issues, or changed site conditions are allowable provided Parts I.D. through I.E. are complied with.

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All **boldfaced** terms are defined in "Definitions", Pages 15 through 18.

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APPENDIX B

PERMANENT EROSION AND SEDIMENT CONTROL PLAN

(Completed prior to submitting an application)

A. GOAL: The goal of the Permanent Erosion and Sediment Control Plan is to protect Minnesota's water resources from pollutants generated from a project's ultimate development's impervious surfaces, change in land use, or changed ground cover.

B. ASSIGNING RESPONSIBILITY

When developing bidding documents or other contacts, the **owner** must identify who will maintain the water quality management **BMPs** until construction is complete, all maintenance activities required in Part I.E. are complete, the site has undergone **final stabilization**, and a **Notice of Termination** has been submitted to the **Agency**.

C. PLAN CONTENTS

The Permanent Erosion and Sediment Control Plan must be prepared for the proposed project, and may be developed as a separate document from the **final plans and specifications**. The plan must contain appropriate **BMPs** which satisfy the above goal, and contain **standard plates** and/or specifications of these **BMPs**. These **standard plates** and specifications must be incorporated into the project's **final plans and specifications**. At a minimum, the plan must contain:

1. Land feature changes (in acres) for both **before** and **after** construction:

   a. Total project area;
   b. Total **impervious surface** area of project;
   c. Total pervious area of project;
   d. Total estimated **impervious surface** area of ultimate development;
   e. Total estimated pervious area of ultimate development;

2. **Standard plates** and/or specifications of permanent erosion and sediment control BMPs below (Appendix B. C. 2a. 2b. and 2c.):

   a. **Sediment Control**
   Where a project's ultimate development replaces surface vegetation with one or more acres of cumulative impervious surface and all runoff has not been accounted for in a local unit of government's existing storm water management plan or practice, the runoff shall be discharged to a wet sedimentation basin* prior to entering waters of the state.

      1) Proposed Development

      Except as provided in 2) below ("Reconstruction or Work on Existing Roadways"), the wet sedimentation basin shall be based on the project's ultimate development and comply with the following requirements:

All **boldfaced** terms are defined in "Definitions", Pages 15 through 18.

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a) The basin's hydraulic volume shall be sufficient to capture a 1/2 inch of runoff from the impervious watershed area.
b) Basins shall also provide a minimum of 250 $ft.^3$ dead sediment storage volume below the basin's hydraulic volume/impervious acre drained.
c) Basin inlets shall be placed above the sediment storage volume.
d) Basin outlets shall be designed to remove all suspended solids greater than five microns with a settling velocity of 1.3×10^{-4} ft/sec.
e) Basin outlets shall also be designed to prevent short circuiting and the discharge of floating debris.
f) Basins must provide spillways to accommodate storm events in excess of the basin's hydraulic design.

2) Reconstruction or Work on Existing Roadways

* While recommended, the above provision (Appendix B.C.2a.) will not be required for work on existing roadways where:
1) the drainage area is served by an existing storm sewer which is daylighted off the road's right-of-way **or**,
2) proximity to bedrock or vertical relief precludes it, **or**,
3) existing right-of-way precludes it.

For these situations, however, the **owner** will be required to incorporate other sedimentation or treatment devices (i.e., grass swales, smaller sediment basins, etc.).

b. **Permanent Erosion Control**

1) All drainage ditches constructed to drain water from the site after construction is complete must be **stabilized.**

2) All pipe outlets must be provided with permanent **energy dissipation** where the pipe's outlet velocity will exceed the permanent cover's erosive velocity.

c. Treatment

The **owner** is required to provide treatment of storm water through the use of **BMPs** such as grass swales, wetlands constructed for the purpose of treating **storm water**, and the planting or development of emergent vegetation around the perimeter of the wet sedimentation basin's **sediment** storage volume.

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D. FINAL PLANS AND SPECIFICATIONS

The above standard plates and/or specifications are to be incorporated into the project's final plans and specifications. In addition, the final plans and specifications shall clearly denote:

1. Location and type of all permanent erosion and sediment control BMPs (Appendix B.C.2a., 2b. and 2c.).

2. The plan sheets must clearly identify all **waters of the state**, including wetlands identified on the National Wetlands Inventory Map within and one-half mile from the construction area which will receive direct **storm water** runoff from the construction site after construction is complete.

   Where the **waters of the state** which will receive the direct runoff and will not fit on the plan sheet, the resource shall be identified with an arrow, indicating both direction and distance.

3. Methods to be used for final stabilization of all exposed soil areas. For linear utility and roadway projects, final stabilization is not required on agricultural land which will be tilled within one year of project completion.

E. PLAN RETENTION

The owner shall keep a copy of the Permanent Erosion and Sediment Control Plan and all changes to it for three years after completion of the construction project.

F. CHANGES TO THE PERMANENT EROSION AND SEDIMENT CONTROL PLAN

Changes in the plan made during construction to accommodate changed site conditions are allowable provided all of Appendix B. is complied with.

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APPENDIX C

PROVISIONS

A. APPLICABILITY CRITERIA

1. This permit covers storm water discharges associated with a construction activity which disturb **five (5) or more acres of land** in all areas of the state of Minnesota, except for agricultural/ silvicultural activities.

2. This is a National Pollutant Discharge Elimination System/State Disposal System general permit.

3. If the Commissioner determines that storm water discharges associated with a construction activity, or other activities, are contributing to a violation of a water quality standard or would be more appropriately regulated by an individual permit, the Commissioner may require a Permittee to be covered by an individual storm water discharge permit. The Commissioner may require a Permittee to develop and implement specific best management practices. Upon issuance of an individual permit, this general permit would no longer apply.

4. A permit applicant, or Permittee, may request an individual permit.

B. MPCA ADDRESS

Submit all forms, correspondence, reports, etc. to the following address:

Minnesota Pollution Control Agency
Water Quality Division
Attn: Construction Activity Storm Water Program
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

C. RESPONSE

The Permittee shall respond to Agency requests for submittal of temporary and permanent erosion and sediment control plans and water quality management plans, certificates, reports, records, or other information required by this permit. Upon request, the Permittee shall also provide a copy of this information to the local permitting authority and municipal storm sewer operator.

D. AUTHORIZED DISCHARGES

All discharges of storm water associated with a construction activity shall be composed entirely of storm water.

E. PROHIBITIONS

Discharges of any material other than storm water, such as vehicle and equipment maintenance spills; wash water; oil and other hazardous substances are prohibited by this permit.

F. DEFINITIONS

1. **"Act"** means the Clean Water Act (formerly the Federal Water Pollution Control Act), United States Code, Title 33, Sections 1251 et seq., as amended.

2. **"Agency"** means the Minnesota Pollution Control Agency (MPCA).

3. **"Application"** means a completed application for activities regulated by this permit. Application forms are available from the Agency.

4. **"Best Management Practices (BMPs)"** means erosion and sediment control and water quality management practices that are the most effective and practicable means of controlling, preventing, and minimizing degradation of surface water, including construction-phasing, minimizing the length of time soil areas are exposed, prohibitions, and other management practices published by state or designated areawide planning agencies.

   Examples of BMPs can be found in **Protecting Water Quality in Urban Areas**, Minnesota Pollution Control Agency 1989, and **Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices**, U.S. Environmental Protection Agency 1992 as a reference for BMPs, and **Erosion Control Design Manual**, Minnesota Department of Transportation, et al, 1993.

5. **"Construction Activity"** means a disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography which may result in accelerated storm water runoff, leading to soil erosion and movement of sediment into waters of the state. Examples can include clearing, grading, filling and excavating.

6. **"Discharge"** means the conveyance, channeling, runoff, or drainage, of storm water, including snow melt, from a construction site.

7. **"Energy Dissipation"** means methods employed at pipe outlets to prevent erosion. Examples include, but are not limited to; aprons, riprap, splash pads, and gabions which are designed to prevent erosion.

8. **"Erosion"** means the wearing away of soil by rainfall, surface water runoff, wind, or ice movement.

9. **"Erosion Control"** means methods employed to prevent erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.

10. **"Exposed Soil Areas"** means all areas of the construction site where the perennial vegetation (including trees, shrubs, and brush) has been removed. This includes topsoil stockpile areas, borrow areas and disposal areas within the construction site.

11. "**Final Plans and Specifications**" means the reports, prints, drawings, written descriptions, and clear technical requirements necessary to build a project used by the owner for the purposes of entering into a construction contract.

12. "**Final Stabilization**" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70 percent of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been employed. Examples of vegetative cover practices can be found in Supplemental Specifications to the 1988 Standard Specifications for Construction (Minnesota Department of Transportation, 1991).

13. "**Five or more acres of total land area**" means any project that disturbs at least five acres of land measured by the project's construction corridor, excluding areas staked as not to be disturbed. If the project is less than five acres, but is part of larger common plan of development or sale (where multiple separate and distinct construction activities may be taking place at different times on different schedules but under one plan), it is defined as "five acres or more of total land area."

14. "**General Contractor**" means the party who signs the construction contract with the owner to construct the entire project described in the final plans and specifications. Where the construction project involves more than one contractor, the general contractor will be the party responsible for managing the entire project on behalf of the owner. In some cases, the owner may be the general contractor. In these cases, the owner will sign the permit application as the general contractor and would become the sole permittee.

15. "**Impervious Surface**" means a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads.

16. "**Local Permitting Authority**" means the township, county, municipality, conservation district, watershed district, watershed management organization, or other public entity which has the authority to review and approve construction activities.

17. "**Local Unit of Government's Existing Storm Water Management Plan or Practice**" means plans or practices developed by the local permitting authority under state law for the purposes of protecting water quality.

18. **"National Pollutant Discharge Elimination System (NPDES)"** means the program for issuing, modifying, revoking, reissuing, terminating, monitoring, and enforcing permits under the Clean Water Act (Sections 301, 318, 402, and 405) and United States Code Title 33, Sections 1317, 1328, 1342, and 1345.

19. **"Notice of Termination"** means notice to terminate coverage under this permit after construction is complete, the site has undergone stabilization, and all conditions of this permit have been satisfied. Notice of Termination forms are available from the Agency.

20. **"Owner"** means the person or party possessing the title of the land on which the construction activities will occur; or if the construction activity is for a lease holder, the party or individual identified as the lease holder; or the contracting government agency responsible for the construction activity.

21. **"Permanent Cover"** means final stabilization. Examples include grass, gravel, asphalt, and concrete.

22. **"Paved Surface"** means a constructed hard, smooth surface made of asphalt, concrete or other pavement material. Examples include, but are not limited to, roads, sidewalks, driveways and parking lots.

23. **"Permit"** means a National Pollutant Discharge Elimination System/ State Disposal System (NPDES/SDS) permit.

24. **"Permittee"** means a person, firm, or governmental agency or other institution who signs the application submitted to the Agency and is responsible for compliance with the terms and conditions of this permit.

25. **"Runoff Coefficient"** means the fraction of total precipitation that is not infiltrated into or otherwise retained by the soil, concrete, asphalt or other surface upon which it falls that will appear at the conveyance as runoff.

26. **"Sediment"** means the product of an erosion process; solid material both mineral and organic, that is in suspension, is being transported, or has been moved by water, air, or ice, and has come to rest on the earth's surface either above or below water level.

27. **"Sediment Control"** means methods employed to prevent sediment from leaving the site. Sediment control practices include silt fences, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, and temporary or permanent sedimentation basins.

28. **"Soil"** means the unconsolidated mineral and organic mineral material on the immediate surface of the earth.

29. **"Stabilized"** means the exposed ground surface has been covered by staked sod, riprap, wood fiber blanket, or other material which prevents erosion from occurring. Grass seed is not stabilization.

30. **"Standard Plates"** means general drawings having or showing similar characteristics or qualities that are representative of a construction practice or activity.

31. **"Storm water"** means the precipitation runoff, storm water runoff, snow melt runoff, and any other surface runoff and drainage (defined in 40 CFR 122.26 [b][13]). Storm water does not include construction site dewatering.

32. **"Temporary Protection"** means methods employed to prevent erosion. Examples of temporary include; straw, wood fiber blanket, wood chips, and erosion netting.

33. **"Waters of the State"** means all streams, lakes, ponds, marshes, wetlands, watercourses, waterways, drainage systems and all other bodies or accumulations of waters, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portions thereof. Waters of the state do not include storm water detention basins, or wetlands constructed for the purposes of treating storm water, which do not discharge to surface waters.

APPENDIX D

RESPONSIBILITIES

A. TRANSFER OWNERSHIP OR CONTROL

This permit may not be assigned or transferred by the permit holder. Where a new general contractor is selected after the submittal of an application, or where the general contractor changes, a new application must be, in accordance with Part I.B., submitted to the Agency at least 48 hours prior to when the general contractor begins work at the site.

B. PERMIT MODIFICATION

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

1. Violation of any terms of this permit;

2. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

3. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; or

4. Minn. Rules pts. 7001.0170 and 7001.0180.

C. RIGHT OF ENTRY

The Permittee shall, pursuant to Section 308 of the Act and Minnesota Statutes 115.04, allow representatives of the; Agency, local permitting authorities, local soil and water conservation districts, or municipality which operates the storm sewer system, upon presentation of credentials:

1. To enter upon the Permittee's premises where the construction activity is occurring for the purpose of obtaining information, examination of records, conducting surveys or investigations;

2. To bring such equipment upon the Permittee's premises as is necessary to conduct such surveys and investigations;

3. To examine and copy any books, papers, records, or memoranda pertaining to the storm water discharge.

4. To sample and monitor any substances or parameters at any location.

D. CIVIL AND CRIMINAL LIABILITY

Nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance with the terms and conditions provided herein.

E. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the installation of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject to under Section 311 or the Act and Minn. Stat. chs. 115 and 116, as amended.

F. LIABILITY EXEMPTION

This permit authorizes the Permittee to perform the activities described herein within the conditions set forth. In issuing this permit, the State/Agency assumes no responsibility for any damage to persons, property or the environment caused by the activities authorized or undertaken pursuant to this permit. To the extent the state/agency may have any liability for the activities of its employees, that liability is explicitly limited to that provided in the Torts Claim Act, Minn. Stat. § 3.736.

G. MINNESOTA LAWS

Nothing in this permit shall be construed to preclude the installation of any legal or administrative proceedings or relieve the Permittee from any responsibilities, liabilities, or penalties for violation of effluent and water quality limitations not included in this permit or applicable laws or regulations.

H. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

I. SEVERABILITY

The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

J. NPDES/SDS RULE

The Permittee shall comply with the provisions of Minn. Rules pts. 7001.0150, subp. 3 and 7001.1090, subp. 1.A,B,C,H,I. This permit does not require the submittal of a data monitoring report.

K. OTHER STATUTES, RULES AND ORDINANCES

The Agency's issuance of a permit does not release the Permittee from any liability, penalty or duty imposed by Minnesota or federal statutes or local ordinances, except the obligation to obtain the permit.

L. MORE STRINGENT RULES

The Agency's issuance of a permit does not prevent the future adoption by the Agency of pollution control rules, standards, or orders more stringent than those now in existence and does not prevent the enforcement of these rules, standards or orders against the Permittee.

M. AGENCY OBLIGATION

The Agency's issuance of a permit does not obligate the Agency to enforce local laws, rules or plans beyond that authorized by Minnesota Statutes.

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SECTION 02220

DEMOLITION
01/02

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.

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from project site 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 occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Work Plan; GA.

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence

of operations in accordance with EM 385-1-1.

Work plan shall also include a description of equipment that will be on site and procedures contractor intends to use to provide storm water pumping capabilities equivalent to the existing pumps, between the time when the existing pumps are removed and the new pump system(s) is operational.

1.4 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.

1.5 PROTECTION

1.5.1 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.5.2 Protection of Structures

Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, shall remain standing without additional bracing, shoring, of lateral support until demolished, unless directed otherwise by the Contracting Officer. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.3 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place or be reused; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall 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.

1.5.4 Protection From the Weather

Salvageable materials and equipment shall be protected from the weather at all times.

1.5.5 Protection of Trees

Trees within the project site which might be damaged during demolition, and which are indicated by the Contracting Officer to be left in place, shall be protected by a 4 foot high fence as specified in SECTION 01000: GENERAL. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

1.5.6 Environmental Protection

The work shall comply with the requirements of SECTION 01410: ENVIRONMENTAL PROTECTION.

1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.7 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXISTING STRUCTURES

Existing structures indicated on plans to be removed shall be removed. In general, minor structures are not shown and the Contractor is expected to examine the work site, prior to bidding to determine the character and extent of such structures. All above ground structures, not shown and required to be removed to construct the permanent features shall be removed as part of the work to which the removal pertains. Removal of structures, not shown or specified for removal, for the convenience of the Contractor will be subject to approval.

Interior walls, other than retaining walls and partitions, shall be removed to 10.0 feet below grade. Basement slabs, foundations, and miscellaneous debris from sites where homes have previously been removed shall be removed as specified in paragraph 3.4 and 3.5. Streets and parking lot pavement and base courses, sidewalks, curbs, gutters, driveways, and street light bases shall be removed as indicated.

Abandoned watermains, storm and sanitary sewer lines, water and sewer services and other utilities that go through or under the levees shall be removed in their entirety within the levee prism, unless otherwise shown,

and plugged or capped outside of the levee prism as specified below. Abandoned watermains, storm and sanitary sewer lines, water and sewer services, and other utilities outside of the levee footprint may be plugged by filling with sand or grout and capped or removed as indicated or as approved by the Contracting Officer. The watermain, storm and sanitary sewer plugs shall be inspected and approved by the Contracting Officers Representative prior to backfilling.

3.2 UTILITIES

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.

3.2.1 Utility Services

Utility services are not indicated on the drawings. Services have been abandoned from homes that have been removed, however the services of homes have typically not been removed. The Contractor will encounter utility services of homes that have been removed while performing the work of this contract. The Contractor shall remove services as specified in Paragraph: Existing Structures.

3.3 FILLING

Holes, open basements and other hazardous openings shall be filled in accordance with SECTION 02300: EARTHWORK.

3.4 DISPOSITION OF MATERIAL

Title to material and equipment to be demolished, except 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 Material

Contractor shall salvage items and material to the maximum extent possible. Hydrants to be removed shall be salvaged and remain the property of the City of Crookston. Salvaged hydrants shall be delivered to the City of Crookston Water and Light Department at a site to be determined within the City.

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 the project site before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

3.4.1.2 Items Salvaged for Reuse

Salvaged items to be reused shall be removed and delivered or stockpiled in a manner to prevent damage and protect from damage while in storage. The

Contractor will not be responsible for salvaged items after delivery or stockpiling.

3.4.2 Unsalvageable Material

Concrete, masonry, and other combustible and noncombustible material, except concrete permitted to remain in place, shall be disposed off-site at a site selected by the Contractor.

3.5 CLEAN UP

Debris and rubbish shall be removed from basement and similar excavations. 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 PAVEMENTS

Existing pavements designated for removal shall be saw cut and removed in accordance with the details shown on the drawings.

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SECTION 02230

CLEARING AND GRUBBING
01/02

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags (trees on or embedded in the river bank at or below water level), brush, and rubbish occurring in the areas to be cleared.

1.1.2 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.

1.1.3 Clearing and Grubbing Limits

Clearing and grubbing shall be performed on all trees, stumps, and other vegetation, described above, as indicated. The Contractor shall give the Contracting Officer a minimum of 72 hours of notice of commencing clearing and grubbing operations. The Contracting Officer will mark trees, brush, and other vegetation within the areas indicated that are to be saved and not cleared and grubbed.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

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. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require as specified in SECTION 02220: DEMOLITION, and SECTION 01000: GENERAL.

Limbs of trees designated to be left standing within the cleared areas that are damaged by construction operations shall be trimmed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in any dimension shall be painted with an approved tree-wound paint.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings and levees, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

Where indicated or directed by the Contracting Officer, trees and stumps shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 DISPOSAL OF MATERIALS

3.4.1 Materials Other Than Salable Timber

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

3.5 ACCEPTANCE

Upon completion of the site clearing, obtain the Contracting Officer's acceptance of the extent of clearing and grubbing.

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SECTION 02300

EARTHWORK
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Test Method for Materials Finer Than 75 Micrometers (No. 200 Sieve) in Mineral Aggregates by Washing
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft.)
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(1993) Description and Identification of Soils (Visual-Manual Procedure)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM D 4718	(1987; R 1994) Correction of Unit Weight and Water Content for Soils Containing Oversize Particles

Minnesota Department of Transportation (MN/DOT) Standard Specifications for Construction (1995 Edition and Supplements)

MNDOT 3149	Granular Material

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

Testing; FIO.

A summary of testing results indicated in PARAGRAPH: TESTING shall be submitted when the site work is substantially complete. 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, but do not need to be formally transmitted through the submittal process.

Daily Report Forms;FIO.

A compilation of the daily report forms for earthwork observation and inspection trench observations ordered by date shall be submitted when the work is substantially complete. Preliminary copies shall be furnished to the Contracting Officer on a weekly or monthly basis as directed, but do not need to be formally transmitted through the submittal process.

1.3 SUBSURFACE DATA

Reference the Physical Data clause in SECTION 00800:

1.4 ALTERNATE BORROW SOURCES AND EVALUATION

Borrow materials, for riprap and aggregates, shall be produced from the sources listed in SECTION 00830: ATTACHMENTS. If the Contractor proposes to furnish materials from a source not listed, the Government will make such investigations and evaluations as necessary to determine whether or not materials with acceptable characteristics can be obtained from the proposed source.

1.5 ALTERNATE SOURCES

1.5.1 Evaluation by Site Inspection

If the Contractor proposes to furnish borrow from an unlisted source, the Government will evaluate the alternate source and reply within 30 days. An investigation shall be performed by a Government geologist or engineer. The Contractor shall expose fresh soil for the full height of the face proposed for production during the field evaluation.

1.5.2 Evaluation by Test Data

If sufficient information is not available, the Government will reconsider the alternative source if evaluation is supplemented by sampling and testing of the properties specified for the material. If the Contractor wishes to pursue the alternate source, the Government will notify the Contractor of required sampling and number of tests required. The Contractor shall be responsible for sampling and testing costs for alternate sources. The Contracting Officer shall be present during the sampling, unless waived. Information provided with the samples shall include the location and elevation from which the sample was taken. Testing shall be completed by a laboratory approved in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL. Test results and jar samples shall be furnished to the Government geologist at the District Office. This will require a 14-day evaluation period after the test results are received at the District Office.

PART 2 PRODUCTS

2.1 DEFINITIONS

2.1.1 Satisfactory Materials

Satisfactory materials shall be of a character and quality satisfactory for the purpose intended, and meet the applicable material specifications.

2.1.2 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

2.1.3 Proctor

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" or "Proctor" value. The optimum moisture content, w_o, is the water content at which the soil is compacted to the maximum density as determined during the test procedure presented in ASTM D 698.

2.2 MATERIALS

All material placed as fill or backfill shall consist of material

classified by ASTM D 2487 as GW, GP, GC, GM, SP, SM, SC, CL, CH, and SW. The material shall be free of ice, snow, frozen earth, trash, debris, sod, roots, organic matter, or stones larger than 3 inches in any dimension.

2.2.1 Common Borrow

Common borrow shall have less than 40% retained on the No. 4 sieve, and less than 30% retained on the 3/4" sieve.

2.2.2 Select Granular Fill

Select granular fill shall meet requirements for common borrow and shall contain not more than 5% by weight of material passing the No. 200 sieve. The maximum allowable aggregate size shall be 1-1/2 inches.

2.2.3 Granular Fill

Granular fill shall meet requirements for common borrow and shall contain not more than 12% by weight of material passing the No. 200 sieve.

2.2.4 Fine Filter Aggregate

Fine filter aggregate shall meet the requirements of MNDOT 3149 for Fine Filter Aggregate.

2.2.5 Impervious Fill

Impervious fill shall meet requirements for common borrow and shall have a plasticity index less than 50 and classified by ASTM D 2487 as CL or CH.

2.2.6 Select Impervious Fill

Select impervious fill shall meet requirements for common borrow, shall have a plasticity index less than 30, a clay fraction less than 40% by weight finer than 0.002 mm and classified by ASTM D 2487 as CL or CH.

2.2.7 Random Fill

Random fill shall consist of native materials meeting the requirements for common borrow.

2.3 CONSTRUCTION EQUIPMENT

Compaction equipment shall consist of sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil type being compacted. Water flooding or jetting methods of compaction will not be permitted for any soil types. Sprinkling equipment for cohesive soils shall apply water uniformly, in controlled quantities and be capable of variable application widths.

2.3.1 Dams and Levees

Use of sheepsfoot rollers (vibratory or non-vibratory), or scarification between lifts, is required for construction of dams, dikes, or levees (any

water retaining structures). Construction equipment and methods shall avoid poor bonding between lifts, characterized by layered or laminated texture at the lift interfaces. Smooth surfaces (such as produced from smooth drum rollers, rubber-tired rollers, and construction traffic) shall be scarified prior to placing subsequent lifts.

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 Stockpiles

Stockpiles 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. Satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials 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 contaminated, frozen or too wet for use, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government.

3.3 STRIPPING OF TOPSOIL

Where indicated or directed, topsoil shall be stripped to a depth of 6 inches. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Topsoil shall be kept separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2-inches in diameter, and other materials that would interfere with planting and maintenance operations. Any surplus of topsoil from excavations and grading shall be removed from the site.

3.4 EXCAVATION AND BORROW PITS

After topsoil removal has been completed, excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated. Excavation material suitable for use as fill shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory material, including any soil which is disturbed by the Contractor's operations or softened due to exposure to the elements and water, and surplus material shall be disposed of in areas approved for off-site storage. Excavation carried below the depths indicated shall be refilled to the proper grade

with satisfactory material. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be excavated from the borrow areas indicated or from other approved areas selected by the Contractor as specified.

3.4.1 Changes and Differing Site Conditions

Any excavation subgrades that are unstable, pump, rut excessively, reveal soil conditions that are substantially different from that indicated in the contract, or are unsuitable for proceeding with the work shall immediately be reported to the Contracting Officer. In the event that it is necessary to remove material to a depth greater than specified, the Contracting Officer will provide direction for changed work; and an adjustment in the contract price will be considered in accordance with the contract. Unsatisfactory material encountered below the grades shown shall be removed as directed. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer. The Contracting Officer shall be notified prior to proceeding with any unauthorized work. Additional work not authorized by the Contracting Officer shall be at the Contractor's expense.

3.5 DITCHES, GUTTERS, AND CHANNEL CHANGES

Ditches, gutter, and channel changes shall be cut accurately to the cross sections and grades indicated. Gutters and ditches shall be finished in a manner that will result in effective drainage. All roots, stumps, rock, and foreign matter in the sides and bottom of ditches, gutter, and channel changes shall be trimmed and dressed or removed to conform to the slope, grade, and shape of the section indicated. Care shall be taken not to excavate ditches and gutters below the grades indicated. Excessive ditch and gutter excavation shall be backfilled to grade with properly placed and compacted material. All ditches and gutters excavated under this section shall be maintained until final acceptance of the work. Satisfactory material excavated from ditches and channel changes shall be placed in fill areas.

3.6 BORROW MATERIAL

Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be obtained from the borrow areas shown, from removal of the existing levees as shown, or from other approved sources, either private or within the limits of the project site, selected by the Contractor. Material excavated from existing levees, except for stripping materials, shall be used as impervious fill as shown, unless otherwise directed. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, pay royalties and other charges involved and bear the expense of developing the sources, including rights-of-way for hauling. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits

of the project site without prior written approval. Necessary clearing, grubbing, and drainage of borrow pits, disposal of debris thereon, and restoration shall be considered related operations to the borrow excavation.

3.6.1 Excavation and Borrow Pits

Except as otherwise permitted, borrow pits and other excavation areas shall be excavated providing adequate drainage. Overburden and other spoil material shall be transported to designated spoil areas or otherwise disposed of, or used for special purposes. Borrow pits shall be neatly trimmed and drained after the excavation is completed. The Contractor shall ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.6.1.1 Restoration of Borrow Areas

Upon completion of levee removal, removal areas shall be restored as shown or specified. Upon completion of excavation from indicated borrow areas, the bottom of the borrow areas shall be graded to provide free surface drainage and preclude ponding and erosion. Side slopes shall not be steeper than 1 vertical on 5 horizontal. Borrow areas shall be seeded with winter wheat if planted in the Spring or oats if planted in the Fall. Seed shall be placed at a rate of 20 pounds per acre.

3.6.2 Utilization of Excavated Materials

Material removed from excavations shall be incorporated in the work insofar as practicable. No excavated material that is satisfactory for use as fill shall be wasted without specific written authorization. Material authorized to be wasted shall be stored in designated areas approved for surplus material storage and disposed of offsite. No excavated material shall be disposed of in such a manner as to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the complete work in any way.

3.7 EMBANKMENTS

Fills and embankments shall be constructed at the locations and to the lines and grades indicated. Fill shall meet the material specifications for the zones indicated on the drawings. The material shall be placed in successive horizontal layers for the full width of the cross section and shall be compacted as specified. Each layer shall be compacted before the overlaying lift is placed.

3.8 STRUCTURES

See SECTION 02315: EXCAVATION, FILLING AND BACKFILLING FOR STRUCTURES

3.9 LEVEES

3.9.1 Embankment

If not specifically identified, common borrow, random fill, or other

unclassified material shall be sorted to the extent practicable with the more cohesive and less pervious material placed riverside, and sandy free-draining material placed landside.

3.9.2 Inspection Trench

The inspection trench will be used to locate undesirable subsurface features. Any pipes, tiles, conduits, buried debris, or other utilities that are indicated or specified for removal shall be removed from within the footprint of the levee and plugged outside of the levee limits as directed by the Contracting Officer. Unsatisfactory foundation materials encountered shall be removed from within the footprint of the levee as directed by the Contracting Officer. Utilities indicated or specified to remain in place shall be protected from damage during inspection trench operations. The Contractor shall notify the Contracting Officer 48 hours prior to start of this work. Observation shall be recorded on the daily report forms attached to this specification, or to a Contractor's special purpose form for observing trench excavations if approved by the Contracting Officer.

3.9.2.1 Inspection Trench Excavation and Observation

An inspection trench will be excavated as shown on the plans. Immediately after excavating the trench, the Contractor shall inspect and record the soil and water conditions encountered and any other pertinent features. Soils on the base and side slopes shall be identified in accordance with ASTM D 2488. In reaches where caving occurs, the Contractor shall either widen the trench, dewater to keep the trench stable, or assign a competent person to observe the excavation continuously in addition to the excavator operator. Excessive water seepage shall be removed to allow visual inspection. During construction of the inspection trench, the Contractor shall immediately notify the Contracting Officer in the event that soil conditions encountered differ significantly from those shown on the boring logs.

3.9.2.2 Inspection Trench Backfill

The Contracting Officer will observe the trench before backfilling, unless waived for trench stability reasons. All water and mud shall be removed from the trench before backfill is placed. The excavated material may be used for backfill only if it meets the requirements of impervious fill. All inspection trench backfill shall be placed in lifts and completed as specified in PARAGRAPH: COMPACTION.

3.9.2.3 Inspection Trench Location

The inspection trench shall generally be located close to the levee centerline. The inspection trench shall be continuous at all points, aligned with smooth curves, and free from abrupt changes in alignment. The Contracting Officer may direct the actual alignment of the inspection trench within the limits of the levee right of way to intercept suspect areas.

3.10 SUBGRADE PREPARATION

All areas upon which fill is to be placed shall be stripped before the fill is started. Material shall not be placed on surfaces that are muddy, frozen, contain frost, or where unsatisfactory material remains in or under the fill. For cohesionless soils, the subgrade surface shall be compacted to at least 100% of the Standard Proctor density. For cohesive soils, the subgrade shall be proof rolled with rubber-tired equipment and any soft areas shall be brought to the Contracting Officer's attention. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be stepped such that the fill material will bond with the existing surface.

3.10.1 Subgrade Correction

Soft or otherwise unsatisfactory material shall generally be removed and replaced with satisfactory excavated material or other approved material as directed. Low areas resulting from removal of unsatisfactory material shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified.

3.11 SOIL CORRECTION FOR REMOVED STRUCTURES

Excavate and replace soils previously used to backfill depressions created by removal of structures. Excavate to the lines and grades shown. Backfill with impervious fill to existing grade. Compaction of fill shall comply with the requirements specified in Paragraph: COMPACTION

3.12 FINISHING

All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations, except as otherwise specified.

Ditches and gutters shall be finished to permit adequate drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for establishment of turf.

3.12.1 Pavement Subgrade Tolerances

When the final layer of base has been completed, and at the time any additional construction is to be placed thereon, the finished surface of the base shall not vary more than 0.05 feet from the plan elevation.

3.13 PLACING TOPSOIL

Topsoil placement is covered in SECTION: 02920 SEEDING, SODDING, AND TOPSOIL

3.14 COMPACTION

3.14.1 Moisture Control

Control of moisture in the fill shall be maintained to provide acceptable compaction. Dried or crusted cohesive soils shall be plowed, disked or otherwise broken up before compaction. If water is added to fills, the layer shall be spread in even lifts, moistened as necessary, thoroughly mixed, and compacted. Maintain moisture content for select impervious fill between w_o - 3% and w_o + 1% during placement and compaction.

3.14.2 Placement and Compaction

Each layer shall be spread uniformly. The type of fill, its maximum uncompacted lift thickness, and the minimum compaction requirements (Percent of Standard Proctor density) to which each type of fill shall be compacted shall be as listed below.

Fill Zone	Maximum Uncompacted Lift Thickness (inches)	Percent of Standard Proctor Density
General Grading (Random Fill)	12	90
Structure Subgrades Floor Slabs and Steps	9	100
Structure Backfill	12	95
Levees	12	95
Utility Backfill	See SECTION 02316: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS	

a. Fill materials shall be placed in horizontal layers not exceeding 6 inches loose depth when hand-operated compactors are used.

b. Embankments and subgrade under pavements shall be compacted to at least the Percent of Standard Proctor density as follows:

(1) For fill sections the top 36 inches below the aggregate base course shall be placed in uncompacted lifts not exceeding 9 inches and compacted to at least 100% of Standard Proctor density.

(2) For cut sections in cohesionless soils the subgrade surface shall be compacted to at least 100% of Standard Proctor density. For cut sections in cohesive soils, the subgrade shall be proof rolled and any soft areas shall be brought to the Contracting Officer's attention.

3.15 TESTING

3.15.1 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 01451: 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.

3.15.2 Field Density Tests

Report forms for summaries of field density tests shall include the minimum information. Additional data required by the applicable ASTM test methods shall be kept on file by the Contractor. Tests shall be numbered sequentially throughout the job, and retests shall reference the original test number (1A, 1B, etc.):

1. Test Number.

2. Dry density, water content and gravel content of field test.

3. Proctor Number, maximum dry density, optimum water content, and gravel content.

4. Relative Compaction.

5. Each test shall be plotted on the graphic presentation of the applicable Proctor test.

6. Test location and project feature for which test applies.

3.15.3 Proctor Tests

Report forms for summaries of Proctor tests shall include the minimum information. Additional data required by the applicable ASTM test methods shall be kept on file by the Contractor. Jar samples shall be retained by the testing laboratory for each Proctor test until field testing is completed.

1. Test Number and method.

2. Sample location and visual soil description.

3. Maximum dry density, and optimum water content.

4. Gravel contents in sample and test specimens.

3.15.4 Treatment of Oversize Particles for Density Tests

The fine gravel contents shall be corrected by selecting an appropriate Proctor sample. The fine gravel content shall be the particles retained on the No. 4 sieve and passing the 3/4" sieve. The fine gravel content of the field density test shall be within + or - 5% of the fine gravel content of the Proctor sample.

The oversize fraction shall be particles retained on the 3/4" sieve. For oversize fractions greater than 5%, the oversize particles shall be corrected in accordance with the Finer Fraction Method specified in ASTM D 4718.

Each sand cone test shall report the gravel content retained on the No. 4, 3/8" and 3/4" sieve as appropriate for the Proctor method referenced.

Where nuclear testing is used and lack of uniformity in the soil due to layering, rock or voids are suspected, the test volume site shall be dug up and visually examined to determine if the test material is representative of the full material in general and if rock correction is required.

3.15.5 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 the 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.

3.15.6 Testing Schedule

a. Moisture-Density Relations (ASTM D 698)

One test for each material variation, not less than 10 tests total.

b. In-Place Densities (ASTM D 1556 or ASTM D 2922)

(1) Typical, 1 test per 2000 CY of fill placed.

(2) Structure foundations and floor slabs. See SECTION 02315: EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES.

(3) Utility trench backfill. See SECTION 02316: EXCAVATION,

TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS

(4) Segmental Concrete Retaining Walls over 5-feet in height, not less than 1 test for each 2 vertical feet per 300 linear feet along wall face.

c. Percent Passing No. 200 sieve (ASTM C 117).

(1) Select Granular Fill, 1 test per 1000 CY of fill placed, not less than 1 test for each source placed.

(2) Granular Fill, 1 test per 5000 CY of fill placed, not less than 1 test for each source.

d. Sieve Analysis, (ASTM C 136)

(1) Select Granular Fill, 1 test for each source.
(2) Fine Filter Aggregate, 1 test for each source and 1 test for every 1000 CY placed.

e. Plasticity Index (ASTM D 4318)

(1) Cohesive soils, 1 test for each Proctor test.

(2) Impervious fill, 1 test per 5000 CY of fill.

(3) Select impervious fill, 1 test per 5000 CY of fill.

f. Clay Fraction (percent smaller than 0.002 mm, determined in accordance with ASTM D 422)

(1) Select impervious fill, 1 test per 5000 CY of fill.

3.16 NUCLEAR DENSITY TESTING EQUIPMENT

Nuclear density testing equipment shall be used in general accordance with ASTM D 2922 and ASTM D 3017. In addition, the following conditions shall apply:

a. Prior to using the nuclear density testing equipment on the site the Contractor shall submit to the Contracting Officer a certification that the operator has completed a training course approved by the nuclear density testing equipment manufacturer, the most recent data sheet from the manufacturer's calibration, and a copy of the most recent statistical check of the standard count precision.

b. The first test and every tenth test thereafter shall include a sand cone correlation test. The sand cone test shall be centered over the prepared surface for the nuclear test, shall include a nominal 6-inch diameter sand cone, and shall include a minimum wet soil weight of 6 pounds extracted from the hole. In addition, testing of aggregate base soils shall include a minimum of 3 sand cone correlations for each day of testing; and testing of bituminous shall include a minimum of 3 core densities for each day of testing. The density correlations shall be

submitted with test results. Each transmittal including density test data shall include a summary of all density correlations for the job neatly prepared on a summary sheet including at a minimum:

(1) Date, meter serial number and operators initials.

(2) Standard count and adjustment data for each test.

(3) Material type.

(4) Probe depth.

(5) Moisture content by each test method and the deviation.

(6) Wet density by each test method and the deviation.

c. The nuclear density testing equipment shall be capable of extending a probe 6 inches minimum down into a hole. The probe shall generally be extended to the maximum depth obtainable.

d. Nuclear density testing equipment used within 2 vertical feet from the existing ground water level, 5 horizontal feet from a vertical wall or massive concrete structure, or in a trench shall have the standard count changed before and after each test, or the manufacturers published correction procedure shall be followed.

e. Nuclear density testing equipment shall not be used during rain.

3.17 SUBGRADE AND EMBANKMENT PROTECTION

Compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified herein to the required density prior to further construction thereon. Subgrades not meeting the specifications for finish, material type and density at the time of surface material placement shall be corrected at the Contractor's expense. Cohesive embankments and subgrades shall be kept crowned or sloped for drainage. Newly graded areas shall be protected from traffic and erosion. Any settlement or washing away that may occur from any cause shall be repaired. No base course or pavement shall be laid until the subgrade has been checked and approved by the Contracting Officer. Ditches and drains along subgrade shall be maintained to provide effective drainage. All work shall implement best management practices for erosion control.

-- End of Section --

DAILY REPORT FORM FOR EARTHWORK OBSERVATION

Project Name:	Date:
Contract Number: DACW37- - -	Temperature
QC Technician/Inspector:	Precipitation
Earthwork Contractor:	

Sunny ☐ partly cloudy ☐ overcast ☐ windy ☐ Other _____

Stripping and Excavation

Area (sta., Elevation)	Depth/Thickness Removed	Excavated Material (ASTM D 2488)	Base Material (ASTM D 2488)

Excavation Equipment:

Description	No. Operating	Type (Make & Model or Capacity)
Dozers		
Backhoes		
Wheel Loaders		
Other_____		

Fill Placement

Area (Sta., Elevation) (Grids, depth below FFE)	Fill Material (ASTM D 2488)	Lift Thickness & Number of Passes

Hauling/Placing Equipment:

Description	No. Operating	Type (Make & Model or Capacity)
Trucks		
Scrapers		
Compactors		
Dozers/Graders		
Other_____		

Density Tests Taken (list numbers): _____

Notes: _____

_____

DAILY REPORT FORM FOR INSPECTION TRENCH

Project Name:	Date:
Contract Number: DACW37- - -	Temperature
QC Technician/Inspector:	Precipitation
Earthwork Contractor:	

Sunny ☐ partly cloudy ☐ overcast ☐ windy ☐ Other _____

Soil Stratigraphy

Zone (label in sketch)	Soil Description (ASTM D 2488)	Water Conditions
Trench base soils		

Sketch of Trench Profile

Beginning Sta. Ending Sta.

Trench Width: _____

Side Slopes (vert., 1V:1H, etc.): _____

Pipes, tiles, or Conduits: _____

(indicate sta., depth or elevation, leakage, etc.) _____

Excavation Equipment:

Description	No. Operating	Type (Make & Model or Capacity)
Backhoes		
Other_____		

Fill Material: _____

Borrow Area: _____

Compaction Equipment: _____

Lift Thickness: _____

Number of passes: _____

Density Tests Taken (list numbers): _____

Notes: _____

_____

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SECTION 02315

EXCAVATION, FILLING AND BACKFILLING FOR STRUCTURES
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft.)
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.2 DEGREE OF COMPACTION

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, abbreviated as percent laboratory maximum density.

Line of protection includes levee, floodwall and closures.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-09 Reports

Testing; FIO.

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

Satisfactory materials for general and structural backfill for structures located on the riverside of the levee and within the line of protection, pump stations, and storm sewer structures shall be comprised of native soils classified by ASTM D 2487 as SC, CL, CL-ML, and CH, unless otherwise shown.

2.1.2 Granular Fill

Granular material shall be satisfactory material containing not more than 12 percent by weight of material passing the No. 200 sieve. For free draining select granular fill, the material shall contain not more than 5 percent by weight of material passing the No. 200 sieve.

2.1.3 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified if any contaminated materials are found.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

Clearing and grubbing is specified in SECTION 02230: CLEARING AND GRUBBING.

3.2 TOPSOIL

Stripping topsoil is specified in SECTION 02300: EARTHWORK.

3.3 EXCAVATION

Excavation shall conform to the dimensions and elevations indicated for each structure, and footing except as specified. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. Excavations below indicated depths will not be permitted except to remove unsatisfactory material or to aid in dewatering. Unsatisfactory material encountered below the grades shown shall be removed as directed and replaced with satisfactory material; and payment will be made in conformance with the CHANGES clause of SECTION 00700: CONTRACT CLAUSES. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced, at no additional cost to the Government, with satisfactory materials to the indicated excavation grade. Satisfactory material shall be placed and compacted as specified in paragraph FILLING AND BACKFILLING. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

Where wet or otherwise unstable soil incapable of properly supporting the

structure, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular fill, compacted as provided in paragraph BACKFILLING of this section. When removal of unstable material is due to the fault or neglect of the Contractor in the Contractor's performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.4 DRAINAGE AND DEWATERING

3.4.1 Drainage

Surface water shall be directed away from structure excavation sites to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated 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 the area affecting operations at the site shall be continually and effectively drained.

3.4.2 Dewatering

See SECTION 01000: GENERAL for dewatering requirements.

Groundwater flowing toward or into structure excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the groundwater level in order to maintain the integrity of the **in situ** material. While the excavation is open, the groundwater level shall be maintained continuously, at least 2 feet below the working level. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.

Crushed rock or granular soils are not allowed beneath structure foundations, unless otherwise shown. Other methods to create a dry, stable subgrade on which to place reinforcement and concrete shall be used that will not create a permeable condition beneath the structure. Remove to the maximum extent possible, pervious materials incorporated into dewatering systems. Prior to placement of backfill the Contracting Officer will determine if materials used in dewatering are removed satisfactorily.

3.5 SHORING

See SECTION 01000: GENERAL for shoring requirements.

3.6 CLASSIFICATION OF EXCAVATION

Excavation will be unclassified regardless of the nature of material

encountered.

3.7 BLASTING

Blasting will not be permitted.

3.8 EXCAVATED MATERIALS

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required under this section or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in SECTION 02300: EARTHWORK.

3.9 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Excavation to final grade shall not be made until just before reinforcement or concrete is to be placed. For pile foundations, the excavation shall be stopped at an elevation of from 6 to 12 inches above the bottom of the footing before driving piles. After pile driving has been completed, the remainder of the excavation shall be completed to the elevations shown. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. Shales shall be protected from slaking and all surfaces shall be protected from erosion resulting from ponding or flow of water.

3.10 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified in paragraph FILLING AND BACKFILLING.

3.11 FILLING AND BACKFILLING

Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Satisfactory materials shall be placed in horizontal layers not exceeding

8 inches in loose thickness, or 6 inches when hand-operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as specified. Backfilling shall not begin until construction below finish grade has been approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall not be placed against structure prior to the concrete attaining 70% of its design strength. As far as practicable, backfill shall be brought up evenly on each side of the structure and sloped to drain away from the wall. When there are separate structural and grading contracts, the Structural Contractor shall backfill box culverts and buried structures to an elevation of 2 feet above the top of the structure. The Grading Contractor shall complete the remaining backfill in conjunction with grading operations. Each layer of fill and backfill shall be compacted to not less than the percentage of Standard Proctor maximum density specified below:

	Percent Laboratory Maximum Density	
	Cohesive material	Cohesionless material
Fill, embankment, and structure backfill	95	95
Under structures, structure subgrade, floor slabs, steps, paved areas, around footings, and subgrade	100	100
Under structures and paved areas, top 12 inches	100	100

Approved compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified herein before to the required density prior to further construction thereon. Recompaction over underground utilities shall be by hand tamping.

3.12 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Testing shall be performed in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL.

3.12.1 In-Place Densities

In-place density and moisture content test results shall be included with the Contractor's daily construction quality control reports.

3.12.1.1 In-Place Density of Subgrades

One test per 500 square feet per lift or fraction thereof as determined by the foundation area of each structure.

3.12.1.2 In-Place Density of Fills and Backfills

Not less than 1 test for each 2 vertical feet of fill per 100 linear feet or fraction thereof as determined by the perimeter or circumference of each structure.

3.12.2 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material, including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per source, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density will be made.

3.13 GRADING

Areas within 5 feet outside of each structure line shall be constructed true-to-grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

3.14 TOPSOIL AND SEEDING

Placement of topsoil and seeding is specified in SECTION 02920: SEEDING, SODDING, AND TOPSOIL.

3.15 PROTECTION

Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work, shall be repaired and grades reestablished to the required elevations and slopes.

-- End of Section --

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SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS
01/02F

PART 1 GENERAL

1.1 RELATED WORK OF OTHER SECTIONS

Dewatering is covered in SECTON 01000: GENERAL. Material definitions, backfill compaction and testing requirements are covered in SECTION 02300: EARTHWORK, and SECTION 02630: STORM-DRAINAGE SYSTEM.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft.)
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

Corps of Engineers (COE)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

Minnesota Department of Transportation (MNDOT) 1995 Edition with Supplements

MNDOT 3149	Granular Material

1.3 DEFINITIONS

Reference to pipes shall include culverts. Appurtenant structures include manholes, inlets, outlets, headwalls, or similar structures.

1.4 Submittals

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

CLSM Mix Design; GA.

Testing; FIO.

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

In addition to the definitions below, material definitions shall be as specified in SECTION 02300: EARTHWORK.

2.1.1 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.2 Unstable Material

Unstable material shall consist of materials too soft and/or compressible to properly support the pipe or appurtenant structure.

2.1.3 Granular Bedding

Material consisting of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 12 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 3/4 inch sieve.

2.1.4 Crushed Rock Bedding and Drainage Fill

Free draining material consisting of crushed gravel, crushed stone or washed stone and conforming to MNDOT 3149.2H Coarse Filter Aggregate

2.1.5 Impervious Fill

See SECTION 02300: EARTHWORK.

2.1.6 Controlled Low Strength Mortar (CLSM)

Design CLSM mix to provide a slump of 10 inches plus or minus 1 inch and an unconfined compressive strength of 75 psi to 400 psi at 28 days. The CLSM mix shall contain cement, fly ash, fine aggregate, coarse aggregate and water proportioned to meet the mix requirements. All materials used shall be in accordance with the referenced MNDOT specifications except **MNDOT 3137.2c** and **3137.2D** shall not apply to the coarse aggregate. Submit mix proportion and testing necessary to demonstrate the proposed mix meets the mix requirements specified above.

PART 3 EXECUTION

3.1 EXCAVATION

Trench excavation shall be by open cut except for 2 segments of sanitary sewer addressed in SECTION 02531: SANITARY SEWERS to be installed by jacking techniques. All excavation shall be constructed in accordance with the Safety and Health Requirements Manual (EM 385-1-1) and/or OSHA Standards. Allowable trench widths, depths, side slopes, sheet and bracing requirements, and other considerations are given in the OSHA Standard; and an abbreviated version is given in the Safety and Health Requirements Manual.

Provide full access to public/private premises and fire hydrants so as to prevent serious disruption of travel. Protect and maintain benchmarks and monuments during excavations.

3.1.1 Trench Excavation

Excavation shall be performed to the lines and grades indicated. Remove existing home foundations, walls, slabs, and other related materials to the extent necessary to install the utility system. During excavation, material satisfactory for backfilling shall be stockpiled in a neat and orderly manner at a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or caving. Topsoil shall be stockpiled separately from suitable backfill material. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized over excavation shall be backfilled at no additional cost to the Government.

3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones 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.

3.1.1.2 Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such

material shall be removed 8 inches below the required grade and replaced with granular bedding, except as provided below.

For levees and all utility systems passing through or beneath levees, the replaced fill shall meet the requirements for the zone where it is located. Use of material more pervious than surrounding soils is not acceptable.

3.1.1.3 Unstable Material

Where wet, soft, unsuitable or otherwise unstable soil incapable of properly supporting pipe is encountered in the bottom of a trench or excavation, the Contractor shall immediately contact the Contracting Officer prior to proceeding with the associated work. When removal of unstable material is required due to inadequate shoring and sheeting, water removal, control of ground water or other similar operations, such unstable material shall be excavated and replaced with satisfactory material as directed at no additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for appurtenances shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Removal of unstable material shall be as specified above. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before concrete is to be placed or appurtenances are to be installed.

3.1.2 Stockpiles

Stockpiles of satisfactory material shall be placed and graded as specified. Stockpiles 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. Excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials 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 unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government.

3.2 BACKFILLING AND COMPACTION

Backfilling shall not begin until construction below finish grade has been approved, storm drainage systems have been inspected, tested and approved; concrete forms have been removed and the excavation cleaned of frost, trash and debris. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall. Trenches not immediately backfilled to grade shall be sloped to drain if practicable. Heavy equipment for spreading and compacting backfill shall not be operated closer to a foundation or other underground structural element than a

distance equal to the height of backfill above the top of footing; the area remaining shall be compacted with power driven hand tampers suitable for the material being compacted.

See SECTION 02300: EARTHWORK.

3.2.1 Levees

Where pipes are located within the right of way of levees, all fill materials shall meet the type and classification for the fill zone shown on drawings, otherwise use same type of material for the zone where the trench is located. The portion of the trench in native soils shall be backfilled with the excavated material that matches the surrounding soils.

3.2.2 Bedding

Bedding shall be of the type and thickness shown. Bedding material shall be placed and compacted to 95% of Standard Proctor density with manual tampers to a height above the pipe necessary to prevent damage, but not less than one foot. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.2.3 Final Backfill

Final backfill is all material necessary to complete backfilling at the trench above the bedding. Final backfill shall consist of native impervious fill, unless otherwise required beneath pavements, adjacent to structures or other project features. Placement and compaction of final backfill shall comply with the requirements listed in SECTION 02300: EARTHWORK for the fill zone or feature in which the utility trench is located.

3.2.4 Backfill for Appurtenances

After the structure has been constructed and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.2.5 CLSM

Plug openings below level of the desired backfill. Place CLSM so that it flows around and beneath such footings, foundations, walls, pipes or other structures it was designed to support. CLSM is self-compacting. No mechanical vibration is required. Air pockets mush be vented or eliminated. Air temperature should be maintained above freezing for a minimum of 72 hours. Once the substantial water gains (bleeding) on the surface has evaporated, no other means of curing is necessary.

3.3 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.3.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer.

3.3.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 698. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.3.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test for each 2 vertical feet of backfill for every 300 feet of installation shall be performed. One moisture density relationship shall be determined for every 1500 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 1556 and ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph "Calibration" of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soils. The calibration curves furnished with the gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, 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. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

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SECTION 02373

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SECTION 02373

SEPARATION GEOTEXTILE
01/02

PART 1 GENERAL

1.1 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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3786	(1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1999) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-06 Instructions

Manufacturing Quality Control Sampling and Testing; FIO.

A minimum of 14 days prior to scheduled use, manufacturer's quality control manual including instructions for geotextile storage, handling, installation, seaming, and repair.

SD-13 Certificates

Geotextile; GA

A minimum of 14 days prior to scheduled use, manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. This submittal shall include copies of manufacturer's quality control test results. 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

Delivery, storage, and handling of geotextile shall be in accordance with ASTM D 4873.

1.3.1 Delivery

The Contracting Officer will be present during delivery and unloading of the geotextile. 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

Geotextile rolls shall be protected from becoming saturated. Rolls shall either be elevated off the ground or placed on a sacrificial sheet of plastic. The geotextile rolls shall also be protected from the following: construction equipment, ultraviolet radiation, chemicals, sparks and flames, temperatures in excess of 160 degrees F, and any other environmental condition that may damage the physical properties of the geotextile.

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 woven 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 selvages. Geotextiles and factory seams shall meet 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. GEOTEXTILE PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	TEST VALUE
Elongation percent	Less Than 15	ASTM D 4632
Apparent Opening Size (U.S. Sieve)	70	ASTM D 4751
Permittivity, sec-1	0.1	ASTM D 4491
Puncture, lbs.	90	ASTM D 4833
Grab Tensile, lbs.	250	ASTM D 4632
Trapezoidal Tear, lbs.	90	ASTM D 4533
Burst Strength, psi	350	ASTM D 3786
Ultraviolet Stability (percent strength retained at 500 hours)	50	ASTM D 4355

2.1.2 Thread

Sewn seams shall be constructed with high-strength polyester, nylon, or other approved thread type. Thread shall have ultraviolet light stability equivalent to the geotextile and the color shall contrast with the geotextile.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Subgrade Preparation

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile. Subgrade materials and compaction requirements shall be in accordance with Section 02722: AGGREGATE BASE OR SURFACE COURSE.

3.1.2 Placement

The Contractor shall request the presence of the Contracting Officer during handling and installation. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile 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. On slopes greater than 5 horizontal on 1 vertical, the geotextile shall be laid with the machine direction of the fabric parallel to the slope direction.

3.2 SEAMS

3.2.1 Overlap Seams

Overlapping is not permitted. Sewn seams shall be used to connect all geotextile panels.

3.2.2 Sewn Seams

Seams shall be continuously sewn using a J-type seam with two rows of a 401 locking chain stitch. The minimum distance from the geotextile edge to the stitch line nearest to that edge shall be 3 inches unless otherwise recommended by the manufacturer. The thread at the end of each seam run shall be tied off to prevent unraveling. Seams shall be on the top side of the geotextile to allow inspection.

3.3 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 2 days during installation.

3.4 REPAIRS

Geotextile damaged during installation shall be repaired by placing a patch of the same type of geotextile which extends a minimum of 12 inches beyond the edge of the damage or defect. Patches shall be continuously fastened using a sewn seam or other approved method. The machine direction of the patch shall be aligned with the machine direction of the geotextile being

repaired. Geotextile which cannot be repaired shall be replaced.

3.5 PENETRATIONS

Engineered penetrations of the geotextile shall be constructed as shown on the drawings.

3.6 COVERING

Geotextile shall not be covered prior to approval by the Contracting Officer. The Contractor shall request the presence of the Contracting Officer during covering of the geotextile. Cover soil shall be placed in a manner that prevents wrinkles from folding over onto themselves. No equipment shall be operated directly on top of the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment tires/tracks and the geotextile during the covering process.

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SECTION 02378

GEOTEXTILE FILTERS

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SECTION 02378

GEOTEXTILE FILTERS
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 123	(1996a) Standard Terminology Relating to Textiles
ASTM D 4491	(1999) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls
ASTM D 4884	(1996) Strength of Sewn or Thermally Bonded Seams of Geotextiles

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Geotextile; GA

Submit the manufacturer's certification of the geotextile material. All brands of geotextile and all seams to be used will be accepted on the basis of mill certificates or affidavits. Submit duplicate copies of the mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification.

SD-14 Samples
Samples. FIO

Submit a one foot square sample of each geotextile filter to be used in the project.

1.3 SHIPMENT, HANDLING, AND STORAGE

1.3.1 Shipment and Storage

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.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Geotextile

2.1.1.1 General

The geotextile shall be a non-woven pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall equal or exceed the minimum average roll values listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. The acceptable range for the apparent opening size is listed in the table. Strength values indicated in the table are for the weaker principal direction.

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR FILTERS GEOTEXTILE

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAB STRENGTH	lb	180	ASTM D 4632
SEAM STRENGTH	lb	180	ASTM D 4632
PUNCTURE	lb	80	ASTM D 4833
TRAPEZOID TEAR	lb	50	ASTM D 4533
APPARENT OPENING SIZE	U.S. SIEVE	70-100	ASTM D 4751

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR FILTERS GEOTEXTILE

PERMITTIVITY	sec -1	0.1	ASTM D 4491

2.1.1.2 Geotextile Fiber

Fibers used in the manufacturing of the geotextile shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of polyolefins, polyesters, or polyamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

2.1.2 Seams

The seams of the geotextile shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn or shall be bonded by cementing or by heat. The sheets of geotextile shall be attached at the factory or another approved location, if necessary, to form sections not less than 12 feet wide. Seams shall be tested in accordance with method ASTM D 4884. The strength of the seam shall be not less than the required grab tensile strength of the unaged geotextile in any principal direction.

2.1.3 Securing Geotextile

The geotextile shall be secured to the embankment or foundation soil to prevent movement prior to placement of revetment materials. Appropriate means to prevent movement such as pins, staples, sand bags, and stone shall be used. When used securing pins and staples, the pins or staples shall be inserted through the geotextile along the line passing through the midpoint of the seam locations. Securing pins and staples shall be removed as placement of revetment materials are placed to prevent tearing of geotextile or enlarging holes.

Spacing between securing geotextile depends on the steepness of the embankment slope. The maximum spacing shall be equal to or less than the values listed in TABLE 2, MAXIMUM SPACING FOR SECURING GEOTEXTILE. When windy conditions prevail at the construction site, the spacing should be decreased 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 GEOTEXTILE

TABLE 2
MAXIMUM SPACING FOR SECURING GEOTEXTILE

EMBANKMENT	SPACING, feet
STEEPER THAN 1V ON 3H	2
1V ON 3H TO 1V ON 4H	3
FLATTER THAN 1V ON 4H	5

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

3.2.1 General

The geotextile shall be placed in the manner and at the locations shown. 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.

3.2.2 Placement

The geotextile shall be placed smooth and free of tension, stress, folds, wrinkles, or creases. Temporarily secure the geotextile to help hold it in place until the bedding layer is placed shall be allowed. The temporary securing measures shall be removed as the bedding is placed to relieve high tensile stress which may occur during placement of material on the geotextile. Trimming shall be performed in such a manner that the geotextile shall not be damaged in any way.

3.3 PROTECTION

The geotextile shall be protected at all times during construction from contamination by surface runoff and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of bedding materials shall be replaced by the Contractor at no cost to the Government and the

work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 2 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of riprap or other materials. Before placement of riprap or other materials, the Contractor shall demonstrate that the placement technique will not cause damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

3.4 OVERLAPPING AND SEAMING

3.4.1 Overlapping

The overlapping of geotextile is not allowed. Seaming will be required.

3.4.2 Sewn Seams

Seam geotextile panels together with a J-type seam using two rows of 401 locking chain stitches.

High strength thread should be used such that seam test should conform to ASTM D 4884. The thread shall meet the chemical, ultraviolet, and physical requirements of the geotextile, and the color shall be different from that of the geotextile. The seam strength shall be equal to the strength required for the geotextile in the direction across the seam.

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SECTION 02388

STONE PROTECTION (RIPRAP)
01/02

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, ENGINEERING MANUALS (EM)

EM 1110-2-1906	(Nov. 1970) Laboratory Soils Testing with Change 1 (May, 1980) and Change 2 (Aug. 1986).

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Material Sources; GA.

The Contractor shall designate in writing only one source or one combination of sources from which he proposes to furnish stone. The Contractor shall state in writing methods of processing and handling riprap, and shall notify the Contracting Officer when production methods are changed.

SD-09 Reports

Gradation Test; FIO.

Gradation Test Results for riprap and aggregates. Riprap gradation and riprap bedding testing results shall be submitted on the WORKSHEET FOR GRADATION ANALYSIS OF RIPRAP (Form 4055) and GRADATION CURVES FOR RIPRAP FILTER AND BEDDING (Form 4056). A blank copy of each form is included at the end of this section.

SD-13 Certificates

Certified Weight Scale Tickets; FIO.

Copies of all certified weight scale tickets shall be furnished to the

Contracting Officer at a frequency as directed. The tickets do not need to be formally submitted through the submittal process.

PART 2 PRODUCTS

2.1 STONE SOURCES AND EVALUATION

Stone and aggregate materials may be quarried rock or durable fieldstone and shall be produced or obtained from the sources listed in SECTION 00830: ATTACHMENTS. If the Contractor proposes to furnish materials from a source not listed, the Government Geologist will make such investigations and evaluations as necessary to determine whether or not materials with acceptable durability can be produced from the proposed source. The rock supplied shall be composed of a quality fieldstone or be quarried from one rock formation to provide a product of uniform appearance. The Contractor shall not supply rock from various formations, or mix field stone with quarried rock, unless approved by the Contracting Officer. It is the Contractor's responsibility to determine that the stone source or combination of sources selected is capable of providing the quality, quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work.

2.1.1 Alternate Sources

If the Contractor proposes to furnish stone materials from a source not listed in SECTION 00830: ATTACHMENTS, the Government Geologist will make such investigations and evaluations as necessary to determine whether or not materials meeting the requirements specified can be produced from the proposed source. Alternate sources from which the Contractor proposes to obtain stone materials shall be selected and submitted for approval at least 30 days in advance of the time when the material will be required.

2.1.2 Acceptance of Materials

Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for stone as determined by the Contracting Officer. The Contracting Officer also reserves the right to reject individual units of produced specified materials in stockpiles at the quarry, all transfer points, and at the project construction site when such materials are determined to be unsuitable.

2.2 RIPRAP

Riprap gradation shall meet the requirements for riprap indicated on the attached FORM 4055. The stone shall be well graded within the limits specified.

2.2.1 General

All stone shall be durable material. Stone for riprap shall have a specific gravity between 2.55 and 2.75 unless approved by the Contracting Officer. Stone shall be of a suitable quality to ensure permanence in the

structure and in the climate in which it is to be used. It shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its deterioration from natural causes. The stone shall be clean and reasonably free from soil, quarry fines, and shall contain no refuse. Any foreign material adhering to or combined with the stone as a result of stockpiling shall be removed prior to placement. Neither the breadth nor the thickness of any piece of stone shall be less than one-third of it's 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.

2.2.2 Production

Riprap shall be handled and selectively loaded onto trucks in a manner to avoid segregation and provide a distribution of stone sizes consistent with the gradation band and test samples. Each truckload shall be representative of the gradation requirements.

2.3 RIPRAP BEDDING

Riprap bedding gradation shall meet the requirements listed in Table 1: Riprap Bedding.

Table 1

Riprap Bedding

Sieve Size	Percent Finer By Weight
3"	100
1 1/2"	60 to 87
3/4"	40 to 72
3/8"	25 to 55
No. 4	10 to 40
No.10	0 to 25
No.40	0 to 10
No.200	0 to 4

2.3.1 General

All stone shall be durable material. Stone for riprap shall have a specific gravity between 2.55 and 2.75 unless approved by the Contracting Officer. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its deterioration from natural causes. The stone shall be clean and reasonably free from soil, quarry fines, and shall contain no refuse.

2.3.2 Production

Riprap bedding shall be handled and selectively loaded onto trucks in a manner to avoid segregation and provide a distribution of stone sizes consistent with the gradation band and test samples. Each truckload shall be representative of the gradation requirements.

2.4 GEOTEXTILE

Geotextile shall meet the requirements of Section 02378 Geotextile Filter.

2.5 SOURCE QUALITY CONTROL

Sampling and testing shall be performed by and at the expense of the Contractor at no additional cost to the Government. Gradation tests shall be performed by either Method A or B at the frequency listed below. A satisfactory gradation test shall be obtained prior to any hauling and delivery of materials. All tests, including failing tests shall be submitted. Tests performed on material which do not meet gradation and shape requirements will not be counted as part of the tests required. The Contracting Officer shall be informed immediately of test results and draft copies of test results shall be furnished at the Contracting Officers request.

2.5.1 Sampling Requirements

The Contracting Officer shall direct the time and location of sampling, unless waived. Samples shall be taken from stockpiles or loaded trucks, and not directly from conveyers or chutes.

2.5.2 Gradation Testing

Perform gradation tests on riprap and riprap bedding as required below.

2.5.2.1 Riprap

a. Notification. The Contracting Officer shall be informed 24 hours before each riprap test.

b. Testing frequency. At least 1 gradation test shall be performed per source prior to delivery to the project site. Perform 1 test of riprap stockpiled or delivered to the project site.

c. Sample Size. The sample shall have a minimum gross weight not less than 25 times the maximum stone size in the specified gradation (25 * W_{100}).

2.5.2.2 Riprap Test Method A

Test method A shall consist of weighing all stones larger than 5 pounds in a sample. Five to seven weight classes shall be selected within the range of stone sizes. Each stone shall be weighed and recorded on the work sheet for method A. The weight of stones shall be summed for each weight class; after which calculations and a plot of the gradation shall be completed in accordance with accepted practice for soil and aggregate gradations.

2.5.2.3 Riprap Test Method B

Test method B shall consist of separating the stones into 5 to 7 piles, ordered by size. The sample shall be separated on a clean, hard surface that is free of smaller stones that could become mixed with the sample.

The stones shall be visually screened to place them into appropriate piles. All stones shall be separated and placed into a pile before weighing. After separating, the smallest and largest rock in each pile shall be weighed and recorded. The stones shall be adjusted as necessary so that the weight classes do not overlap. After adjustment is adequate and weight classes have been established, each pile of stone shall be weighed and recorded on the work sheet for method B. Calculations and a plot of the gradation shall be completed in accordance with accepted practice for soil and aggregate gradations.

2.5.2.4 Riprap Bedding

a. Notification. The Contracting Officer shall be informed 24 hours before each riprap test.

b. Testing frequency. At least 1 gradation test shall be performed per source prior to delivery to the project site. Perform 1 test of riprap bedding stockpiled or delivered to the project site.

c. Sample size. The sample shall have a minimum gross weight of 150 pounds.

2.5.2.5 Gradation Tests for Riprap Bedding

The sampling and testing procedures for gradation tests for bedding shall be in accordance with EM 1110-2-1906. Report results on ENG FORM 4056, GRADATION CURVES, provided at the end of this section.

2.6 STOCKPILES

Stockpiles shall be formed by a series of layers or truckload dumps, where the rock essentially remains where it is placed. Subsequent layers shall be started 10 feet from the edge of the previous layer so that the rock will not roll down the edges of the pile. Any stone which has become contaminated with soil or refuse shall not be put into the work unless the contaminating material has been removed prior to placement.

PART 3 EXECUTION

3.1 CONSTRUCTION TOLERANCES

Work shall generally meet the required elevations, slope and grade; and the outer surfaces shall be even and present a neat appearance.

3.1.1 Subgrades

Areas on which stone protection will be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within 2 inches above or below the neat lines. The surface shall be reasonably smooth to match tolerances normally obtained by rough grading with bladed equipment. For subaqueous construction in greater than 3 feet of water, the tolerance shall be 6 inches.

3.1.2 Layer Thickness

Any layers found to be less than 80% of the specified thickness shall be corrected. This tolerance shall only be exceeded on isolated spot checks, and if the tolerance is commonly exceeded, the Contractor shall change his construction methods to improve the quality control. If it is necessary to estimate riprap quantities for changes, the volume shall be based on neat line dimensions and the plan dimension for thickness. A conversion factor of 1.5 tons/CY shall be used to determine quantity requirements, unless otherwise directed by the Contracting Officer.

3.1.3 Surface Tolerances

The finished surface tolerance above the neat line shall generally not deviate from the lines and grades shown by more than half (1/2) the average stone dimension of the gradation range. Riprap that has a rough and uneven surface shall be reworked by hand to stabilize stones that wobble and are out of tolerance, except where the Contracting Officer approves use of equipment. Rearranging of individual stones shall be required to the extent necessary to obtain a well-graded distribution of stone sizes.

3.2 FOUNDATION PREPARATION

Foundation areas shall be excavated or filled to the lines and grades shown. Filling shall be with earth similar to the adjacent material and shall be well compacted. Immediately prior to placing riprap, the prepared subgrade will be inspected by the Contracting Officer unless waived; and no material shall be placed thereon until that area has been approved.

3.3 PLACEMENT OF RIPRAP

3.3.1 Layer Requirements

Riprap shall be placed in a manner which will produce a well-graded mass of rock with the minimum practicable percentage of voids. The large stones shall be well distributed. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones.

3.3.2 Construction Methods

Unsegregated stone shall be placed in a systematic manner. Riprap shall be placed to its full course thickness in one operation and in such manner as to avoid displacing underlying material. Placement shall typically begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. Final finish of slope shall be performed as the material is placed.

Placing riprap in layers will not be permitted. Placing riprap by dumping it into chutes, or by any method likely to cause segregation of the various sizes, shall not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope shall not be permitted. No equipment shall be operated directly on the completed stone protection system. Dump trucks shall be equipped with bottom hinged tailgates if rock is directly placed into position with the trucks.

3.3.3 Riprap Placement on Geotextile

Riprap shall be placed over the geotextile by methods that do not tear, puncture, or reposition the fabric. Equipment shall be operated so as to minimize the drop height of the stone without contacting and damaging the geotextile. Generally this will be about 1 foot of drop from the bucket to the placement surface. Riprap shall be placed so that stones do not roll downhill.

3.4 MAINTENANCE

The Contractor shall maintain the stone protection and underlying works until accepted by the Contracting Officer. When appropriate, the Contractor shall place stone protection in a timely manner to reduce risk of scour. Any material displaced prior to acceptance and due to the Contractor's negligence or neglect shall be replaced at the Contractor's expense.

3.5 CONTRACTOR QUALITY CONTROL

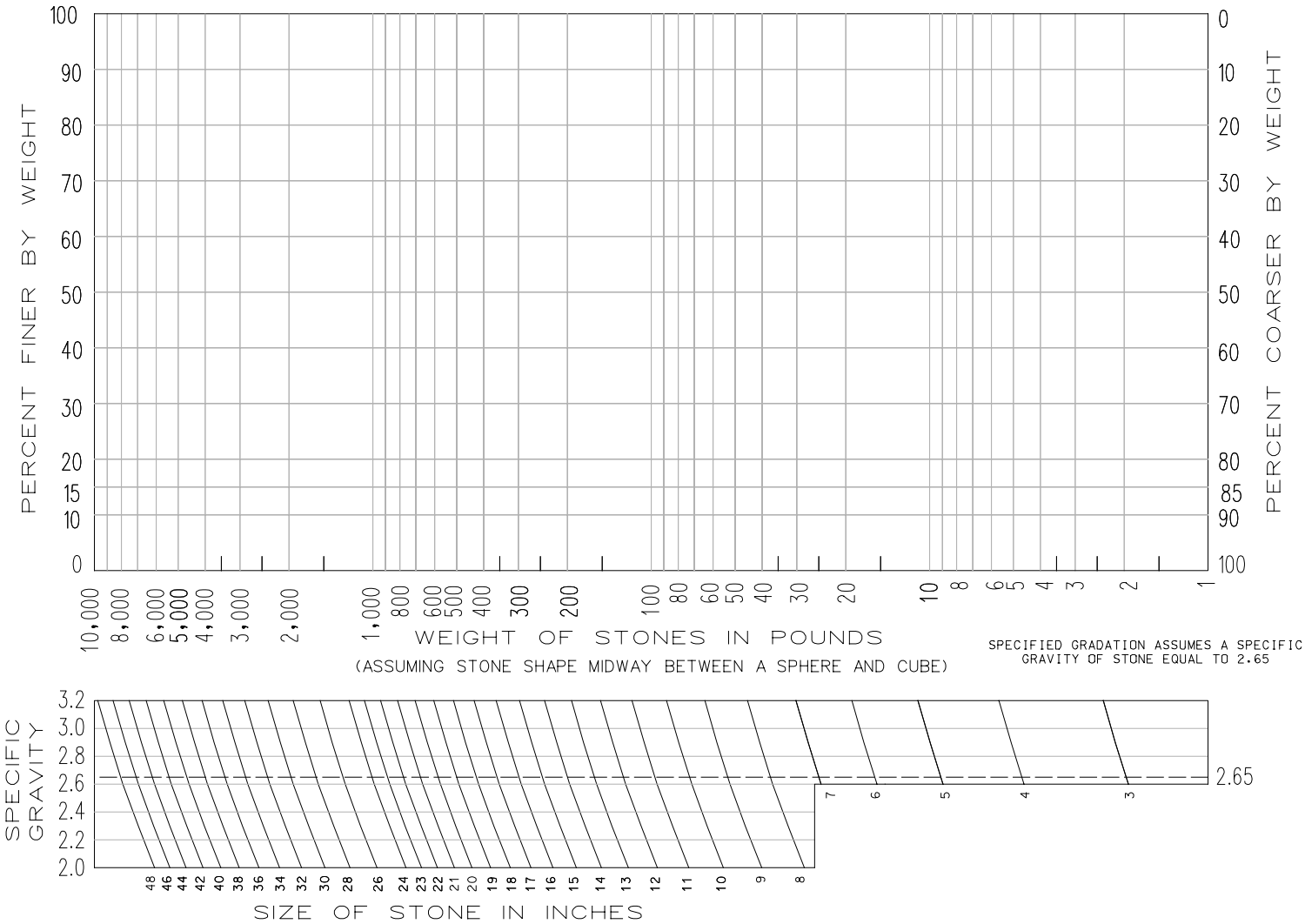
The Contractor shall establish and maintain quality control for all work performed at the job site under this section to assure compliance with contract requirements. He shall maintain records of his quality control tests, inspections and corrective actions. Quality control measures shall cover all construction operations including, but not limited to, the placement of all materials to the slope and grade lines shown and in accordance with this section.

In addition to the Contractor's system to establish and maintain quality control for stone placement operations, the following information shall be recorded and promptly provided to the Contracting Officer on request:

a. Record tonnage of stone placed in completed sections of the work and check quantity for compliance with design sections.

b. Check for uniform thickness of material layers.

-- End of Section --



SPECIFIC GRAVITY OF STONE= ☐

PROJECT _____

AREA _____

DATE _____

RIPRAP/ROCKFILL GRADATION CURVE

ENGR FORM 4055 *COMPUTER GENERATED* DATE OF FORM: MAY 1998

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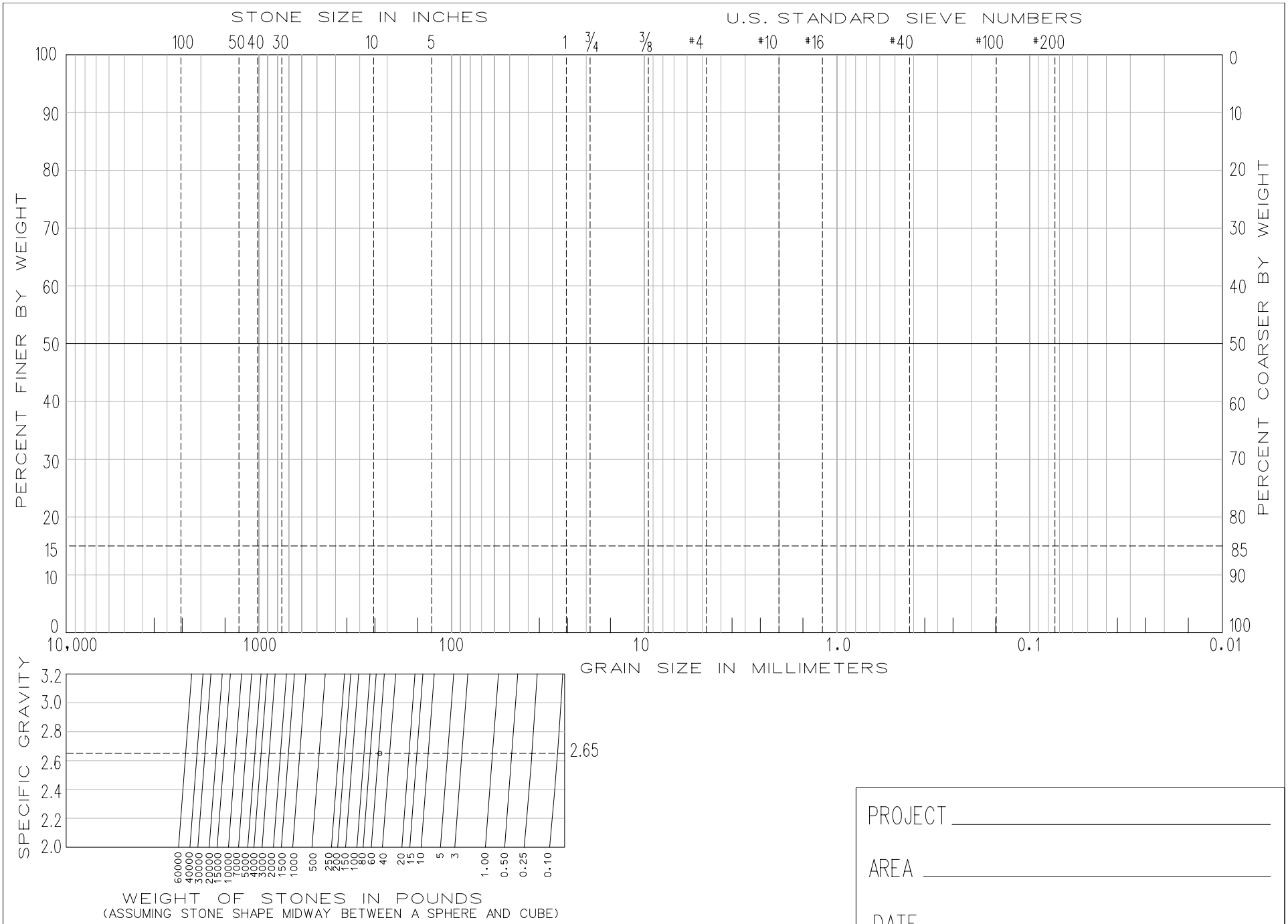

PROJECT _____

AREA _____

DATE _____

SPECIFIC GRAVITY OF STONE= [ ]

GRADATION CURVES FOR RIPRAP FILTER AND BEDDING

ENGR FORM 4056

d:/Temp/gc4056.dgn

WORK SHEET FOR GRADATION ANALYSIS OF RIPRAP
METHOD A

Project Name:	Date:
Riprap Type:	Test No.
Source, Quarry, or Pit:	
Sample Location:	Test Made By:

Part 1. Weigh all stones larger than 5 pounds and record.

(1) PASSING WT.							5 lbs.
(2) RETAINED WT.						5 lbs.	PAN
(3) -------							-------
-------							-------
-------							-------
-------							-------
-------							-------
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(4) TOTALS							

Rows (1) & (2) Enter 5 to 7 weight classes to yield approx. 75%, 50%, 30%, and 15% finer points.

Row (3) List weight of each stone. Attach additional sheets if necessary.

Row (4) Add all individual stone weights listed in each column.

Part 2. Summary Table.

(5) WEIGHT CLASSES		(6)	(7)	(8)
PASSING (stone wt. in lbs.)	RETAINED (stone wt. in lbs.)	TOTAL WEIGHT EACH CLASS (lbs.)	CUMMULATIVE WEIGHT PASSING (lbs.)	TOTAL PERCENT PASSING (%)
	5 lbs.			
5 lbs.	PAN			
SAMPLE TOTAL			--------	--------

Column (5) Enter same weight classes used in Rows (1) and (2).

Column (6) Enter weights of material from Row (4)

Column (7) Add column (6) from bottom up to get cumulative weight passing.

Column (8) Divide column (7) by sample total to get total percent passing.

WORK SHEET FOR GRADATION ANALYSIS OF RIPRAP
METHOD B

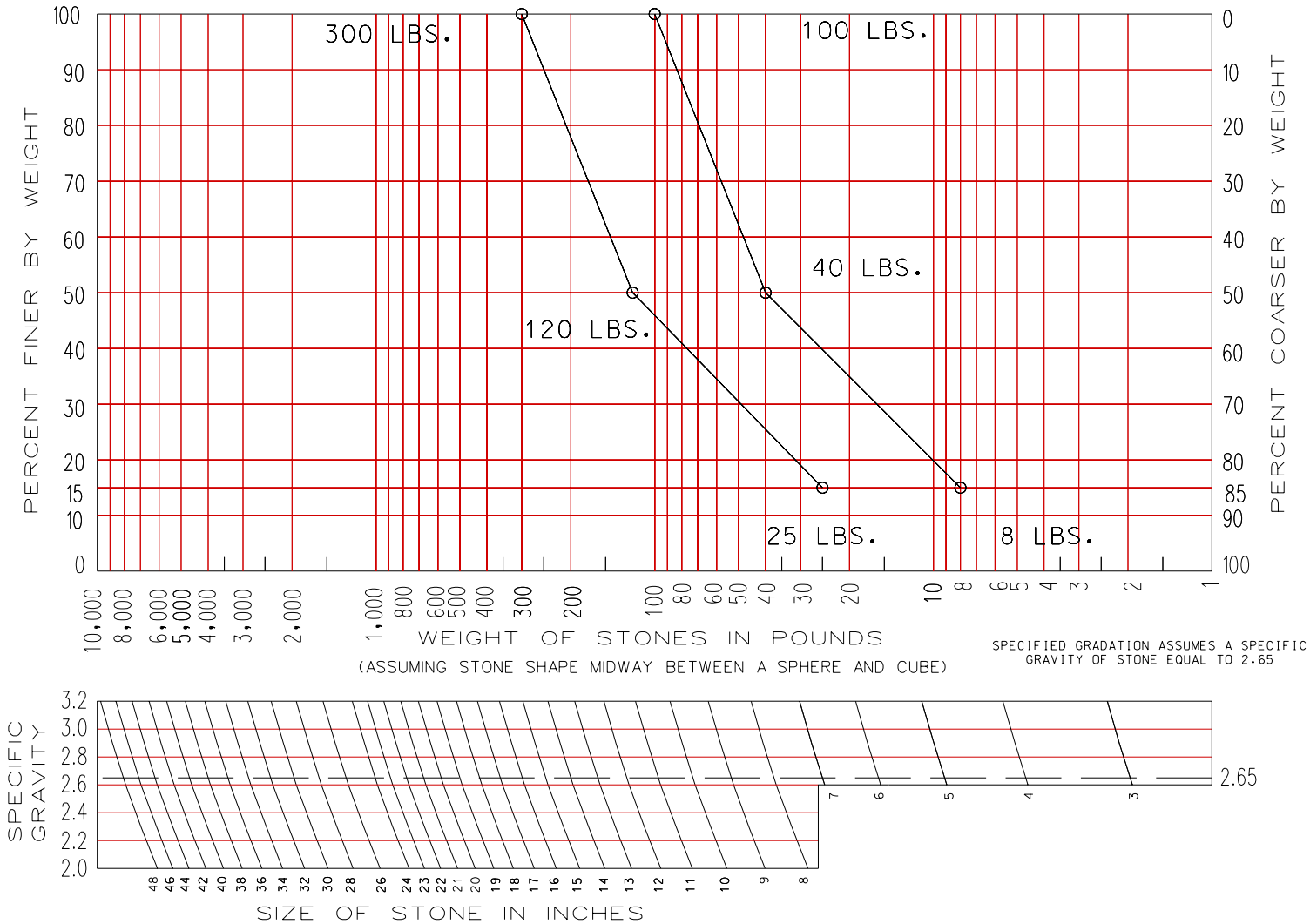
Project Name:	Date:
Riprap Type:	Test No.
Source, Quarry, or Pit:	
Sample Location:	Test Made By:

Part 1. Separate rock into 5 to 7 piles, ordered by size. The largest pile should contain 2 to 5 stones. Intermediate piles between the largest stones and those smaller than 5 pounds should be approximately equal in total weight. Separate all stones before weighing.

Part 2. Summary Table.

(1) WEIGHT CLASSES		(2)	(3)	(4)
PASSING (stone wt. in lbs.)	RETAINED (stone wt. in lbs.)	TOTAL WEIGHT EACH CLASS (lbs.)	CUMMULATIVE WEIGHT PASSING (lbs.)	TOTAL PERCENT PASSING (%)
	5 lbs.			
5 lbs.	PAN			
SAMPLE TOTAL			--------	--------

Column (1) Weight the smallest and largest stone in each pile. If weight classes overlap, adjust stones as necessary and repeat.
Column (2) Weigh the total amount of rock in each pile and record.
Column (3) Add column (2) from bottom up to get cumulative weight passing.
Column (4) Divide column (3) by sample total to get total percent passing.



SPECIFIC GRAVITY OF STONE= 2.65

PROJECT CROOKSTON STAGE 2

AREA

DATE 07/01

RIPRAP/ROCKFILL GRADATION CURVE

ENGR FORM 4055 *COMPUTER GENERATED* DATE OF FORM: MAY 1998

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SECTION 02510

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-- End of Section Table of Contents --

SECTION 02510

WATER DISTRIBUTION SYSTEM
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 88	(1996) Seamless Copper Water Tube
ASTM D 2467	(1996a) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2564	(1996a) Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D 2842	Test Method for Water Absorption of Rigid Plastics
ASTM D 2855	(1996) Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM F 477	(1996a) Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASME INTERNATIONAL (ASME)

ASME B16.26	(1988) Cast Copper Alloy Fittings for Flared Copper Tubes

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA B300	(1992) Hypochlorites
AWWA B301	(1992) Liquid Chlorine
AWWA C104	(1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C105	(1995) Polyethylene Encasement for Ductile-Iron Pipe and Fittings for Water and Other Liquids

AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115	(1996) Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C153	(1994; Errata Nov 1996) Ductile-Iron Compact Fittings, 3 In. Through 24 In. (76 mm through 610 mm) and 54 In. through 64 In. (1,400 mm through 1,600 mm) for Water Service
AWWA C500	(1993; C500a) Metal-Sealed Gate Valves for Water Supply Service
AWWA C502	(1994; C502a) Dry-Barrel Fire Hydrants
AWWA C600	(1993) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C606	(1997) Grooved and Shouldered Joints
AWWA C651	(1992) Disinfecting Water Mains
AWWA C800	(1989) Underground Service Line Valves and Fittings
AWWA C900	(1997; C900a) Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In., for Water Distribution
AWWA C905	(1997) Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 In. Through 36 In.

ASBESTOS CEMENT PIPE PRODUCERS ASSOCIATION (ACPPA)

ACPPA Work Practices	(1988) Recommended Work Practices for A/C Pipe

DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA)

DIPRA-Restraint Design	(1997) Thrust Restraint Design for Ductile Iron Pipe

NSF INTERNATIONAL (NSF)

NSF 14	(1998) Plastics Piping Components and Related Materials
NSF 61	(1998) Drinking Water System Components - Health Effects (Sections 1-9)

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC Paint 21	(1991) White or Colored Silicone Alkyd Paint
SSPC Paint 25	(1991) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments)

1.2 PIPING

This section covers water service lines, and connections to building service at a point approximately 5 feet outside buildings and structures to which service is required. The Contractor shall have a copy of the manufacturer's recommendations for each material or procedure to be utilized available at the construction site at all times.

1.2.1 Service Lines

Piping for water service lines shall be copper tubing, unless otherwise shown or specified.

1.2.2 Distribution Main Lines

Piping for main lines shall be ductile iron or polyvinyl chloride (PVC) as shown.

1.2.3 Potable Water Lines

Piping and components of potable water systems which come in contact with the potable water shall conform to NSF 61.

1.2.4 Plastic Piping System

Plastic piping system components, including PVC, intended for transportation of potable water shall comply with NSF 14 and be legibly marked with their symbol.

1.2.5 Excavation, Trenching, and Backfilling

Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of Section 02316: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, except as modified herein.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Waste Water Disposal Method; GA.

The method proposed for disposal of waste water from hydrostatic tests and disinfection, prior to performing hydrostatic tests.

Satisfactory Installation; FIO.

A statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

SD-09 Reports

Bacteriological Disinfection; FIO.

Test results from commercial laboratory verifying disinfection.

1.4 HANDLING

Pipe and accessories shall be handled to ensure delivery to the trench in sound, undamaged condition, including no injury to the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor in a satisfactory manner, at no additional cost to the Government. No other pipe or material shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

PART 2 PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

2.1.1 Plastic Pipe

2.1.1.1 PVC Plastic Pipe

a. Pipe 4 through 12 inch diameter: Pipe couplings and fittings shall conform to AWWA C900, Class 150, CIOD pipe dimensions, elastomeric-gasket joint, unless otherwise shown or specified.

b. Pipe 14 through 36 inch diameter: Pipe shall conform to AWWA C905 unless otherwise shown or specified.

2.1.2 Copper Tubing

Copper tubing shall conform to ASTM B 88, Type K, annealed.

2.1.3 Ductile Iron Pipe

Ductile iron pipe shall conform to AWWA C151, working pressure not less than 150 psi., unless otherwise shown or specified. Pipe shall be cement-mortar lined in accordance with AWWA C104. Linings shall be standard. Pipe shall be encased with 8 mil thick polyethylene in accordance with AWWA C105. Flanged ductile iron pipe with threaded flanges shall be in accordance with AWWA C115.

2.2 FITTINGS AND SPECIALS

2.2.1 PVC Pipe System

For pipe 4 inch diameter and larger, fittings and specials shall be iron, bell end in accordance with AWWA C110, 150 psi pressure rating unless otherwise shown or specified, except that profile of bell may have special dimensions as required by the pipe manufacturer; or fittings and specials may be of the same material as the pipe with elastomeric gaskets, all in conformance with AWWA C900. Iron fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104. Fittings shall be bell and spigot or plain end pipe, or as applicable. Ductile iron compact fittings shall be in accordance with AWWA C153.

2.2.2 Ductile-Iron Pipe System

Fittings and specials shall be suitable for 150 psi pressure rating, unless otherwise specified. fittings and specials for mechanical joint pipe shall conform to AWWA C110. Fittings and specials for use with push-on joint pipe shall conform to AWWA C110 and AWWA C111. Fittings and specials for grooved and shouldered end pipe shall conform to AWWA C606. Fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104. Ductile iron compact fittings shall conform to AWWA C153.

2.2.3 Copper Tubing System

Fittings and specials shall be flared and conform to ASME B16.26.

2.3 JOINTS

2.3.1 PVC Pipe

Joints, fittings, and couplings shall be as specified for PVC Pipe. Joints connecting pipe of differing materials shall be mechanical joints or as recommended by the manufacturer, subject to the approval of the Contracting Officer.

2.3.2 Ductile-Iron Pipe Jointing

a. Mechanical joints shall be of the stuffing box type and shall conform to AWWA C111.

b. Push-on joints shall conform to AWWA C111.

c. Rubber gaskets and lubricants shall conform to the applicable requirements of AWWA C111.

2.3.3 Copper Tubing Jointing

Joints shall be compression-pattern flared and shall be made with the specified fittings.

2.4 VALVES

2.4.1 Gate Valves

Gate valves shall be designed for a working pressure of not less than 150 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of the opening.

a. Valves 3 inches and larger shall be iron body, bronze mounted, and shall conform to AWWA C500. Flanges shall not be buried. An approved pit shall be provided for all flanged connections.

2.5 MISCELLANEOUS ITEMS

2.5.1 Service Clamps

Service clamps shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable-iron body with cadmium plated straps and nuts. Clamps shall have a rubber gasket cemented to the body.

2.5.2 Corporation Stops

Corporation stops shall have standard corporation stop thread conforming to AWWA C800 on the inlet end, with flanged joints, compression pattern flared tube couplings, or wiped joints for connections to goosenecks.

2.5.3 Goosenecks

Copper tubing for gooseneck connections shall conform to the applicable requirements of ASTM B 88, Type K, annealed. Length of cable requirement connections shall be in accordance with standard practice.

2.5.4 Service Stops

Service stops shall be water-works inverted-ground-key type, oval or round flow way, tee handle, without drain. Pipe connections shall be suitable for the type of service pipe used. All parts shall be of bronze with female iron-pipe-size connections or compression-pattern flared tube couplings, and shall be designed for a hydrostatic test pressure not less than 200 psi.

2.5.5 Tapping Sleeves

Tapping sleeves of the sizes indicated for connection to existing main shall be the cast gray, ductile, or malleable iron, split-sleeve type with flanged or grooved outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construction shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve. When using grooved mechanical tee, it shall consist of an upper housing with full locating collar for rigid positioning which engages a machine-cut hole in pipe, encasing an elastomeric gasket which conforms to the pipe outside diameter around the hole and a lower housing with positioning lugs, secured together during assembly by nuts and bolts as specified, pretorqued to 50 foot-pound.

2.5.6 Service Boxes

Service boxes shall be cast iron or concrete and shall be extension service boxes of the length required for the depth of the line, with either screw or slide-type adjustment. The boxes shall have housings of sufficient size to completely cover the service stop or valve and shall be complete with identifying covers.

2.5.7 Disinfection

Chlorinating materials shall conform to the following:

Chlorine, Liquid: AWWA B301.

Hypochlorite, Calcium and Sodium: AWWA B300.

2.6 VALVE BOXES

Valve boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subjected to vehicular traffic. Cast-iron boxes shall be extension type with slide-type adjustment and with flared base. The minimum thickness of metal shall be 3/16 inch. Concrete boxes shall be the standard product of a manufacturer of precast concrete equipment. The word "WATER" shall be cast in the cover. The box length shall adapt, without full extension, to the depth of cover required over the pipe at the valve location.

2.7 INSULATION

Insulation shall be rigid, extruded polystyrene board with minimum thermal resistance (R) of 5.0. Board size shall be 48-inch x 96-inch. Edges shall be square. Compressive strength shall be minimum 25 psi. Water absorption shall be maximum 0.1 percent in accordance with ASTM D 2842. Minimum thickness of individual boards shall be 1-inch.

2.8 FIRE HYDRANTS

Hydrants shall be dry-barrel type conforming to AWWA C502 with valve opening at least 5 inches in diameter and designed so that the flange at the main valve seat can be removed with the main valve seat apparatus remaining in tact, closed and reasonably tight against connections located no more than 8 inches above the ground grade. Hydrants shall have a 6 inch bell connection, two 2-1/2 inch hose connections and one 4-1/2 inch pumper connection. Outlets shall have American National Standard fire-hose coupling threads. Working parts shall be bronze. Design, material, and workmanship shall be equal to the latest stock pattern ordinarily produced by the manufacturer. Hydrants shall be painted with 1 coat of red iron oxide, zinc oxide primer conforming to SSPC Paint 25 and 2 finish coats of silicone alkyd paint conforming to SSPC Paint 21, of the installation's standard colors or as directed by the Contracting Officer. Suitable bronze adapter for each outlet, with caps, shall be furnished.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Copper tubing shall be cut square and all burrs shall be removed. Squeeze type mechanical cutters shall not be used for ductile iron.

3.1.2 Adjacent Facilities

3.1.2.1 Sewer Lines

Where the location of the water pipe is not clearly defined in dimensions on the drawings, the water pipe shall not be laid closer horizontally than 10 feet from a sewer except where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, in which case the water pipe shall not be laid closer horizontally than 6 feet from the sewer. Where water lines cross under gravity-flow sewer lines, the sewer pipe, for a distance of at least 10 feet each side of the crossing, shall be fully encased in concrete or shall be made of pressure pipe with no joint located within 3 feet horizontally of the crossing. Water lines shall in all cases cross above sewage force mains or inverted siphons and shall be not less than 2 feet above the sewer main. Joints in the sewer main, closer

horizontally than 3 feet to the crossing, shall be encased in concrete.

3.1.2.2 Water Lines

Water lines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electric wiring.

3.1.2.3 Copper Tubing Lines

Copper tubing shall not be installed in the same trench with ferrous piping materials.

3.1.2.4 Nonferrous Metallic Pipe

Where nonferrous metallic pipe, e.g. copper tubing, crosses any ferrous piping material, a minimum vertical separation of 12 inches shall be maintained between pipes.

3.1.3 Joint Deflection

3.1.3.1 Offset for Flexible Plastic Pipe

The maximum offset in alignment between adjacent pipe joints shall be as recommend by the manufacturer and approved by the Contracting Officer but shall not exceed 5 degrees.

3.1.3.2 Allowable Deflection for Ductile-Iron Pipe

The maximum allowable deflection shall be as given in AWWA C600. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

3.1.4 Placing and Laying

Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Water-line materials shall not be dropped or dumped into the trench. Abrasion of the pipe coating shall be avoided. Except where necessary in making connections with other lines or as authorized by the Contracting Officer, pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joints are complete. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by and at the Contractor's expense in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored, as shown.

3.1.4.1 Piping Connections

Where connections are made between new work and existing mains, the connections shall be made by using mechanical joints and specials and fittings to suit the actual conditions. When made under pressure, these connections shall be installed using standard methods as approved by the Contracting Officer. Connections to existing asbestos-cement pipe shall be made in accordance with ACPPA Work Practices.

3.1.4.2 Plastic Pipe Installation

PVC pipe shall be installed in accordance with AWWA M23.

3.1.5 Jointing

3.1.5.1 PVC Plastic Pipe Requirements

a. Pipe less than 4 inch diameter: Threaded joints shall be made by wrapping the male threads with approved thread tape or applying an approved lubricant, then threading the joining members together. The joint shall be tightened using strap wrenches to prevent damage to the pipe and/or fitting. To avoid excessive torque, joints shall be tightened no more than one thread past hand-tight. Preformed rubber-ring gaskets for elastomeric-gasket joints shall be made in accordance with ASTM F 477 and as specified. Pipe ends for push-on joints shall be beveled to facilitate assembly and marked to indicate when the pipe is fully seated. The gasket shall be prelubricated to prevent displacement. The gasket and ring groove in the bell or coupling shall match. The manufacturer of the pipe or fitting shall supply the elastomeric gasket. Couplings shall be provided with stops or centering rings to assure that the coupling is centered on the joint. Solvent cement joints shall use sockets conforming to ASTM D 2467. The solvent cement used shall be made in accordance with ASTM D 2564; the joint assembly shall be made in accordance with ASTM D 2855 and the manufacturer's specific recommendations.

b. Pipe 4 through 12 inch diameter: Joints shall be elastomeric gasket as specified in AWWA C900. Jointing procedure shall be as specified for pipe less than 4 inch diameter with configuration using elastomeric ring gasket.

3.1.5.2 Ductile-Iron Pipe Requirements

Mechanical and push-on type joints shall be installed in accordance with AWWA C600 for buried lines or AWWA C606 for grooved and shouldered pipe above ground or in pits.

3.1.5.3 Copper Tubing Requirements

Joints shall be made with flared fittings. The flared end tube shall be pulled tightly against the tapered part of the fitting by a nut which is part of the fitting, so there is metal-to-metal contact.

3.1.6 Installation of Service Lines

Service lines shall include the pipeline connecting building piping to water distribution lines to the connections with the building service at a point approximately 5 feet outside the building where such building service exists. Where building services are not installed, the Contractor shall terminate the service lines approximately 5 feet from the site of the proposed building at a point designated by the Contracting Officer. Such service lines shall be closed with plugs or caps. All service stops and valves shall be provided with service boxes. Service lines shall be constructed in accordance with the following requirements:

3.1.6.1 Service Lines 2 Inches and Smaller

Service lines 2 inches and smaller shall be connected to the main by a directly-tapped corporation stop or by a service clamp. A corporation stop and a copper gooseneck shall be provided with either type of connection. Maximum sizes for directly-tapped corporation stops and for outlets with service clamps shall be as in TABLE I. Where 2 or more gooseneck connections to the main are required for an individual service, such connections shall be made with standard branch connections. The total clear area of the branches shall be at least equal to the clear area of the service which they are to supply.

TABLE I. SIZE OF CORPORATION STOPS AND OUTLET

Pipe Size Inches	Corporation Stops, Inches For Ductile-Iron Pipe	Outlets w/Service Clamps, Inches Single & Double Strap
3	--	1
4	1	1
6	1-1/4	1-1/2
8	1-1/2	2
10	1-1/2	2
12 & larger	2	2

NOTE:

a. Service lines 1-1/2 inches and smaller shall have a service stop.

b. Service lines 2 inches in size shall have a gate valve.

3.1.7 Setting of Meters and Valves

3.1.7.1 Location of Meters

Meters and meter boxes shall be installed at the locations shown on the drawings. The meters shall be centered in the boxes to allow for reading

and ease of removal or maintenance.

3.1.7.2 Location of Valves

After delivery, valves shall be drained to prevent freezing and shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and valves shall be fully opened and fully closed to ensure that all parts are in working condition. Valves and valve boxes shall be installed where shown or specified, and shall be set plumb. Valve boxes shall be centered on the valves. Boxes shall be installed over each outside gate valve unless otherwise shown. Where feasible, valves shall be located outside the area of roads, streets, and sidewalks. Earth fill shall be tamped around each valve box or pit to a distance of 4 feet on all sides of the box, or the undisturbed trench face if less than 4 feet.

3.1.8 Thrust Restraint

Plugs, caps, tees and bends deflecting 11.25 degrees or more, either vertically or horizontally, on waterlines 4 inches in diameter or larger, shall be provided with thrust restraints. Valves shall be securely anchored or shall be provided with thrust restraints to prevent movement. Thrust restraints shall be thrust blocks.

3.1.8.1 Thrust Blocks

Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2,000 psi after 28 days. Blocking shall be placed between solid ground and the hydrant or fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

3.1.8.2 Restrained Joints

For ductile-iron pipe, restrained joints shall be designed by the Contractor or the pipe manufacturer in accordance with DIPRA-Restraint Design.

3.1.9 Insulation

Watermain shall be insulated as shown at all watermain offsets and sewer crossings.

3.2 HYDROSTATIC TESTS

Where any section of a water line is provided with concrete thrust blocking for fittings or hydrants, the hydrostatic tests shall not be made until at least 5 days after installation of the concrete thrust blocking, unless

otherwise approved.

3.2.1 Pressure Test

After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 200 psi. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, and valves shall be carefully examined during the partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. The requirement for the joints to remain exposed for the hydrostatic tests may be waived by the Contracting Officer when one or more of the following conditions is encountered:

a. Wet or unstable soil conditions in the trench.

b. Compliance would require maintaining barricades and walkways around and across an open trench in a heavily used area that would require continuous surveillance to assure safe conditions.

c. Maintaining the trench in an open condition would delay completion of the project.

The Contractor may request a waiver, setting forth in writing the reasons for the request and stating the alternative procedure proposed to comply with the required hydrostatic tests. Backfill placed prior to the tests shall be placed in accordance with the requirements of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.2.2 Leakage Test

Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and during the test the water line shall be subjected to not less than 200 psi pressure. Water supply lines designated on the drawings shall be subjected to a pressure equal to 200 psi. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure within 5 psi of the specified leakage test pressure after the pipe has been filled with water and the air expelled. Piping installation will not be accepted if leakage exceeds the allowable leakage which is determined by the following formula:

L = 0.0001351ND(P raised to 0.5 power)

L = Allowable leakage in gallons per hour
N = Number of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, in psi gauge

Should any test of pipe disclose leakage greater than that calculated by the above formula, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the Government.

3.2.3 Time for Making Test

Except for joint material setting or where concrete thrust blocks necessitate a 5-day delay, pipelines jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill. Cement-mortar lined pipe may be filled with water as recommended by the manufacturer before being subjected to the pressure test and subsequent leakage test.

3.2.4 Concurrent Hydrostatic Tests

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be as specified. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

a. Pressure test and leakage test may be conducted concurrently.

b. Hydrostatic tests and disinfection may be conducted concurrently, using the water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be reaccomplished.

3.3 BACTERIAL DISINFECTION

3.3.1 Bacteriological Disinfection

Before acceptance of potable water operation, each unit of completed waterline shall be disinfected as prescribed by AWWA C651. After pressure tests have been made, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The chlorinating material shall be either liquid chlorine, calcium hypochlorite, or sodium hypochlorite, conforming to paragraph MISCELLANEOUS ITEMS. The chlorinating material shall provide a dosage of not less than 50 ppm and shall be introduced into the water lines in an approved manner. Polyvinyl chloride (PVC) pipelines shall be chlorinated using only the above specified chlorinating material in solution. The agent shall not be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during

the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. Personnel from the Contractor's commercial laboratory shall take at least 3 water samples on each line from different points, approved by the Contracting Officer, in proper sterilized containers and perform a bacterial examination in accordance with state approved methods. The commercial laboratory shall be certified by the state's approving authority for examination of potable water. The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

3.4 CLEANUP

Upon completion of the installation of water lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

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SECTION 02531

SANITARY SEWERS
01/02

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 RAILWAY ENGINEERING & MAINTENANCE-OF-WAY ASSOCIATION (AREMA)

AREMA Manual	(1999) Manual for Railway Engineering (4 Vol.)

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198	(1998) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Joints

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 240	(1999) Standard Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip
ASTM C 76	(1999) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 94	(1999) Ready-Mixed Concrete
ASTM C 150	(1998a) Portland Cement
ASTM C 260	(1998) Air-Entraining Admixtures for Concrete
ASTM C 270	(1999b) Mortar for Unit Masonry
ASTM C 425	(1998) Compression Joints for Vitrified Clay Pipe and Fittings

ASTM C 443	(1998) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 828	(1998) Low-Pressure Air Test of Vitrified Clay Pipe Lines
ASTM C 924	(1989; R 1997) Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM C 932	**Ref Title**
ASTM D 412	(1998a) Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 624	(1991; R 1998) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D 1784	(1999) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 3034	(1998) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3139	(1998) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3212	(1996a) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F 402	(1993) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
ASTM F 477	(1996a) Elastomeric Seals (Gaskets) for Joining Plastic Pipe

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C105	(1995) Polyethylene Encasement for Ductile-Iron Pipe and Fittings for Water and Other Liquids
AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(1995) Rubber-Gasket Joints for

	Ductile-Iron Pressure Pipe and Fittings
AWWA C115	(1996) Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C500	(1993; C500a) Metal-Sealed Gate Valves for Water Supply Service
AWWA C900	(1997; C900a) Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In., for Water Distribution

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 49	(1994) Hazardous Chemicals Data
NFPA 325-1	(1994) Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids
NFPA 704	(1996) Identification of the Fire Hazards of Materials for Emergency Response

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-6	(1990) Recommended Practice for the Low-Pressure Air Testing of Installed Sewer Pipe

1.2 GENERAL REQUIREMENTS

The Contractor shall replace damaged material and redo unacceptable work at no additional cost to the Government. Excavation and backfilling is specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer. Force mains are specified in Section 02532 FORCE MAINS. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install the plastic pipe shall be stored in accordance with the manufacturer's recommendation and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3 SUBMITTALS

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

submittals having a "FIO" designation are for information only. the following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Portland Cement; GA.

Certificates of compliance stating the type of cement used in manufacture of concrete pipe, fittings and precast manholes.

Joints; FIO.

Certificates of compliance stating that the fittings or gaskets used for waste drains or lines designated on the plans are oil resistant.

SD-08 Statements

Statements;FIO

1. Type written text describing the equipment and procedures to be used at each site within the project during the construction to provide continuous sanitary sewer service.

2. Type written text describing the equipment and procedures to be used during construction to install pipe by jacking methods.

PART 2 PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

2.1.1 Concrete Pipe

Concrete pipe, unless otherwise shown or specified, shall be reinforced and conform to ASTM C 76, Class as shown. Pipe shall be bell and spigot type.

2.1.2 Plastic Pipe

2.1.2.1 PVC Pipe

PVC pips shall be ASTM D 3034, Type PSM with a maximum SDR of 35, 15 inches or less in diameter, except for pipe indicated as C900. PVC C900 pipe shall be in accordance with AWWA C900, Class 150 with push-on joints. PVC shall be certified by the compounder as meeting the requirements of ASTM D 1784, cell Class 12454B. The pipe stiffness shall be greater than or equal to 735/D for cohesionless material pipe trench backfills.

2.1.3 Ductile Iron Pipe

Pipe shall conform to AWWA C151 with working pressure not less than 150 psi, unless otherwise shown or specified.

2.2 REQUIREMENTS FOR FITTINGS

Fittings shall be compatible with the pipe supplied and shall have a strength not less than that of the pips. Fittings shall conform to the respective specifications and other requirements specified below.

2.2.1 Fittings for Concrete Pipe

Fittings for concrete pipe shall be in accordance with ASTM C 76.

2.2.2 Fittings for Plastic Pipe

2.2.2.1 Fittings for PVC Pipe

ASTM D 3034 for type PSM pipe. AWWA C900 for C900 pipe.

2.2.3 Fittings for Ductile Iron Pipe

Mechanical fittings shall conform to AWWA C110, rated for 150 psi. Push-on fittings shall conform to AWWA C110 and AWWA C111, rated for 150 psi.

2.3 JOINTS

Joints installation shall comply with the manufacturer's instructions. Fittings and gaskets utilized for waste drains or industrial waste lines shall be certified by the manufacturer as oil resistant.

2.3.1 Concrete Pipe Jointing

Joints and gaskets shall conform to ASTM C 443.

2.3.2 Plastic Pipe Jointing

PVC gasketed joints shall conform to ASTM D 3212 except that joints for C900 pipe shall be in accordance with ASTM D 3139 with ASTM F 477 gaskets.

2.3.3 Ductile Iron Pipe Jointing

Push-on joints shall conform to AWWA C111. Mechanical joints shall conform to AWWA C111 as modified by AWWA C151. Flanged joints shall conform to AWWA C115.

2.4 BRANCH CONNECTIONS

Branch connections shall be made by use of regular fittings or solvent cemented saddles as approved. Saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

2.5 FRAMES AND COVERS

Frames and covers shall be cast iron or ductile iron. Cast iron frames and covers shall be as indicated or shall be of type suitable for the

application, circular, without vent holes. The frames and covers shall have a combined weight of not less than 400 pounds. The word "Sewer" shall be stamped or cast into covers so that it is plainly visible. All covers and frames shall be capable of withstanding an HS20 Vehicle load.

2.6 STEEL LADDER

A steel ladder shall be provided where the depth of a manhole exceeds 12 feet. The ladder shall not be less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

2.7 MANHOLE STEPS

Manhole steps shall be provided for manholes less than 12 feet in depth. Manhole steps shall be a minimum of 12 inches wide with rungs spaced 12 inches apart. Manhole steps shall be cast aluminum or polypropylene-coated steel.

2.8 CEMENT MORTAR

Cement mortar shall conform to ASTM C 270, Type M with Type II cement.

2.8.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type II for concrete used in concrete pipe, concrete pipe fittings, and manholes and type optional with the Contractor for cement used in concrete cradle, concrete encasement, and thrust blocking. Air-entraining admixture conforming to ASTM C 260 shall be used with Type V cement.

2.8.2 Portland Cement Concrete

Portland cement concrete shall conform to ASTM C 94, compressive strength of 4000 psi at 28 days, except for concrete cradle and encasement or concrete blocks for manholes. Concrete used for cradle and encasement shall have a compressive strength of 2500 psi minimum at 28 days. Concrete in place shall be protected from freezing and moisture loss for 7 days.

2.9 Structures

2.9.1 Precast Reinforced Concrete Manhole Sections

Precast reinforced concrete manhole sections shall conform to ASTM C 478, except that portland cement shall be as specified herein. Joints between section shall be flexible water tight joints.

2.9.2 Flexible Watertight Joints

Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. the design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198,

and rubber-type gaskets shall conform to ASTM C 425. 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.

2.9.3 Chimney Seal

The manhole frame and chimney joint area of sanitary sewer manhole structures shall be sealed with an external flexible rubber seal as shown. the chimney seal shall consist of an external flexible rubber seal and compression bands.

2.9.3.1 External Rubber Seal

The flexible rubber sleeve and extension shall be extension shall be extruded from a high grade rubber compound conforming to the applicable requirements of ASTM C 932, with a minimum 1,500 psi tensile strength, maximum 18% compression set and a hardness (durometer of 48(+ or -) 5.

The sleeve shall be corrugated, with a minimum thickness of 3/16 inches and shall be available in unexpanded vertical heights of 6 and 9 inches, each capable of a vertical expansion of not less than 2 inches when installed. the top section of the sleeve shall contain multiple sealing fins and be designed to extend both over and under the manhole base flange, thereby allowing it to be mechanically locked in place. The bottom section of the sleeve shall contain an integrally formed compression band recess and multiple sealing fins.

The extension shall have a minimum thickness of 3/16 inches. The top portion of the extension shall be shaped to fit into the bottom band recess of the sleeve and have its own integrally formed band recess, which is located such that when assembled the recess is centered over that of the sleeve. the bottom section of the extension shall contain an integrally formed compression band recess and multiple sealing fins.

Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180 degree bend with no visible separation.

2.9.3.2 Compression Bands

Expansion bands used to compress the rubber seal against the manhole frame shall be minimum 16 gauge stainless steel conforming to ASTM A 240, Type 304, with a minimum width of 1 inch. The top compression band shall have a shape and width sufficient to mechanically lock the sleeve and frame together, when tightened.

2.10 CASING PIPE

Casing pipe shall be welded steel pipe, new materials, with a minimum yield of 35,000 psi. The minimum wall thickness shall be 0.250 inches for casing pipe with outside diameter 24" or less, shall be 0.375 inches for casing pipe with outside diameter greater than 24" and less than or equal to 30", and shall be 0.5 inches for casing pipe 36" in diameter or larger. A

minimum clearance of at least 2 inches between the inner wall of the casing pipe and the maximum outside diameter of the cased pipe and joints shall be provided. Sand shall be placed in the void between the inner wall of the casing pipe and the ceased pipe at the ends of the casing pipe after placement of sand. Steel casing pipe shall be encased in polyethylene as specified in Paragraph: PE Pipe Encasement.

2.11 VALVES

2.11.1 Gate Valves

Gate valves shall be designed for a working pressure of not less than 150 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of the opening.

a. Valves 3 inches and larger shall be iron body, bronze mounted,and shall conform to AWWA C500. Flanges shall not be buried. An approved pit shall be provided for all flanged connections.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Adjacent Facilities

3.1.1.1 Water Lines

Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be closer horizontally than 10 feet to a water-supply main or service line, except that where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, the horizontal spacing may be a minimum of 6 feet. Where gravity-flow sewers cross above water lines, the sewer pipe for a distance of 10 feet on each side of the crossing shall be fully encased in concrete or shall be acceptable pressure pipe with no joint closer horizontally than 3 feet to the crossing. The thickness of the concrete encasement including that at the pipe joints shall be not less than 4 inches.

3.1.1.2 Structural Foundations

Where sewer pipe is to be installed within 3 feet of an existing or proposed building or structural foundation, the sewer pipe shall be cased as specified above. Contractor shall ensure there is no damage to these structures, and no settlement or movement of foundations or footing.

3.1.2 Pipe Laying

a. Pipe shall be protected during handling against impact shocks and free fall; the pipe interior shall be free of extraneous material.

b. Pipe laying shall proceed upgrade with the spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Each pipe shall be laid accurately to the line and grade shown on the drawings. Pipe shall be laid and centered so that the sewer has a uniform invert. As the work progresses, the interior of the sewer shall be cleared of all superfluous materials.

c. Before making pipe joints, all surfaces of the portions of the pipe to be joined shall be clean and dry. Lubricants, primers, and adhesives shall be used as recommended by the pipe manufacturer. The joints shall then be placed, fitted, joined, and adjusted to obtain the degree of water tightness required.

d. Installations of solvent weld joint pipe, using ABS or PVC pipe and fittings shall be in accordance with ASTM F 402. The Contractor shall ensure adequate trench ventilation and protection for workers installing the pipe.

3.1.2.1 Trenches

Trenches shall be kept free of water and as dry as possible during bedding, laying, and jointing and for as long a period as required. When work is not in progress, open ends of pipe and fittings shall be satisfactorily closed so that no trench water or other material will enter the pipe or fittings.

3.1.2.2 Backfill

As soon as possible after the joint is made, sufficient backfill material shall be placed along the pipe to prevent pipe movement off line or grade. Plastic pipe shall be completely covered to prevent damage from ultraviolet light.

3.1.2.3 Width of Trench

If the maximum width of the trench at the top of the pipe, as specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, is exceeded for any reason other than by direction, the Contractor shall install, at no additional cost to the Government, concrete cradling, pipe encasement, or other bedding required to support the added load of the backfill.

3.1.2.4 Jointing

Joints between different pipe materials shall be made as specified, using approved jointing materials.

3.1.2.5 Handling and Storage

Pipe, fittings and joint material shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities for plastic pipe, fittings, joint materials and solvents shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49

and NFPA 325-1.

3.1.3 Jacking Pipe

Methods of operation and installation for pipe indicated to be jacked shall conform to requirements specified in Volume 1, Chapter 1, Part 4 of AREMA Manual. The void between the casing pipe and the sewer piping shall be filled with sand or other approved material.

3.1.4 PE Pipe Encasement

Steel and ductile iron pipe and casing pipe shall be encased with 8 mil thick polyethylene in accordance with AWWA C105.

3.1.5 Leakage Tests

Lines shall be tested for leakage by low pressure air testing, infiltration tests or exfiltration tests, as appropriate. Low pressure air testing for vitrified clay pipes shall be as prescribed in ASTM C 828. Low pressure air testing for concrete pipes shall be as prescribed in ASTM C 828. Low pressure air testing for PVC pipe shall be as prescribed in UBPPA UNI-B-6. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 and ASTM C 924, after consultation with the pipe manufacturer. Prior to infiltration or exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. When the Contracting Officer determines that infiltration cannot be properly tested, an exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be re-established. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by either the infiltration test or exfiltration test shall not exceed 25 gal per inch diameter per mile of pipeline per day. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correction, and retesting shall be made at no additional cost to the Government.

3.2 CONCRETE CRADLE AND ENCASEMENT

The pipe shall be supported on a concrete cradle, or encased in concrete where indicated or directed.

3.3 INSTALLATION OF WYE BRANCHES

Wye branches shall be installed where sewer connections are indicated or

where directed. Cutting into piping for connections shall not be done except in special approved cases. When the connecting pipe cannot be adequately supported on undisturbed earth or tamped backfill, the pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence by the Contractor shall be installed at no additional cost to the Government. The installation of wye branches in an existing sewer shall be made by a method which does not damage the integrity of the existing sewer. One acceptable method consists of removing one pipe section, breaking off the upper half of the bell of the next lower section and half of the running bell of wye section. After placing the new section, it shall be rotated so that the broken half of the bell will be at the bottom. The two joints shall then be made with joint packing and cement mortar.

3.4 MANHOLE DETAILS

3.4.1 General Requirements

Manholes shall be constructed of glass-fiber-reinforced polyester, prefabricated plastic, concrete, or precast concrete manhole sections. The invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Changes in size and grade of the channels shall be made gradually and evenly. The invert channels shall be formed directly in the concrete of the manhole base, or shall be built up with brick and mortar, or shall be half tile laid in concrete, or shall be constructed by laying full section sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. Pipe connections shall be made to manhole using water stops, standard O-ring joints, special manhole coupling, or shall be made in accordance with the manufacturer's recommendation. The Contractor's proposed method of connection, list of materials selected, and specials required, shall be approved prior to installation. The floor of the manhole outside the channels shall be smooth and shall slope toward the channels not less than 1 inch per foot nor more than 2 inches per foot. Free drop inside the manholes shall not exceed 18 inches, measured from the invert of the inlet pipe to the top of the floor of the manhole outside the channels; drop manholes shall be constructed whenever the free drop would otherwise be greater than 1 foot 6 inches.

3.4.2 Steel Ladder Anchorage

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet apart vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

3.4.3 Jointing, Plastering and Sealing

Mortar joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of the manhole. Mortar and mastic joints between precast rings shall be full-bedded in jointing compound and shall

be smoothed to a uniform surface on both the interior and exterior of the manhole. Installation of rubber gasket joints between precast rings shall be in accordance with the recommendations of the manufacturer. Precast rings may also be sealed by the use of extruded rolls of rubber with mastic adhesive on one side.

3.4.4 Setting of Frames and Covers

Unless otherwise indicated, tops of frames and covers shall be set flush with finished grade in paved areas or 2 inches higher than finished grade in unpaved areas. Frame and cover assemblies shall be sealed to manhole sections using external preformed rubber joint seals that meet the requirements of ASTM D 412 and ASTM D 624, or other methods specified in paragraph Jointing, Plastering and Sealing, unless otherwise specified.

3.4.5 Flexible Watertight Joints

Gaskets and jointing materials shall be a s recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If while the joint is being made the gasket becomes visibly dislocated, the pipe shall be removed and the joint remade.

3.5 CONNECTING TO EXISTING MANHOLES

Pipe connections to existing manholes shall be made so that finish work will conform as nearly as practicable to the applicable requirements specified for new manholes, including all necessary concrete work, cutting, and shaping. The connection shall be centered on the manhole. Holes for the new pipe shall be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cutting the manhole shall be done in a manner that will cause the least damage to the walls.

3.6 BUILDING CONNECTIONS

Building connections shall include the lines to and connection with the building waste drainage piping at a point approximately 5 feet outside the building, unless otherwise indicated. Where building drain piping is not installed, the Contractor shall terminate the building connections approximately 5 feet from the site of the building at a point and in a manner designated.

3.7 CLEANOUTS AND OTHER APPURTENANCES

Cleanouts and other appurtenances shall be installed where shown on the drawings or as directed by the Contracting Officer, and shall conform to

the detail of the drawings.

3.8 VALVES

Gate valves shall be installed where valves are indicated.

3.9 Sewer Discharge

Provide for continuous sanitary sewer discharge (flow) during construction comparable to the existing sewer capacity.

-- End of Section --

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SECTION 02532

FORCE MAINS
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM D 2464	(1996a) Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2564	(1996a) Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D 3139	(1998) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3308	(1997) PTFE Resin Skived Tape
ASTM F 477	(1996a) Elastomeric Seals (Gaskets) for Joining Plastic Pipe

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C105	(1995) Polyethylene Encasement for Ductile-Iron Pipe and Fittings for Water and Other Liquids
AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C203	(1997) Coal-Tar Protective Coatings and

	Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C500	(1993; C500a) Metal-Sealed Gate Valves for Water Supply Service
AWWA C600	(1993) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C900	(1997; C900a) Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In., for Water Distribution

DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA)

DIPRA-Restraint Design	(1997) Thrust Restraint Design for Ductile Iron Pipe

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

River Crossing Pipe Shop Drawings; GA

Catalog cuts of river crossing pipe and ductile iron fittings for the sanitary forcemain relocation.

SD-08 Statements

Forcemain Bypass and Relocation Plan; GA

A plan of operations for relocating the forcemain without interrupting service shall be submitted. The submittal shall include plans, catalog cuts of valves and other materials, and design calculations.

SD-09 Reports

Hydrostatic Tests; FIO.

Copies of test results.

1.3 DELIVERY AND STORAGE

Pipe, fittings and accessories, and pipe coatings shall not be damaged during delivery, handling, and storage.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

Piping for forcemains shall be ductile iron river crossing pipe as shown. Piping for forcemain bypass shall be PCVC plastic, ductile, iron, or ductile iron river crossing pipe. Pipe shall conform to the respective specifications and other requirements specified below.

2.1.1 Plastic Pipe

2.1.1.1 PVC Pipe

a. PVC Pipe and Fittings 4 inches Diameter and Larger: AWWA C900, Class 150 with push-on joints.

2.1.2 Ductile Iron Pipe

a. Ductile Iron Pipe: AWWA C151, working pressure not less than 150 psi.

b. River Crossing Pipe: AWWA C151, minimum thickness Class 54 with joints in compliance with applicable requirements of AWWA C110.

c. Fittings, Mechanical: AWWA C110, rated for 150 psi.

2.2 JOINTS

Joints connecting pipe of differing materials shall be mechanical joint or as recommended by the manufacturer, subject to the approval of the Contracting Officer.

2.2.1 PVC Piping

a. Screw Joint Fittings: ASTM D 2464, Schedule 80.

b. Push-On Joint Fittings: ASTM D 3139, with ASTM F 477 gaskets.

c. Solvent Cement: ASTM D 2564.

d. Couplings for use with plain end pipe shall have centering rings or stops to ensure the coupling is centered on the joint.

2.2.2 Ductile Iron Pipe

2.2.2.1 Ductile Iron Pipe

Mechanical joints: AWWA C111 as modified by AWWA C151.

2.2.2.2 River Crossing Pipe

Ductile iron river crossing pipe joints shall be a ball and socket design to meet high deflection and restrained joint requirements. The joint shall be boltless type using a bayonet style locking of the retainer over the bell.

2.3 VALVES

2.3.1 Gate Valves

Gate valves shall be insertion type that can be installed in existing forcemain without turning off flow in the forcemain. Gate valves 3 inches and larger shall comply with AWWA C500. Valves for buried service shall be non-rising stem (NRS), 2 inch square nut operated with joints applicable to the pipe or installation. Buried valves shall be furnished with extension stems comprising socket, extension stem and operating nut, and shall be of an appropriate length to bring operating nut to within 6 inches of grade. One 4 foot "T" handle valve wrench shall be furnished for each quantity of 6 buried valves. Gate valves that are exposed or installed inside shall be outside screw and yoke (OS&Y), handwheel operated with flange ends unless otherwise indicated. Gate valve operating nuts and handwheels shall have an arrow and the word "OPEN" cast in raised letters to indicate the direction of opening. The valve shall be opened by turning counterclockwise. Gate valves 14 inches and larger shall be equipped with gearing to reduce operating effort. Gate valves 14 inches and larger installed in horizontal lines in horizontal position with stems horizontal shall be equipped with bronze track, roller and scrapers to support the weight of the gate for its full length of travel. Gate valves 14 inches and larger installed in vertical pipe lines with stems horizontal shall be fitted with slides to assist the travel of the gate assembly.

2.4 VALVE BOXES

Valve boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subject to vehicular traffic. Cast iron boxes shall be the extension type with slide type adjustment and with flared base. The minimum thickness of metal shall be 3/16 inch. The box length shall be adaptable, without full extension, to the depth of cover over the pipe at the valve locations. Concrete boxes shall be the standard product of a manufacturer of precast concrete equipment. The word "SEWER" shall be cast in the cover.

2.5 VALVE VAULTS

Valve vaults or manholes shall be precast concrete units conforming to ASTM C 478.

2.6 MISCELLANEOUS MATERIALS

Miscellaneous materials shall comply with the following requirements:

2.6.1 Pipe Coatings and Linings

d. Polyethylene encasement for ductile iron: AWWA C105, minimum 8 mils thick.

2.6.2 Joint Lubricants

Joint lubricants shall be as recommended by the pipe manufacturer.

2.6.3 Bolts, Nuts and Glands

AWWA C111.

2.6.4 Joint Compound

A stiff mixture of graphite and oil or inert filler and oil.

2.6.5 Joint Tape

ASTM D 3308.

2.6.6 Bond Wire

Bond wire type RHW or USE, Size 1/0 AWG, neoprene jacketed copper conductor shaped to stand clear of the joint.

PART 3 EXECUTION

3.1 INSTALLATION

Pipe, pipe fittings, and appurtenances shall be installed at the locations indicated. Excavation, trenching, and backfilling shall be as specified in Section 02316 EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS.

3.1.1 Forcemain Bypass and Relocation Plan

A plan for the forcemain bypass and relocation shall be submitted to the Contracting Officer for approval prior to conducting work on the forcemain.

3.1.2 Adjacent Facilities

Installation of force mains near adjacent facilities shall be as specified in Section 02531 SANITARY SEWERS.

3.1.3 Cutting

Pipe shall be cut in a neat manner with mechanical cutters. Wheel cutters shall be used where practicable. Sharp and rough edges shall be ground smooth and loose material removed from the pipe before laying.

3.1.4 Laying

Except where otherwise authorized, pipe shall be laid with bells facing the direction of laying. Before lowering and while suspended, the pipe shall be inspected for defects. Defective material shall be rejected. Pipe shall be laid in compliance with the following:

a. Ductile Iron: AWWA C600.

d. Polyvinyl Chloride: Manufacturer's instructions.

3.1.5 Jointing

3.1.5.1 Joints for PVC Pipe

a. Threaded joints shall be made by wrapping the male threads with joint tape or by applying an approved thread lubricant, then threading the joining members together. The joint shall be tightened with strap wrenches which will not damage the pipe and fittings. The joint shall be tightened no more than 2 threads past hand-tight.

b. Push-on joints: The ends of pipe for push-on joints shall be beveled to facilitate assembly. Pipe shall be marked to indicate when the pipe is fully seated. The gasket shall be lubricated to prevent displacement. The gasket shall remain in proper position in the bell or coupling while the joint is made.

c. Solvent-weld joints shall comply with the manufacturer's instructions.

3.1.5.2 Joints for Ductile Iron Pipe

Installation of mechanical and push-on type joints shall comply with AWWA C600 and the manufacturer's instructions. Installation of flanged joints shall comply with manufacturer's instructions.

3.1.6 Coating and Lining

Field coating of non-galvanized steel pipe shall comply with AWWA C203. The applied materials shall be tested by means of a spark-type electrical device in compliance with AWWA C203. Flaws and holidays in the coating or lining of the pipe and the pipe joints shall be repaired; the repaired areas shall be at least equal in thickness to the minimum required for the pipe.

3.1.7 Pipe Encasement

When installed underground, ductile iron pipe shall be encased with 8 mil thick polyethylene in accordance with AWWA C105.

3.1.8 Installation of Valves

Prior to installation, valves shall be cleaned of all foreign matter and inspected for damage. Valves shall be fully opened and closed to ensure that all parts are properly operating. Valves shall be installed with the stem in the vertical position.

3.1.9 Installation of Valve Boxes

Valve boxes shall be installed over each outside gate valve, unless otherwise indicated. Valve boxes shall be centered over the valve. Fill shall be carefully tamped around each valve box to a distance of 4 feet on all sides or to undisturbed trench face, if less than 4 feet.

3.1.10 Installation of Valve Vaults

Valve vaults shall be installed as indicated.

3.1.11 Drain Lines

Drain lines shall be installed where indicated. The drain line shall consist of a tee in the main line with a 4 inch diameter branch, a 4 inch diameter elbow, and a 4 inch gate valve.

3.1.12 Thrust Restraint

Plugs, caps, tees and bends deflecting 11-1/4 degrees or more, either vertically or horizontally, shall be provided with thrust restraint. Valves shall be securely anchored or shall be provided with thrust restraints to prevent movement. Thrust restraints shall be either thrust blocks or, for ductile-iron pipes, restrained joints.

3.1.12.1 Thrust Blocks

Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2000 psi after 28 days. Blocking shall be placed between solid ground and the fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

3.1.12.2 Restrained Joints

For ductile iron pipe, restrained joints shall be designed by the Contractor or the pipe manufacturer in accordance with DIPRA-Restraint Design.

3.1.13 Grout

Grout for exterior joint protection on concrete pipes shall be a mix of 1 part portland cement, 2 parts sand, and of sufficient liquid consistency to flow into the joint recess beneath the diaper. Grout for interior joint protection shall be a mix of 1 part portland cement and 1 part sand. A polyurethane foam loop, impregnated with portland cement, may be substituted for grout for exterior joints.

3.1.14 Bonded Joints

Where indicated, a metallic bond shall be provided at each joint, including joints made with flexible couplings or rubber gaskets, of ferrous-metallic piping to effect continuous conductivity. The bond shall be of the thermal-weld type.

3.2 HYDROSTATIC TESTS

The pipeline shall be subjected to both a pressure test and a leakage test. The method proposed for disposal of waste water from hydrostatic tests shall be approved by the Contracting Officer. Testing shall be the responsibility of the Contractor. The test may be witnessed by the Contracting Officer. The Contracting Officer shall be notified at least 7 days in advance of equipment tests. The final test report shall be delivered to the Contracting Officer within 30 days of the test.

3.2.1 Pressure Test

After the pipe has been installed, joints completed, thrust blocks have been in place for at least five days, and the trench has been partially backfilled, leaving the joints exposed for examination, the pipe shall be filled with water to expel all air. The pipeline shall be subjected to a test pressure of 100 psi or 150 percent of the working pressure, whichever is greater, for a period of at least one hour. Each valve shall be opened and closed several times during the test. The exposed pipe, joints, fitting, and valves shall be examined for leaks. Visible leaks shall be stopped or the defective pipe, fitting, joints, or valve shall be replaced.

3.2.2 Leakage Test

The leakage test may be conducted subsequent to or concurrently with the pressure test. The amount of water permitted as leakage for the line shall be placed in a sealed container attached to the supply side of the test pump. No other source of supply will be permitted to be applied to the pump or line under test. The water shall be pumped into the line by the test pump as required to maintain the specified test pressure as described for pressure test for a 2 hour period. Exhaustion of the supply or the inability to maintain the required pressure will be considered test failure. PE pipe can experience diametric expansion and pressure elongation during initial testing. The manufacturer shall be consulted prior to testing for special testing considerations. Allowable leakage shall be determined by the following I-P formula:

$L = NDP/K$ Where:

L = Allowable leakage in gallons per hour.

N = Number of joints in length of pipeline tested.

D = Nominal diameter of the pipe in inches.

P = Square root of the test pressure in psig.

K = 7400 for pipe materials.

At the conclusion of the test, the amount of water remaining in the container shall be measured and the results recorded in the test report.

3.2.3 Retesting

If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests shall be reconducted until the results of the

tests are within specified allowances, without additional cost to the Government.

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SUBDRAINAGE SYSTEM
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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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3034	(1998) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F 405	(1996) Corrugated Polyethylene (PE) Tubing and Fittings

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) STANDARD SPECIFICATIONS FOR CONSTRUCTION 1995 EDITION WITH SUPPLEMENTS

MNDOT 3149	Granular Material

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Geotextile; GA. Pipe for Subdrains; GA.

Certifications from the manufacturers attesting that materials meet specification requirements. Certificates are required for drain pipe fittings, filter and bedding material, and geotextile .

1.3 DELIVER, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with minimum handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. During shipment and storage, geotextile shall be wrapped in

burlap or similar heavy duty protective covering. The storage area shall protect the fabric from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in direct sunlight. Plastic pipe shall be installed within 6 months from the date of manufacture unless otherwise approved.

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 and not dragged to the trench.

PART 2 PRODUCTS

2.1 PIPE FOR SUBDRAINS

Pipe for subdrains shall be of the types and sizes indicated.

2.1.1 Plastic Pipe

Plastic pipe shall contain ultraviolet inhibitor to provide protection from exposure to direct sunlight.

2.1.1.1 Corrugated Polyethylene (PE) Drain Tile and Fittings

Drain tile shall be in accordance with ASTM F 405. Fittings shall be manufacturer's standard type and shall conform to the indicated specification.

2.1.1.2 Polyvinyl Chloride (PCVC) Pipe and Fittings

Polyvinyl chloride (PVC) pipe and fittings shall conform to ASTM D 3034.

2.1.1.3 Pipe Perforations

Water inlet area shall be a minimum of 0.5 square inch per linear foot for perforated drain pipe indicated. Manufacturer's standard perforated pipe which essentially meets these requirements may be substituted with prior approval of the Contracting Officer.

a. Slotted Perforations: Circumferential slots shall be cleanly cut so as not to restrict the inflow of water and uniformly spaced along the length and circumference of the tubing. Width of slots shall not exceed 1/8 inch nor be less than 1/32 inch. The length of individual slots shall not exceed 1-1/4 inches on 3 inch diameter tubing, 10 percent of the tubing inside nominal circumference on 4 to 8 inch diameter tubing, and 2-1/2 inches on 10 inch or larger diameter tubing. Rows of slots shall be symmetrically spaced so that they are fully contained in 2 quadrants of the pipe. Slots shall be centered in the valleys of the corrugations of profile wall pipe.

b. Circular Perforations: Circular holes shall be cleanly cut not more than 3/8 inch or less than 3/16 inch in diameter and arranged in rows parallel to the longitudinal axis of the pipe. Perforations shall be approximately 3 inches center-to-center along rows. The rows shall be approximately 1-1/2 inches apart and arranged in a staggered pattern so that all perforations lie at the midpoint between perforations in adjacent rows. A minimum of four rows shall be spaced over not more than 155 degrees of circumference. The spigot or tongue end of the pipe shall not be perforated for a length equal to the depth of the socket, and perforations shall continue at uniform spacing over the entire length of the pipe.

2.2 GEOTEXTILE

Geotextile shall be as specified in SECTION 02378: GEOTEXTILE FILTERS.

2.3 DRAINAGE STRUCTURES

Subdrainage system shall be connected to concrete drainage structures in accordance with SECTION 02630: STORM-DRAINAGE SYSTEM.

2.4 SUBDRAIN FILTER AND BEDDING MATERIAL

Fine filter aggregate shall be used for subdrain filter and bedding material meeting the requirements of MNDOT 3149.2.J.

PART 3 EXECUTION

3.1 EXCAVATION AND BEDDING FOR SUBDRAIN SYSTEMS

Trenching and excavation, including the removal of rock and unstable material, shall be in accordance with Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Bedding and filter material shall be placed in the trench as indicated or as required as replacement materials used in those areas where unstable materials were removed. Compaction of the bedding material shall be as specified for cohesionless material in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.2 INSTALLATION OF GEOTEXTILE AND PIPE FOR SUBDRAINS

3.2.1 Trench Lining

Trenches to be lined with geotextile shall be graded to obtain smooth side and bottom surfaces so that the geotextile will not bridge cavities in the soil or be damaged by projecting rock. The geotextile shall be laid flat but not stretched on the soil, and it shall be secured with anchor pins. All seams shall be sewn, and anchor pins shall be used along the seam.

3.2.2 Geotextile Installation

Geotextile sock and pipe wrap install where shown. Use prefabricated

material or sew geotextile around drain pipe. Band the ends around the pipe.

3.2.3 Installation of Pipe for Subdrains

3.2.3.1 Pipelaying

Each pipe shall be carefully inspected before it is laid. Any defective or damaged pipe shall be rejected. No pipe shall be laid when the trench conditions or weather is unsuitable for such work. Water shall be removed from trenches by sump pumping or other approved methods. The pipe shall be laid to the grades and alignment as indicated. The pipe shall be bedded to the established gradeline. Perforations shall be centered on the bottom of the pipe. Pipes of either the bell-and-spigot type or the tongue-and-groove type shall be laid with the bell or groove ends upstream. All pipes in place shall be approved before backfilling.

3.2.3.2 Jointings

a. Drainage pipe shall be installed in accordance with the manufacturer's specifications and as specified herein. A pipe with physical imperfections shall not be installed. No more than 5 percent stretch in a section will be permitted.

3.2.4 Flushing and Observation Risers

Flushing and Observation riser pipes with frames and covers shall be installed where indicated. Riser pipes shall be of the material indicated and joined to the subdrain system as shown or directed.

3.3 INSTALLATION OF FILTER MATERIAL AND BACKFILLING FOR SUBDRAINS

After pipe for subdrains has been laid, inspected, and approved, filter material shall be placed around and over the pipe to the depth indicated. The filter material shall be placed in layers not to exceed 12 inches thick, and each layer shall be thoroughly compacted by mechanical tampers or rammers to obtain the required density. Compaction of filter material and the placement and compaction of overlying backfill material shall be in accordance with the applicable provisions specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

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SECTION 02630

STORM-DRAINAGE SYSTEM
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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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198	(1998) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Joints

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 48	(1994a) Gray Iron Castings
ASTM A 536	(1984 R; 1999) Ductile Iron Castings
ASTM A 760	(1997) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 798	(1997a) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
ASTM B 26	(1997) Specification for Aluminum-Alloy Sand Castings
ASTM C 76	(1999) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 270	(1999b) Mortar for Unit Masonry
ASTM C 425	(1998) Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C 443	(1998) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections

ASTM C 923	(1998) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Materials
ASTM D 2842	Test Method for Water Absorption of Rigid Plastics

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-13 Certificates

Test Reports; FIO.

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed. Certification on the ability of frame and cover to carry the imposed live load.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

ASTM C 76, Class as indicated on the Drawings.

2.1.2 Corrugated Metal Pipe

ASTM A 760, zinc or aluminum (Type 2) coated pipe of either:

a. Type I pipe with annular or helical 2-2/3 by 1/2 inch corrugations.

b. Type IR pipe with helical 3/4 by 3/4 by 7-1/2 inch corrugations.

2.1.3 Ductile Iron Pipe

a. River Crossing Pipe: AWWA C151, Minimum thickness Class 54 with joints in compliances with applicable requirements of AWWA C110.

2.2 DRAINAGE STRUCTURES

2.2.1 Precast Concrete Flared End Sections

Sections shall be of a standard design in accordance with ASTM C 76, Class II. Steel trash racks shall be provided for concrete flared end sections where indicated. Trash racks shall be in accordance with SECTION 05055: METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Concrete

Concrete for cast-in-place drainage structures shall conform to the requirements of SECTION 03300 CAST-IN-PLACE-STRUCTRUAL CONCRETE.

2.3.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.3.3 Precast Reinforced Concrete Manholes

Precast reinforced concrete manholes shall conform to ASTM C 478. Joints between precast concrete sections shall be made with flexible watertight, rubber-type gaskets meeting the requirements of paragraph JOINTS.

2.3.4 Frame and Cover

Frame and cover shall be cast gray iron, ASTM A 48, Class 35B; cast ductile iron, ASTM A 536, Grade 65-45-12; or cast aluminum, ASTM B 26, Alloy 356.OT6. Frame and cover model for grates and curb inlets shall be as indicated on the Drawings. All castings and frames shall be capable of withstanding a HS20 wheel load.

2.3.5 Joints

2.3.5.1 Concrete Pipe

Joints in concrete shall be flexible watertight joints.

a. Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443. Factory-fabricated resilient joint materials shall conform to ASTM C 425. 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 or manhole being gasketed exceeds 54 inches.

2.3.5.2 River Crossing Pipe

Ductile iron river crossing pipe joints shall be a ball and socket design to meet high deflection and restrained joint requirements. The joint shall be boltless type using a bayonet style locking or the retainer over the bell.

2.3.6 Separation Geotextile

Separation geotextile shall be as specified in SECTION 02373: SEPARATION GEOTEXTILE.

2.4 Manhole Steps

Manhole steps shall be provided for manholes and drainage structures. Manhole steps shall be a minimum of 12-inches wide with rungs spaced at 12-inches apart where not shown. Manhole steps shall be cast aluminum or polypropylene-coated steel.

2.5 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C 923.

2.6 INSULATION

Insulation shall be rigid, extruded polystyrene board with minimum thermal resistance (R) of 5.0. Board size shall be 48-inch x 96-inch or equal to size of the structure base slab. Edges shall be square. Compressive

strength shall be minimum 25 psi. Water absorption shall be maximum 0.1 percent in accordance with ASTM D 2842. Minimum thickness of individual boards shall be 1-inch.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of SECTION 02316: "EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS" and SECTION 02300: "EARTHWORK" and the requirements specified below. Excavation and backfill for junction manholes, pump stations, and gatewell structures shall be in accordance with SECTION 02315: EXCAVATION, FILLING AND BACKFILLING FOR STRUCTURES.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 36 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. Contractor shall not overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will 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.

3.1.2 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with satisfactory material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.2.2 Corrugated Metal Pipe

3.2.2.1 Round Corrugated Metal Pipe

Bedding for corrugated metal pipe and pipe arch shall be in accordance with ASTM A 798. It is not required to shape the bedding to the pipe geometry.

3.2.2.2 Corrugated Metal Slotted Drain

Bedding for corrugated metal slotted drain shall be concrete. Concrete shall be in accordance with Section 03300: Cast-in-Place structural

3.2.3 Ductile Iron Pipe

Bedding for ductile iron pipe for storm drainage shall be as specified for concrete pipe.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipe shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (%)
Corrugated Metal	5

Not less than 30 days after the completion of backfilling, the Government may perform a deflection test on the entire length of installed flexible pipe using a mandrel or other suitable device. Installed flexible pipe showing deflections greater than those indicated above shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.3.1 Concrete Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Corrugated Metal Pipe

Laying shall be with the separate sections joined firmly together, with the outside laps of circumferential joints pointing upstream, and with longitudinal laps on the sides.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.4.2 Corrugated Metal Pipe

3.4.2.1 Field Joints

Transverse field joints shall be designed so 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 meet the general performance requirements described in ASTM A 798. Suitable transverse field joints which satisfy the requirements for one or more of the joint performance categories can be obtained with the following types of connecting bands furnished with suitable band-end fastening devices: corrugated bands, bands with projections, flat bands, and bands of special design that engage factory reformed ends of corrugated pipe. The space between the pipe and connecting bands shall be kept free from dirt and grit so that corrugations fit snugly. The connecting band, while being tightened, shall be tapped with a soft-head mallet of wood, rubber or plastic, to take up slack and ensure a tight joint. Field joints for each type of corrugated metal pipe shall maintain pipe alignment during construction and prevent infiltration of fill material during the life of the installations. The type, size, and sheet thickness of the band and the size of angles or lugs and bolts shall be as indicated or where not indicated, shall be as specified in the applicable standards or specifications for the pipe.

3.4.2.2 Flexible Watertight, Gasketed Joints

Installation shall be as recommended by the gasket manufacturer for use of lubricants and cements and other special installation requirements. The gasket shall be placed over one end of a section of pipe for half the width of the gasket. The other half shall be doubled over the end of the same pipe. When the adjoining section of pipe is in place, the doubled-over half of the gasket shall then be rolled over the adjoining section. Any unevenness in overlap shall be corrected so that the gasket covers the end of pipe sections equally. Connecting bands shall be centered over adjoining sections of pipe, and rods or bolts placed in position and nuts tightened. Band Tightening: The band shall be tightened evenly, even tension being kept on the rods or bolts, and the gasket; the gasket shall

seat properly in the corrugations. Watertight joints shall remain uncovered for a period of time designated, and before being covered, tightness of the nuts shall be measured with a torque wrench. If the nut has tended to loosen its grip on the bolts or rods, the nut shall be retightened with a torque wrench and remain uncovered until a tight, permanent joint is assured.

3.5 GEOTEXTILE WRAP

Storm drainage piping installed in the levee embankment shall be wrapped in separation geotextile as shown.

3.6 DRAINAGE STRUCTURES

3.6.1 Manholes

Construction shall be of precast reinforced concrete with flexible watertight joints, complete with frames and covers or grates, and with fixed galvanized steel ladders or manhole steps.

3.6.2 Cast-In-Place Structures

Construction shall be in accordance with SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE.

3.7 MANHOLE STEPS INSTALLATION

Manhole steps shall be adequately anchored to the wall by means of steel inserts.

3.8 MOVEMENT OF CONSTRUCTION MACHINERY

When 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 damaged pipe shall be replace and joints repaired.

3.9 INSULATION

Insulation shall be installed where shown and to the thickness shown. Joints, if necessary, shall be staggered.

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SECTION 02722

AGGREGATE BASE OR SURFACE COURSE
01/02

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 the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 75	(1997) Sampling Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft.)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), STANDARD SPECIFICATIONS FOR CONSTRUCTION (1995 EDITION AND SUPPLEMENTS)

MNDOT 2112	Subgrade Preparation
MNDOT 2211	Aggregate Base
MNDOT 3138	Aggregates for Surface and Base Courses

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

Testing; FIO

A summary of sampling and testing results indicated in PARAGRAPH: TESTING shall be submitted when the road work is substantially complete.

PART 2 PRODUCTS

2.1 REQUIREMENTS

All products shall meet the requirements of the specified sections of the MNDOT Standard Specifications, except where modified or required below. Aggregate gradations, as indicated by class, for aggregate base course and surface course specified in the MNDOT Standard Specifications shall be strictly adhered to.

2.2 MATERIALS

2.2.1 Aggregate Base Course

Aggregate base course shall consist of crushed gravel, unless otherwise noted or required for reconstructed street sections, meeting the required gradations as identified by class and all other requirements of MNDOT 2211 and MNDOT 3138. Replace base course of reconstructed street sections in kind meeting MNDOT 2211 and MNDOT 3138.

2.2.2 Aggregate Surfacing Course

Aggregate surfacing course shall consist of crushed gravel graded to the class shown and meeting the requirements of MNDOT 3138.

PART 3 EXECUTION

3.1 GENERAL

Furnishing, placing, compaction, subgrade preparation, and testing shall meet the requirements of the MNDOT 2112, MNDOT 2211, and MNDOT 3138. Compaction shall be in accordance with the specified density method.

3.2 TESTING

3.2.1 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 01451: CONTRACTOR QUALITY CONTROL.

3.2.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction or corrective action required. Draft copies of field testing results shall be submitted to the Contracting Officer within 24 hours of the test, as directed.

3.2.3 Corrective Action

Tests of materials which do not meet the contract requirements (failing tests) 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 be 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.

3.2.4 Sampling

Sampling shall be done in accordance with ASTM D 75. Properties shall be determined from three random samples taken from the stockpile from each lot of 5,000 tons or fraction thereof at the source prior to delivery to the site.

3.2.5 Liquid Limit and Plasticity Index

Liquid Limit and Plasticity Index shall be tested in accordance with ASTM D 4318, respectively. The portion of the material passing the No. 40 sieve must have a liquid limit not greater than 25 and a plasticity index not greater than 5.

3.2.6 LA Abrasion

LA Abrasion shall be tested in accordance with ASTM C 131. Results must meet the requirements of the MNDOT 3138.

3.2.7 Sieve Analysis

Sieve Analysis shall be made in conformance with ASTM D 422. Satisfactory results are specified in MNDOT 3138.

3.2.8 Moisture Density Determination

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 698.

3.2.9 Field Density and Water Content

In-place density shall be field verified in accordance with ASTM D 2922. Water content shall be maintained during the compaction procedure to within plus or minus 3 percent of the optimum water content. Compaction shall continue until each layer has a degree of compaction that is at least 100 percent of the laboratory maximum density through the full depth of the layer. Testing shall occur at random intervals on every 2,000 tons of aggregate base or surface course installed or fraction thereof.

3.2.10 Subgrade Tolerances

Tolerances are provided in MNDOT 2211.

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SECTION 02741

PLANT-MIXED BITUMINOUS PAVEMENT

01/02

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SECTION 02741

PLANT-MIXED BITUMINOUS PAVEMENT
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Test Method for Materials Finer Than 75 Micrometers (No. 200 Sieve) in Mineral Aggregates by Washing
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 2172	(1995) Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) STANDARD SPECIFICATIONS FOR CONSTRUCTION (1995 EDITION WITH SUPPLEMENTS)

MNDOT 2331	Plant Mixed Bituminous Pavement
MNDOT 2340	Plant-Mixed Bituminous Pavement Quality Control/Quality Assurance
MNDOT 2357	Bituminous Tack Coat
MNDOT 3139	Graded Aggregate for Bituminous Mixtures

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-07 Schedules

Paving Schedule; FIO

Submit paving schedule at least 7 days prior to start of paving.

SD-09 Reports

Testing; FIO.

The Contractor shall submit complete records of all quality control test and inspections. All test results and calculations will be recorded and documented on data sheets approved by the Contracting Officer. Data sheets shall list the mix design criteria, job mix formula, testing requirements and results.

Mix Design; GA.

At least ten days prior to placement of bituminous pavement the Contractor shall submit the mix proportions that meet the requirements specified in the MNDOT Standard Specifications and that will produce bituminous pavement of the quality required. The mix design will be developed according to the MNDOT Standard Specifications. The mix design in Table 2331-14 of MNDOT 2331 shall have the properties required.

If aggregate or asphalt is utilized from sources other than those initially submitted with the mix proportions, the aggregate is processed using a different crusher, or if a different type or grade of asphalt is used, the Contractor shall notify the Contracting Officer in writing before incorporating the material into the work. If the Contracting Officer determines that a new mix design is required, the Contractor shall submit another mix design and submit it for approval.

Job Mix Formula (JMF)

The results of the mix design process is the Job Mix Formula. The JMF submitted shall contain the following:

1. The percentage of aggregate passing each of the specified sieves.

2. The percent asphalt cement to be added to the mixture.

3. The target air voids will be 4 percent.

4. The maximum specific gravity of the mixture obtained in the laboratory.

5. The bulk specific gravity of the mixture obtained in the laboratory.

6. The percent VMA of the mixture obtained in the laboratory.

7. The Stability of the mix.

8. Flow.

9. Calculated Film Thickness (Microns).

10. Calculated Dust/Asphalt Ratio.

PART 2 PRODUCTS

All products shall meet the requirements of the referenced sections of the MNDOT Standard Specifications. Aggregate shall be A, B, C, or D, as specified in the MNDOT 3139. Asphalt type and grade shall be as indicated in MNDOT 2331.

2.1 TACK COAT

Tack coat shall meet the requirements of MNDOT 2357.

2.2 BITUMINOUS PAVEMENT

2.2.1 Wearing Course

The wearing course shall consist of Type 41 as specified in MNDOT 2331. The lift thickness for wearing course shall not exceed 2 inches.

2.2.2 Non Wearing Course (Base Course)

The non-wearing course shall consist of Type 31 as specified in MNDOT 2331. The lift thickness for non-wearing course shall not exceed 2 inches.

PART 3 EXECUTION

3.1 GENERAL

Refer to SECTION 02722: AGGREGATE BASE OR SURFACE COURSE for subgrade preparation and aggregate base.

Furnishing, paving, finishing, compaction, and installation of Plant Mixed Bituminous Pavement shall meet the requirements of the specified sections of the MNDOT Standard Specifications, except as otherwise required herein. Where referenced in the MNDOT Standard Specifications, Engineer shall mean the Contracting Officer and Department shall mean the Government.

For road reconstruction the Contractor shall take a minimum of 3 road cores from each section. Road cores shall be tested for thickness of wear course and non-wear course, asphalt cement content, and aggregate gradation. Replace each section in kind. The Contractor will have the option to use the approved JMF provided it exceeds the quality of the existing pavement section and approval is obtained in writing from the Contracting Officer.

3.2 TESTING

3.2.1 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 01451: CONTRACTOR QUALITY CONTROL. All testing shall conform with the requirements of MNDOT 2340.

3.2.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction or corrective action required. Draft copies of field testing results shall be submitted to the Contracting Officer within 24 hours of the test, as directed.

3.2.3 Response to Results and Corrective Action

As required in MNDOT 2340.

3.2.4 Testing Schedule

Perform the following testing; the frequency of testing listed applies to each separate area paved. Core samples will be used to measure the thickness and specified density. Compare Marshall density test results from the bag samples to the bituminous mixture core samples to determine the pay factor in accordance with MNDOT 2331.

Material	Test	Frequency
Aggregate for Bituminous Mixture	Sieve Analysis (ASTM C 117 & ASTM C 136)	Every 125 Cubic Yards
Bituminous Non-Wearing and Wearing Course	Core Samples (MNDOT 2331)	3 for each course
	Extraction (ASTM D 2172)	3 for each course
	Marshall Density	1 for each course

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CONCRETE BASE AND PAVEMENT

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SECTION 02754
CONCRETE BASE AND PAVEMENT

01/02

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.

MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (1995 EDITION AND SUPPLEMENTS)

MNDOT 2201	Concrete Base
MNDOT 2301	Concrete Pavement
MNDOT 2461	Structural Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 143	(1990a) Slump of Hydraulic Cement Concrete
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES.

SD-09 Reports

Concrete Mixture Proportions; GA

At least ten days prior to placement of concrete, the Contractor shall submit the mixture proportions that meet requirements specified in the 1995 MNDOT Standard specifications and that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions meet requirements specified in the 1995 MNDOT Standard specifications and will produce concrete of the quality specified.

Testing; FIO

A summary of testing results indicated in PARAGRAPH: TESTING shall be submitted when concrete work is substantially complete for each paved area.

PART 2 PRODUCTS

2.1 MATERIALS

All products shall meet the requirements of the specified sections of the 1995 MNDOT Standard Specifications, Sections: MNDOT 2201, MNDOT 2301, MNDOT 2461.

PART 3 EXECUTION

3.1 GENERAL

Refer to SECTION 02722: AGGREGATE BASE OR SURFACE COURSE for subgrade preparation and aggregate base.

Concrete pavement construction, finishing, curing, joints, and testing for roads and driveways shall meet the requirements specified in the 1995 Minnesota Department of Transportation Standard Specifications for construction (1995 MNDOT Standard Specifications), Sections: MNDOT 2201, MNDOT 2301, MNDOT 2461

3.2 TESTING

3.2.1 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 01451: CONTRACTOR QUALITY CONTROL.

3.2.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction or corrective action required. Draft copies of field testing results shall be submitted to the Contracting Officer within 24 hours of the test, as directed.

3.2.3 Corrective Action

Tests of materials which do not meet the contract requirements (failing tests) 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 be 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.

3.2.4 Testing Schedule

a. Surface Smoothness

The finished surfaces of the pavements shall have no abrupt change of 1/8 inch or more, and all pavements shall be within the tolerances specified in Table 1 when checked with the straightedge.

Table 1
Straightedge Surface Smoothness - Pavements

Pavement Category	Direction of Testing	Tolerances (Inches)
Roads and Streets	Longitudinal	3/16
	Transverse	1/4
Driveways and Parking Areas	Longitudinal	1/4
	Transverse	1/4

The surface of the pavement shall be tested with the straightedge to identify all surface irregularities exceeding the tolerances specified above. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines approximately 15 feet apart. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points.

b. Strength Tests

Compressive tests shall be made to determine that concrete strength specified in MNDOT 2461 is achieved prior to opening pavement to traffic.

Compressive tests shall be made and cured according to ASTM C 39.

Concrete cylinders shall be tested for compressive strength according to ASTM C 39. 1 set of 5 cylinders per 4,000 square yards or fraction thereof shall be sampled and tested for each pavement or driveway area.

c. Tests for Uniformity

Uniformity will be tested by comparing slump (ASTM C 143), and air content (ASTM C 231) of 2 individual samples taken from approximately the 1/6 and 5/6 points of the batch as discharged at the site of placement. Satisfactory uniformity results are specified in MNDOT 2461.

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SECTION 02763

PAVEMENT MARKINGS
01/02

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 247	(1981) Glass Beads Used in Traffic Paint

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT)

MUTCD	Minnesota Manual on Uniform Traffic Control Devices
Attachment	Specification for Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment Lists; FIO.

Lists of proposed equipment, including descriptive data, and notifications of proposed Contractor actions as specified in this section. List of removal equipment shall include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation.

SD-06 Instructions

Mixing, Thinning and Application; FIO.

Manufacturer's current printed product description and Material Safety Data Sheets (MSDS) for each type paint/color proposed for use.

SD-08 Statements

Qualifications; FIO.

Document certifying that personnel are qualified for equipment operation and handling of chemicals.

SD-09 Reports

Material Tests; FIO.

Certified copies of the test reports, prior to the use of the materials at the jobsite. Testing shall be performed in an approved independent laboratory.

SD-13 Certificates

Volatile Organic Compound (VOC) Content; FIO.

Certificate stating that the proposed pavement marking paint meets the VOC regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which the project is located.

1.3 DELIVERY AND STORAGE

All materials shall be delivered and stored in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's name, and directions, all of which shall be plainly legible at time of use.

1.4 EQUIPMENT

All machines, tools and equipment used in the performance of the work shall be approved and maintained in satisfactory operating condition. Equipment operating on roads and runways shall display low speed traffic markings and traffic warning lights.

1.4.1 Pavement Marking Application Equipment

The equipment to apply pavement marking shall be a self-propelled or mobile-drawn pneumatic spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. The machine shall have a speed during application not less than 5 mph, and shall be capable of applying the stripe widths indicated, at the paint coverage rate specified in Paragraph: APPLICATION, and of even uniform thickness with clear-cut edges. Equipment used for marking shall be capable of placing the prescribed number of lines at a single pass as solid lines, intermittent lines or a combination of solid and intermittent lines using a maximum of two different colors of paint as specified. The applicator shall have reservoirs or tanks of sufficient capacity and suitable gauges to apply pavement markings in accordance with requirements specified. Tanks shall be equipped with suitable air-driven mechanical agitators. The spray mechanism shall be equipped with quick-action valves conveniently located, and shall include necessary pressure regulators and

gauges in full view and reach of the operator. Strainers shall be installed in supply lines to ensure freedom from residue and foreign matter that may cause malfunction of the spray guns. The applicator shall be readily adaptable for attachment of an air-actuated dispenser for the reflective media approved for use. Pneumatic spray guns shall be provided for hand application of paint in areas where the mobile applicator cannot be used.

1.4.2 Reflective Media Dispenser

The dispenser for applying the reflective media shall be attached to the pavement marking applicator and shall operate automatically and simultaneously with the applicator through the same control mechanism. The dispenser shall be capable of adjustment and designed to provide uniform flow of reflective media over the full length and width of the stripe at the rate of coverage specified in paragraph APPLICATION, at all operating speeds of the applicator to which it is attached.

1.4.3 Surface Preparation Equipment

1.4.3.1 Sandblasting Equipment

Sandblasting equipment shall include an air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be painted. The compressor shall be capable of furnishing not less than 150 cfm of air at a pressure of not less than 90 psi at each nozzle used, and shall be equipped with traps that will maintain the compressed air free of oil and water.

1.4.3.2 Waterblast Equipment

The water pressure shall be specified at 2600 psi at 140 degrees F in order to adequately clean the surfaces to be marked.

1.4.4 Marking Removal Equipment

Equipment shall be mounted on rubber tires and shall be capable of removing markings from the pavement without damaging the pavement surface or joint sealant. Waterblasting equipment shall be capable of producing an adjustable, pressurized stream of water. Sandblasting equipment shall include an air compressor, hoses, and nozzles. The compressor shall be equipped with traps to maintain the air free of oil and water.

1.4.4.1 Shotblasting Equipment

Shotblasting equipment shall be capable of producing an adjustable depth of removal of marking and pavement. Each unit shall be self-cleaning and self-contained, shall be able to confine dust and debris from the operation, and shall be capable of recycling the abrasive for reuse.

1.4.4.2 Chemical Equipment

Chemical equipment shall be capable of application and removal of chemicals from the pavement surface, and shall leave only non-toxic biodegradeable

residue.

1.4.5 Traffic Controls

Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Equipment shall be marked with large warning signs indicating slow-moving equipment in operation. Comply with the Minnesota Manual on Uniform Traffic Control Devices (MUTCD).

1.5 HAND-OPERATED, PUSH-TYPE MACHINES

All machines, tools, and equipment used in performance of the work shall be approved and maintained in satisfactory operating condition. Hand-operated push-type machines of a type commonly used for application of markings to pavement surfaces will be acceptable for marking small streets and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of uniform application at coverage specified. Sandblasting equipment shall be provided as required for cleaning surfaces to be marked. Hand-operated spray guns shall be provided for use in areas where push-type machines cannot be used.

1.6 MAINTENANCE OF TRAFFIC

1.6.1 Roads, Streets, and Parking Areas

When traffic must be rerouted or controlled to accomplish the work, the necessary warning signs, flagpersons, and related equipment for the safe passage of vehicles shall be provided.

1.7 WEATHER LIMITATIONS FOR REMOVAL

Pavement surface shall be free of snow, ice, or slush. Surface temperature shall be at least 50 degrees F and rising at the beginning of operations, except those involving shot or sand blasting. Operation shall cease during thunderstorms. Operation shall cease during rainfall, except for waterblasting and removal of previously applied chemicals. Waterblasting shall cease where surface water accumulation alters the effectiveness of material removal.

PART 2 PRODUCTS

2.1 PAVEMENT MARKINGS

The pavement markings shall conform with the Attachment, "Specification for Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals)".

2.2 REFLECTIVE MEDIA

Reflective media shall conform to AASHTO M 247, Type I, "Standard Gradation", except that the beads shall have a minimum of 80 percent true spheres.

2.3 SAMPLING AND TESTING

Materials proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at source of supply, sufficiently in advance of needs to allow 60 days for testing. Upon notification by the Contractor that the material is at the site or source of supply, a sample shall be taken by random selection from sealed containers by the Contractor in the presence of a representative of the Contracting Officer. Samples shall be clearly identified by designated name, specification number, batch number, manufacturer's formulation number, project contract number, intended use, and quantity involved. Testing shall be performed in an approved independent laboratory. If materials are approved based on reports furnished by the Contractor, samples will be retained by the Government for possible future testing should the material appear defective during or after application.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surfaces to be marked shall be thoroughly cleaned before application of the pavement marking material. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion as directed. Areas of old pavement affected with oil or grease shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint. Pavement surfaces shall be allowed to dry, when water is used for cleaning, prior to striping or marking. Surfaces shall be recleaned, when work has been stopped due to rain.

3.1.1 Cleaning Existing Pavement Markings

In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings, which are in good condition but interfere or conflict with the newly applied marking patterns, shall be removed. Deteriorated or obscured markings that are not misleading or confusing or interfere with the adhesion of the new marking material do not require removal. New preformed and thermoplastic pavement markings shall not be applied over existing preformed or thermoplastic markings. Whenever grinding, scraping, sandblasting or other operations are performed the work must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed the pavement surface shall be blown off with compressed air to remove residue and debris resulting from the cleaning work.

3.2 APPLICATION

All pavement markings and patterns shall be placed as shown on the plans. The color shall be as indicated.

3.2.1 Application

Apply epoxy pavement markings in accordance with the attached specification. Furnish and place epoxy pavement markings together with appropriate glass spheres for reflectorizing the resin.

3.2.2 Spacing and Layout

1. Apply all markings in accordance with plan layout and details.

2. The Contractor shall place necessary "spotting" at appropriate points to provide horizontal control for striping, and determine necessary starting and cutoff points. Skip line intervals will not be marked. Longitudinal joints and pavement edges shall serve as horizontal control when so directed.

   A tolerance of 1/8 inch under and 1/2 inch over the specified width will be allowed for striping provided the variance is gradual and does not detract from the general appearance. Skip line segments may vary up to 1/4 foot from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the control guide shall not exceed 2 inches. Material shall not be applied over a longitudinal joint. Establishment of application tolerances shall not relieve the Contractor of the responsibility to comply as closely as practicable with the planned dimensions.

3.3 PROTECTION OF TRAFFIC AND MARKINGS

Furnish and install all necessary warning and directional signs and devices in order to; maintain traffic whenever pavement markings are applied in the presence of traffic, and to protect uncured markings as needed until traffic can cross markings without damaging markings. When necessary, a pilot car and flaggers shall be used to provide adequate control and direction of traffic.

3.4 MARKING REMOVAL

Pavement marking, including plastic tape, shall be removed in the areas shown on the drawings. Removal of marking shall be as complete as possible without damage to the surface. Aggregate shall not be exposed by the removal process. After the markings are removed, the cleaned pavement surfaces shall exhibit adequate texture for remarking as specified in paragraph SURFACE PREPARATION. Contractor shall demonstrate removal of pavement marking in an area designated by the Contracting Officer. The demonstration area will become the standard for the remainder of the work.

3.4.1 Equipment Operation

Equipment shall be controlled and operated to remove markings from the pavement surface, prevent dilution or removal of binder from underlying pavement, and prevent emission of blue smoke from asphalt or tar surfaces.

3.4.2 Cleanup and Waste Disposal

The worksite shall be kept clean of debris and waste from the removal operations. Cleanup shall immediately follow removal operations in areas subject to air traffic. Debris shall be disposed of at approved sites.

-- End of Section --

Attachment
Specifications for Epoxy Resin Pavement Markings
(Free of Toxic Heavy Metals)

1.0 DESCRIPTION

The work shall consist of furnishing and installing reflectorized white and yellow two-component, 100 percent solids epoxy pavement markings. Applications are lines, legends, symbols, crosswalks and stop lines placed on properly prepared asphaltic and portland cement concrete pavement surfaces in accordance with the Special Provisions, Plans, this Attachment and as directed by the Engineer. Upon curing, the materials produce pavement markings of specified thickness, width and retroreflectivity that resist wear from high traffic volumes for several years. During darkness and weather permitting, yellow markings shall be readily distinguishable from white markings.

Values stated in the International System of Units SI apply only to projects to be constructed in Metric units of measure. Values stated in inch-pound units (in parenthesis) apply only to projects to be constructed in English units of measure.

2.0 QUALIFICATIONS

2.1 Epoxy striping is a technical process requiring specialized equipment, quality controlled materials and well-trained operators to produce functional, long life pavement markings. To minimize application failures, Mn/DOT requires epoxy materials, beads, the pavement marking contractor, and striper to be approved prior to the bidding process.

2.1.1 A pavement marking contractor and/or equipment may be qualified as follows:

1. No previous epoxy striping on any construction contract-- contact Mn/DOT to arrange for field demonstration.
2. Recent epoxy striping experience with other state transportation departments-- contact Mn/DOT and provide experience summary, including names of persons to be contacted.
3. If striper is new, contact Mn/DOT to arrange for field demonstration.

2.1.2 Before any epoxy product is acceptable for bid, it shall be field tested, evaluated, approved and assigned a product identification number by the Mn/DOT Materials Engineering Section. An approved product is placed on the APPROVED PRODUCTS LIST which is shown in Section 2.1.4.

2.1.3 No change in product identification, chemical composition as indicated by infrared spectrophotometry and/or chemical analysis, or changes in the application requirements will be allowed. Any such changes shall be submitted for further evaluation.

Mn/DOT EPOXY PAVEMENT MARKING MATERIAL
APPROVED PRODUCTS LIST

2.1.4

Fast Dry (Type I)

Manufacturer	Product	Appr Date
Polycarb Inc.	MARK 55.3	1998
Epoplex	LS 50	1998

Slow Dry (Type II)

Manufacturer	Product	Appr Date

Polycarb Inc.	MARK 55	1991
Epoplex	LS 60	1998

3.0 MATERIAL CLASSIFICATIONS

3.1 This specification provides for the classification of epoxy resin pavement marking systems by type.

3.1.1 Type I - A fast cure material suitable for line applications and, under ideal conditions , may not require coning.

3.1.2 Type II - A slow cure material suitable for all applications of pavement markings under controlled traffic conditions, i.e., coning is required and flagging may be as directed by the Engineer.

3.1.2 **Only Slow Dry Type II epoxy material shall be used for epoxy pavement markings** except when specified as otherwise in the Special Provisions.

4.0 EPOXY AND BEAD REQUIREMENTS

4.1 Epoxy Resin Material

4.1.1 The material shall be composed of epoxy resins and pigments only. No solvents are to be given off to the environment upon application to a pavement surface.

4.1.2 The composition shall be within the tolerance permitted for the product tested and approved by Mn/DOT. Type II material shall be completely free of TMPTA (Tri-Methyol Propane Tri-Acrylate) and other multi-functional monomers.

4.1.3 All materials shall be free of lead, cadmium, mercury, hexavalent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency.

4.1.4 Color -- The color of the white epoxy shall be a pure flat white, free of tints. The color of the yellow epoxy shall closely match Color Number 33538 of Federal Standard 595 and shall conform to the following CIE Chromaticity limits using illuminant "C":

x	0.470	0.485	0.520	0.480
y	0.440	0.460	0.450	0.420

Daylight Directional Reflectance (Y), white, minimum	83
Daylight Directional Reflectance (Y), yellow, minimum	50

Testing will be according to :

Daylight Directional Reflectance	ASTM D 2805
Color	ASTM D 2805

4.1.5 Adhesion Capabilities -- When the adhesion of the material to portland cement concrete (the concrete shall have a minimum of 2,070 kPa (300 psi.) tensile strength) is tested according to American Concrete Institute Committee 403 testing procedure, the failure of the system must take place in the concrete. The concrete shall be 32°C when the material is applied, after which the material shall be allowed to cure for 72 hours at 23±2°C.

4.1.6 Abrasion Resistance -- When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The wear index is the weight in milligrams that is abraded from the sample under the test conditions).

4.1.7 Hardness -- The Type D durometer hardness of the material shall be not less than 75 nor more than 90 when tested according to ASTM D2240 after the material has cured for 72 hours at 23 ±2°C.

4.1.8 Tensile Strength -- The tensile strength of the material, when tested according to ASTM D

638, shall not be less than 41,370 kPa (6,000 psi.) after 72 hours cure at 23±2°C.

4.1.9 Compressive Strength -- The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 82,700 kPa (12,000 psi.) after 72 hours cure at 23±2°C.

4.1.10 Shelf Life -- The individual components shall not require mixing prior to use when stored for a period of 12 months.

4.2 Glass Beads

4.2.1 Glass beads shall meet the requirements of AASHTO M247, Type I, and:

a. Coatings -- the beads shall be treated according to the manufacturers recommendations and meet the requirements of Section 4.4.2 of M247, and

b. Roundness-- the beads shall have a roundness of at least 80%.

4.2.2 For 380 µm (15 mil) applications, glass beads shall be applied at a rate of at least 3.0 kg/L (25 lb./gal.). **A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.**

4.3 Time to No-Track -- Type I material shall be in "no-tracking" condition in 15 minutes or less and within 45 minutes for Type II material. The "no-tracking" condition shall be determined on an application of specified thickness to the pavement and covered with glass beads at the rate of at least 3.0 kg/L (25 lb./gal.). The lines for this test shall be applied with striping equipment operated so as to have the material at manufacturer's recommended application temperature. This maximum "no-tracking" time shall not be exceeded when the pavement temperature varies from 10 to 49° C (50 to 120° F) and under all humidity conditions, providing the pavement is dry. The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck at a speed of 40 to 55 kmph (25 to 35 mph) in a simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 15 m (50 ft.) shall be considered as showing "no-tracking" and conforming to this requirement for time to "no-track."

5.0 APPLICATION EQUIPMENT AND PROCEDURES

5.1 Equipment

5.1.1 Equipment furnished shall include an applicator truck of adequate size and power, designed to apply an epoxy resin material and glass beads in a continuous or intermittent line pattern. The equipment shall be capable of placing stripes on the left and right sides. The left carriage shall be capable of placing two lines simultaneously with either line in a solid or intermittent pattern in yellow or white. With change in color usage, an amount of material equal to fifteen 3 m (10 ft.) stripes shall be wasted to eliminate the change of the incorrect color being applied.

5.1.2 The applicator truck (striper) and other vehicles in the striping train shall have permanently mounted Type C flashing arrowboards. They shall be visible to oncoming or following traffic, depending on the type of line being placed. Arrowboard requirements are detailed in the "Field Manual" of the *Minnesota Manual of Traffic Control Devices*. Also, truck equipment shall be capable of accumulating the footage applied per gun, individually each day. Only material application shall activate the footage accumulators. The readout shall be digital and not adjustable.

5.1.3 The equipment shall be capable of applying glass beads in a pressurized system at a rate of at least 3.0 kg/L (25 lb./gal.). **A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.**

5.1.4 All guns on the spray carriages shall be in full view of the operator(s) during operation.

5.1.5 Each crew shall include at least one technical expert knowledgeable in equipment operation, application techniques, control of traffic, and safety regulations.

5.2 Procedures

5.2.1 Pavement markings shall be placed in accordance with the details shown in the Plans and the control points established by the Engineer.

5.2.2 The road surface shall be cleaned at the direction of the Engineer just prior to an application. Pavement cleaning shall consist of at least brushing with a rotary broom (non-metallic), or as

recommended by the material manufacturer and acceptable to the Engineer. New Portland cement concrete surfaces shall be sandblasted clean to remove any surface treatments and/or laitance. On low speed [Speed Limit 65 km/h (40 mph) or less] urban portland cement concrete roadways, sandblast cleaning shall be used for all epoxy pavement markings.

5.2.3 If the roadway surface is dry, the epoxy material application shall immediately follow the pavement cleaning and be preceded by an air blast. However, markings shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface before the material can be applied.

5.2.4 The Engineer will place necessary spotting at appropriate points as overall horizontal control for striping and to indicate necessary starting and cutoff points. Broken line intervals will not be marked. Longitudinal joints, pavement edges, and existing markings shall serve as control points when so directed.

5.2.5 A 380 µm (15 mil) epoxy line requires a liter of mixed components for every 25.8 m (84.5 ft.) of 100 mm (4 in.) wide line. Field measurements are inserted into the following equation: Line Thickness in micrometers = Liters x 0.001 x 10^{-3} x m^3 divided by the quantity Length in meters x width in meters (Thickness in inches = Gallons x 231 cubic inches divided by the quantity Length (inches) x Width (inches)). Use 3.785 liters per gallon if epoxy is metered in gallons.

5.2.6 The minimum line width shall be its nominal width with 6 mm (¼ in.) greater than the nominal width allowed provided the variation is gradual and does not detract from the general appearance. Broken line segments, normally 2 m (6.56 ft.) every 10 m (32.81 ft.), may vary up to 75 mm (3 in.) from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the control guide shall not exceed , except when approved by the Engineer. Material shall not be applied over a longitudinal joint. Establishment of application tolerances shall not relieve the Contractor of his responsibility to comply as closely as practicable with the planned dimensions.

5.3 Spraying Operation

5.3.1 Placement of epoxy materials shall be permitted only on a clean, dry pavement surface and air and pavement temperatures at least 10° C (50° F) unless the manufacturer, in writing, approves a lower temperature.

5.3.2 Two parts of epoxy component A (pigment) and one part component B (hardener) shall be heated separately at 43° ± 1° C (110° ± 30° F) and thoroughly mixed. All material heated over 60° C (140° F) shall be discarded. The sprayed epoxy shall be applied at 43° ± 1° C (110° ± 30° F) **or as recommended by the manufacturer**.

5.3.3 Glass beads shall be applied immediately after the placement of the epoxy. If two bead gradations are required by the Special Provisions, two bead dispensers are required to deliver the specified drop rates. Otherwise the dispenser system must deliver at a minimum 3.0 kg (25 lb./gal.) of beads per liter of epoxy material. **A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.**

5.3.4 The Contractor shall cooperate with inspection personnel in reviewing operation of the equipment, safety precautions, measurement of materials (components and beads), computations to determine specific and daily application rates, sampling materials, making other measurements, such as epoxy thickness, and notifications as to work schedule.

5.3.5 **Only Type II epoxy material shall be used for epoxy pavement markings except when specified as otherwise in the Special Provisions.**

5.3.6 Traffic control for the pavement marking operations shall be in substantial conformance with the "Field Manual," *Minnesota Manual of Uniform Traffic Control Devices* . **A shadow vehicle with a truck-mounted attenuator shall be used on high speed [SPEED LIMIT (65 km/h) (40 mph) and greater], high volume (ADT 1500 and greater) highways.**

6.0 SAMPLING RATE & PROCEDURES

6.1 One pint samples of each manufacturer's lot or batch furnished for the contract shall be **submitted to Mn/DOT at the time of manufacturing.** One pint samples of both Part A (yellow/white) & part B must be submitted to the Mn/DOT Materials Laboratory, 1400 Gervais Ave., Maplewood, Minnesota 55109. (612) 779-5550 or 5549, FAX: (612) 779-5616. Samples shall be identified as follows:

1. Manufacturer's Name
2. Manufacturer's Product Number
3. Lot/Batch Number
4. Date Manufactured
5. Color
6. Intended state project numbers.

6.2 Contractors will not be allowed to use material that has not meet the requirements of Sections 6.1 & 7.0. Contractors will be asked to remove material that does not conform to Sections 6.1 & 7.0 and replace with material that does.

7.0 CERTIFICATIONS

7.1 The manufacturer shall certify that the components meet the requirements of these specifications and are on the Mn/DOT Approved Product List.

7.2 Certifications shall be sent along with the samples in section 6.1.

8.0 CONTAINER MARKINGS

8.1 Containers for epoxy components shall be marked with the manufacturer's name, product identification number, lot or batch number, date of manufacture, color, net weight of contents.

8.2 Containers for glass beads shall be marked with the name of manufacturer, the wording "Glass Beads," lot or batch number, coating type, date manufactured, and the net weight.

9.0 ACCEPTANCE OF PAVEMENT MARKINGS

In order to be a long-life pavement marking, epoxy markings placed in Minnesota must retain a satisfactory level of retroreflectivity in addition to demonstrating good adhesion, resisting chipping, and exhibiting proper daytime and nighttime colors. These attributes have been observed and evaluated for several years and are the basis for acceptance/rejection procedures and values used herein.

9.1 Retroreflectivity

9.1.1 Acceptable Minimum Retroreflectivity Values

MINIMUM AVERAGE RETROREFLECTIVITY VALUES
FOR EPOXY MARKINGS
($mcd/m^2/lux$)

Period	White	Yellow
Initial*	300	200
After-One-Winter*	175	140

* Described in Section 9.1.4 Miscellaneous Traffic Controls, Numbers 4 and 5.

9.1.2 Retroreflectometers-- Measurements shall be taken with either a portable or mobile retroreflectometer conforming to 30-meter geometry which is defined as: the entrance angle (the angle between the illumination axis and the retroreflector axis) shall fall between 88.50° and 88.76° and the observation angle (the angle between the illumination axis and the observation axis) shall fall between 1.0° and 1.05°; and, the co-viewing angle (the complement of the entrance angle) shall fall between 2.29° and 2.50°. All retroreflectivity

readings and data analysis will be provided by Mn/DOT at no cost to the Contractor. Mn/DOT reserves the right to:

- make daytime and/or nighttime visual inspections with or without the presence of the Contractor's representative, mainly to locate obvious or suspect areas of deficiency, and
- determine retroreflectivity of symbols, legends and lines wider than 200 mm (8 in.) using the portable retroreflectometer only.

9.1.3 Test Segments -- The following methodology will be used to evaluate retroreflectivity performance of in-service longitudinal line pavement markings:

LENGTH AND NUMBER OF TEST SEGMENTS[a] PER ROADWAY[b] PER LINE TYPE[c]

Length of Roadway	Number of Test Segments	Length of Test Segments
Less than 1.5 km (1 mi.)	1	300 m (0.2 mi.)
Greater than or equal to 1.5 km (1 mi.)	1 per 1.5 km (1 mi.)	300 m (0.2 mi.)

[a] TEST SEGMENTS-- Areas of a roadway chosen for measuring retroreflectivity of the line types.

[b] ROADWAY--As used here, means that portion of a street or highway ordinarily used for vehicular traffic. In the event a street or highway includes two or more separate roadways, the term roadway shall refer to each roadway separately.

[c] LINE TYPE-- Longitudinal lines of the same color and function. For example, white and yellow edge lines are each a line type.

9.1.4 Measurements in Test Segments

Portable Retroreflectometer

1. Take a minimum of 20 readings in each test segment per line type.
2. On broken lines (skip striping), measure every other stripe, taking no more than two readings per stripe with readings 0.5 m (20 in.) from the ends of the marking.
3. For solid lines, divide test segment into ten areas of 30 m (100 ft.); space readings a minimum of 10 m (33 ft.) and a maximum of 30 m (100 ft.) apart.
4. For 10 percent of each message type, take 5 readings on each message line; for 10 percent of each symbol type, take 5 readings on each symbol.
5. Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

Mobile Retroreflectometer

1. Calibration of the instruments shall be in accordance with the manufacturer's instructions.
2. Retroreflectivity shall be measured at a minimum rate of 20 percent of each roadway length by line type.
3. Should another mobile unit be available, the maximum acceptable deviation for measurements made by the two different instruments of the same manufacturer and for the same roadway length shall be ± 10%.
4. Repeatability for the given mobile unit shall be ± 6%.
5. Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

Miscellaneous Controls

1. Take measurements on a clean, dry roadway.
2. Collect data in direction of traffic flow.
3. Measurement units are: mcd/m^2/lux.
4. Wait at least two (2) weeks from date of placement of the markings before taking initial readings.
5. Take after-one-winter readings in May or June to assure that spring rains have cleaned the beads.
6. Randomly select test segments unless night reviews or other knowledge supersedes a random selection process.
7. Measure each line type separately.
8. The Engineer may request additional readings or test segments.
9. In the event LASERLUX is not available, the Engineer may require the use of the portable retroreflectometer or establish an alternative evaluation plan.

9.1.5 Contents of Retroreflectivity Report

The report shall consist of:

- State Project number
- Trunk Highway number
- Test date
- Geographical location of the test site(s), including distance from the nearest permanent site identification, such as a reference point.
- Identification of the pavement marking material tested: type, color, age, and transverse location on the road
- Identification of the retroreflectometer
- Remarks concerning the overall condition of the line, messages and symbols such as carryover of asphalt, snow plow damage, uneven distribution of beads, etc.
- Average of the readings for each test segment with one standard deviation calculated.
- Average of the readings for each message and symbol type.

9.2 Correction of Defects/Penalties

1. All pavement markings not conforming to the requirements of the Contract shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer. Removal of unacceptable work shall be accomplished with suitable blasting or grinding equipment unless other means are authorized by the Engineer.
2. Where yield computations show a deficiency in material usage of not more than 20 percent, Mn/DOT may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in material usage exceeds 20%, Mn/DOT may require removal and replacement to the satisfaction of the Engineer unless other means are approved by the Engineer.
3. If the Engineer requires removal and replacement, the contractor shall remove (by an approved process) at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width shall be one inch wider all around the nominal width of the pavement marking to be removed.
4. Where initial retroreflectivity falls below the minimum acceptable levels but not more than 20%, the Engineer may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in retroreflectivity exceeds 20%, i.e., less than 240 mcd/m^2/lux for white and 160 mcd/m^2/lux for yellow, the Engineer may require the removal and replacement to the satisfaction of the Engineer unless other means are approved by the Engineer. Where minimum levels after one winter fall below the specified levels

(170 mcd/m^2/lux - 135 mcd/m^2/lux), Mn/DOT will notify the project contractor and manufacturer(s) of the failure. If the initial readings were above Mn/DOT's specified initial minimum levels (300 mcd/m^2/lux - 200 mcd/m^2/lux), the Engineer, contractor, and manufacturer(s) of the material(s) shall review the project together. Based on the review an of all known aspects, the Engineer will make a determination as to why the job failed and notify the Contractor, pavement marking contractor, and/or manufacturer(s) in writing.

5. If this process has to be repeated on several projects with either the same contractor and/or manufacturer(s), Mn/DOT will take corrective action. This corrective action will be a two step process:

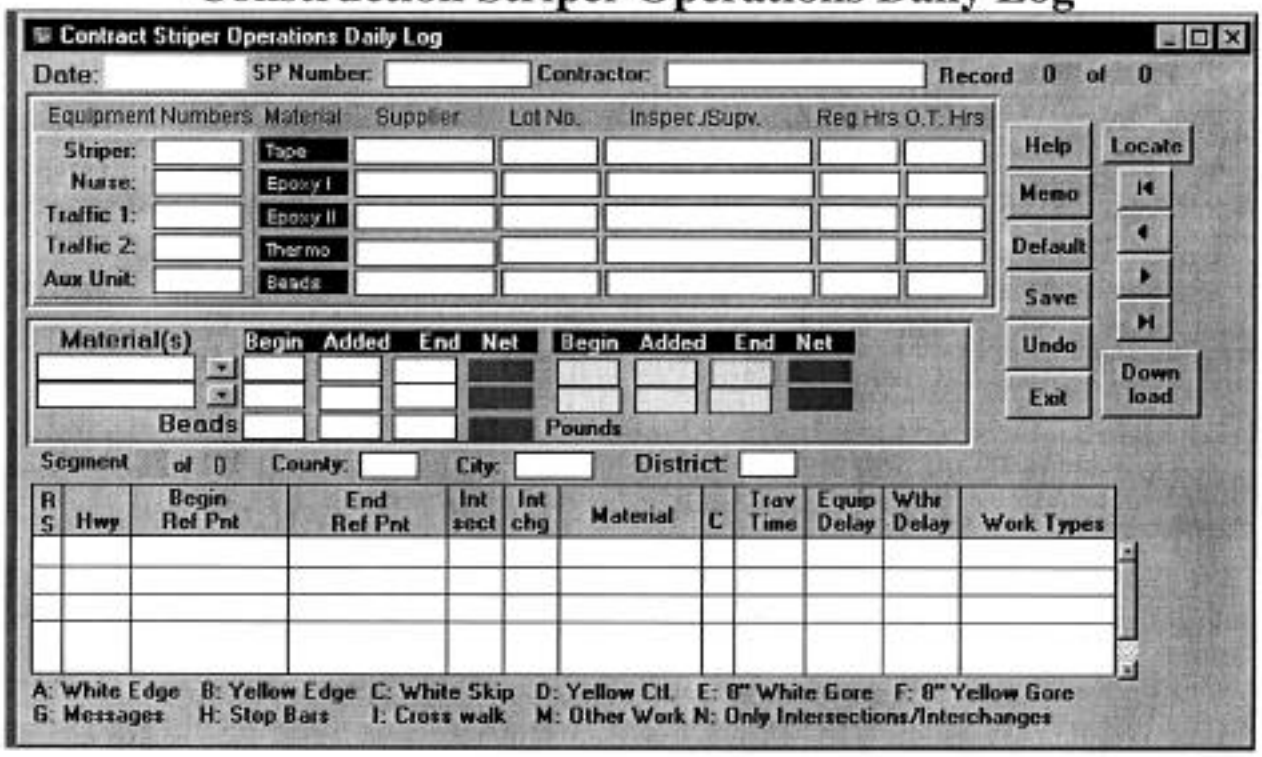
   Step 1 Pavement marking contractor/manufacturer(s) will be considered not approved for Mn/DOT projects, except to bring workmanship/product back into compliance.

   Step 2 If the first step cannot be attained, pavement marking contractor/ manufacturer(s) will not be allowed to participate in Mn/DOT projects and/or be removed from Approved Product List.

10.0 DOCUMENTATION

Contractors applying epoxy pavement markings for Mn/DOT under a contract **are required** to fill out the attached "Construction Striper Operations Daily Log" form. These forms shall be completed at the end of each project and faxed to the "Reflective Systems Unit" at (612) 797-3181 Attn: Jim Carlson. **Failure to submit completed forms may result in 10% of the overall contract price for epoxy pavement markings held back.** Also, if forms are not sent in to the reflective systems unit in a timely manner projects will not be inspected during optimum times for meeting their performance criteria. Any questions regarding this form can be answered by calling the Reflective Systems Unit at (612) 797-3183.

Construction Striper Operations Daily Log



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SECTION 02770

CONCRETE SIDEWALKS, CURBS AND GUTTERS
01/02

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182	(1991) Burlap Cloth Made from Jute or Kenaf

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 615	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 616	(1996a) Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 617	(1996a) Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM C 31	(1998) Making and Curing Concrete Test Specimens in the Field
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(1997) Sampling Freshly Mixed Concrete
ASTM C 173	(1996) Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 920	(1998) Elastomeric Joint Sealants

ASTM D 1751	(1983; R 1991) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 3405	(1996) Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements

1995 MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (MNDOT STANDARD SPECIFICATIONS)

MNDOT 2461	Structural Concrete
MNDOT 2521	Walks
MNDOT 2531	Concrete Curbing

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Schedules

Concrete placement schedule; FIO

Provide schedule at least 7 days prior to start of placement.

SD-09 Reports

Concrete Mixture Proportions; GA.

At least ten days prior to placement of concrete, the Contractor shall submit the mixture proportions that meet requirements specified in the MNDOT Standard specifications and that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions meet requirements specified in the MNDOT Standard specifications and will produce concrete of the quality specified.

Testing; FIO.

Copies of all test reports within 24 hours of completion of the test.

SD-18 Records

Concrete; FIO.

Copies of certified delivery tickets for all concrete used in the

construction.

1.3 WEATHER LIMITATIONS

1.3.1 Placing During Cold Weather

Concrete placement shall not take place when the air temperature reaches 40 degrees F and is falling, or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Provisions shall be made to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection shall be approved in writing. Approval will be contingent upon full conformance with the following provisions. The underlying material shall be prepared and protected so that it is entirely free of frost when the concrete is deposited. Mixing water and aggregates shall be heated as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating shall be approved. The aggregates shall be free of ice, snow, and frozen lumps before entering the mixer. Covering and other means shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.3.2 Placing During Warm Weather

The temperature of the concrete as placed 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. The placing temperature shall not exceed 95 degrees F at any time.

1.4 PLANT, EQUIPMENT, MACHINES, AND TOOLS

1.4.1 General Requirements

Plant, equipment, machines, and tools used in the work shall be subject to approval and shall be maintained in a satisfactory working condition at all times. The equipment shall have the capability of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Use of the equipment shall be discontinued if it produces unsatisfactory results. The Contracting Officer shall have access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

1.4.2 Slip Form Equipment

Slip form paver or curb forming machine, will be approved based on trial use on the job and shall be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in 1 pass.

PART 2 PRODUCTS

2.1 CONCRETE

Concrete shall conform to the applicable requirements of MNDOT 2461, MNDOT 2521, and MNDOT 2531 except as otherwise specified.

2.1.1 Air Content

Mixtures shall have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.2 Slump

The concrete slump shall be as required by MNDOT 2521 for sidewalks and MNDOT 2531 for curb and gutter as applicable to the method of placement.

2.1.3 Reinforcement Steel

Reinforcement bars shall conform to ASTM A 615, ASTM A 616, or ASTM A 617. Wire mesh reinforcement shall conform to ASTM A 185.

2.2 CONCRETE CURING MATERIALS

2.2.1 Impervious Sheet Materials

Impervious sheet materials shall conform to ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

2.2.2 Burlap

Burlap shall conform to AASHTO M 182 for Class 3.

2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C 309, Type 2, Class B.

2.3 CONCRETE PROTECTION MATERIALS

Concrete protection materials shall be a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

2.4 JOINT FILLER STRIPS

2.4.1 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D 1751 or ASTM D 1752, 1/2 inch thick, unless otherwise indicated.

2.5 JOINT SEALANTS

2.5.1 Joint Sealant, Cold-Applied

Joint sealant, cold-applied shall conform to ASTM C 920.

2.5.2 Joint Sealant, Hot-Poured

Joint sealant, hot-poured shall conform to ASTM D 3405.

2.6 FORM WORK

Form work shall be designed and constructed to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Wood forms shall have a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning. Steel forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Steel forms shall have a nominal length of 10 feet with a minimum of 3 welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

2.6.1 Sidewalk Forms

Sidewalk forms shall be of a height equal to the full depth of the finished sidewalk.

2.6.2 Curb and Gutter Forms

Curb and gutter outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter as indicated and shall be securely fastened to and supported by the outside form. Rigid forms shall be provided for curb returns, except that benders or thin plank forms may be used for curb or curb returns with a radius of 10 feet or more, where grade changes occur in the return, or where the central angle is such that a rigid form with a central angle of 90 degrees cannot be used. Back forms for curb returns may be made of 1-1/2 inch benders, for the full height of the curb, cleated together. In lieu of inside forms for curbs, a curb "mule" may be used for forming and finishing this surface, provided the results are approved.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

The subgrade shall be constructed to the specified grade and cross section prior to concrete placement. Subgrade shall be placed and compacted in conformance with SECTION 02722: AGGREGATE BASE OR SURFACE COURSE.

3.1.1 Sidewalk Subgrade

The subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

3.1.2 Curb and Gutter Subgrade

The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.3 Maintenance of Subgrade

The subgrade shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited.

3.2 FORM SETTING

Forms shall be set to the indicated alignment, grade and dimensions. Forms shall be held rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.2.1 Sidewalks

Forms for sidewalks shall be set with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment shall be checked with a 10 foot straightedge. Forms shall have a transverse slope as indicated with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after finishing has been completed.

3.2.2 Curbs and Gutters

The forms of the front of the curb shall be removed not less than 2 hours nor more than 6 hours after the concrete has been placed. Forms back of curb shall remain in place until the face and top of the curb have been finished, as specified for concrete finishing. Gutter forms shall not be removed while the concrete is sufficiently plastic to slump in any direction.

3.3 SIDEWALK CONCRETE PLACEMENT AND FINISHING

3.3.1 Formed Sidewalks

Concrete shall be placed in the forms in one layer. When consolidated and finished, the sidewalks shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated with an approved vibrator, and the surface shall be finished to grade with a strike off.

3.3.2 Concrete Finishing

After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, the surface shall be finished with a wood float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

3.3.3 Edge and Joint Finishing

All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8 inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

3.3.4 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 5/16 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.4 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

3.4.1 Formed Curb and Gutter

Concrete shall be placed to the section required in a single lift. Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall be finished with a standard curb "mule".

3.4.2 Curb and Gutter Finishing

Approved slipformed curb and gutter machines may be used in lieu of hand placement.

3.4.3 Concrete Finishing

Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with a fine-hair brush with longitudinal strokes.

The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float.

3.4.4 Joint Finishing

Curb edges at formed joints shall be finished as indicated.

3.4.5 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.5 SIDEWALK JOINTS

Sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width. Transverse expansion joints shall be installed every 50 feet or less and at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, transverse expansion joints shall be installed as indicated. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated.

3.5.1 Sidewalk Contraction Joints

The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-third of the sidewalk slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

3.5.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 1/2 inch joint filler strips for the full depth of the sidewalk. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period,

expansion joints shall be cleaned and filled with joint sealant where adjacent to structures. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and atmospheric and concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

3.5.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

3.6 CURB AND GUTTER JOINTS

Curb and gutter joints shall be constructed at right angles to the line of curb and gutter.

3.6.1 Contraction Joints

Contraction joints shall be constructed directly opposite contraction joints in abutting portland cement concrete pavements and spaced so that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length.

3.6.2 Expansion Joints

Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter full depth. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement or other in place fixed objects, and shall be of the same type and thickness as joints in the pavement. Where curb and gutter do not abut portland cement concrete pavement, expansion joints at least 1/2 inch in width shall be provided.

3.7 CURING AND PROTECTION

3.7.1 General Requirements

Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Unhardened concrete shall be protected from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

3.7.1.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall

be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.7.1.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3.7.1.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet per gallon for the total of both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed before the concrete in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for curing concrete pavement shall be provided at a location accessible to the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from any other possible damage to the continuity of the membrane.

3.7.2 Backfilling

After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

3.7.3 Protection

Completed concrete shall be protected from damage until accepted. The Contractor shall repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

3.7.4 Protective Coating

Protective coating of linseed oil mixture shall be applied to the exposed-to-view concrete surface to protect concrete placed during cold weather.

3.7.4.1 Application

Curing and backfilling operation shall be completed prior to applying two coats of protective coating. Concrete shall be surface dry and clean before each application. Coverage shall be by spray application at not more than 50 square yards per gallon for first application and not more than 70 square yards per gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture shall be in accordance with the manufacturer's instructions. Coated surfaces shall be protected from vehicular and pedestrian traffic until dry.

3.7.4.2 Precautions

Protective coating shall not be heated by direct application of flame or electrical heaters and shall be protected from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Material shall not be applied at ambient or material temperatures lower than 50 degrees F.

3.8 FIELD QUALITY CONTROL

3.8.1 General Requirements

The Contractor shall perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, the Contractor shall take the action and submit reports as required below, and any additional tests to insure that the requirements of these specifications are met.

3.8.2 Concrete Testing

3.8.2.1 Strength Testing

The Contractor shall provide molded concrete specimens for strength tests. Samples of concrete placed each day shall be taken not less than once a day nor less than once for every 50 cubic yards of concrete. The samples for strength tests shall be taken in accordance with ASTM C 172. Cylinders for acceptance shall be molded in conformance with ASTM C 31 by an approved testing laboratory. Each strength test result shall be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

3.8.2.2 Air Content

Air content shall be determined in accordance with ASTM C 173 or ASTM C 231. ASTM C 231 shall be used with concretes and mortars made with relatively dense natural aggregates. Two tests for air content shall be made on randomly selected batches of each class of concrete placed during each shift. Additional tests shall be made when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. If results are out of tolerance, the placing foreman shall be notified and he shall take appropriate action to have the air content corrected at the plant. Additional tests for air content will be performed on each truckload of material until such time as the air content is within the tolerance specified.

3.8.2.3 Slump Test

Two slump tests shall be made on randomly selected batches of each class of concrete for every 50 cubic yards, or fraction thereof, of concrete placed during each shift. Additional tests shall be performed when excessive variation in the workability of the concrete is noted or when excessive crumbling or slumping is noted along the edges of slip-formed concrete.

3.8.3 Thickness Evaluation

The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine. If a slip form paver is used for sidewalk placement, the subgrade shall be true to grade prior to concrete placement and the thickness will be determined by measuring each edge of the completed slab.

3.8.4 Surface Evaluation

The finished surface of each category of the completed work shall be uniform in color and free of blemishes and form or tool marks.

3.9 SURFACE DEFICIENCIES AND CORRECTIONS

3.9.1 Thickness Deficiency

When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

3.9.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch. Areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

3.9.3 Appearance

Exposed surfaces of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

-- End of Section --

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01/02

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SECTION 02832

SEGMENTAL CONCRETE BLOCK RETAINING WALL
01/02

PART 1 GENERAL

1.1 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.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 252	(1996) Corrugated Polyethylene Drainage Tubing

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 140	(1997) Sampling and Testing Concrete Masonry Units
ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM C 1262	(1997) Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units
ASTM C 1372	(1997) Segmental Retaining Wall Units
ASTM D 448	(1986; R 1993) Sizes of Aggregate for Road and Bridge Construction
ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft.)
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(1993) Description and Identification of Soils (Visual-Manual Procedure)

ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1999) Water Permeability of Geotextiles by Permittivity
ASTM D 4595	(1986; R 1994) Tensile Properties of Geotextiles by the Wide-Width Strip Method
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls
ASTM D 5321	(1992) Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method

GEOSYNTHETIC INSTITUTE (GSI)

GSI GRI GG1	(1988) Geogrid Rib Tensile Strength
GSI GRI GG5	(1991) Geogrid Pullout
GSI GRI GG6	(1992) Grip Types for Use in the Wide Width Testing of Geotextiles and Geogrids
GSI GRI GT6	(1992) Geotextile Pullout

NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)

NCMA SRWU-1	(1997) Determination of Connection Strength between Geosynthetics and Segmental Concrete Units
NCMA SRWU-2	(1997) Determination of Shear Strength between Segmental Concrete Units
NCMA SRW Manual	(1997) Design Manual for Segmental Retaining Walls, 2nd Edition

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 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 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Manufacturer's Data.FIO

The Contractor shall submit descriptive technical data on the blocks, wall caps, masonry adhesive, reinforcement and geotextile filter materials. The submittal shall include all material properties specified under paragraph PRODUCTS. The submittal shall also include a copy of any standard manufacturer's warranties for the products.

Test Data. FIO

The Contractor shall submit testing data specific to the blocks and

reinforcement to be supplied.

a. The shear strength between blocks shall be established in accordance with NCMA SRWU-2.

b. The connection strength between the blocks and the reinforcement shall be established in accordance with NCMA SRWU-1.

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 GG5 or GSI GRI GT6.

Calculations; FIO.

The Contractor shall submit a calculation 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 or the single rib test in GSI GRI GG1. The calculation shall itemize each reduction factor and include backup data to justify each reduction factor.

The Contractor shall submit calculations demonstrating the connection strength requirements are met at each reinforcement level for the proposed blocks and geogrid for each wall.

The Contractor shall submit calculations demonstrating block to block shear is met for each wall.

SD-04 Drawings

Shop Drawings; GA.

The fabrication and installation drawings shall be submitted. The shop drawings shall include all items described under paragraph SEGMENTAL RETAINING WALL DESIGN.If approved by the Contracting Officer, shop drawings may consist of marked up contract drawings showing exact dimensions for the blocks supplied, required coping, and other minor revisions.

SD-08 Statements

Qualifications. FIO

The Contractor shall provide documentation, including referenced, showing that the installer and supplier meet the qualifications listed.

SD-13 Certificates

Certificate of Compliance; FIO.

The Contractor shall submit an 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 prior to 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 either ASTM D 4595 or GSI GRI GG1.

SD-14 Samples

Segmental Concrete Units; FIO.

The Contractor shall submit two samples of each proposed block. Each sample shall be typical of the size, texture, color, and finish.

Reinforcement. FIO

The Contractor shall submit 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. Samples shall identify the primary strength direction.

1.4 CONTRACTOR QUALIFICATIONS

The job foreman or the company directly responsible for the wall installation shall have completed a minimum of 3 segmental concrete retaining wall projects similar in design and have at least 2 years experience.

1.5 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.

1.6 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 at least once during construction.

1.7 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.

1.7.1 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.

1.7.2 Geosynthetic Labeling

Each roll shall be labeled with the manufacturer's name, product identification, roll dimensions, lot number, and date manufactured.

1.7.3 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.

1.7.4 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 - Tan, Brown, or Natural Limestone.

b. Face Texture - split face typical of broken mortar.

c. Face Appearance - straight or single-surface face or 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.

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 of 5 percent for a 24 hour period.

c. The minimum oven dry density of concrete shall be 125 pcf.

d. The blocks shall provide a minimum of 80 pounds per square foot 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) when tested in a 3 percent saline solution: (1) the weight loss of each of 5 specimens after 40 cycles shall not exceed 1 percent; or (2) the weight loss of 4 out of 5 specimens after 50 cycles shall not exceed 1.5 percent.

f. The shear strength between blocks determined in accordance with NCMA SRWU-2 shall have shear strength exceeding the following minimum requirements:

Minimum Service State Shear Capacity = 100 lbs/ft
Friction Angle for Service State Shear Capacity = 30 degrees
Service State Connection Strength = 546 lbs/ft
Maximum At Normal Load of 787 lbs/ft

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. Cap blocks shall be sampled and tested for compressive strength, absorption, and freeze thaw at the same frequency required for the block units.

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 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.
The reinforcement shown on the contract drawings shall meet the property requirements listed in Table 1. Reinforcement strength requirements represent minimum average roll values in the machine direction.
The reinforcement shown on the contract drawings shall meet the property requirements listed in Table 1. Additional reinforcement shown in the approved shop drawing submittal shall meet the long term design strength requirements used in the design and shall meet other 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
Long Term Design Strength	[1,110] lb	NCMA SRW Manual, Method A
UV Resistance	70 percent after 500 hours	ASTM D 4355
Coefficient of Interaction for Pullout	[0.7]	GSI GRI GG5 or GSI GRI GT6
Coefficient for Direct Shear	[0.95]	ASTM D 5321

2.2.2.1 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. Submit the calculation of the long term design strength for the proposed geogrid along with data supporting the reduction factors used.

2.2.2.2 Connection Strength

The connection strength between the blocks and reinforcement determined in accordance with NCMA SRWU-1 shall have connection strength exceeding the following minimum requirements

Minimum Service State Connection Strength = 350 lbs/ft
Friction Angle for Service State Connection Strength = 30 degrees
Maximum service State Connection Strength = 1,200 lb/ft at a normal load of 1,450 lbs/ft.

Submit calculations for each wall demonstrating the selected geogrid and block unit exceed the connection strength envelope plotted using the minimum shown above at each geogrid level.

2.3 GEOTEXTILE

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. Geotextile filters used for retaining walls shall meet the requirements of MNDOT 3733 Type 1.

Geotextiles used for base reinforcements on retaining walls shall meet the minimum physical properties listed in Table 3 and conform to MNDOT 3733 Type VI Geotextile.

TABLE 2. GEOTEXTILE FILTER PHYSICAL PROPERTIES

PROPERTY	TEST REQUIREMENT	TEST METHOD
Grab Tensile, lbs.	100	ASTM D 4632
Apparent Opening Size (U.S. Sieve)	40 - 100	ASTM D 4751
Permittivity, sec-1	0.7	ASTM D 4491

TABLE 3. GEOTEXTILE TYPE VI - PHYSICAL PROPERTIES

PROPERTY	TEST REQUIREMENTS	TEST METHOD
Grab Tensile, lbs	300	ASTM D 4632
Grab Tensile Elongation, max. %	15	ASTM D 4632
Wide Width Tensile, lbs/ft	2400	ASTM D 4595
Wide Width Elongation, max. %	15	ASTM D 4595
Puncture, lbs	120	ASTM D 4833

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 Section 2722 AGGREGATE BASE OR SURFACE COURSE..

c. Select Granular Fill. Soil placed in the reinforced fill zone shall consist of select granular fill meeting the requirements listed in Section 02300 EARTHWORK.

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 and the top two course of blocks, unless otherwise shown 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 as shown. 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 within 3 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 01451, 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, not less than 3 tests total.

In-Place Densities (ASTM D 1556 or ASTM D 2922)

Not less than 1 test for each 2 vertical feet per 300 linear feet along wall face.

Sieve Analysis, (ASTM C 136)

(1) Drainage Aggregate, 1 test for each source.

3.9 REINFORCEMENT TESTING

All testing expenses shall be the Contractor's responsibility. Testing shall be performed by a commercial testing laboratory selected by the Contractor and approved by the Contracting Officer or performed by the Contractor if approved by the Contracting Officer. The Contracting Officer reserves the right to direct the location and select the material for samples.

TABLE 4. REINFORCEMENT TESTING

PROPERTY	TEST DESIGNATION	FREQUENCY
Wide Width Strip Tensile Strength	ASTM D 4595	1 test

ASTM D 4595 shall be modified for geogrids considering recommendations in GSI GRI GG6; and the tensile strength shall be expressed on a unit length basis by substituting n*a for Ws, where:

Ws = specimen width, (inches)
n = number of ribs in the sample (must be a whole number)
a = nominal rib spacing for the product tested, (inches)

3.10 SEGMENTAL CONCRETE UNIT TESTING

Compressive Strength (ASTM C 140) 3 Tests for each block units and, 3 Tests for cap units.

Moisture Absorption (ASTM C 140) 1 Test for block units and 1 Test for cap units.

Freeze - thaw Durability (ASTM C 1262) 1 Test for block units and 1 Test for cap units.

3.11 DRAINAGE PIPE

Drain pipe shall be placed as indicated on the drawings. Drain lines shall be laid to true grades and alignment with a continuous fall in the direction of flow. The interior of the pipe shall be kept clean from soil and debris; and open ends shall be temporarily capped as necessary.

3.12 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.

3.13 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.

-- End of Section --

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SECTION 02920

SEEDING, SODDING, AND TOPSOIL
01/02

PART 1 GENERAL

Wherever possible, all seed shall be drilled. Other seeding methods are subject to approval. 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 following the requirements in this section, at no additional cost to the Government.

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.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01	(Aug 95) Federal Seed Act Regulations Part 201

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes

AMERICAN SOD PRODUCERS ASSOCIATION, INC. (ASPA)

ASPA	(1988) Guideline Specifications to Sodding

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), 2000 Edition with Supplements

MNDOT 2575	Turf Establishment
MNDOT 60B	Turf Seed
MNDOT 30B	Urban Prairie Seed
MNDOT 25B	Moist Prairie Seed

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION: 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Manufacturer's Literature; FIO.

The Contractor shall submit manufacturer's literature discussing physical characteristics, applications, guarantees, and installation of the seed, mulch, and fertilizer. The Contractor shall submit manufacturer's literature for equipment showing application and installation instructions.

SD-08 Statements

Experience for Native Grasses; FIO.

The Contractor shall submit a statement indicating that the work to establish the turf will be supervised by an individual with a minimum of 5 years experience with establishment and restoration of native plant communities.

SD-09 Reports

Soil Test; FIO.

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

Seed Test; FIO.

The Contractor shall submit test reports for a purity and germination test following the Association of Official Seed Analysts (AOSA) rules for each seed mixture. The test reports shall indicate the purity percentage, germination percentage, and amount of Pure Live Seed (PLS) per bag for each species.

Water Test; FIO

Water from sources other than municipal water supply shall be tested for salinity and pH.

SD-13 Certificates

Certificates of Compliance; FIO.

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Seed. Mixture percentage, percent pure live seed, percent germination, weed seed content, and date tested.
b. Topsoil. Gradation, pH, organic matter content, textural class, soluble salts.
d. Fertilizer. Chemical analysis and composition percent.

e. Organic Material: Composition and source.
g. Mulch: Composition and source.

SD-14 Samples

Samples; FIO

Samples shall be provided for the following:

a. A 5 pound sample for each source of topsoil brought from off-site.
b. A 2 pound sample for each type of soil amendment proposed for use.
c. A 2 pound sample for each type of mulch proposed for use.

SD-18 Records

Quantity Check; FIO

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

Maintenance Record; FIO

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Seed Order for Native Grasses; FIO

Contractor shall submit proof of seed order for native grass seed mixes as specified within this section within 30 days of notice to proceed.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed materials shall be delivered in manufacturer's original, unopened containers with labels and tags intact and legible. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.2 Storage

Materials shall be stored on-site in areas provided by the Contractor. The

storage areas shall be made accessible to the Contracting Officer so that application rates can be verified. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall be stored according to manufacturer's instructions and not with seed.

1.4.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.4 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

PART 2 PRODUCTS

2.1 SEED

Substitutions will not be allowed without written request and approval from the Contracting Officer. The mixing of seed may be done by the seed supplier prior to delivery, or on site in the presence of the Contracting Officer. Seed for native grass and forbe species shall be gathered from within 500 miles of the jobsite.

2.1.1 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 and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures specified in MNDOT 2575 shall be provided as follows:

1) Class 1, MNDOT 60B Turf Seed

2) Class 2, MNDOT 30B, Urban Prairie Seed

3) Class 3, MNDOT 25B Moist Prairie Seed

2.1.3 Quality

Weed seed shall be a maximum 1/2 of 1 percent by weight of the total mixture. Innoculent shall consist of the proper bacteria applied in the amount and manner recommended by the manufacturer to all legumes in the seed mix.

2.2 SOD

Sod shall be nursery grown as classified in the ASPA Guideline Specifications to Sodding. Sod shall be 100% mineral sod. Sod grown in peat soils will not be accepted. Sod shall consist of at least 75% Kentucky Blue Grass (Poa pratensis). Acceptable varieties include park, newport, glade, nugget, touch down, rugby, and parade.

2.2.1 Quality

Sod shall be machine cut at a uniform soil thickness of 5/8 inch, plus or minus 1/4 inch, at the time of cutting. Measurement of thickness shall exclude top growth and thatch. Standard size sections of sod shall be strong enough that when grasped at one end, can be picked up and handled without damage. Sod shall not be harvested or transplanted when moisture content, either excessively dry or wet, may adversely affect its survival. Broken pads and pads with torn or uneven ends will not be accepted. The pieces of sod shall not vary more than 1/2 inch in width.

2.2.2 Harvesting

Before harvesting, the turf shall be mowed uniformly at a height of 1 to 1-1/2 inches. Sod shall be harvested, delivered and transplanted within a period of 36 hours. Sod not transplanted within this time period shall not be installed without the inspection and approval of the Contracting Officer.

2.2.3 Delivery

Sod Pallets shall be sprinkled with water and covered with moist burlap, straw, or other approved covering and protected from exposure to wind and direct sunlight. Covering shall be such that air can circulate and heating will not develop.

2.3 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.4 SOIL AMENDMENTS

Soil amendments required under this contract consist of fertilizer.

2.4.1 Fertilizer

The nutrients ratio shall be 20 percent nitrogen, 20 percent phosphorus, and 20 percent potassium. Fertilizer shall be controlled release commercial grade, free flowing, and uniform in composition.

2.5 MULCH

2.5.1 Straw Mulch

Straw mulch materials shall consist of wheat, oat, or rye straw, hay, grass, or other plants approved by the Contracting Officer. Mulch materials shall be native to the region. 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.

2.6 WATER

Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

PART 3 EXECUTION

3.1 TURF PLANTING LOCATIONS, TIMES, AND CONDITIONS

3.1.1 Notification

The Contractor shall notify the Contracting Officer 24 hours in advance of beginning seeding, sodding, or any changes in turf establishment operations.

3.1.2 Seed Locations

Seed shall be planted in locations indicated on the drawings

3.1.3 Rates of Seeding

Seed shall be applied at the rates listed below:

Seed Rates

Seed Mixture	Application Rate (pounds per acre)
Class 1 MNDOT 60B	100
Class 2 MNDOT 30B	60
Class 3 MNDOT 25B	30

3.1.4 Seeding Time

Seed shall be planted within the dates specified below. No finished construction area shall be left untopsoiled and unseeded during the winter months. When substantially complete areas are not seeded within the specified seeding times for fall planting, a temporary winter cover shall be placed. Temporary winter cover shall be oats. Rate of seeding for oats as winter cover shall be 80 pounds per acre.

Seeding Time

Seed Mixture	Spring	Fall
Class 1 MNDOT 60B	April 1 to June 1	July 20 to Sept.20
Class 2 MNDOT 30B	April 15 to July 20	Sept. 20 to Oct. 20
Class 3 MNDOT 25B	April 15 to July 20	Sept. 20 to Oct. 20

3.1.5 Sod Locations

Sod shall be placed in locations indicated and on any disturbed areas outside of the limits of work.

3.1.6 Planting Conditions

Seeding and sodding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding and sodding operations, proposed alternate times shall be submitted for approval.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed prior to the commencement of the seeding operation. All vegetation, including live roots, shall be completely removed or treated with herbicide prior to spreading topsoil or placing sod.

3.2.2 Spreading Topsoil

Topsoil shall be distributed and spread uniformly to one half the thickness shown on the plans and tilled to a depth of 2 inches into the subgrade. The remaining half of the topsoil shall then be placed. Surface irregularities resulting from topsoiling or other operations shall be leveled to prevent depressions.

3.2.2.1 Equipment

Topsoil shall be spread using a bladed dozer having ground pressure less than 4.5 psi and operating weight less than 35,000 pounds, or with rubber tired equipment having operating weight less than 10,000 pounds. The work shall be coordinated such that equipment for hauling the topsoil does not travel over the topsoil in place. Areas compacted by construction operations shall be completely pulverized by tillage.

3.2.2.2 Stripped Materials.

Topsoil obtained from stripping operations shall be kept separate from

other unusable excavated materials, brush, litter, objectionable weeds, roots, stones, and other materials that would interfere with planting and maintenance operations. Unusable material shall be removed and properly disposed of.

3.2.3 Tillage

Topsoil on slopes up to a maximum 3H:1V slope shall be tilled to a nominal 3 inch depth by plowing, disking, harrowing, rototilling or other approved method. On slopes between 3H:1V and 1:1, the soil shall be tilled to a minimum 2 inch depth by scarifying with heavy rakes, or other method.

3.2.4 Prepared Surface

The prepared surface shall be 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris. Debris and stones over a minimum 1-1/2 inches in any dimension shall be removed from the surface. Drainage patterns shall be maintained as indicated on drawings. Tolerance for prepared surfaces shall be within 1 inch of the plan elevation. The prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 SEEDING

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Equipment

Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved.

3.3.2 Broadcast Seeding

In areas inaccessible to drill seeding, seed shall be broadcast by hand. Seed shall be uniformly broadcast at the rate specified for the mix. Half the total rate of seed application 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 a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device. Seed shall not be broadcast when wind speed exceeds 5 miles per hour.

3.3.3 Drill Seeding

Seed shall be uniformly drilled to a depth of 1/2 to 3/4 inches at the rate specified for the mix. Equipment shall have drills a maximum 6 inches distance apart. Row markers shall be used with the drill seeder. Seed shall be drilled in two directions, applying approximately half the seed in each direction. The drilling equipment shall be maintained with half full seed boxes during the seeding operations. 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 Hydroseeding (Optional)

The hydroseeding operation shall apply the seed, mulch, and fertilizer simultaneously. The seed shall be applied at the rate indicated in the Seed Mixture Table. The fertilizer shall be applied at a rate proposed by the Contractor and agreed to by the Contracting Officer. The mulch shall be applied at a rate of about 1 ton per acre. During application, the spray shall be directed to obtain a uniform material distribution as evidenced by a formation of a "blotter-like" cover, with about 5% void area. The mulch shall permit percolation of water to the underlying soil. The seed mixed with water and fertilizer shall be applied within 1 hour after adding to the tank.

3.3.5 Mulching

3.3.5.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre, except as modified for native grasses. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.3.5.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.6 Initial Watering

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 3 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed by Contracting Officer.

3.3.7 Native Grasses

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Areas seeded with native grasses, except slopes steeper than 3H:1V, shall be firmed with a roller not exceeding 90 pounds per foot roller width. Seed drills equipped with rollers are acceptable.

3.4 SODDING

3.4.1 Placement

Sod shall be carefully placed with the first row laid in a straight line and subsequent rows placed parallel to and abutted tightly against each other. Sod shall be placed with staggered end joints and without stretching or overlapping. On slope areas sodding shall be started at the bottom of the slope. On 1V:3H or steeper slopes, sod shall be laid across the angle of the slope and secured by tamping, pegging or other approved methods of temporarily securing each piece. In areas where concentrated flow of water is expected, sod shall be laid at right angles to the flow. After the sodding operation has been completed, the edges of the sodded area shall blend smoothly into the surrounding area.

3.4.2 Rolling and Watering

After completion of the sod placement in each area, the Contractor shall water the sod immediately, and the entire area shall be lightly rolled. The sod shall be watered to a depth sufficient such that the underside of the sod pad and the soil immediately below the pad are thoroughly wet. Watering operations shall be properly supervised to prevent run-off. The Contractor shall arrange for an adequate water supply and all equipment necessary for water application shall be supplied including all pumps, hoses, pipelines, and sprinkling equipment until final acceptance is made.

3.5 RESTORATION AND CLEAN UP

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades, providing signage, or as directed by Contracting Officer. Existing turf areas, pavements, riprap areas and other project features that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense. Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.6 GRASS PLANT QUALITY

Grass plants shall be evaluated for species and health when the grass plants are a minimum 2 inches high. the living grass area shall be maintained to be uniform in color and leaf texture; and free from weeds and other undesirable growth. the living grass area shall be reatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, wood plant roots, and other materials detrimental to a healthy stand of grass plants. Broadleaf weeds and patches of foreign grasses shall be a maximum 2 percent of the total area.

3.7 MAINTENANCE

3.7.1 Maintenance Watering

The Contractor shall be responsible for watering after planting to promote adequate growth and development. Water shall be distributed with equipment that does not erode or disturb the mulch. If the grass wilts, or if the soil becomes crusted and desiccated during germination, the Contracting

Officer may direct watering. Watering directed by the Contracting Officer shall be performed within 48 hours after notice by the Contracting Officer to the Contractor; and shall place about 10,000 gallons per acre.

3.7.2 Mowing

Lawn and field areas shall be mowed throughout the growing season to meet the requirements of Paragraph: GRASS PLANT QUALITY.

a. Bluegrass predominant seed mixes, including Class 1 seed mixture: Mowing shall be done as needed to maintain lawn areas at a nominal height of 3 inches until final acceptance, with no more than 1/4 of the leaf length removed during a cutting, except not more than 1/3 of the grass leaf shall be removed by the initial cutting. Clippings shall be removed when the amount of cut turf is heavy enough to damage the turfed areas. Seeded areas shall be mowed immediately prior to final inspection.

b. Native Grasses including Class 2 and Class 3 seed mixtures: Areas seeded with native grasses shall be mowed during the first growing season to control pioneering weeds and other competition. For the purposes of this project a weed is defined as any plant not included in the seed mix. Mowing should be done before the general height is 6 to 10 inches, or when the weedy foliar cover reaches 50 percent of the seeded area, or when the weed species begin to flower. The first mowing shall be set at a height of 3 inches with the following mowings to be set at a height of 4 to 8 inches. Rotary, flail, or sickle bar type mowing equipment is acceptable.

3.7.3 General Maintenance

Maintenance of the seeded areas shall include eradicating weeds, protecting embankments and ditches from surface erosion, maintaining erosion control materials and mulch, protecting installed areas from traffic, mowing, watering, and post-fertilization. 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. 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.

3.7.3.1 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be properly filled. 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.

3.7.4 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

3.8 EVALUATION AND ACCEPTANCE

Turf establishment after seeding 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. Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch high.

a. Bluegrass predominant seed mixes, including Class 1 seed mixture. A satisfactory stand of turf 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. Bare spots shall be a maximum 6 inches square. the total bare spots shall be a maximum 2 percent to the total area.

b. Native Grasses, including Class 2 and Class 3 seed mixture. A satisfactory proper stand of turf from the seeding of native grasses is defined as a minimum of 10 plants per square foot and where no gaps larger than 6 inches in diameter occur anywhere in the turfed area. The total bare spots shall not exceed 2 percent of the total seeded area. Only plants specified in the seed mix table will be considered.

3.9 SURFACE EROSION CONTROL

Where directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material and deviation to finished grade. When directed by Contracting Officer and during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded with a temporary seed crop.

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SECTION 02930

EXTERIOR PLANTING
02/02

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 NURSERY AND LANDSCAPE ASSOCIATION (ANLA)

ANLA/ANSI Z60.1	(1996) Nursery Stock

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A300	(1995) Tree Care Operations - Trees, Shrubs and other Woody Plant Maintenance

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 3882	Mulch

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330: SUBMITTAL PROCEDURES:

SD-07 Schedules

Plant Installation Schedule; FIO.

Plant installation schedule shall be submitted a minimum of 30 days before beginning plant installation. Schedule shall specify planting season (spring or fall), dates, locations, and plant materials to be installed.

SD-08 Statements

Plant Establishment Period; FIO.

The period for maintaining installed plant material in a healthy growing condition shall begin immediately after planting and shall be in effect for 12 months from the date of acceptance of planting operations in an area. Written calendar time period shall be furnished for the plant establishment period. When there is more than one plant establishment period, the boundaries of the planted area covered for each period shall be described.

SD-09 Reports

Percolation Test; FIO.

Test reports, prepared by an independent testing agency.

SD-18 Records

Maintenance Record; FIO.

A record shall be furnished describing the maintenance work performed, the quantity of plant losses, diagnosis of the plant loss, the quantity and date of replacements made, and pesticide application.

1.3 SOURCE INSPECTIONS

The nursery or source of plant material and the source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

1.4.1.1 Plant Material Identification

Plant material shall be identified with attached, durable, waterproof labels and weather-resistant ink, stating the correct botanical plant name and size.

1.4.1.2 Protection During Delivery

Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball. Branches shall be protected by tying-in. Exposed branches shall be covered during transport.

1.4.1.3 Conditioners and Amendments

Soil conditioners and amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis and name. In lieu of containers, soil conditioners and amendments may be furnished in bulk and a certificate from the manufacturer indicating the above information shall accompany each delivery.

1.4.1.4 Pesticide Material

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the Environmental Protection Agency (EPA) registration number and the manufacturer's registered uses.

1.4.2 Storage

Plants stored on the work site shall be protected from any drying at all times by covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar mulching material. Plants, including those in containers, shall be kept in a moist condition by watering with a fine mist spray until planted.

Storage of other material shall be in designated areas. Soil amendments shall be stored in dry locations and away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with plants or other materials.

1.4.3 Handling

Plant material shall not be injured in handling. Cracking or breaking the earth ball of balled and burlapped plant material shall be avoided. Plant material shall not be handled by the trunk or stems. Materials shall not be dropped from vehicles.

1.5 SCHEDULE

Planting shall be scheduled within the dates in the Optimal Planting Date table shown on the drawings. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted for approval. Planting operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, frozen ground or other unsatisfactory conditions prevail, the work shall be stopped when directed.

1.6 INSPECTION

Plants shall be subject to inspection at any time prior to planting. Plants may be inspected at the nursery prior to shipment, but such inspection shall not be considered as acceptance. Upon request of the Contracting Officer, the Contractor shall accompany the Government inspector to the nursery and identify plant material to be furnished. Unacceptable material shall be promptly removed from the job site.

PART 2 PRODUCTS

2.1 PLANT MATERIAL

2.1.1 Tree Delivery

Trees shall be delivered to the jobsite without wrapping (bark shall be visible for inspection).

2.1.2 Quality

Well shaped, well grown, vigorous plant material having healthy and well branched root systems in accordance with ANLA/ANSI Z60.1 shall be provided. Plant material shall be provided free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement and abrasion. Plant material shall be free of shock or damage to branches, trunk, or root systems, which may occur from the digging and preparation for shipment. Plant material shall be well shaped, vigorous and healthy with a healthy, well branched root system. Plant material shall be checked for unauthorized substitution and to establish nursery grown status. The plant material shall exhibit typical form of branch-to-height ratio; and meet the caliper and height measurements specified. Plant material that measures less than specified, or has been poled, topped off or headed back, shall be rejected. Container-grown plant material shall show new fibrous roots and the root mass shall contain its shape when removed from the container.

2.1.3 Method of Shipment to Maintain Health of Root System

2.1.3.1 Container-Grown (C) Plant Material

Container size shall be in accordance with ANLA/ANSI Z60.1. Plant material shall be grown in a container over a duration of time for new fibrous roots to have developed and for the root mass to retain its shape and hold together when removed from the container. Container-grown plant material shall be inoculated with mycorrhizal fungi during germination in the nursery. Before shipment the root system shall be dipped in gels containing mycorrhizal fungi inoculum. The container shall be sufficiently rigid to hold ball shape and protect root mass during shipping.

2.1.4 Growth of Trunk and Crown

2.1.4.1 Deciduous Trees

A height to caliper relationship shall be provided in accordance with ANLA/ANSI Z60.1. Height of branching shall bear a relationship to the size and species of tree specified and with the crown in good balance with the trunk. The trees shall not be "poled" or the leader removed.

a. Single stem: The trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

b. Multi-stem: All countable stems, in aggregate, shall average the size specified. To be considered a stem, there shall be no division of the trunk which branches more than 6 inches from ground level.

2.1.4.2 Deciduous Shrubs

Deciduous shrubs shall have the height and number of primary stems recommended by ANLA/ANSI Z60.1. Acceptable plant material shall be well shaped, with sufficient well-spaced side branches, and recognized by the trade as typical for the species grown in the region of the project.

2.1.4.3 Coniferous Evergreen Plant Material

Coniferous Evergreen plant material shall have the height-to-spread ratio recommended by ANLA/ANSI Z60.1. The coniferous evergreen trees shall not be "poled" or the leader removed. The leader shall be whole and unpruned, including the tip.

2.1.4.4 Ground Cover and Vine Plant Material

Ground cover and vine plant material shall have the minimum number of runners and length of runner recommended by ANLA/ANSI Z60.1. Plant material shall have heavy, well developed and balanced crown with vigorous, well developed root system and shall be furnished in containers.

2.2 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with SECTION 02300: EARTHWORK. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the plant material specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.3 MULCH

Mulch shall be shredded hardwood mulch in accordance with MNDOT 3882, Type 6 modified. Mulch shall be free from weeds, mold, and other deleterious materials. Rotted manure and recycled mulch including compost, plastics, or pine needles is not acceptable.

2.4 Metal Edging

Metal Edging shall be 1/8 inch X 4 inch with black electrostatically applied baked on paint with 12 inch aluminum stakes that lock into performed loops on the edging at 3 foot intervals.

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING VEGETATION

If turf areas have been established prior to planting operations, the surrounding turf shall be covered before excavations are made in a manner that will protect turf areas. Existing trees, shrubbery, and beds that are to be preserved shall be protected in accordance with the approved Environmental Protection Plan and SECTION 01000: GENERAL.

3.2 PERCOLATION TEST

Test for percolation shall be done to determine positive drainage of plant pits and beds. A positive percolation shall consist of a minimum 1 inch per 3 hours. If a negative percolation test occurs, no planting shall be continued in the area represented by the test until changes are directed by

the Contracting Officer.

3.3 SITE PREPARATION

The Contractor shall verify that finished grades are as indicated on drawings, and that the placing of topsoil, the smooth grading, and the compaction requirements have been completed in accordance with SECTION 02300 : EARTHWORK, prior to the commencement of the planting operation. The location of underground utilities and facilities in the area of the planting operation shall be verified. Damage to underground utilities and facilities shall be repaired at the Contractor's expense.

3.3.1 Layout

Tree locations and bed outlines shall be staked by the Contractor on the project site and approved by the Contracting Officer before any plant pits or beds are dug.

3.4 INSTALLATION

3.4.1 Setting Plant Material

Plant material shall be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. Balled and burlapped and container grown plants shall be handled and moved only by the ball or container. Plastic wrap and metal baskets shall be completely removed before the placement of backfill. Container grown stock shall be removed from containers without damaging plant or root systems. After centering the plant in pit, all ropes secured to the trunk shall be removed and burlap opened on top 1/3 of the root ball.

3.4.2 Backfill Soil Mixture

The backfill soil mixture may be a mix of topsoil and soil amendments suitable for the plant material specified. When practical, the excavated soil from the plant pit that is not amended provides the best backfill and shall be used. Mycorrhizal fungi inoculum shall be added as recommended by the manufacturer of the plant material specified.

3.4.3 Backfill Procedure

Prior to backfilling, all metal, wood, synthetic products, or treated burlap devices shall be removed from the ball or root system avoiding damage to the root system. The backfill procedure shall remove air pockets from around the root system. Plant pits and plant beds shall be watered immediately after backfilling, until completely saturated.

3.4.4 Staking and Guying

Staking will be required when trees are unstable or will not remain set due to their size, shape, or exposure to high wind velocity. Trees that are staked and guyed shall be completed as shown on the drawings.

3.5 FINISHING

3.5.1 Placing Mulch

Care shall be taken to avoid contaminating the mulch with the planting soil. Mulch shall be kept out of the crowns of shrubs, ground cover, and vines and shall be kept off buildings, sidewalks and other facilities.

3.5.2 Pruning

New plant material shall be pruned in accordance with recommended dates for each species in the following manner: prune dead and broken branches, cross branches, weak branches, and for shape. Typical growth habit of individual plants shall be retained with as much height and spread as is practicable. The pruning of trees shall be in accordance with ANSI A300. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead and broken branches shall be removed. "Headback" cuts at right angles to the line of growth will not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off".Trimming shall be disposed of as specified for clearing and grubbing debris in SECION 01000: GENERAL

3.6 MAINTENANCE DURING PLANTING OPERATION

Installed plant material shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed to prevent desiccation and shall continue until the plant establishment period commences. Installed areas shall be kept free of weeds, grass, and other undesired vegetation. The maintenance includes maintaining the mulch, watering, and adjusting settling.

3.7 RESTORATION AND CLEAN UP

Turf areas, pavements and facilities that have been damaged from the planting operation shall be restored to original condition at the Contractor's expense. Excess and waste material shall be removed from the installed area and shall be disposed offsite. Adjacent paved areas shall be cleared of all waste material and waste shall be disposed of off site.

3.8 PLANT ESTABLISHMENT PERIOD

3.8.1 Commencement

The period for maintaining installed plant material in a healthy growing condition shall begin immediately after planting and shall be in effect for 12 months from the date of acceptance of planting operations in an area. Written calendar time period shall be furnished for the plant establishment period. When there is more than one plant establishment period, the boundaries of the planted area covered for each period shall be described. The plant establishment period shall be coordinated with SECTIONS 02920: SEEDING, SODDING, AND TOPSOIL and 02935: EXTERIOR PLANT MATERIAL MAINTENANCE. The plant establishment period shall be modified for separate completion dates for areas. Maintenance of seeded and sodded areas and of plants shall be in accordance with SECTION: 02935: EXTERIOR PLANT MATERIAL MAINTENANCE.

3.8.2 Maintenance During Establishment Period

Maintenance of plant material shall include straightening plant material, straightening stakes; tightening guying material; correcting girdling; supplementing mulch; pruning dead or broken branch tips; maintaining plant material labels; watering; eradicating weeds, insects and disease; post-fertilization; and removing and replacing unhealthy plants as specified in SECTION 02935: EXTERIOR PLANT MATERIAL MAINTENANCE.

3.8.2.1 Watering Plant Material

The plant material shall be watered as necessary to prevent desiccation and to maintain an adequate supply of moisture within the root zone. All watering shall be done in a manner which will provide uniform coverage but which will not cause erosion or damage to the finished surface. Water shall not be applied with a force sufficient to displace mulch and shall not be applied at such a rate that it cannot be absorbed by the mulch and plants.

3.8.2.2 Weeding

Grass and weeds in the installed areas shall not be allowed to reach a maximum 3 inches height before being completely removed, including the root system.

3.8.3 Unhealthy Plant Material

A tree shall be considered unhealthy or dead when the main leader has died back, or up to a maximum 25 percent of the crown has died. A shrub shall be considered unhealthy or dead when up to a maximum 25 percent of the plant has died. This condition shall be determined by scraping on a branch an area 1/16 inch square, maximum, to determine if there is a green cambium layer below the bark. The Contractor shall determine the cause for unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be removed immediately and shall be replaced as soon as seasonal conditions permit.

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SECTION 02935

EXTERIOR PLANT MATERIAL MAINTENANCE
01/02

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 A300	(1995) Tree Care Operations - Trees, Shrubs and other Woody Plant Maintenance

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 3882	Mulch

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "GA" designation are for information only. The following shall be submitted in accordance with Section 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Work Plan and Schedule; FIO.

Contractor's work plan and schedule.

Maintenance Record; FIO.

Contractor's record of each site visit.

Contractor's record of each site visit; FIO

SD-09 Reports

Soil Test; FIO. Percolation Test; FIO.

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and

compliance with recognized test standards shall be described.

1.3 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.3.1 Delivery Schedule

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.3.2 Storage

Materials shall be stored in designated areas. Lime and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.3.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

PART 2 PRODUCTS

2.1 MULCH

Mulch shall be shredded hard wood mulch per MNDOT 3882, Type 6 modified. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Rotted manure shall not be used.

2.2 WATER

Water shall be the responsibility of the Contractor.

PART 3 EXECUTION

3.1 MULCHING

Mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.2 WATERING

Water to supplement rainfall shall be applied at a rate sufficient to ensure plant growth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

3.3 GENERAL MAINTENANCE REQUIREMENTS

3.3.1 Maintenance Record

A record of each site visit shall be furnished, describing:

a. Maintenance work performed.

b. Areas repaired or reinstalled.

c. Diagnosis for unsatisfactory stand of grass.

d. Diagnosis for unsatisfactory stand of plant material in planting bed.

e. Condition of trees.

f. Condition of shrubs.

g. Quantity and diagnosis of plant loss.

h. Irrigation of system.

3.4 LAWN AND FIELD AREAS MAINTENANCE

3.4.1 Mowing

Seeded and sodded areas shall be mowed throughout the growing season to meet the requirements of Paragraph: GRASS PLANT QUALITY. Cutting height shall be adjusted according to type of grass. Mowing schedule shall be coordinated with the Contracting Officer. Frequency of mowing shall be adjusted so that no more than 1/4 of the leaf length is removed during a cutting.

3.5 PLANT MATERIAL QUALITY

3.5.1 General Requirements

Plant material shall be identified as native to the region of the site or as a specimen. Plant material shall be maintained as well shaped, well grown, vigorous plant material having healthy root systems. The plant material shall be maintained as free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement and abrasion. Plant material shall be free of shock or damage to branches, trunk, or root systems. Plant quality is determined by the growing conditions; climate and microclimate of the site for maintaining a healthy root system; and growth of the trunk and crown as follows.

3.5.2 Growth of Trunk and Crown

3.5.2.1 Deciduous Trees

Deciduous tree height to caliper relationship shall be maintained. Height of branching shall bear a relationship to the size and species of the tree and with the crown in good balance with the trunk. The trees shall not be "poled" or the leader removed.

a. Single stem: The trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

b. Multi-stem: To be considered a stem, there shall be no division of the trunk which branches more than 6 inches from ground level.

c. Specimen: The tree shall be well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be indicated.

3.5.2.2 Deciduous Shrubs

Deciduous shrub height to number of primary stems shall be maintained. Shrubs shall be maintained as well shaped, with sufficient well-spaced side branches, and recognized by the trade as typical for the species grown in the region of the site.

3.5.2.3 Coniferous Evergreen Plant Material

Coniferous evergreen plant material height-to-spread ratio shall be maintained. The coniferous evergreen trees shall not be "poled" or the leader removed. The plant material shall be maintained to be well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be indicated.

3.5.2.4 Broadleaf Evergreen Plant Material

Broadleaf evergreen plant material height-to-spread ratio shall be maintained. The plant material shall be shaped to be recognized by the trade as typical for the variety grown in the region of the site.

3.5.2.5 Ground Cover and Vine Plant Material

Ground cover and vine plant material shall be maintained to have a heavy, well developed, and balanced crown with vigorous, well developed root system.

3.6 SHRUB AND HEDGE MAINTENANCE

3.6.1 Trimming and Pruning

Trimming shall be performed to ensure the following:

a. Safety.

b. Quality (size, height, and shape).

c. Health (removing broken, diseased branches).

d. Rejuvenation (removing one third to one half of the older stems or branches).

e. Visibility (signs, building entrances, motorist line of sight).

Shrubs shall be pruned to the requirements of paragraph PLANT MATERIAL QUALITY. Pruning shall be accomplished by trained and experienced

personnel in accordance with ANSI A300. The typical growth habit of individual plant material or the theme shape of the hedge shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead and broken branches shall be removed.

3.6.2 Irrigation of Shrubs and Hedges

Run-off, puddling and wilting shall be prevented.

3.6.3 Shrub Fertilization Program

A regular program of fertilization shall be established to include a fall feeding to meet the requirements of paragraph PLANT MATERIAL QUALITY. Use industry standards for foliage and root fertilizing the plant material inventoried.

3.7 TREE MAINTENANCE

3.7.1 Trimming and Pruning of Trees

Trimming shall be performed to ensure the following:

a. Safety.

b. Quality (size, height).

c. Health (removing broken, diseased wood branches).

d. Rejuvenation (removing one third to one half of the older stems or branches).

e. Visibility (signs, building entrances, motorist line of sight).

Trees shall be pruned to meet the requirements of paragraph PLANT MATERIAL QUALITY. Pruning shall be accomplished by trained and experienced personnel in accordance with ANSI A300. The typical growth habit of individual plant material shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead and broken branches shall be removed. "Headback" cuts at right angles to the line of growth will not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off".

3.7.2 Irrigation of Trees

Run-off, puddling and wilting shall be prevented.

3.7.3 Unhealthy Plant Material

A tree shall be considered unhealthy or dead when the main leader has died back, or up to a maximum 25 percent of the crown has died. A shrub shall be considered unhealthy or dead when up to a maximum 25 percent of the plant has died. This condition shall be determined by scraping on a branch an area 1/16 inch square, maximum, to determine if there is a green cambium layer below the bark. The Contractor shall determine the cause for

unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be removed immediately.

3.8 RESTORATION AND CLEAN UP

3.8.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the maintenance operations shall be restored to original condition at Contractor's expense.

3.8.2 Clean Up

Excess and waste material shall be removed from the maintenance areas and dispose off site. Adjacent paved areas shall be cleaned as determined by the Contracting Officer.

3.9 CLEANING OF PAVED AREAS

Grass, weeds, leaves, and debris from mowing, clipping, and pruning shall be removed immediately. Excess and waste material shall be removed from paved areas and disposed off site. Debris, leaves shall be removed weekly.

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SECTION 03100

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SECTION 03100

STRUCTURAL CONCRETE FORMWORK
01/02

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 347R	(1994) Guide to Formwork for Concrete

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA ANSI/AHA A135.4	(1995) Basic Hardboard

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1	(1996) Voluntary Product Standard - Construction and Industrial Plywood

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-01 Data

Design; FIO.

Design analysis and calculations for form design and methodology used in the design.

Form Materials; FIO.

Manufacturer's data including literature describing form materials, accessories, and form releasing agents.

SD-04 Drawings

Concrete Formwork; FIO.

Drawings showing details of formwork, including dimensions of fiber voids,

joints, supports, studding and shoring, and sequence of form and shoring removal. See SECTION 03300 for additional requirements of formwork drawings.

SD-06 Instructions

Form Releasing Agents; FIO.

Manufacturer's recommendation on method and rate of application of form releasing agents.

1.3 DESIGN

Design and engineering of formwork, shoring and reshoring as well as its construction is the responsibility of the Contractor.

Formwork shall be designed by a Professional Structural Engineer currently registered in the State of Minnesota, having a minimum of 3 years experience in this type of design work and in accordance with methodology of ACI 347R for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface which meets the requirements of the class of finish specified in SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE. Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

1.3.1 Design Requirements

Design formwork for loads, lateral pressures and allowable stresses outlined in ACI 347R and for design considerations, wind loads, allowable stresses and other applicable requirements of the controlling local building code. Where conflicts occur between the above two standards, the more stringent requirements shall govern. Design formwork to limit maximum deflection of form facing materials reflected in concrete surfaces exposed to view to 1/240 of span between structural members.

1.3.2 Form Removal

Develop a procedure and schedule for removal of shores and installation of reshores and for calculating the loads transferred to the structure during this process. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon. When developing procedure, schedule and structural calculations, consider the following at each stage of construction: The structural system that exists; effects of all loads during construction; strength of concrete; the influence of deformations of the structure and shoring system on the distribution of dead loads and construction loads; the strength and spacing of shores or shoring systems used, as well as the method of shoring, bracing, shore removal, and reshoring including the minimum time intervals between the various operations; any other loading or condition that affects the safety of serviceability of the structure during construction.

PART 2 PRODUCTS

2.1 FORM MATERIALS

2.1.1 Forms For Class A and Class B Finish (Exposed to View)

Forms for Class A and Class B finished surfaces shall be plywood panels conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels. Use full 4 foot x 8 foot panels unless smaller pieces will cover entire area. Forms for round columns shall be the prefabricated seamless type.

2.1.2 Forms For Class C Finish (Not Exposed to View)

Forms for Class C finished surfaces shall be shiplap lumber; plywood conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II; tempered concrete form hardboard conforming to AHA ANSI/AHA A135.4; other approved concrete form material; or steel, except that steel lining on wood sheathing shall not be used. Forms for round columns may have one vertical seam.

2.1.3 Forms For Class D Finish (Concrete to be covered with soil)

Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.

2.1.4 Form Ties

Commercially fabricated for use in form construction. Do not use wire ties. Constructed so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete. 3/4 inch minimum to 1 inch maximum diameter cones on both ends. Embedded portion of ties to be not less than 1-1/2 inch from face of concrete after ends have been removed.

2.1.5 Form Releasing Agents

Form releasing 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.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Formwork

Install products in accordance with manufacturer's instructions. Make forms sufficiently tight to prevent loss of mortar from concrete. At construction joints, overlap contact surface of form sheathing for flush surfaces exposed to view over hardened concrete in previous placement by at

least 1 inch. Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain a true surface. Where possible, locate juncture of built-in-place wood or metal forms at architectural lines, control joints or at construction joints.

Construct wood forms for wall openings to facilitate loosening, if necessary, to counteract swelling. Anchor formwork to shores or other supporting surfaces or members so that movement of any part of formwork system is prevented during concrete placement. Provide runways for moving equipment with struts or legs, supported directly on formwork or structural member without resting on reinforcing steel. Provide positive means of adjustment (wedges or jacks) of shores and struts and take up all settlement during concrete placing operation. Securely brace forms against lateral deflection. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check.

Provide temporary openings at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed, and to limit height of free fall of concrete to prevent aggregate segregation. Temporary openings to limit height of free fall of concrete shall be spaced no more than 8 FT apart. Clean surfaces of forms, reinforcing steel and other embedded materials of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed.

3.2 CHAMFERING

Except as otherwise shown, place 3/4 inch chamfer strips in exposed to view corners of forms to produce 3/4 inch wide beveled edges.

3.3 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.

3.4 REMOVAL OF FORMS

Forms shall be removed preventing injury to the concrete and ensuring the complete safety of the structure. Formwork for columns, walls, side of beams 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 beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads. Supporting forms or shores shall not be removed before the concrete strength has reached 70 percent of design strength, 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.

3.5 TOLERANCES FOR FORMED SURFACES

1.	Variations from the plumb:	
	a. In the lines and surfaces of columns, piers, walls and in arises	In any 10 feet of length ---------- 1/4 inch Maximum for entire length ---------- 1/2 inch
	b. For exposed corner columns,control-joint grooves, and other conspicuous lines	In any 20 feet of length ---------- ---- 1/4 inch Maximum for entire length---------- 1/2 inch
2.	Variation from the level or from the grades indicated on the drawings:	
	a. In slab soffits, ceilings, beam soffits, and in arises, measured before removal of supporting shores	In any 10 feet of length ---------- 1/4 inch In any bay or in any 20 feet of length --------- 3/8 inch Maximum for entire length ---------- 3/4 inch
	b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines	In any bay or in any 20 feet of length ---------- ----- 1/4 inch Maximum for entire length---------- 1/2 inch
3.	Variation of the linear building lines from established position in plan	In any 20 feet --------- 1/2 inch Maximum ----------1 inch
4.	Variation of distance between walls, columns, partitions	1/4 inch per 10 feet of distance, but not more than 1/2 inch in any one bay,and not more than 1/2 inch

		total variation
5.	Variation in the sizes and locations of sleeves, floor openings, and wall opening	Minus ---------- 1/4 inch Plus ---------- 1/2 inch
6.	Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls	Minus ---------- 1/4 inch Plus ---------- 1/2 inch
7.	Footings:	
	a. Variation of dimensions in plan	Minus ---------- 1/2 inch Plus ---------- 2 inches when formed or plus 3 inches when placed against unformed excavation
	b. Misplacement of eccentricity	2 percent of the footing width in the direction of misplacement but not more than 2 inches
	c. Reduction in thickness of specified thickness	Minus ---------- 5 percent Plus ---- No limit except that which may interfere with other construction
8.	Variation in steps:	
	a. In a flight of stairs	Riser ---------- 1/8 inch Tread ---------- 1/4 inch
	b. In consecutive steps	Riser ---------- 1/16 inch Tread ---------- 1/8 inch

Establish and maintain in an undisturbed condition and until final completion and acceptance of Project, sufficient control points and bench marks to be used for reference purposes to check tolerances. Regardless of tolerances listed allow no portion of structure to extend beyond legal boundary of Project. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete.

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SECTION 03150

EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

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SECTION 03150

EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM D 412	(1998a) Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 471	(1996) Rubber Property - Effect of Liquids
ASTM D 994	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
ASTM D 1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D 1190	(1996) Concrete Joint Sealer, Hot-Applied Elastic Type Joint Sealers
ASTM D 1191	(1984) Test Methods for Concrete Joint Sealers
ASTM D 1751	(1983; R 1991) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 5249	(1995) Backer Material for Use With Cold and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints

CORPS OF ENGINEERS (COE)

COE CRD-C 513	(1974) Corps of Engineers Specifications

	for Rubber Waterstops
COE CRD-C 572	(1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Preformed Expansion Joint Filler; GA. Sealant; GA. Waterstops; GA.

Manufacturer's literature, including safety data sheets, for preformed fillers and the lubricants used in their installation; field-molded sealants and primers (when required by sealant manufacturer); and waterstops.

SD-04 Drawings

Waterstops; FIO.

Shop drawings and fabrication drawings provided by the manufacturer or prepared by the Contractor.

SD-06 Instructions

Preformed Expansion Joint Filler; FIO. Sealant; FIO. Waterstops; FIO.

Manufacturer's recommended instructions for installing preformed fillers, field-molded sealants; preformed compression seals; and waterstops; and for splicing non-metallic waterstops.

SD-13 Certificates

Preformed Expansion Joint Filler; FIO. Sealant; FIO. Waterstops; FIO.

Certificates of compliance stating that the joint filler and sealant materials and waterstops conform to the requirements specified.

1.3 DELIVERY AND STORAGE

Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants. Sealants shall be delivered in the manufacturer's original unopened containers. Sealants whose shelf life has expired shall be removed from the site.

PART 2 PRODUCTS

2.1 PREFORMED EXPANSION JOINT FILLER

Expansion joint filler shall be preformed material. Unless otherwise indicated, filler material shall be 3/8 inch thick and of a width applicable for the joint formed. Backer material, when required, shall conform to ASTM D 5249.

2.1.1 Neoprene Expansion Joint Fillers

Materials: closed cell neoprene. ASTM D 1056, Class SC, 2 to 5 psi compression deflection, Grade SCE-41.

2.1.2 Asphalt Expansion Joint Fillers

Materials: ASTM D 994.

2.1.3 Fiber Expansion Joint Fillers

Materials: ASTM D 1751.

2.2 SEALANT

Joint sealant shall conform to the following:

2.2.1 Joint Sealant

Elastomeric (non-bituminous, gray, single-component polyurethane-type): ASTM C 920, Type S, Grade P for horizontal joints, Grade NS for vertical joints, Class 25 and use as required per paragraph 5 of ASTM C 920.

2.2.2 Hot-Poured Type (for slabs on grade)

ASTM D 1190 tested in accordance with ASTM D 1191.

2.2.3 Field-Molded Type

ASTM C 920, Type M for horizontal joints or Type NS for vertical joints, Class 25, and Use NT. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The back-up material shall be compressible, non-shrink, nonreactive with sealant, and non-absorptive material type such as extruded butyl or polychloroprene rubber.

2.3 WATERSTOPS

Intersection and change of direction waterstops shall be shop fabricated, leaving only straight butt splices for the field.

2.3.1 Non-Metallic Materials`

2.3.1.1 PVC Waterstops

PVC waterstops shall be manufactured from virgin polyvinyl chloride compound not containing any scrap or reclaimed materials or pigment. The compound shall contain plasticizers, stabilizers, and other additives to meet specified requirements. Polyvinylchloride (PVC) waterstops shall

conform to COE CRD-C 572. Rubber waterstops shall conform to COE CRD-C 513. Thermoplastic elastomeric rubber waterstops shall conform to ASTM D 471.

2.3.1.2 Expansion Joints

Materials: In expansion joints: 9 inch wide x 3/8 inch thick tear web type waterstop. 2 inch minimum horizontal movement without rupturing. Similar to Greenstreak Plastic Products Style #700. In all other joints: 6 inch wide x 3/8 inch thick bulb type. Provide hog rings or grommets at maximum 12 inch OC along the length of the waterstop.

2.3.2 Non-Metallic Hydrophilic

Swellable strip type compound of polymer modified chloroprene rubber that swells upon contact with water shall conform to ASTM D 412 as follows: Tensile strength 420 psi minimum; ultimate elongation 600 percent minimum. Hardness shall be 50 minimum on the type A durometer and the volumetric expansion ratio in distilled water at 70 degrees F shall be 3 to 1 minimum.

PART 3 EXECUTION

3.1 JOINTS

Joints shall be installed at locations indicated and as authorized.

3.1.1 General - Construction Joints

Locate joints as indicated on Contract Drawings or as shown on approved shop drawings. Unplanned construction joints will not be allowed. If concrete cannot be completely placed between planned construction joints, then it must be removed. In general, locate joints near middle of spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case, offset joint in girder a distance equal to twice the width of the beam. Locate joints in walls and columns at underside of floors, slabs, beams, or girders, and at tops of foundations or floor slabs, unless shown otherwise. At Contractor's option, beam pockets may be formed into concrete walls. Size pockets to allow beam reinforcing to be placed as detailed on Drawings. Place beams, girders, column capitals and drop panels at same time as slabs. Make joints perpendicular to main reinforcement with all reinforcement continuous across joints. Provide roughened construction joints at all construction joints unless indicated otherwise on Drawings. Clean the previously hardened concrete interface and remove all laitance. Intentionally roughen the interface to a full amplitude of 1/4 inch. Provide recessed flat surface as required to install strip type waterstops. Allow a minimum of 48 HRS before placement of adjoining concrete construction.

3.1.2 Contraction Joints

Contraction joints may be constructed by cutting the concrete with a saw after concrete has set. Joints shall be approximately 1/8 inch wide and shall extend into the slab one-fourth the slab thickness, minimum, but not less than 1 inch.

3.1.2.1 Sawed Joints

Joint sawing shall be early enough to prevent uncontrolled cracking in the slab, but late enough that this can be accomplished without appreciable spalling. Concrete sawing machines shall be adequate in number and power, and with sufficient replacement blades to complete the sawing at the required rate. Joints shall be cut to true alignment and shall be cut in sequence of concrete placement.

3.1.2.2 Waste Disposal

The method used in disposing of wastewater employed in cutting, washing, and rinsing of concrete surfaces shall be such that the wastewater does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area.

3.1.3 Expansion Joints

Do not permit reinforcement or other embedded metal items bonded to concrete (except smooth dowels bonded on only one side of joint) to extend continuously through an expansion joint. Use approved expansion joint fillers, unless noted otherwise on Drawings.

3.1.4 Joint Sealant

Sawed contraction joints and expansion joints in slabs shall be filled with joint sealant, unless otherwise shown. Joint surfaces shall be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Joint sealant shall be applied as recommended by the manufacturer of the sealant.

3.2 WATERSTOPS, INSTALLATION AND SPLICES

Waterstops shall be installed at the locations shown to form a continuous water-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Splices shall be made by certified trained personnel using approved equipment and procedures.

3.2.1 Non-Metallic Hydrophilic

Install on smooth surface of hardened concrete by use of nails, adhesive or other means as recommended by manufacturer to prevent movement of waterstop during placement of concrete. Waterstop to be continuous with splices in accordance with manufacturer's instructions. Use in joints against existing concrete and where indicated on Drawings.

3.2.2 PVC Bulb type

Position waterstop accurately in forms. Secure waterstops in correct

position using hog rings or grommets spaced along the length of waterstop and tie wire to adjacent reinforcing. Hold horizontal waterstops in place with continuous supports. Install according to manufacturer's instructions. Do not displace reinforcement from required location. Waterstops to be continuous. Splice ends with perpendicular butt splice using electrical splicing iron in accordance with manufacturer's instructions. Unless otherwise noted, use for all construction joints in new construction for all structures indicated on Drawings.

3.2.3 Quality Assurance

Edge welding will not be permitted. Centerbulbs shall be compressed or closed when welding to non-centerbulb type. Waterstop splicing defects which are unacceptable include, but are not limited to the following: 1) Tensile strength less than 80 percent of parent section. 2) Free lap joints. 3) Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch. 4) Misalignment which reduces waterstop cross section more than 15 percent. 5) Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness. 6) Misalignment of waterstop splice resulting in misalignment of waterstop in excess of 1/2 inch in 10 feet. 7) Visible porosity in the weld area, including pin holes. 8) Charred or burnt material. 9) Bubbles or inadequate bonding. 10) Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.

3.2.4 Non-Metallic Hydrophilic Waterstop Installation

Ends to be joined shall be miter cut with sharp knife or shears. The ends shall be adhered with cyanacryiate (super glue) adhesive. When joining hydrophilic type waterstop to PVC waterstop, the hydrophilic waterstop shall be positioned as shown on the drawings. A liberal amount of a single component hydrophilic sealant shall be applied to the junction to complete the transition.

3.3 CONSTRUCTION JOINTS

Construction joints are specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE except that construction joints coinciding with expansion and contraction joints shall be treated as expansion or contraction joints as applicable.

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SECTION 03200

CONCRETE REINFORCEMENT
01/02

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 318/318R	(1999) Building Code Requirements for Structural Concrete and Commentary
ACI SP-66	ACI Detailing Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	(1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded, and Seamless
ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 615	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 706	(1998) Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4	(1998) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI MSP-1	(1996) Manual of Standard Practice

1.2 QUALITY ASSURANCE

1.2.1 Quality Control

Independent Testing Agency: Contractor to employ and pay for services of a testing laboratory to: Review and approve Contractor proposed welding procedures and processes for conformance with AWS D1.4. Qualify welders in accord with AWS D1.4. Test three samples of each bar size and each type of

weld in accord with AWS D1.4. The tensile strength of each test shall be not less than 125 percent of the required yield strength of the rebar tested. Conduct nondestructive field tests (radiographic or magnetic particle) on not less than one random sample for each 10 welds. In addition if any welds are found defective, test five previous welds performed by same welder. Visually inspect each weld for presence of cracks, undercuts, inadequate size and other visible defects.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Concrete Reinforcement System; GA.

Detail drawings showing rebar number, sizes, spacing, dimensions, configurations, locations, mark numbers, lap splice lengths and locations, concrete cover and rebar supports. Sufficient rebar details to permit installation of reinforcing. Rebar details in accordance with ACI SP-66. Locations where proprietary rebar mechanical splices are required or proposed for use.

SD-06 Instructions

Adhesive Anchors; FIO

Proprietary Rebar Mechanical Splices; FIO

Manufacturer's installation instructions. Manufacturer and type of proprietary rebar mechanical splices. Manufacturer and type of rebar adhesive anchor including installation instructions and embedment depth required to achieve specified pull-out strength.

SD-08 Statements

Welding; FIO.

A list of qualified welders names.

SD-13 Certificates

Product Technical Data; FIO.

Acknowledgement that products submitted meet requirements of standards referenced. Mill certificates for all reinforcing attesting that the reinforcing steel furnished contains no less than 25 percent recycled scrap steel and meets the requirements specified herein, prior to the installation of reinforcing steel.

1.4 WELDING

Welders shall be qualified in accordance with AWS D1.4. Qualification test shall be performed at the worksite and the Contractor shall notify the Contracting Officer 24 hours prior to conducting tests. Special welding procedures and welders qualified by others may be accepted as permitted by AWS D1.4. Welders to have been qualified during the previous 12 months prior to commencement of welding.

1.5 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.1 DOWELS

Dowels shall conform to ASTM A 615, Grade 60, with metal end cap to allow longitudinal movement equal to joint width plus 1 inch. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2 REINFORCING STEEL

Reinforcing steel shall be deformed bars conforming to ASTM A 615 or ASTM A 706, grades and sizes as indicated. Cold drawn wire used for spiral reinforcement shall conform to ASTM A 82.

2.3 WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.4 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI MSP-1 and shall be steel or precast concrete blocks. Precast concrete blocks shall have wire ties and shall be not less than 4 inches square when supporting reinforcement on ground. Precast 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 galvanized, 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. For slabs on grade, supports shall be precast concrete blocks or plastic coated steel fabricated with bearing plates.

2.5 PROPRIETARY REBAR MECHANICAL SPLICES

To develop in tension and compression a minimum of 125 percent of the yield strength of the rebars being spliced.

2.6 WELDING ELECTRODES

E90 meeting requirements of AWS D1.4.

2.7 REBAR ADHESIVE ANCHORS

Manufactured for the specific purpose of embedding and developing 125 percent of the yield strength of rebars in hardened concrete.

2.8 FABRICATION

2.8.1 Tolerances.

Tolerances: Sheared lengths: +/- 1 inch. Overall dimensions of stirrups, ties and spirals: +/- 1/2 inch. All other bends: +0 inch, -1/2 inch.

Minimum diameter of bends measured on the inside of the rebar to be as indicated in ACI 318/318R paragraph 7.2. Ship rebars to jobsite with attached plastic or metal tags. Place on each tag the mark number of the rebar corresponding to the mark number indicated on the shop drawing. Mark numbers on tags to be so placed that the numbers cannot be removed.

PART 3 EXECUTION

3.1 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318/318R. 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. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Wire tie ends shall face away from the forms.

3.1.1 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 318/318R at locations shown plus or minus one bar diameter (measured parallel with face of form). Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage (measured perpendicular to face of form) shall be as indicated on drawings.

3.1.2 Splicing

Splices of reinforcement shall conform to Paragraph 12.15 of ACI 318/318R and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No. 11 unless otherwise indicated. Obtain approval by the Engineer prior to welding reinforcement. Welding shall conform to AWS D1.4. Welded butt splices shall be full penetration butt welds. Do not tack weld reinforcing. Have each welder place an

approved identifying mark near each completed weld. 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. Mechanical proprietary splice connectors may only be used when approved, or indicated on the Contract Drawings. Mechanical butt splices shall be in accordance with the recommendation of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line. Where parallel horizontal reinforcement in beams is indicated to be placed in two or more layers, rebars in the upper layers shall be placed directly above rebars in the bottom layer with clear distance between layers to be 6 inches. Place spacer rebars at 3 feet maximum centers to maintain the required clear distance between layers. Extend reinforcement to within 4 inches of concrete perimeter edges unless noted otherwise on contract drawings.

3.1.3 Rebar Support

Support rebars and fasten together to prevent displacement by construction loads or placing of concrete. On ground, provide supporting concrete blocks or metal bar supports with bottom plate. Over formwork, provide chairs, runners, bolsters, spacers, hangers and other rebar support.

3.1.4 Adhesive Anchors

Embed rebars into hardened concrete utilizing adhesive anchor system specifically manufactured for such installation. Drill hole in concrete with diameter and depth as required to develop 125 percent of the yield strength of the bar according to manufacturer's requirements. Place adhesive in drilled hole. Insert rebar into hole and adhesive in accordance with manufacturer's instructions.

3.1.5 Tolerances

Rebar placement: Clear distance to formed surfaces: +1/4 inch. Minimum spacing between bars: -1/4 inch. Top bars in slabs and beams: Members 8 IN deep or less: +1/4 inch. Members between 8 inch and 2 feet deep: -1/4 inch, +1/2 inch. Members more than 2 FT deep: -1/4 inch, +1 inch. Crosswise of members: Spaced evenly within +/- 1 inch. Lengthwise of members: +/- 2 inch. Minimum clear distances between rebars: Beams, walls and slabs: Distance equal to rebar diameter or 1 inch, whichever is greater. Columns: Distance equal to 1-1/2 times the rebar diameter or 1-1/2 inch, whichever is greater. Beam and slab rebars shall be threaded through the column vertical rebars without displacing the column vertical rebars and still maintaining the clear distances required for the beam and slab rebars.

3.2 DOWEL INSTALLATION

Dowels shall be installed at locations indicated and at right angles to

joint being doweled. Dowels shall be accurately positioned and aligned parallel to the finished concrete surface before concrete placement. Dowels shall be rigidly supported during concrete placement. One end of dowels shall be coated with a bond breaker.

3.3 FIELD QUALITY CONTROL

3.3.1 Reinforcement Congestion and Interferences

Notify Engineer whenever the specified clearances between rebars cannot be met. Do not place any concrete until the Engineer submits a solution to rebar congestion problem. Rebars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If rebars are moved more than one bar diameter, obtain Engineer's approval of resulting arrangement of rebars. No cutting of rebars shall be done without written approval of Engineer.

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SECTION 03300

CAST-IN-PLACE STRUCTURAL CONCRETE
01/02

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 201.2R	(1992) Guide to Durable Concrete
ACI 211.1	(1991)Standard Practice for Selecting Proportions for Normal, heavyweight and Mass Concrete
ACI 301	(1996) Standard Specifications for Structural Concrete
ACI 304	(1989) Measuring, Mixing, Transporting and Placing Concrete
ACI 304.2	(1991) Placing Concrete by Pumping Methods
ACI 305	(1991) Hot Weather Concreting
ACI 306	(1988) Cold Weather Concreting
ACI 309	(1997) Guide for Consolidation of Concrete
ACI 318/318R	(1999) Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	(1998) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1999a) Concrete Aggregates
ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	(1999) Ready-Mixed Concrete

ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 138	(1981) Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
ASTM C 143	(1990a) Slump of Hydraulic Cement Concrete
ASTM C 150	(1998a) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 173	(1996) Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1998) Air-Entraining Admixtures for Concrete
ASTM C 289	Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	(1999) Chemical Admixtures for Concrete
ASTM C 618	(1999) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 685	(1998a) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C 881	(1999) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 1059	(1999) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064	(1999) Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1077	(1998) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM D 75	(1997) Sampling Aggregates
ASTM E 329	(2000) Agencies Engaged in the Testing

	and/or Inspection of Materials Used in Construction

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA TMMB-100	(1994) Truck Mixer Agitator and Front Discharge Concrete Carrier Standards of the Truck Mixer Manufacturers Bureau
NRMCA QC 3	(1984) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities

1.2 QUALITY ASSURANCE

1.2.1 Quality Control.

Independent Testing Agency: Contractor to employ and pay for services of a testing laboratory to: Perform materials evaluation and inspection and to design concrete mixes. Concrete testing agency to meet requirements of ASTM E 329 and ASTM C 1077. Do not begin concrete production until proposed concrete mix design has been approved by Engineer. Approval of concrete mix design by Engineer does not relieve Contractor of his responsibility to provide concrete that meets the requirements of this Specification. Adjust concrete mix designs when material characteristics, job conditions, weather, strength test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and approved by Engineer. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon.

1.2.2 Qualifications

Ready mixed concrete batch plant certified by National Ready Mixed Concrete Association (NRMCA).

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Concrete Mixture Design; GA.

The results of trial mixture design studies along with a statement giving the maximum nominal coarse aggregate size and the proportions of ingredients that will be used in the manufacture of each strength or class of concrete, at least 14 days prior to commencing concrete placing operations. Aggregate weights shall be based on the saturated surface dry

condition. The statement shall be accompanied by test results from an approved independent commercial testing laboratory, showing that mixture design studies have been made with materials proposed for the project and that the proportions selected will produce concrete of the qualities indicated. No substitutions shall be made in the materials used in the mixture design studies without additional tests to show that the quality of the concrete is satisfactory.

A mix design shall be submitted for each concrete mix to be used on the project. Concrete mix design submittal is to include the following information:

a. Sieve analysis and source of fine and coarse aggregates.
b. Test for aggregate organic impurities.
c. Test for deleterious aggregate per ASTM C 289.
d. Proportioning of all materials.
e. Type of cement with mill certificate for cement.
f. Type of fly ash with certificate of conformance to specification requirements.
g. Slump.
h. Air content.
i. Brand, type, ASTM designation, and quantity of each admixture proposed for use.
j. 28-day cylinder compressive test results of trial mixes per ACI 318/318R and as indicated herein.
k. Shrinkage test results.
l. Standard deviation value for concrete production facility. Project Data. Submit evidence obtained within the last 5 years from previous quality control testing on the concrete mix.
m. Results of fine aggregate tests for gradation and durability.
n. Results of coarse aggregate tests for gradation and durability.

All materials included in the mixture shall be of the same type and from the same source as will be used on the project. Each mix shall be accompanied by evidence by one of the following methods that demonstrates the mix will produce concrete having the characteristics and quality as specified:

a. Project Data. Submit evidence obtained within the last 5 years from previous quality control testing on the concrete mix.

b. Mix Design Study. Submit a mix design study complying with ACI 211.1 conducted in the past 12 months. The mix design shall be completed by a testing laboratory complying with ASTM C 1077.

Project data or mix design studies shall be obtained for the exact mix as submitted. Minor mix alterations or substitutions may be accepted if approved by the Contracting Officer. Any alternations or substitutions shall be clearly identified, and shall be accompanied by recommendations from the admixture supplier or a registered professional engineer indicating the expected effects on the concrete.

Concrete Operation Plan; GA.

The plan shall demonstrate a thorough understanding of all involved technical and logistical conditions necessary for the production of concrete that meets all requirements of these specifications. The plan shall provide as a minimum the following:

a. Sources of cement, pozzolan, and aggregates.
b. Location of aggregate stockpiles, batching plant, and mixing plant.
c. Method and route for conveying batched concrete under all expected weather conditions.
d. Method of conveying concrete within the project.
e. Sources of electrical power and water.
f. Provisions for replacement of required equipment in the event of breakdown.
g. Methods for preventing aggregate stockpiles from freezing, moisture variation, or contamination.
h. Methods of consolidation and curing. Include manufacturer's literature.
i. Contractor quality control.

Cold Weather Plan; FIO.

If concrete is to be placed under cold weather conditions, the procedures, materials, methods, and protection proposed to accomplish it shall be submitted for review.

Hot Weather Plan; FIO.

If concrete is to be placed under hot weather conditions, the procedures, materials, methods, and protection proposed to accomplish it shall be submitted for review.

Joint Treatment Plan; FIO..

The methods and equipment proposed for joint cleanup and waste disposal shall be submitted for review.

SD-09 Reports

Concrete Testing Reports; FIO.

Per Article 3.13.

SD-13 Certificates

Manufacturer's Certificates; FIO.

The following materials shall be certified for compliance with all specification requirements. Submit manufacturer, type and product literature:

a. Cement and pozzolan
b. Impervious sheet curing materials
c. Admixtures
d. Curing compound

e. Bonding and patching mortar
f. Bonding agent and epoxy adhesive
g. Non-shrink grout and cure/seal compound
f. Special surface finish materials

Qualifications; FIO.

Written documentation for Contractor Quality Control personnel and Independent Testing Agency.

Batch Tickets; FIO

Batch tickets shall be collected and furnished to the Contracting Officer for each load of ready-mixed concrete. The batch tickets do not need to be transmitted through the submittal process. Ticket to show:

1) Mix identification mark.
2) General name of structure to which concrete is to be placed.
3) Quantity delivered.
4) Amount of each material in batch.
5) Outdoor temperature in the shade.
6) Time at which cement was added.
7) Time of delivery.
8) Time of discharge.
9) Numerical sequence of the delivery.
10) Amount of water added.

1.4 CONSTRUCTION TOLERANCES

Variation in alignment, grade, and dimensions of the structures from the established alignment, grade, and dimensions shown shall be within the tolerances specified in SECTION 03100 - CONCRETE FORMWORK.

1.4.1 Appearance

Finished surfaces shall be protected from stains or abrasions. Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by an approved method that does not harm the concrete. Abrupt variations in color, shade, or tint will not be permitted on these surfaces.

1.5 STORAGE OF MATERIALS

Cement and other cementitious materials shall be stored in weathertight buildings, bins, or silos which will exclude moisture and contaminants and keep each material completely separated. Do not use cementitious materials if caked or lumpy. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Aggregate shall not be stored directly on ground unless a sacrificial layer is left undisturbed. Do not use frozen or partially frozen aggregates. Allow sand to drain until moisture content is uniform prior to use. Reinforcing bars and accessories shall not be stored on cohesive soils or areas that may puddle water. Other materials shall be stored in such a manner as to avoid contamination and deterioration. Admixtures which have been in storage at

the project site for longer than 6 months or which have been subjected to freezing shall not be used unless retested and proven to meet the specified requirements. Materials shall be capable of being accurately identified after bundles or containers are opened.

1.6 GOVERNMENT ASSURANCE INSPECTION AND TESTING

The Contracting Officer may appoint a Government representative or an independent testing laboratory to inspect construction and monitor operations of the Contractor's CQC staff as considered appropriate for quality assurance. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Government inspection or testing will not relieve the Contractor of any of it's CQC responsibilities. Failure to detect defective work or material will not prevent rejection later when a defect is discovered nor will it obligate the Government for final acceptance.

PART 2 PRODUCTS

2.1 GENERAL CONCRETE REQUIREMENTS

Concrete shall be ready mixed concrete conforming to ASTM C 94. All concrete to be normal weight concrete. Water-cement ratio shall not exceed 0.44. Materials shall meet the requirements of the respective publications and other data specified below.

2.1.1 Strength Requirements

The design compressive strength (f'c) shall not be less than 4,000 pounds per square inch. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Design compressive strength (f'c) shall be evaluated for acceptance at 28 days unless pozzolan is used, in which case the design strength shall be met in 90 calendar days, provided the 90-day period does not extend past the contract expiration date. Members identified with concrete not meeting the criteria shall be replaced. The Contractor may conduct additional testing to verify strength or further define the limits of inferior concrete if approved by the Contracting Officer.

2.1.2 Slump

Slump of the concrete, as delivered to the point of placement into the forms, shall not exceed 3 inches and, shall not be less than 1 inch. Slump is measured at point of discharge of the concrete into the concrete construction member. If a superplastizer is used, the slump shall not exceed 3 inches before the admixture is added and shall not exceed 8 inches at the point of delivery after the admixture is added. Concrete of lower than minimum slump may be used provided it can be properly placed and consolidated. Pumped concrete: Provide additional water at batch plant to allow for slump loss due to pumping. Provide only enough additional water

so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified above. Determine slump per ASTM C 143.

2.1.3 Admixtures

Concrete shall not contain admixtures that provide special properties to the concrete unless specified or approved. Admixtures to be used on the project shall be included in the mix design submittals. Accelerating admixtures shall be used only during cold weather and when approved in writing.

2.1.3.1 Air Entrainment

Air entrained concrete will be required in all structures except for the footings of the closure structures.

Reference ACI 201.2R, Table 1.4.3, recommended air content for severe exposure:

Nominal max. aggregate	3/4"	1"	1.5"	3"
Ave. air content	6%	6%	5.5%	4.5%

A reasonable tolerance is + or - 1.5% subject to the limits in the following paragraph:

All concrete shall be air entrained to contain between 5 and 7 percent total air. Air content to be measured in accordance with ASTM C 231, ASTM C 173, or ASTM C 138.

2.1.4 Gradation of Aggregates

Nominal maximum size coarse aggregate shall be 1-1/2 inches, except 3/4 inch nominal maximum size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 7-1/2 inches, the depth of the slab is less than 4-1/2 inches, or the minimum cover or clear spacing between reinforcing is less than 2 inches.

2.2 CEMENTITIOUS MATERIALS

Cementitious materials shall be portland cement, or portland cement in combination with pozzolan. Minimum cement content shall be 611 pounds per cubic yard. Optional pozzolan replacement of cement shall be limited to 20 percent of the total cementitious material of a mix by weight for 15% of the cement content. Cementitious materials shall conform to appropriate specifications listed below. Use of cementitious materials in concrete which will have surfaces exposed in the completed structure shall be restricted so there is no change in color, source, or type of cementitious material.

2.2.1 Portland Cement

ASTM C 150, Type I with a maximum 15 percent amount of tricalcium

aluminate, or Type II.

2.2.2 Pozzolan (Fly Ash)

ASTM C 618, Class C or F with the optional requirements for multiple factor, drying shrinkage, and uniformity from Table 2A of ASTM C 618. Requirement for maximum alkalies from Table 1A of ASTM C 618 shall apply. Nonstaining. Hardened concrete containing fly ash to be uniform light gray color. Maximum loss on ignition: 4 percent. Compatible with other concrete ingredients.

2.3 AGGREGATES

2.3.1 Composition

Fine aggregate shall consist of clean natural sand. Coarse aggregate shall consist of natural gravel, crushed rock, or other inert granular material. Maximum amount of clay or shale particles: 1 percent.

2.3.2 Quality

The aggregate particles shall be clean, hard, unweathered, and uncoated. The shape of the particles shall be generally cubical or spherical. Where required, fines shall be removed from the aggregates by adequate washing. The aggregates as delivered to the mixer shall meet the quality requirements of ASTM C 33, Table 3 for the appropriate type or location of concrete construction for use in a severe climate.

2.3.3 Sources

Unless approved otherwise, aggregates shall be produced from the sources listed in SECTION 00830 - ATTACHMENTS. If the Contractor proposes to furnish aggregates from a source not listed, the Government will make such tests and other investigations as necessary to determine whether or not aggregates meeting the requirements of this project can be produced from the proposed source. The tests to which the aggregate will be subjected may include specific gravity, absorption, Los Angeles abrasion, soundness in magnesium sulfate, petrographic analysis, freezing and thawing in concrete, alkali-aggregate reaction, organic impurities, deleterious materials, and other tests necessary to determine that concrete of acceptable quality and cost can be produced from the materials proposed. These tests will be conducted in accordance with the applicable Corps of Engineers methods of testing given in the Handbook for Concrete and Cement. When the Contractor desires to use aggregates from a source not listed, suitable samples for quality evaluation consisting of not less than 700 pounds of each size of coarse aggregate and 300 pounds of fine aggregates shall be taken in accordance with ASTM D 75 and delivered to the Contracting Officer or to a laboratory as directed. Sampling and shipping of samples shall be at the Contractor's expense. A maximum of 120 calendar days will be required to complete evaluation of the aggregate.

2.4 CHEMICAL ADMIXTURES

Chemical admixtures, when required or permitted, shall conform to the

appropriate specification listed.

a. Air-Entraining Admixture. ASTM C 260 and shall consistently entrain the air content in the specified ranges under field conditions.

b. Accelerating Admixture. ASTM C 494, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

c. Water-Reducing or Retarding Admixture. ASTM C 494, Type A and B.

d. High-Range Water Reducer. ASTM C 494, Type F or G.

e. Do not use retarding or accelerating admixtures unless specifically approved in writing by Engineer and at no cost to Owner.

2.5 CURING MATERIALS

2.5.1 Impervious-Sheet

Impervious-sheet materials shall conform to ASTM C 171, type optional, except that polyethylene sheet shall be white opaque.

2.5.2 Membrane-Forming Compound

Membrane-Forming curing compound shall conform to ASTM C 309, Type 1-D or 2, except that only a styrene acrylate or chlorinated rubber compound meeting Class B requirements shall be used for surfaces that are to be painted or are to receive bituminous roofing, or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing, or flooring specified. Nonpigmented compound shall contain a fugitive dye, and shall have the reflective requirements in ASTM C 309 waived. Membrane-forming curing compound shall not be used on surfaces that are to be treated with floor hardener.

2.6 WATER

Water for mixing and curing shall be fresh, clean, potable, and free of oil, acid, salt, or alkali. Water for curing shall not contain any substance that stains the concrete. River water shall not be used.

2.7 GROUT

2.7.1 Nonshrink Grout:

Nonmetallic, noncorrosive, nonstaining, premixed with only water to be added. Grout to produce a positive but controlled expansion. Mass expansion not to be created by gas liberation. Minimum compressive strength of nonshrink grout at 28 days: 6500 psi.

2.7.2 Epoxy Grout:

3-component epoxy resin system: Two liquid epoxy components and one inert

aggregate filler component. Each component packaged separately for mixing at jobsite.

2.8 BONDING AGENT

ASTM C 1059, Type II.

2.9 BONDING GROUT

One part cement to one part aggregate. Mix cement and aggregate. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions. Add bonding agent/water mixture to cement/aggregate mixture. Mix to consistency of thick cream. Bonding agent itself may be used as bonding grout if approved by manufacturer and Engineer.

2.10 PATCHING MORTAR

One part cement to two and one-half parts aggregate by damp loose volume. Substitute white Portland cement for a part of gray Portland cement to produce color matching surrounding concrete. Mix cement and aggregate. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions. Add only enough bonding agent/water mixture to cement/aggregate mixture to allow handling and placing. Let stand with frequent manipulation with a trowel, until mix has reached stiffest consistency to allow placement.

2.11 EPOXY ADHESIVE

ASTM C 881, Type V.

2.12 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated or as needed for the application. Dovetail slots shall be galvanized steel. Inserts for shelf angles and bolt hangers shall be of malleable iron or cast or wrought steel.

PART 3 EXECUTION

3.1 CONCRETE FINISH SCHEDULE

a. Broomed Finish. A broomed finish shall be applied to the following surfaces: walks, exterior stairs, surfaces to receive terrazzo, treads of concrete pan stairs, and exterior slab closure. Exterior surfaces shall be sloped for drainage, unless otherwise shown.

b. Float Finish. Surfaces to be float-finished shall include the top of the structural slab where insulation is to be applied and all remaining surfaces not specified elsewhere. The finished surface shall be a true plane within 5/16 inch in 10 feet.

c. Trowel Finish. A steel trowel finish shall be applied to all floor surfaces, unless otherwise specified or indicated.

d. Forms. Surfaces, unless another type of finish is specified, shall be left with the texture imparted by the forms, except defective surfaces shall be repaired as described below. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

e. Horizontal Concrete Repairs. Concrete shall be screeded, floated, and lightly troweled to a finish approved by the Contracting Officer. The finished surface shall be a true plane within 5/16 inch in 10 feet.

3.2 PREPARATION FOR PLACING

Surfaces to receive concrete shall be clean, damp and free from frost, ice, mud, loose particles, foreign matter, and water. Forms shall be in place, cleaned, coated, and adequately supported. Reinforcing steel shall be in place, cleaned, tied, and adequately supported. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition and in sufficient amount for the entire placement. Concrete shall not be placed before the completion of all adjacent pile driving or other operations that might prove detrimental to freshly placed concrete.

3.2.1 Soil Subgrades

Immediately prior to setting forms and reinforcement, the foundation shall be compacted with a manual tamper.

3.2.2 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Conduit and other embedded items shall be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids.

3.3 CONCRETE PRODUCTION

Concrete shall be furnished from a ready-mixed concrete plant, except that small batches for pours less than 2 cubic yards may be batched on-site. Ready-mixed concrete shall be batched, mixed, and transported in accordance with ASTM C 94. Truck mixers, agitators, and nonagitating transporting units shall comply with NRMCA TMMB-100. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA QC 3. Aluminum pipes, chutes, troughs, spouts, or tremies shall not be used for pumping, conveying, or placing concrete.

3.3.1 Concrete Mixers

The mixers shall not be charged in excess of the capacity recommended by the manufacturer. Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94. Each truck shall be equipped with two counters from which it is possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

3.3.2 Site Mixed Concrete

If the Contractor elects to provide an on site batching and mixing plant, a batch type plant shall be provided of sufficient capacity to prevent cold joints. Site-mixed concrete shall be produced in conformance with ACI 301, or by volumetric batching and continuous mixing in conformance with ASTM C 685.

3.4 TRANSPORTING CONCRETE TO PROJECT SITE

Concrete shall be transported to the placing site in truck mixers.

3.5 CONVEYING CONCRETE ON SITE

Concrete shall be conveyed from mixer to forms by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper, which is conical in shape, and shall not be dropped vertically more than 5 feet, except where suitable equipment is provided to prevent segregation and where specifically authorized. Trucks shall be equipped with radios or phones to permit communication between the mixing plant and the concrete placement site.

3.5.1 Concrete Pumps

The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three times the nominal maximum size coarse aggregate in the concrete mixture to be pumped, but not less than 5 inches. The maximum size coarse aggregate will not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms and in compliance with the approved environment protection plan.

3.6 PLACING CONCRETE

Place concrete in compliance with ACI 304 and ACI 304.2. Mixed concrete shall be discharged within 1-1/2 hour or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the length of haul makes it impossible to deliver truck- mixed concrete within this time limit, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site. Concrete shall be

placed within 15 minutes after it has been discharged from the transporting unit. Sufficient placing capacity shall be provided so that concrete can be kept free of cold joints. Do not allow concrete to freefall more than 4 feet.

3.6.1 Depositing Concrete

Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 18 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screeded to the proper level. Concrete shall be deposited continuously so that fresh concrete is deposited on in-place concrete that is still plastic.

3.6.2 Consolidation

Consolidation of concrete shall conform to ACI 309, except as otherwise specified. Immediately after placing, each layer of concrete shall be consolidated by internal vibrators. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete. A spare vibrator shall be kept at the jobsite during all concrete placing operations. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a reasonable amount. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then vertically withdrawn slowly while operating. Form vibrators shall not be used unless specifically approved and unless forms are constructed to withstand their use. Vibrators shall not be used to move concrete within the forms. Excessive vibration of concrete resulting in segregation shall be prevented.

3.6.3 Cold Weather Requirements

Concrete shall not be placed without a procedure approved in accordance with paragraph: SUBMITTALS when the concrete is likely to be subjected to freezing temperatures before the expiration of the curing period. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. The placing temperature of the concrete shall be as recommended in ACI 306, Table 3.1, with the temperature of the concrete measured in accordance with ASTM C 1064. Do not place heated concrete that is warmer than 80 degrees F. Air and form temperature in contact with concrete shall be above 50 degrees F prior to placing concrete and maintained for the first 3 days, and at a temperature above 32 degrees F for the remainder of the specified curing period. Do not place concrete on frozen ground. Thermometers shall be installed at such locations as may be directed. Suitable thermometers shall be furnished by the Contractor and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. During the period of protection

removal, heat shall be shut down and insulation or tents shall removed in a systematic schedule such that the temperature differential between the air and concrete surface does not exceed 25 degrees F. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure, and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. Materials entering the mixer shall be free from ice, snow, or frozen lumps.

3.6.4 Hot Weather Requirements

Concrete shall be properly placed and finished with approved procedures in accordance with paragraph: SUBMITTALS. When hot, windy conditions during concreting appear probable, equipment and material shall be at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete. The concrete-placing temperature shall not exceed 85 degrees F (60 degrees F for concrete for horizontal repairs). Cooling of the mixing water or aggregates or placing concrete in the cooler part of the day may be required to obtain an adequate placing temperature. Steel forms and reinforcements shall be cooled prior to concrete placement when steel temperatures are greater than 120 degrees F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature. When the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305, may reasonably be expected to exceed 0.2 pounds per square feet per hour, provision for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

3.7 JOINTS

All joints not shown on the drawings are subject to approval by the Contracting Officer. Joints shall be perpendicular to the main reinforcement. Place waterstops per SECTION 03150: EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS.

3.7.1 Construction Joints

Concrete shall be placed continuously so that structural members are monolithic in construction. Construction joints shall be located and constructed as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type of construction joint shall be subject to approval of the Contracting Officer. Fresh concrete shall not be placed against adjacent hardened concrete until it is at least 48 hours old.

3.7.1.1 Preparation for Construction Joints

Concrete surfaces to which other concrete is to be bonded shall be abraded in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Surfaces shall be thoroughly washed and shall be damp but without free water when concrete is placed or joint shall be coated with epoxy adhesive or cement grout. The concrete surface shall be free of all accumulated laitance, coatings, stains, debris, loose material,

and other foreign matter. Laitance shall be removed when the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse aggregate particles.
The surface shall be cleaned as the last operation prior to closing forms and obstructing the area with reinforcement.

3.7.2 Expansion and Contraction (Control) Joints

See SECTION 03150: EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

3.8 REPAIR OF SURFACE DEFECTS

3.8.1 Preparation for Surface Repairs

Preparation for surface repairs shall follow the requirements for preparation for construction joints, with the following additional criteria: The surface preparation shall include air-water cutting, sandblasting, high-pressure water jet, or other approved method. The surface shall be cleaned as the last operation prior to placing concrete or obstructing the area with reinforcement. The surface shall be watered for 12 hours prior to placing concrete. Horizontal surfaces shall be air blasted to remove puddled water.

3.8.2 Repairing Surface Defects

Repair shall follow procedure of "Finishing Formed Surfaces" below.

3.9 FINISHING FORMED SURFACES

Beginning no more than 24 hours after form removal,, all fins and loose materials shall be removed. All voids and honeycombs exceeding 1/2 inch in diameter and all tie rod holes shall be reamed or chipped and filled with patching mortar. Voids and honeycomb shall be dampened, brush-coated with a neat cement grout or with an approved bonding agent, and filled with patching mortar. Allow bonding grout to set for period of time required by bonding agent manufacturer before applying premixed patching mortar.
Mortar shall be thoroughly compacted inplace and struck off to adjacent concrete, or mortar during remedial work, including curing, shall be above 50 F. The patched areas shall be cured for seven days. Defective areas larger than 36 square inches in any surface shall be replaced or corrected as directed by the Contracting Officer.

3.9.1 Ordinary and Sack Rubbed Surface Finishes

An Ordinary Surface Finish or Sack Rubbed Surface Finish shall be applied to new exposed concrete surfaces. The term "exposed surfaces", as used hereinafter, shall mean exposed to public view in the completed structure above a point 6 inches below the final groundline. The Contractor, at the Contractor's option, may use the Sack Rubbed Method to fill smaller voids in lieu of the Ordinary Method.

3.9.1.1 Ordinary Surface Finish

As soon as possible after removal of the forms, the concrete surfaces shall

be examined for areas of unsound concrete and defective surfaces due to improper concrete placement, faulty form work, faulty form removal, and other causes. Concrete with porosity, honey comb, or segregated materials shall be removed and replaced, but the ordinary surface finish shall not be started until the Engineer has viewed the extent of the defective concrete and has approved the time and method of repair and the materials to be used. In general, small areas may be repaired with mortar as specified for surface cavities; large areas may require concrete with formed surfaces.

A bonding agent, mechanical bonds, or both may be required, and all repair work shall be cured in an approved manner. When defects in a concrete section are so extensive that satisfactory repairs cannot be made, that section will be considered unacceptable work. All fins and irregular projections shall be removed from exposed surfaces and form surfaces that will be waterproofed. All surface cavities produced by form ties, and on exposed surfaces, any surface cavities (bug holes) with a diameter of approximately 3/8 inch and larger, and smaller surface cavities so closely spaced as to be conspicuous shall be thoroughly cleaned, saturated with water, and filled with mortar. The mortar shall consist of 1 part white cement, 2 parts standard Portland cement, 6 parts mortar sand, and water. For surfaces which will not be exposed to view, standard Portland cement may be substituted for the white cement. The amount of water used shall produce a mortar consistency as dry as possible to use effectively, and to further reduce plastic shrinkage, the mortar shall be mixed about one hour in advance of use. An approved latex or acrylic-based bonding agent shall be incorporated into the mortar used for performing the ordinary surface finish. with mortar, thoroughly compacted into place, pointed, and trimmed flush with the concrete surface.

On exposed surfaces, mortar stains or streaks outside the area of the filled cavity shall be avoided and, if they should occur, they shall be removed. When the specifications or drawings do not specify additional surface finishing on an exposed surface, at the time of completion of all concrete work on the structure, all conspicuous streaks, stains, and blemishes shall be removed from the surface. Additional surface finishing shall also be done on an exposed surface that requires only ordinary surface finish, when the ordinary surface finish is performed before the completion of the curing period for the concrete being finished, the finishing shall be done with a minimum of interruption to the curing.

3.9.1.2 Sack Rubbed Surface Finish

Where numerous surface voids are present on an exposed surface, the Sack Rubbed Finish may be used to fill the smaller voids in lieu of the method described under Ordinary Surface Finish. However, the filling of form tie holes and other large cavities shall be done as specified under Ordinary Surface Finish. As a preparatory operation, the entire surface shall be ground with a high-speed, electric, disk-type grinder or sandblasted until blemishes, discoloration, and thin mortar films covering surface voids have been removed. When the structure has been completed to the extent that further blemishes and discolorations on the surface will not result from any remaining construction, the final operations shall be performed as follows:

1) Initial Operation

The surface shall be thoroughly saturated with water and while the surface is still moist, a mortar mixture (consisting of 1 part white cement, 1 part standard Portland cement, and 2 parts mortar sand, with sufficient water added to produce a moderately thick paste) shall be applied to the wetted area with a rubber float, starting at the top. All voids shall be completely filled during this operation. If any portion of the surface shows evidence of becoming dry before the mortar is applied, it shall be rewetted.

2) Operations During Mortar Cure

After the mortar has set sufficiently to be retained within the voids, and before it has become completely dry, the entire surface which has been floated with mortar shall be rubbed with a small burlap sack filled with a dry mix (sand and cement only) of the mortar described above. All mortar in excess of that required to fill the voids shall be removed during the dry mortar sack rubbing operations. In lieu of the dry mix filled burlap sack, any equally effective means of removing the excess mortar will be approved.

3) Final Operation

The completed surface shall be free of blemishes, discolorations, surface voids, and conspicuous form marks. The surface shall be uniform in texture and appearance except for the difference in texture between filled voids and the remainder of the surface. Surfaces that do not meet these requirements shall be corrected to the satisfaction of the Engineer.

3.10 FINISHING UNFORMED SURFACES

The finish of all unformed surfaces shall meet the requirements of paragraph Tolerances in PART 1, when tested as specified herein.

3.10.1 General

Unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish, with additional finishing as specified below, and shall be true to the elevation shown on the drawings. Unless otherwise shown on the drawings, exterior surfaces shall be sloped for drainage, as directed. Joints shall be carefully made with a jointing or edging tool. The dusting of surfaces with dry cement or other materials or the addition of any water during finishing shall not be permitted. If bleedwater is present prior to finishing, the excess water shall be carefully dragged off or removed by absorption with porous materials such as burlap. Slabs with surfaces which exhibit significant crazing shall be removed and replaced.

3.10.2 Rough Slab Finish

As a first finishing operation for unformed surfaces and as final finish for slabs to receive mortar setting beds, the surface shall receive a rough slab finish. The concrete shall be screeded with straightedge strikeoffs immediately after consolidation to bring the surface to the required finish

level with no coarse aggregate visible. Side forms and screed rails shall be provided, rigidly supported, and set to exact line and grade.

3.10.3 Floated Finish

Screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. After the concrete has stiffened it shall be floated to a true and even plane free of ridges. Floating shall be performed by use of suitable hand floats or power driven equipment.

3.10.4 Troweled Finish

The finished surface shall be thoroughly consolidated and shall be steel-troweled to a smooth, even, dense finish, free from blemishes including trowel marks and be uniform in texture and appearance. A final hard steel troweling shall be done by hand, with the trowel tipped, and using hard pressure, when the surface is at a point that the trowel will produce a ringing sound. Tolerance shall be true planes within 5/16 inch in 10 feet as determined by a 10 foot straightedge placed anywhere on the slab in any direction.

3.10.5 Broomed Finish

After floating, the surface shall be lightly steel troweled, and then carefully scored by pulling a coarse fiber push-type broom across the surface. Brooming shall be transverse to traffic or at right angles to the slope of the slab. After the end of the curing period, the surface shall be vigorously broomed with a coarse fiber broom to remove all loose or semi-detached particles.

3.11 CURING AND PROTECTION

Concrete shall be cured by an approved method for a period of 7 days, except that cement blended with pozzolan shall be cured for 14 days.

3.11.1 General

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and damage from rain and flowing water. Materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat, including welding, shall be permitted near or in direct contact with the concrete at any time. In cold weather, follow curing procedures in Cold Weather Plan. In hot weather, follow curing in Hot Weather Plan

3.11.2 Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period, commencing immediately after finishing. When wooden forms are left in place during curing, they shall be kept wet at all times. Surfaces shall be cured by ponding, by continuous sprinkling, by

continuously saturated burlap or cotton mats, or by continuously saturated plastic coated burlap. Burlap and mats shall be clean and free from any contamination and shall be completely saturated before being placed on the concrete. The Contractor shall have an approved work system to ensure that moist curing is continuous 24 hours per day. If inspection identifies an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for those areas shall be extended by 1 day.

3.11.3 Membrane forming Curing Compounds

Membrane curing will not be permitted on any surface to which sack-rubbed finish or smooth finish is to be applied. Membrane curing shall not be used on surfaces containing protruding steel reinforcement, or surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete, such as additional concrete, hardeners, sealers, terrazzo, or abrasive aggregate finish. Clear or translucent membrane-forming compound with fugitive dye shall be used on all surfaces permanently exposed to view, and white pigmented compound may be used on all other surfaces. A styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B requirements, may be used for surfaces which are to be painted or are to receive bituminous roofing or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing or flooring. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam.

Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. All surfaces shall be thoroughly moistened with water. Curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 75 psi, at a uniform coverage of not more than 400 square feet per gallon for each coat, and the second coat shall be applied perpendicular to the first coat. Allow preceding coat to completely dry prior to applying the next coat. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. Surfaces on which clear compound is used shall be shaded from direct rays of the sun for the first 3 days. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

Appearance is a primary consideration for exterior concrete surfaces exposed to view. The Contractor shall exercise extreme care to apply curing compound evenly on these surfaces. Variations in shade, color, or tint, resulting from uneven application of curing compound, shall be repaired by and at the expense of the Contractor as directed.

3.11.4 Impervious Sheeting

Surfaces shall be thoroughly wetted and be completely covered with sheeting. Sheeting shall be at least 18 inches wider than the concrete surface to be covered. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 12 inches and securely weighted down or shall be lapped not less than 4 inches and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. If inspection identifies tears, holes, laps or joints that are not completely closed, the tears and holes shall immediately be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by 1 day.

3.11.5 Ponding or Immersion

Water shall not be more than 20 degrees F less than the temperature of the concrete.

3.12 GROUT

3.12.1 Grout Schedule of Use

a. Nonshrink grout: Filling form tie holes, under column and beam base plates, other uses indicated on the Drawings.

b. Epoxy grout: Patching cavities in concrete, grouting of dowels and anchor bolts into existing concrete, other uses indicated on the Drawings.

3.12.2 Grout Installation

a. Nonshrink grout: Clean concrete surface to receive grout. Saturate concrete with water for 24 HRS prior to grouting. Mix in a mechanical mixer. Use no more water than necessary to produce flowable grout. Place in accordance with manufacturer's instructions. Provide under beam, column, and equipment base plates, and in other locations indicated on the Drawings. Completely fill all spaces and cavities below the top of base plates. Provide forms where base plates and bed plates do not confine grout. Where exposed to view, finish grout edges smooth. Except where a slope is indicated on the Drawings, finish edges flush at the base plate, bed plate, member or piece of equipment. Coat exposed edges of grout with cure or seal compound recommended by the grout manufacturer.

b. Epoxy grout: Mix and place in accordance with manufacturer's instructions. Apply only to clean, dry, sound surface. Completely fill all cavities and spaces around dowels and anchors without voids. Grout base and bed plates as specified for nonshrink grout. Obtain manufacturer's field technical assistance as required to assure proper placement.

3.13 TESTING AND INSPECTION FOR CONTRACTOR QUALITY CONTROL

The Contractor's Independent Testing Agency shall perform the inspection and tests described below and, based upon the results of these inspections and tests, shall take the action required and shall submit specified reports. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease and the operation shall be corrected. If the Government conducts quality assurance testing, the Contractor shall assist in collection of samples as directed. All necessary platforms, tools, and equipment for obtaining samples shall be furnished by the Contractor.

3.13.1 Gradation

3.13.1.1 Fine Aggregate

At least once during each shift when the concrete plant is operating, there shall be one sieve analysis in accordance with ASTM C 136.

3.13.1.2 Coarse Aggregate

At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate.

3.13.2 Concrete Mixture

a. Air Content Testing. Air content tests shall be measured when compressive strength specimens are fabricated. Specified air content shall be attained at point of placement into the forms. Measurement shall be in accordance with ASTM C 231.

c. Slump Testing. The concrete slump shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 143. The slump shall be reported along with the compressive strength data.

e. Temperature. The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064. The temperature shall be reported along with the compressive strength data.

f. Strength Specimens. Test cylinders shall be cast for compressive strength tests for each mix design at the following rates:

a. not less than once each day when pour exceeds 8 cubic yards.

b. not less than once for each 125 cubic yards of concrete.

c. the number of test cylinders need not exceed 3 sets per day for each mix.

A set of test specimens shall consist of four cylinders, one to be tested at 7 days and two at 28 days. If either of the 28 day breaks does not meet the specified strength, the fourth cylinder shall be tested at 90 days, otherwise it shall be discarded. Test specimens

shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Results of all strength tests shall be reported immediately to the Contracting Officer.

3.13.3 Inspection Before Placing

Foundations, construction joints, forms, and embedded items shall be inspected by the Contractor in sufficient time prior to each concrete placement in order to certify to the Contracting Officer that they are ready to receive concrete. Full cooperation shall be given other trades to install embedded items. Suitable templates or instructions shall be used for setting items not placed in the forms.

3.13.4 Cold-Weather Protection

At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. Any deficiencies shall be noted, corrected, and reported.

3.13.5 Reports

The results of all tests and inspections conducted at the project site, as well as corrective actions taken, shall be reported in writing weekly and shall be delivered to the quality assurance representative within three days after the end of each weekly reporting period. The Contracting Officer has the right to examine all Contractor quality control records.

-- End of Section --

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SECTION 05055

METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS
01/02

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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1997) Carbon Structural Steel
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 307	(1997) Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 325	(1994) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Sensile Strength
ASTM A 449	(2000) Standard Specification for Quenched and Tempered Steel Bolts and Nuts
ASTM A 563	(1996) Specification for Carbon and Alloy Steel Nuts
ASTM A 572	(1997) Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 584	(1992) Aluminum-Coated Steel Woven Wire Fence Fabric
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM E 165	(1995) Liquid Penetrant Examination Inspection Method
ASTM E 709	(1995) Magnetic Particle Examination
ASTM F 436	(1993) Specification for Hardened Steel Washers
ASTM F 593	(1998) Stainless Steel Bolts, Hex Cap

Screws, and Studs

ASME INTERNATIONAL (ASME)

ASME B4.1	(1967; R 1994) Preferred Limits and Fits for Cylindrical Parts.
ASME B18.2.1	(1996) Square and Hex Bolts and Screws Inch Series.
ASME B18.2.2	(1989; R 1993) Square and Hex Nuts (Inch Series)
ASME B18.6.3	(1972; R 1991) Machine Screws and Machine Screw Nuts
ASME B18.21.1	(1994) Lock Washers (Inch Series)
ASME B18.22.1	(1965; R 1990) Plain Washers
ASME B18.22M	(1981; R 1990) Metric Plain Washers

Minnesota Department of Transportation (MNDOT) Standard Specifications for Construction (1995 Edition with Supplements)

MNDOT 2257d	Fencing (Chain Link)
MNDOT 2557d	Fencing (Chain Link)
MNDOT 3406	Structural Metal Posts

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MBG 531	(1993) Metal Bar Grating Manual
NAAMM MBG 532	(1988) Heavy Duty Metal Bar Grating Modulal

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel
AWS D1.2	(1990) Structural Welding Code-Aluminum

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-04 Drawings

Detail Drawings; GA.

Detail drawings for metalwork, chain link fencing and machine work shall be submitted and approved prior to fabrication.

SD-07 Schedules

Materials Orders; FIO.

Copies of purchase orders, mill orders, shop orders and work orders for materials shall be submitted prior to the use of the materials in the work.

Materials List; FIO.

Materials list for fabricated items shall be submitted at the time of submittal of detail drawings.

Shipping Bill; FIO.

Shipping bill shall be submitted with the delivery of finished pieces to the site.

Structural Steel Welding Repairs; FIO.

Welding repair plans for steel shall be submitted and approved prior to making repairs.

SD-18 Records

1.3 METALWORK AND MACHINE WORK DETAIL DRAWINGS

Detail drawings for metalwork, fencing and machine work shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of material as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the detail drawings.

1.4 DELIVERY, STORAGE AND HANDLING

Galvanized steel items shall be stored in a dry location with spacers to separate the pieces from the ground and each other.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Materials Orders

The Contractor shall furnish 3 copies of purchase orders, mill orders, shop orders and work orders for all materials orders and items used in the work. Where mill tests are required purchase orders shall contain the test site address and the name of the testing agency.

2.1.2 Materials List

The Contractor shall furnish a materials list of the materials to be used in the fabrication of each item.

2.1.3 Shipping Bill

The Contractor shall furnish a shipping bill or memorandum of each shipment of finished pieces or members to the project site giving the designation mark and weight of each item, the number of items, the total weight, and the car initial and number if shipped by rail in carload lots. Duplicate copies of shipping bills shall be mailed promptly to the Contracting Officer.

2.1.4 Miscellaneous Metals and Standard Articles

2.1.4.1 Structural Steel

ASTM A 36, or ASTM A 572, Grade 50, as indicated. Galvanized after fabrication.

2.1.4.2 Threaded Rod

Steel Rod

ASTM A 449, galvanized after fabrication.

2.1.4.3 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall be of the material, grade, type, class, style and finish indicated or best suited for intended use.

High-Strength Bolts, Nuts, and Washers

Bolts: ASTM A 325, Type 1, hot-dip galvanized.
Nuts: ASTM A 563, hot-dip galvanized.

Bolts, Nuts, and Washers (Other than High-Strength)

a. Bolts and Nuts - ASTM A 307, Grade A, hot-dip galvanized.
b. Bolts - ASME B18.2.1.
c. Nuts - ASME B18.2.2.
d. Washers

(1) Plain Washers - ASME B18.22M ASME B18.22.1, Type B.
(2) Lock Washer - ASME B18.21.1.
(3) Beveled Washers - ASTM F 436, Beveled.

2.1.4.4 Screws

Screws shall be of the material, grade, type, style, and finish indicated or best suited for use intended.

Machine Screws

ASME B18.6.3.

2.1.4.5 Welding Electrodes

AWS D1.1, E70 Series or as required by AWS Specification.

2.1.4.6 Embedded Anchor Bolts, Expansion Anchor Bolts, Adhesive Anchor Bolts

Material: ASTM F 593 Stainless steel, Type 304 or 316. Provide Type 316 unless noted otherwise. Provide minimum edge distance cover and spacing as recommended by manufacturer, or as indicated on Drawings whichever is larger. Depth of embedment: minimum embedment as recommended by manufacturer or nine diameters of bolt, whichever is larger. Notify Contracting Officer if required depth of embedment cannot be achieved at a particular anchor bolt location. Follow manufacturer's recommendations for installation and torque.

Submit manufacturer's load test data to verify at least the anchor bolt capacities at the following embedment depths: (Data must be based on actual tests performed in unreinforced mass concrete of not more than 4000 psi compressive strength. Capacity must be at a concrete temperature of at least 130 Degrees F).

ANCHOR BOLT EMBEDMENT & CAPACITY

ANCHOR BOLT DIAMETER	MINIMUM EMBEDMENT (IN)	MINIMUM ULTIMATE TENSION CAPACITY (KIP)
1/2	4-1/2	8.1
5/8	5-5/8	11.4
3/4	6-3/4	15.4
7/8	7-7/8	20.1
1	9	24.1
1-1/4	11-1/4	34.3

2.1.4.7 Galvanizing Repair Paint

High zinc dust content paint for regalvanizing welds and abrasions. Dried film shall contain not less than 83 percent zinc dust by weight.

2.2 FABRICATION

Provide each fabricated item complete with attachment devices as indicated or required to install.

2.2.1 Structural Fabrication

Structural steel shapes and plate shall be ASTM A 36 galvanized, unless noted otherwise on Drawings. Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods

that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on detail drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

2.2.1.1 Dimensional Tolerances for Structural Work

Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/32 inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown by not more than 1/16 inch for members 30 feet or less in length and by more than 1/8 inch for members over 30 feet in length. Finished members shall be free from twists, bends and open joints. Sharp kinks, bends and deviation from above tolerances are cause for rejection of material. Comply with requirements of applicable building codes and AISC Specification with modifications and additional requirements specified herein.

2.2.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Hand-guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal. Minimize the amount of field welding, shop assemble components into largest size possible commensurate with transportation and handling limitations.

2.2.2 Welding

2.2.2.1 Welding of Structural Steel

a. Welding Procedures for Structural Steel - Welding procedures for structural steel shall be prequalified as described in AWS D1.1, or shall be qualified by tests as prescribed in AWS D1.1. 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. 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. Welding shall be such as to minimize residual stresses, distortion and shrinkage. Each welder shall use identifying mark at welds.

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, to maintain low moisture of low hydrogen electrodes.

(2) Preheat and Interpass Temperature - Preheating shall be performed as required by AWS D1.1, 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, hold at that temperature until the welding is completed and then permitted to cool slowly in still air. Do not perform welding when ambient temperature is lower than 0 degrees F or where surfaces are wet or exposed to rain, snow, or high wind, or when welders are exposed to inclement conditions.

(3) Stress-Relief Heat Treatment - Where stress relief heat treatment is specified or shown, it shall be in accordance with

the requirements of AWS D1.1.

d. Workmanship - Workmanship for welding shall be in accordance with AWS D1.1.

(1) Preparation of Base Metal - Prior to welding the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1.

(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 for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds arcs shall not be struck in other than weld locations. Each temporary weld shall be removed and ground flush with adjacent surfaces after serving its purpose.

(3) Tack Welds - Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds and shall be cleaned and thoroughly fused with permanent welds. Preheating shall be performed as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

2.2.3 Bolted Connections

2.2.3.1 Bolted Structural Steel Connections

a. Bolt Holes - Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical. Do not make or enlarge holes by burning.

(1) Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16 inch larger than the diameter of the bolt.

(2) Holes for fitted bolts shall be match-reamed or drilled in the shop. Burrs resulting from reaming shall be removed. The threads of bolts shall be entirely outside of the holes. The body diameter of bolts shall have tolerances as recommended by ASME B4.1 for the class of fit specified. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

(3) Holes for high strength bolts shall have diameters of not more than 1/16 inch larger than bolt diameters. If the thickness of the material is not greater than the diameter of the bolts the holes may be punched. If the thickness of the material is greater than the diameter of the bolts the holes may be drilled full size

or subpunched or subdrilled at least 1/8 inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting occurring during assembly shall not distort the metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

2.2.4 Machine Work

Tolerances, allowances and gauges for metal fits between plain, non-threaded, cylindrical parts shall conform to ASME B4.1 for the class of fit shown or required unless otherwise shown on approved detail drawings. Where fits are not shown they shall be suitable as approved. Tolerances for machine-finished surfaces designated by non-decimal dimensions shall be within 1/64 inch. Sufficient machining stock shall be allowed on placing pads to ensure true surfaces of solid material. Finished contact or bearing surfaces shall be true and exact to secure full contact. Journal surfaces shall be polished and all surfaces shall be finished with sufficient smoothness and accuracy to ensure proper operation when assembled. Parts entering any machine shall be accurately machined and all like parts shall be interchangeable except that parts assembled together for drilling or reaming of holes or machining will not be required to be interchangeable with like parts. All drilled bolt holes shall be accurately located.

2.2.4.1 Unfinished Surfaces

All work shall be laid out to secure proper matching of adjoining unfinished surfaces unless otherwise directed. Where there is a large discrepancy between adjoining unfinished surfaces they shall be chipped and ground smooth or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts shall be filled in an approved manner.

2.2.5 Miscellaneous Provisions

2.2.5.1 Metallic Coatings

a. Zinc Coatings - Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. Where zinc coatings are destroyed by cutting, welding or other causes the affected areas shall be regalvanized. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating. Coatings less than 2 ounces shall be repaired in accordance with ASTM A 780.

#.1 Shop Assembly

Each machinery and structural unit furnished shall be assembled in the shop to determine the correctness of the fabrication and matching of the

component parts unless otherwise specified. Tolerances shall not exceed those shown. Each unit assembled shall be closely checked to ensure that all necessary clearances have been provided and that binding does not occur in any moving part. Assembly in the shop shall be in the same position as final installation in the field unless otherwise specified. Assembly and disassembly work shall be performed in the presence of the Contracting Officer unless waived in writing. Errors or defects disclosed shall be immediately remedied by the Contractor without cost to the Government. Before disassembly for shipment each piece of a machinery or structural unit shall be match-marked to facilitate erection in the field. The location of match-marks shall be indicated by circling with a ring of white paint after the shop coat of paint has been applied or as otherwise directed.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

The Contractor shall have required material tests and analyses performed and certified by an approved laboratory to demonstrate that materials are in conformity with the specifications. These tests and analyses shall be performed and certified at the Contractor's expense. Tests, inspections, and verifications shall conform to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Tests shall be conducted in the presence of the Contracting Officer if so required. The Contractor shall furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Specimens and samples shall be properly labeled and prepared for shipment.

2.3.1 Nondestructive Testing

When doubt exists as to the soundness of any material part such part may be subjected to any form of nondestructive testing determined by the Contracting Officer. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government. Any defects will be cause for rejection and rejected parts shall be replaced and retested at the Contractor's expense.

2.3.2 Tests of Machinery and Structural Units

The details for tests of machinery and structural units shall conform to the requirements of the particular sections of these specifications covering these items. Each complete machinery and structural unit shall be assembled and tested in the shop in the presence of the Contracting Officer unless otherwise directed. Waiving of tests will not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site each complete machinery or structural unit shall be operated through a sufficient number of complete cycles to demonstrate to the satisfaction of the Contracting Officer that it meets the specified operational requirements in all respects.

2.3.3 Inspection of Structural Steel Welding

The Contractor shall maintain an approved inspection system and perform required inspections in accordance with Contract Clause CONTRACTOR INSPECTION SYSTEM. Welding shall be subject to inspection to determine conformance with the requirements of AWS D1.1, the approved welding procedures and provisions stated in other sections of these specifications. Nondestructive examination of designated welds will be required. Supplemental examination of any joint or coupon cut from any location in any joint may be required.

2.3.3.1 Visual Examination

All visual examination of completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.1.

2.3.3.2 Nondestructive Examination

The nondestructive examination of shop and field welds shall be performed as designated or described in the sections of these specifications covering the particular items of work. Ten percent of all welds shall be tested.

a. Testing Agency - The nondestructive examination of welds and the evaluation of examination tests as to the acceptability of the welds shall be performed by a testing agency adequately equipped and competent to perform such services or by the Contractor using suitable equipment and qualified personnel. In either case written approval of the examination procedures is required and the examination tests shall be made in the presence of the Contracting Officer. The evaluation of examination tests shall be subject to the approval and all records shall become the property of the Government.

b. Examination Procedures - Examination procedures shall conform to the following requirements.

(1) Ultrasonic Testing - Making, evaluating and reporting ultrasonic testing of welds shall conform to the requirements of AWS D1.1. The ultrasonic equipment shall be capable of making a permanent record of the test indications. A record shall be made of each weld tested.

(2) Radiographic Testing - Making, evaluating and reporting radiographic testing of welds shall conform to the requirements of AWS D1.1.

(3) Magnetic Particle Inspection - Magnetic particle inspection of welds shall conform to the applicable provisions of ASTM E 709.

(4) Dye Penetrant Inspection - Dye penetrant inspection of welds shall conform to the applicable provisions of ASTM E 165.

c. Acceptability of Welds - Welds shall be unacceptable if shown to have defects prohibited by AWS D1.1, Subsection 9.25 or possess any degree of incomplete fusion, inadequate penetration or undercutting.

2.3.3.3 Test Coupons

The Government reserves the right to require the Contractor to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive examination. Should tests of any two coupons cut from the work of any welder show strengths less than that specified for the base metal it will be considered evidence of negligence or incompetence and such welder shall be removed from the work. When coupons are removed from any part of a structure the members cut shall be repaired in a neat manner with joints of the proper type to develop the full strength of the members. Repaired joints shall be peened as approved or directed to relieve residual stress. The expense for removing and testing coupons, repairing cut members and the nondestructive examination of repairs shall be borne by the Government or the Contractor in accordance with the Contract Clauses INSPECTION AND ACCEPTANCE.

2.3.3.4 Supplemental Examination

When the soundness of any weld is suspected of being deficient due to faulty welding or stresses that might occur during shipment or erection the Government reserves the right to perform nondestructive supplemental examinations before final acceptance. The cost of such inspection will be borne by the Government.

2.3.4 Structural Steel Welding Repairs

Defective welds in the structural steel welding repairs shall be repaired in accordance with AWS D1.1. Defective weld metal shall be removed to sound metal by use of air carbon-arc or oxygen gouging. The surfaces shall be thoroughly cleaned before welding. Welds that have been repaired shall be retested by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds costs of repairs and retesting shall be borne by the Contractor.

2.4 Fencing, Chain Link

Fencing materials shall conform to MNDOT 2557d. Fence fabric shall be in conformance with ASTM A 584, 9 gage, with 2" mesh. Posts shall conform to MNDOT 3406, Structural Metal Posts.

PART 3 EXECUTION

3.1 INSTALLATION

All parts to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Holes and grooves for lubrication shall be cleaned. Where units or items are shipped as assemblies they will be inspected prior to installation. Disassembly, cleaning and lubrication will not be required except where necessary to place the assembly in a clean and properly lubricated condition. Pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts shall not be used for assembling and

tightening parts. Bolts and screws shall be tightened firmly and uniformly but care shall be taken not to overstress the threads. When a half nut is used for locking a full nut the half nut shall be placed first and followed by the full nut. Threads of all bolts except high strength bolts, nuts and screws shall be lubricated with an approved lubricant before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with an approved antigalling compound. Driving and drifting bolts or keys will not be permitted. After erection, grind smooth all sharp surface irregularities resulting from field cutting or welding; power tool clean welds, bolts, washers and abrasions to shop coat removing all rust and foreign matter.

3.1.1 Alignment and Setting

Each machinery or structural unit shall be accurately aligned by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place. The alignment of all parts with respect to each other shall be true within the respective tolerances required. Machines shall be set true to the elevations shown.

3.1.2 Blocking and Wedges

All blocking and wedges used during installation for the support of parts to be grouted in foundations shall be removed before final grouting unless otherwise directed. Blocking and wedges left in the foundations with approval shall be of steel or iron.

3.1.3 Expansion Anchor Bolts and Adhesive Anchor Bolts

Install in strict accordance with manufacturer's instructions for hole size, hole cleaning, installation, torque requirements substrate temperature and curing. Use only carbide-tipped drilling equipment.

3.1.4 Bolted Connections

Install ASTM A 325 bolts with hardened washers. Install and tighten in accordance with Section 8 of Specifications for Structural Joints. Coordinate installation with inspection. Do not start installation until coordination with Testing Agency is complete. Slip critical connections: Perform calibration testing for all methods of installation of high-strength bolts in accordance with Section 8(b) of Specification for Structural Joints, using ASTM A 325 bolts.

1. Turn-of-nut tightening: Torque wrenches shall be used only by laboratory personnel.

2. Calibrated wrench tightening: Calibrate on a daily basis.

3. Direct tension indicator tightening: If previously approved by Contracting Officer.

4. Installation of alternate design bolts: If previously approved by Contracting Officer.

In the event any bolt in a connection is found to be defective, check and retighten all bolts in the connection.

Do not use gas cutting to correct fabrication errors. In case members do not fit or holes do not match, ream out the holes and insert the next larger size bolt. If the connections require new holes, then drill new holes. Make no such corrections without prior approval of the Contracting Officer. Burning of holes: Not permitted.

Tighten and leave in place erection bolts used in welded construction. Provide beveled washers to give full bearing to bolt head or nut where bolts are to be used on surfaces having slopes greater than 1 in 20 with a plane normal to bolt axis.

After bolts are tightened, upset threads of A 307 unfinished bolts and anchor bolts to prevent nuts from backing off.

3.1.5 Fence, Chain Link

Install fence in accordance with MNDOT 2557d.

3.2 PROTECTION OF FINISHED WORK

3.2.1 Machined Surfaces

Machined surfaces shall be thoroughly cleaned of foreign matter. All finished surfaces shall be protected by suitable means. Unassembled pins and bolts shall be oiled and wrapped with moisture resistant paper or protected by other approved means. Finished surfaces of ferrous metals to be in bolted contact shall be washed with an approved rust inhibitor and coated with an approved rust resisting compound for temporary protection during fabrication, shipping and storage periods.

3.2.2 Galvanized Surfaces

Repair damaged galvanized surfaces in accordance with ASTM A 780. Prepare damaged surfaces by abrasive blasting or power sanding. Apply galvanizing repair paint in accordance with manufacturer's instructions. Minimum thickness: larger of 6 mils DFT or manufacturer's standard.

3.3 TESTS

3.3.1 Workmanship

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

3.3.2 Production Welding

Production welding shall conform to the requirements of AWS D1.1 or AWS D1.2 as applicable.

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SECTION 15050

SLUICE GATES

PART 1 GENERAL

1.1 SCOPE

This section includes the sluice gates, portable operators, and accessories to be furnished and installed as shown on the drawings and specified herein.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1997) Carbon Structural Steel
ASTM A 108	(1999) Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 126	(1995) Gray-Iron Casting for Valves, Flanges, and Pipe Fittings
ASTM A 148	(1993) Steel Castings, High-Strength, for Structural Purposes
ASTM A 276	(1998) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 480	(1999A) Standard Specification for General Requirements for Flat Rolled Stainless and Heat Resisting Steel Plate, Sheet and Strip
ASTM A 582	(1995B) Free-Matching Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished
ASTM B 21	(1996) Naval Brass Rod, Bar and Shapes
ASTM B 98	(1998) Copper-Silicon Alloy Rod, Bar, and Shapes
ASTM B 584	(1993A) Copper Alloy Sand Castings for General Applications
ASTM D 2000	(1990) Rubber Products in Automotive Applications
ASTM D 4020	(1996) Specification for Ultra-High-

Molecular-Weight Polyethylene Molding and Extrusion Materials

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C 501 (1992) Standard for Sluice Gates

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 (2000) Structural Welding Code - Steel

AWS D1.6 (1998) Structural Welding Code - Stainless Steel

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Design Data; GA

Design computations 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.

Hoist Design Criteria; GA

The Contractor shall submit calculations which clearly show how the size of the portable operator and stem was chosen. For the sluice gate lifts, a friction factor of 0.6 shall be used, and the gate size and the heads shall be those specified below. Alternate friction factors are acceptable provided the Contractor submits documentation and calculations showing how the friction factor was selected.

SD-04 Drawings

Sluice Gates; GA.

Shop drawings shall be submitted for sluice gates showing details for mounting, materials, construction and installation procedures. Catalog data, including specifications and full descriptive data, shall be submitted for all materials and equipment furnished. Other shop drawings to be submitted include the following:

a) Dimensional drawing of all sluice gates supplied.

b) Installation drawing for all sluice gates in the project.

c) Material listing for the sluice gates

d) Catalogue and performance data on the portable operator. Include coupling for connection to the square nut operator. Include torque and speed rating information.

e) Performance data on the sluice gates. Include weight, pressure and leakage rating, and a statement of compliance for adherence to AWWA C 501.

SD-08 Statements

Gate Vendor's Erecting Engineer; GA

Gate vendor information as specified in PARAGRAPH: Gate Vendor's Erecting Engineer shall be submitted.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Manual; FIO

The Contractor shall submit, prior to delivery of gates to the project work site, five copies of a manual containing complete information in connection with the operation, lubrication, adjustment, routine and special maintenance, disassembly, repair, and re-assembly of the gates and accessories. 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, and (4) the contract number. Header sheets shall be placed before instructions covering the subject. The sheets shall be approximately 8-1/2 x 11" which large sheets of drawings folded in. Each set shall include, but not be limited to, the following:

a) Operating and maintenance instructions for each piece of equipment including lubrication instructions.

b) Manufacturer's bulletins, cuts, and descriptive data.

c) Parts lists and recommended spare parts.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Sluice gates 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. Gates and accessories shall be of the following design:

a) Sluice gates shall be rising stem. All operating mechanisms and the stem itself shall be contained beneath the operating floor. Stem shall either be telescoping or designed with a parallel drive unit. Square nut shall be used to operate the gate.

b) Gates shall either be cast iron or fabricated stainless steel.

c) Gates frames shall be self-contained. Frame shall be flange back type.

2.1.1 General Design

Component parts shall be designed for the seating and unseating heads shown in TABLE 1, using a minimum factor of safety of 5. 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 pressure shown in TABLE 1, with coefficient of friction of not less than 0.6 for sluice gates 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.

TABLE 1. GATE REQUIREMENTS

GATE LOCATION	GATE SIZE (INCHES)	NUMBER OF GATES	FACE DESIGN PRESSURE (HEAD) (FT)	BACK DESIGN PRESSURE (HEAD) (FT)
Woods Addition	30 x 30	3	30	25
Summitt	30 x 30	1	30	25
3rd and Elm	24 x 24	1	30	25
Ash Street	18 x 18	1	30	25

2.2 MATERIALS

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.

2.2.1 Structural Steel

ASTM A 36

2.2.2 Naval Brass

ASTM B 21, copper alloy No. 464 or 482; temper, optional.

1) Iron castings - ASTM A 126.

2) Steel castings - ASTM A 148.

2.2.3 Manganese Bronze

ASTM B 584, high-strength yellow brass, copper alloy No. 932.

2.2.4 Cold Rolled Steel

ASTM A 108, Grades 1010 through 1020.

2.2.5 Stainless Steel

1) ASTM A 276, Type 304, Condition A (annealed) or B (cold worked, high tensile), type of finish optional.

2) ASTM A 582, Type 303, Condition A (annealed), type of finish optional.

3) ASTM A 480, Stainless Steel Plate.

2.2.6 Bolting Materials

1) Bolts - ASTM A 582 - Type 303 or 416.

2) Nuts - ASTM B 98 - Alloy 655. Stainless nuts per ASTM A 582 or ASTM A 276.

2.2.7 Seals

ASTM D 2000 -Grade 4AA 625A13 and ASTM D 4020, U.H.M.W polyethylene molding and extrusion material.

2.3 SLUICE GATES

2.3.1 General

Gates shall either be fabricated stainless steel or cast iron. Gates must meet requirements of AWWA C 501. Gates shall be heavy duty type as manufactured by Rodney Hunt, Hydro Gate, Waterman, Whipps 950 Series, Fontaine Series 20, or equal. Stainless steel gates shall be thick edge design. 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 on the drawings. The gates shall be of the pressure seating type, and shall be designed for the face pressures and back pressures indicated in TABLE 1. The capacities of the operating stands shall be based upon the pressure exerted on the entire area enclosed by the gate sealing surfaces (seating faces). As used herein, operating pressure head is defined as the distance from the center of the slide, in its closed position, to the maximum water surface elevation. Sluice gates designated for power operation shall be sufficiently rugged to withstand operation by means of electric lifts or portable operators.

2.3.2 Frames

Gate frames shall be self-contained. Frames shall be flange mounted. The frames shall be cast iron or fabricated stainless steel 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 C 501. The frame guides for cast iron gates shall be of cast iron. The frame guides shall be equipped with 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 wide open. The side wedges shall be faced with manganese bronze. Wedges shall be designed in such a manner that wedge 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 gates. Gates shall be provided with top wedges.

2.3.3 Gate Leaves

Gate leaves shall be of cast iron or fabricated stainless steel, consisting of flat castings with horizontal and vertical ribs of ample section to withstand all of the specified conditions of operation with limited distortion to prevent leakage. The seating surfaces shall be of naval brass not less than 3/4" wide and shall be machined to a 63 micro-inch finish or better and attached by dovetail notching to make a watertight seal. The gate shall be guided in the frame with a tongue and groove

construction. The tongue and grooves shall be machined full length with a 1/8" overall clearance in the frame guide groove. Slide wedges shall be faced with manganese bronze and 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 C 501.

2.3.4 Stems

The stems shall be of stainless steel conforming to ASTM A 276, Type 302, 303, 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 the rated output of the lift with a 25 pound effort on the crank or handwheel. Threads on stems shall be machine cut or rolled with single or double lead threads of the Acme type. The exterior corners of the threads shall be given slight radius of approximately 0.015" in order to prevent them from acting as cutting edges as the stem passes through the lift nut.

2.3.5 Stem Guides

Stem guides shall be a manufacturer's standard product, except as specified provided herein, and shall 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 brushed. The guides shall be anchored in an approved manner with not less than two bolts.

2.3.6 Seals for Stainless Gates

The gate frames shall include seals to prevent metal to metal contact and prevent leakage. Seals shall be ultra high molecular weight polyethylene (UHMW). Leakage shall not exceed 0.05 gpm per foot of seal perimeter. Bottom seal shall be installed on the gate leaf.

2.3.7 Anchors

Anchors shall be epoxy adhesive type similar to Ramset/Red Head Epcon System or Hilti HIT System. Anchor bolts shall be a minimum of ½" diameter.

2.3.7.1 Bolts and Nuts

All anchor bolts and nuts for the rising stem type sluice gate frames and guides, stem guides, hoists and floor stands, and all bolts and studs used in the sluice gate leaves, frames and guides, and stem guides shall be stainless steel conforming to the requirements of ASTM A 276, type 304.

2.4 OPERATING HOISTS

2.4.1 Hoists

Sluice gates shall be operated with a self-contained, parallel drive unit that allows the stem to act as a rising stem. Gates shall be operated through a 2" square nut installed in a floor box. Floor box shall be parallel with the top of gatewells. Provide an H20 load rated cover for the floor box. Provide a tee wrench for manual operation of the gate through

the 2" square nut. Hoisting units shall be mounted on top of the gate frame. Hoist unit shall be enclosed, equipped with machine cut gears, having gear ratios recommended by the hoist manufacturer. The hoisting units shall be made of cast iron or cast steel. Exposed fastening of 1-1/2" diameter and less shall have American Standard hexagon-socket (Allen) type wrench heads. The hoist shall have a cast bronze lift nut, threaded to match and engage with the stem threads. The lift nut shall be provided with ball or roller bearings both above and below a flange on the lift nut, to accommodate the opening and closing thrusts. Each hoist shall be designed to unseat the slide from its wedging device at the maximum head with a maximum force of 40 pounds at 15" radius. Means for lubrication of the hoist shall be provided. No more than 16 turns of the hand crank or handwheel shall be required to move the gate 1 inch.

2.5 PORTABLE OPERATOR

One electric drill and tripod device shall be provided for opening and closing of sluice gates at the gatewells. Drill shall be Milwaukee 2404 or equal. Drill shall be reversible, 250 RPM, and provided with 50 feet of power cable. Provide a clutch assembly on the drill to disengage at 75 foot pounds of torque. Clutch setting shall be adjustable. An adaptor shall be provided for the drill to engage the 2" square nut on the gate operator. Tripod and drill unit shall be designed for vertical operation in order to operate the lift nut.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Installation Instructions

The setting, installation, assembly, lubrication, and testing of the gates and hoisting units shall be in accordance with the instructions of the gate manufacturer as approved by the Contracting Officer. These instructions shall be submitted for approval prior to any gate installation work. An erecting engineer shall inspect and determine the adherence to the above instructions for the setting of the gate thimble, rail assemblies, the stem guide anchor bolts, and the hoisting unit anchor bolts; the alignment and assembly of the stem to the sluice gate, stem guides, and hoisting unit; and observe the initial gate operations using the hoist. The Contractor shall make all arrangements for the presence of the erecting engineer for this inspection. The presence of the erecting engineer, however, will not relieve the Contractor of full responsibility.

3.1.2 Alignment

Anchor bolts shall be set in place prior to the placing of concrete. 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 or lean concrete fill mixture as shown.

3.1.3 Gate Vendor's Erecting Engineer

This erecting engineer shall be experienced in the specific installation of sluice gates as a complete system. Installation experience shall include as a minimum three successful installations of which at least one must have

been in the last two years and at least one must have been a gate of the larger size furnished with this project. The Gate Vendor shall coordinate with the Contractor on the most advantageous times and durations necessary for his erecting engineer to be at construction site and be confident of the proper installation and operational function of their product. The Vendor's erecting engineer shall initiate instructions for all actions necessary for the proper receipt, inspections, handling, assembly, installation, operation, and testing of this sluice gate system furnished by his company under this contract. Discrepancies shall be reported to the Contracting Officer. The Vendor's erecting engineer shall also keep records of measurements and actions taken during his visits and shall furnish a copy to the Contracting Officer on request or at the completion of each visit. Multiple visits may be required depending on installation sequencing. One of the visits shall be during final preparation and performance of the installed acceptance test. The erecting engineer shall instruct the Contractor in the operation and maintenance features of his company's installed sluice gate product. The following information will be submitted with the submittal package to verify the qualifications of the engineer:

1) Experience, years of service, etc. as an erecting engineer.

2) List of successful gate installations with owner's address and phone number.

3) Size and type control of the installed gates.

3.1.4 Welding of Stainless Steel Gates

Welding shall conform to AWS D1.1 and AWS D1.6. Welders shall be qualified per AWS D1.1 and AWS D1.6.

3.1.5 Assembly

Prior to assembly, the gate stems shall be thoroughly cleaned, for inspection by the Contracting Officer or his representative. All parts of the gates and operating mechanisms shall be installed and fitted together so that after final assembly there will be no interference through bad alignment, or any warping or twisting of the members that would in any way interfere with operation. All finished contact or bearing surfaces shall be true and exact to insure full and complete contact. All bolts for attaching the gate frames, stem guides, and operating hoists shall be accurately embedded at the time of placing concrete. Provisions for lubrication of the operating mechanisms shall be made and the lubrication systems shall be properly filled with suitable lubricant as recommended by the manufacturer of the hoists. When the sluice gate slide is in the fully closed position and wedged in position against the frame, maximum clearance between mating faces shall not exceed 0.004 inch.

3.2 TESTS

After final assembly, each gate shall be tested in the presence of the gate vendor's erecting engineer and the Contracting Officer or his representative by raising and lowering it throughout its complete travel by means of its operating mechanism and to demonstrate that it complies with the specifications. Any defective part of 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.

3.2.1 Gate Operation Testing

Upon completion of the installation, each gate shall be lubricated and operated through as many cycles of opening and closing as may be necessary to demonstrate proper functioning of the gates and that the units are free from binding or other defects.

3.2.2 Portable Operator Testing

The portable operator shall be tested in the presence of the Contracting Officer in raising and lowering the gates.

3.3 PAINTING

Cast iron gates shall be painted. The gate manufacturer shall be responsible for shop prime and finish painting of all cast iron sluice gates and appurtenances supplied under this contract. Stainless steel gates shall not be painted. All coatings shall conform with VOC Emission Regulations in effect at the manufacturing location and at project site to allow touch-up or recoating to be performed with the same products. The type of paint shall be as specified in the following schedule. Where required by application the coating shall be approved for contact with drinking water by the NSF, EPA, or other appropriate governing agencies. Number of coats, mil thickness and surface preparation shall be in accordance with the paint manufacturer's recommendations for that application, but in no case shall be less than the requirements in the following schedule. All coatings shall be free of carcinogens as listed on the IARC monographs. Colors are to be manufacturer's standards, provided they are selected for ease of manufacturer's standards, provided they are selected for ease of field touch-up and color match and are fade resistant. Colors shall be selected to provide contrast between the product and the prime coat, and between the prime coat and the finish coat, to insure uniform covering and coating thickness. All coatings shall be applied in accordance with the paint manufacturer's recommendations for thinning, technique and safety precautions.

3.3.1 Paint Schedule

Application	Material	Preparation	1st Coat	2nd Coat	3rd Coat
Gates, Wall Thimbles,	Cast Iron	SP 6	Amine Mod. Pol. Epoxy Amerlock 400 or Equal 5 mils min.	Amine Mod. Pol. Epoxy Amerlock 400 or Equal 5 mils min.	None

3.4 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.

3.5 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 materials, design and workmanship.

1) Sluice gates including stems and operating stands.

2) Portable operators.

Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guarantee period, the affected parts shall be replaced promptly with new parts by the Contractor and at no additional cost to the Government.

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SECTION 15060

DISCHARGE PIPELINES

PART 1 GENERAL

1.1 SCOPE

This section covers discharge piping, including installation requirements, for the pumps at the tractor driven pump stations and for the submersible, electric, pump stations.

1.2 RELATED WORK OF OTHER SECTIONS

The following items are covered under other sections:

(1) Pump work: SECTION 15162: TRACTOR DRIVEN PUMPING EQUIPMENT.

(2) Pump work: SECTION 15161: ELECTRIC PUMPING EQUIPMENT.

(3) Valves: SECTION 15100: VALVES.

1.3 APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this section to the extent indicated by the references thereto:

American Society of Mechanical Engineers (ASME)

ASME B1.1	(1989) Unified Inch Screw Threads (UN and UNR Thread Form).
ASME B16.5	(1996) Pipe Flanges and Flanged Fittings.
ASME B18.2.1	(1996) Square and Hex Bolts and Screws Inch Series.
ASME B18.2.2	(1989; R 1993) Square and Hex Nuts (Inch Series)
ASME 17	(1992) Boiler and Pressure Vessel Code, Section IX-92: Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.

American Welding Society (AWS)

AWS D1.1	(2000) Structural Welding Code-Steel.

American Water Works Association (AWWA)

AWWA C104	(1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

AWWA C105	(1995) Polyethylene Encasement for Ductile-Iron Pipe and Fittings for Water and Other Liquids
AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115	(1996) Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C150	(1991) Thickness Design of Ductile-Iron Pipe
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C206	(1991) Field Welding of Steel Water Pipe.

Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS)

MSS SP-58	(1988) Pipe Hangers and Supports - Materials, Design and Manufacture.
MSS SP-69	(1991) Pipe Hangers and Supports - Selection and Application.
MSS SP-89	(1991) Pipe Hangers and Supports - Fabrication and Installation Practices.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation. Submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01305: SUBMITTAL PROCEDURES.

SD-04 Drawings

Shop Drawings; GA.

Shop drawings shall be submitted for all materials and equipment. Shop drawings shall include: manufacturer's descriptive and technical literature, performance charts, and catalog cuts; complete piping diagrams; details and data on equipment layout and anchorage, valves, couplings, and supports, anchors; and other details necessary to demonstrate that each proposed system has been coordinated and will properly function as a unit. The following shop drawings shall be submitted:

(a) Shop drawings on the layout and installation of the pump discharge lines at all pumping stations. The complete pump discharge piping system shall be shown on a scaled engineering drawing. This shall include all piping within the limits of the pump stations, piping within the levee prism, and piping installed down the side of the levee. All support details and anchors (including any welding details)

shall be shown. All valves and couplings shall be shown.

(b) Show details for piping installation in the discharge headwalls. Show flap valve installation in the headwall.

(b) Certificates of compliance shall be submitted for piping.

(C) Anchors and supports. Include certificate of compliance.

(d) Data on the manufacturer's standard coatings for new valves, new pipes and new fittings shall be submitted.

SD-09 Reports

Performance Test Reports;FIO.

Upon completion, including testing, of each installed system, test reports shall be submitted in booklet form presenting all field tests performed. Performance test reports shall be included in the operation and maintenance manual specified in SECTION 15162: Tractor Driven Pumping Equipment and SECTION 15161: Electric Pumping Equipment.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Pipe sizes shall be as shown. In general, pipe material shall be ductile iron with restrained mechanical or push-on joints per AWWA C111 and flanged joints per AWWA C115. Fittings and valves shall have restrained mechanical joints or flanged joints as shown. Materials and equipment shall be the standard products of manufacturers regularly engaged in the manufacture of such items. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 3 years prior to the contract award date.

2.1.1 Asbestos Prohibition

Asbestos and products containing asbestos shall not be used and will not be permitted in the contract work.

2.1.2 Verification Of Dimensions

The Contractor shall be familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy prior to performing the work.

2.1.3 Welding Procedures

Welding details for piping supports and anchors shall be submitted for approval. Welding shall be performed in accordance with qualified procedures using qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME 17 Boiler and Pressure Vessel Code Section IX, and/or AWS D1.1.

2.1.4 Polyethylene Encasement

All buried piping and fittings shall be wrapped in polyethylene per AWWA C105 in addition to the coating system.

2.2 MATERIALS AND EQUIPMENT

2.2.1 Ductile Iron Pipe

AWWA C150 and AWWA C151, thickness Class 53 for flanged piping. Pipe sizes as indicated on the drawings.

2.2.2 Fittings

Material, thickness, and pressure rating shall be per AWWA C110 and AWWA C111. 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 C110 and ASME B16.5 as appropriate. Flanged end pipe shall be in accordance with AWWA C115 Class 150. Flanges shall be ductile iron in accordance with AWWA C110.

2.2.3 Joints

Push-on joints and mechanical joints shall conform to AWWA C111.

2.2.4 Protective Coatings And Linings

Pipes, fittings, and couplings shall be coated outside with a minimum 2 mil thickness (dry) asphalt paint in accordance with AWWA C151. Piping shall be cement mortar lined per AWWA C104. Piping and fittings shall also be wrapped per AWWA C105.

2.2.5 Bolts And Nuts

Size, length, and number of bolts and nuts for the pipe flanges shall be in accordance with AWWA C110 and AWWA C115. Bolts shall conform to ASME B18.2.1 and nuts to ASME B18.2.2. Threads shall conform to ASME B1.1. All nuts and bolts for flanges inside pump stations shall be Type 304 stainless steel.

2.2.6 Hangers, Inserts, And Supports

MSS SP-58, MSS SP-69, and MSS SP-89. Hangars and supports inside pump stations shall be hot dipped galvanized steel.

2.2.7 Modular Mechanical Type Sealing Assembly

Sealing assemblies shall be provided at all headwall structures.The seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve with 316 stainless steel bolts, nuts, and pressure plates. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and each nut. After the seal assembly is properly positioned in the sleeve, tightening of the bolt shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe and the sleeve. Each sealing assembly shall be sized as recommended by the manufacturer to fit the pipe and sleeve involved. Seal assemblies shall be manufactured by Link Seal or equal.

2.2.8 Sleeves

Sleeves shall be fabricated from steel pipe, ductile iron pipe, or cast iron pipe.

PART 3 EXECUTION

3.1 INSTALLATION

Flap valves, per SECTION 15100: VALVES, to be installed on the pump discharge lines. Install these valves at the discharge ends of the pipes, at the headwall, as shown on the drawings. Installation shall be with a flanged connection to the pipe. Other valves to be installed as shown with flanged or mechanical joint connections as required. Unless otherwise required, materials and equipment shall be installed in accordance with the manufacturer's written recommendations. The Contractor shall design and install all supports and anchors, as necessary, as submitted and as approved.

3.1.1 Pipes and Fittings

Piping shall be carefully laid out in advance and unnecessary cutting of materials shall be avoided. Pipe openings shall be closed with caps or plugs during installation. Equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury.

3.1.2 Connecting Piping To Pumps

Piping connections to the pumps shall be as shown.

3.1.3 Assembly

Pipe ends shall be clean and free from indentations, projections, and roll marks. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service and conform to AWWA C110 and AWWA C115. Assembly of the flanged joints and push-on joints shall be in accordance with the pipe manufacturer's standard method.

3.1.4 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Squeeze type mechanical cutters shall not be used for ductile iron.

3.1.5 Welding

Field welding shall be in accordance with AWWA C206. The names of qualified welders shall be furnished to the Contracting Officer prior to starting installation of welded piping.

3.1.6 Pipe Sleeves and Seals

Sleeves shall be set in structural members where indicated or approved. Each sleeve shall extend through the wall and be cut flush with each surface. Seals shall be installed as recommended by the manufacturer and as approved by the Contracting Officer.

3.2 TESTING

Miscellaneous piping at each pumping station shall be tested and inspected at the time of the pumping tests. If inspection or testing shows leaks or defects, such defective work or material shall be replaced or repaired as

necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials.

3.2.1 Pressure Test

After the pipe is laid and the joints completed, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 50 psi. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, and valves shall be carefully examined during the test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, and valves, discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory.

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SECTION 15100

VALVES

PART 1 GENERAL

1.1 SCOPE

This section covers flap valves at the ends of the pump discharge pipes, flap valves for gravity drainage lines, gate valves for pump discharge lines, and air/vacuum valves for pump discharge lines.

1.2 RELATED WORK OF OTHER SECTIONS

The following items are covered under other sections:

(1) Pump work: SECTION 15162: TRACTOR DRIVEN PUMPS AND EQUIPMENT.
(2) Pump Work: SECTION 15161: ELECTRIC PUMPING EQUIPMENT

1.3 APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this section to the extent indicated by the references thereto:

American Society of Mechanical Engineers (ASME)

ASME B1.1	(1989) Unified Inch Screw Threads (UN and UNR Thread Form).
ASME B16.5	(1996) Pipe Flanges and Flanged Fittings.
ASME B18.2.1	(1996) Square and Hex Bolts and Screws Inch Series.
ASME B18.2.2	(1989; R 1993) Square and Hex Nuts (Inch Series)
ASME 17	(1992) Boiler and Pressure Vessel Code, Section IX-92: Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.

American Society of Mechanical Engineers (ASME):

ASTM A 27	(1995) Steel Castings, Carbon, for General Application
ASTM A 126	(1995) Gray-Iron Casting for Valves, Flanges, and Pipe Fittings
ASTM A 126 B	**Ref Title**
ASTM A 240	(1999) Standard Specification for Heat

	Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip
ASTM A 276	(1998) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 536	(1984 R; 1999) Ductile Iron Castings
ASTM B 98	(1998) Copper-Silicon Alloy Rod, Bar, and Shapes
ASTM B 584	(1993A) Copper Alloy Sand Castings for General Applications

American Welding Society (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C 500	(1993 C 500a) Metal-Sealed Gate Valve for Water Supply Service.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Shop Drawings; GA.

Shop drawings shall be submitted for all materials and equipment. Components of the system shall be submitted together as a complete package. Shop drawings shall include: manufacturer's descriptive and technical literature, performance charts, and catalog cuts. The following shop drawings shall be submitted:

(a) Flap Valves for pump discharge lines. Submit mounting details.
(b) Gate Valves for pump discharge lines.
(c) Air/Vacuum valves
(d) Gravity discharge flap valves.
(e) Data on the manufacturers standard coating for new valves.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Materials and equipment shall be the standard products of manufacturers regularly engaged in the manufacture of such items. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 3 years prior to the contract award date.

2.1.1 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type/style, model, serial number, and catalog number on a plate secured to

the item of equipment. Nameplates shall be made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.2 Instruction Plates

As necessary, each item of equipment shall be labeled with suitably installed instruction plates including warnings and cautions describing special and important procedures to be followed during starting, operating, and servicing of the equipment. The plates shall be made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.3 Verification of Dimensions

The Contractor shall be familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy prior to performing the work.

2.1.4 Welding Procedures

Welding details for piping supports shall be submitted for approval. Welding shall be performed in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME Boiler and Pressure Vessel Code Section IX, and/or AWS D1.1.

2.2 MATERIALS AND EQUIPMENT

2.2.1 Flap Valves for Pump Discharge Lines

Circular discharge flap valves shall be provided for flange mounting (to the pump discharge line) and pump discharge service on the ductile iron discharge lines. Each valve shall be able to withstand stresses resulting from static head on the face of the gate and the reaction forces from discharge through the gate. The valve body shall be ductile iron conforming to ASTM A 536, spherically dished, with flanged faced and drilled for ANSI B16.5 standard pipe flange. A resilient neoprene or Buna-N seat shall be bonded in a groove machined in the body. Hinge arms shall be high tensile bronze conforming to ASTM B 584 with silicon bronze pins conforming to ASTM B 98. Arms shall have two pivot points with adjustable lower pivot for limited rotation and a threaded upper hinge post for flap valve sensitivity. Spring bumpers shall be provided to prevent valves from opening more than 90 degrees. Lubrication fittings shall be provided at all bushings. Flap valves shall be similar to Rodney Hunt Series FV-ACP as manufactured by Rodney Hunt Co., Orange, Massachusetts. Pump discharge flap valves shall include the following:

(1) Pump Discharge Flap Valves, 8" (2 total)

(2) Pump Discharge Flap Valves, 18" (3 total)

2.2.2 Flap Valves for Gravity Discharge Lines

Circular flap valves shall be provided for gravity discharge service as shown. Valves shall be designed for mounting with anchor bolts into the headwall as shown. A seal shall be provided between the concrete wall and valve frame. Each valve shall be able to withstand stresses resulting from static head on the face of the gate and the reaction forces from discharge

through the gate. The valve body shall be cast iron conforming to ASTM A 126 B, spherically dished. A resilient neoprene or Buna-N seat shall be bonded in a groove machined in the body. Hinge arms shall be high tensile bronze conforming to ASTM B 584 with silicon bronze pins conforming to ASTM B 98. Arms shall have two pivot points with adjustable lower pivot for limited rotation and a threaded upper hinge post for flap valve sensitivity. Lubrication fittings shall be provided at all bushings. Flap valves shall be similar to Rodney Hunt Series FV-AC as manufactured by Rodney Hunt Co., Orange, Massachusetts. Gravity discharge flap valves shall include the following:

(1) Flap Valve, 18" Ash Street (1 total)

(2) Flap Valve, 24" Thorndale (1 total)

(3) Flap Valve, 30" Summitt Avenue (1 total)

(4) Flap Valve, 36" Thorndale (1 total)

2.2.3 Gate Valves for Pump Discharge Lines

Gate valves shall be provided in each pump discharge line as shown. Valves shall be designed for 150 pound service. Body material shall be ductile iron conforming to ASTM A 536. Design shall conform to AWWA C 500. Gate valves shall be installed in a valve box as shown. Gate valves shall include the following:

(1) Gate Valve, 6" (4 total)

(2) Gate Valve, 18" (3 total)

2.2.4 Air/Vacuum Valves

Valve shall vent air as the discharge line is being filled. Valve shall let air back into the pipe system as the pumps are turned off. Valves shall be similar to that manufactured by Crispin or equal and rated for stormwater service. Valves shall be designed for flange mounting. Valves shall have cast iron body, stainless steel float, and BUNA-N rubber seat. Valve shall withstand hydrostatic pressures up to 300 psig.

2.2.5 Valve Coating

Valves shall be furnished with the valve manufacturer's standard coating system for underwater immersion.

2.2.6 Bolts and Nuts

Size, length, and number of bolts and nuts for the pipe flanges shall be in accordance with ASME B16.5. Bolts shall conform to ASME B18.2.1 and nuts to ASME B18.2.2. Threads shall conform to ASME B1.1. All bolts and nuts shall be Type 304 stainless steel.

2.2.7 Anchors

Anchors shall be epoxy adhesive type similar to Ramset/Red Head Epcon System or Hilti HIT System. Anchor bolts shall be a minimum of ½" diameter. All anchor bolts shall be stainless steel conforming to the requirements of ASTM A 276, type 304.

PART 3 EXECUTION

3.1 INSTALLATION

Unless otherwise required, materials and equipment shall be installed in accordance with the manufacturer's written recommendations. Installation of the flap valves at the pump stations shall be coordinated with the pump discharge pipe installation. Contractor shall be responsible for providing any necessary supports and anchors for the valves.

3.2 TESTING

Valves shall be operated, tested, and inspected at the time of the pumping and discharge pipe tests. If inspection or testing shows leaks or defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated.

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SECTION 15161

ELECTRIC PUMPING EQUIPMENT
01/02

PART 1 GENERAL

1.1 SCOPE

This section covers the furnishing and installing of the electric, submersible, pumps. a total of two pumps are required at each location.

1.2 RELATED WORK OF OTHER SECTIONS

1) Discharge Piping: Section 15060: Discharge Pipelines
2) Pre-Cast Concrete Manholes: Section 02630: Storm Drainage System

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.

American Society of Mechanical Engineers (ASME):

ASME B4.1	(1967; R 1994) Preferred Limits and Fits for Cylindrical Parts.

American Society for Testing and Materials (ASTM)

ASTM A 27	(1995) Steel Castings, Carbon, for General Application
ASTM A 36	(1997) Carbon Structural Steel
ASTM A 48	(1994a) Gray Iron Castings
ASTM A 108	(1999) Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 276	(1998) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 285	(1990) Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength

ASTM A 516	(1990) Pressure Vessel Plates, Carbon Steel, for Moderate and Lower Temperature Service
ASTM A 564	(1999) Hot-Rolled and Cold-Finished Age-Hardening Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 576	(1990 B) Steel Bars, Carbon, Hot Rolled, Special Quality
ASTM A 668	(1996 E1) Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM B 148	(1992 A) Aluminum-Bronze Sand Castings
ASTM B 584	(1993A) Copper Alloy Sand Castings for General Applications

Hydraulic Institute (HI)

HI	(1994) Standards for Centrifugal, Rotary and Reciprocating Pumps

National Fire Protection Association (NFPA)

NFPA 70	(1999) National Electrical Code (NEC)

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Shop Drawings; GA.

Shop drawings, including catalog cuts and manufacturer's data, shall be submitted for approval. Shop drawings shall be neat, legible, and of sufficient size so as to be easily read and/or reproduced. The following items shall be submitted.

a) Outline drawings of all proposed pumps showing all pertinent dimensions and weight of the various components of the pumps. The name of each pump manufacturer shall be stated.

b) Dimensioned cross sectional drawings of the pumps and components and motors.

c) The proposed coating (painting) systems and procedures for the pumps and components.

d) Pump capacity-head curves with the brake horsepower (BHP) and the net positive suction head required (NPSHR) requirements presented; operating points shall be indicated on these pump curves. Efficiency data shall be plotted.

e) Electrical schematic diagrams shall be submitted.

f) A bill of materials for all electrical components and devices furnished per SECTION 16250 DUPLEX PUMP PANEL AND ELECTRICAL WORK. Identify each item by name, manufacturer, catalog number, model number, and quantity furnished. Include catalog cuts of electrical control devices, starters, alarms, sensors, and cables.

g) Installation Details. Include installation details for guide bars or cables, lifting chain, and hatch covers. Scaled layout drawings of the pumping stations shall be submitted showing the installation of the new pumps. Provide shop drawings of the pumps and the pre-cast manholes as a single submittal.

h) Warranty. A copy of the pump warranty for each pump provided shall be submitted.

i) Factory Testing. Factory test data shall be submitted as specified in Paragraph: FACTORY TEST.

j) Pump Access Covers. Submit specification, material, and dimensional data. Submit framing and installation instructions.

k) Discharge Elbow. Submit material and dimensional data and installation instructions.

SD-06 Instructions

Installation and Erection Instruction; FIO

The Contractor shall submit five copies of a printed and bound manual describing the procedures, to be followed by a pump installation contractor with supervision of an erecting engineer, for erecting, assembling, and installing the pumps and controls. The proposed manuals shall be submitted with the pump shop drawing submittals.

The installation description shall be a complete, orderly, step-by-step explanation of the various operations required to install each types of pump including the guide rails or cables and discharge elbow. It shall describe all special procedures and outline special precautions. It shall

also include such things as bolt torque values, permissible wear ring clearances, recommended instrument set-ups, recommended gages and instruments, bearing clearances, and similar details.

The description shall be complemented and supplemented by drawings, sketches, photographs, and similar materials as necessary. The overall result shall be a description which may be comprehended by an engineer or mechanic without extensive experience in erecting or installing pumps of the types required.

After review, the Government will furnish to the Contractor recommended revisions as necessary or desirable for the installation manual and return four copies of the previously submitted manual back to the Contractor. Differences of opinion between the Contractor, manufacturers, and the Contracting Officer shall be reconciled in a manner mutually agreeable to all parties, and five copies of the revised manual shall resubmitted. The final approved installation instructions shall be followed by the installation personnel for the completion of pump installation work.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Manual; FIO

The Contractor shall submit, prior to delivery of any pumps to the project work site, five copies of a manual containing complete information in connection with the operation, lubrication, adjustment, routine and special maintenance, disassembly, repair, and re-assembly of the pumps and accessories. The manual shall also have a listing of special tools required for working on the pumps and controls. The manual shall incorporate complete information on the controls covered under this section and SECTION 16250: DUPLEX PUMP PANEL AND ELECTRICAL WORK; and include operation and maintenance procedures, special features, and instructions for setting all adjustable controls and equipment. Comprehensive as-built drawings, photographs, factory test results, and sketches of the pumps shall be included. The manual shall include complete diagnostic information on the pumps and all approved shop drawing submittals on the pump and controls. The manual shall be complete enough and provide enough details so the pump stations and pumps can be operated using the manual.

Parts list: The operation and maintenance manual shall have a complete parts list for the pumps and controls including spare parts. The list shall clearly show all details and parts, and all parts shall be adequately described and have identification markings and include sources for all parts.

Manuals shall be made up with hard cover post type binders and printed on 8-1/2 inch by 11 inch high quality paper with indexed, tabbed section dividers. Large sheets shall be neatly folded and installed with post hole reinforcements such that sheets can unfold without need to open binder posts. Drawings, sketches, and parts lists incorporated in the manual may be reduced to page size provided such reductions are clear and easily legible: otherwise they may be folded into the manual.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS:

Pumps shall be installed at the pumping locations as shown. A total of two pumps shall be provided at each location. The term "pump" shall mean the assembled pump-motor unit complete with electrical cable, discharge elbow, and guide rails or guide cables. Pumps shall be installed inside pre-cast manholes as shown.

2.1.1 Standard Products:

All pumps supplied shall be the product of a pump manufacturer who has produced at least 100 units of the models required under this contract. Fifty of these units shall have been operating successfully in the United States for at least two years prior to the contract award date.

2.1.2 Coordination:

The pump supplier shall furnish the controls required for the contract work. Electrical requirements are given in SECTION 16250: DUPLEX PUMP PANEL AND ELECTRICAL WORK. All pump shop drawings and control shop drawings will be rejected unless this work is properly coordinated. The pump supplier shall coordinate the horsepower requirements for the final selected pump and the associated electrical starter size.

2.1.3 Nameplates:

Each major item of equipment shall have the manufacturer's name, address, type/style, model, serial number, and catalog number on a plate secured to the item of equipment. Nameplates shall be made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.4 Instruction Plates:

As necessary, each item of equipment shall be equipped with suitably installed instruction plates including warnings and cautions describing special and important procedures to be followed during starting, operating, and servicing the equipment. The plates shall be made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.5 Verification Of Dimensions:

The Contractor shall be familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy prior to performing the work.

2.2 MATERIALS

2.2.1 Materials Not Specifically Described

Materials not specifically described shall, as far as practicable, conform to the latest approved industry standard(s) covering the appropriate class or types of materials.

2.2.2 Designated Materials

Designated items shall conform to the following:

Item	Requirements
Cast Iron	ASTM A 48, Class No. 30A, 30B and 30C
Cast Steel	ASTM A 27, Grade 65-35, annealed
Copper Alloy Castings	ASTM B 584, Alloy No. C93700 or C86300
Structural Steel	ASTM A 36
Cold Rolled Steel Bars	ASTM A 108, Minimum Working Strength 65,000 pounds per square inch
Hot Rolled Steel Bars	ASTM A 576, Grades: G10200, G10450, G11410
Hot Rolled Stainless	ASTM A 564, Grade 517400
Bars and Shapes:	
Steel Plates, Structural	ASTM A 285, Grade B
Steel Plates, Pressure Vessel	ASTM A 516, Grade 55
Steel Forgings	ASTM A 668, Class F

2.2.3 Pump Discharge Elbow

Pump discharge elbow shall be furnished by the pump supplier. The discharge elbow shall be made of either cast iron or cast steel and consist of a flange for mating with the pump volute and discharge bowl. Elbow shall be long radius type. The discharge elbow shall have a cast iron shoe for anchoring to the sump floor. The seal between the pump volute and discharge shoe shall remain tight and intact under any pump thrust. No pump thrust shall be induced on the guide rails or guide cables.

2.2.4 Pump Access Hatches

The pump supplier shall furnish the access hatches required for each pump. Covers (doors) shall be minimum 1/4" thick, extruded 6061 aluminum construction, and designed for incorporating the guide rail or guide cable system for each pump. Cover (doors) shall be double leaf design and rated for AASHTO HS-20 loading and shall have diamond tread surfacing. Hatches shall be complete including framing, flush locking mechanism, handles, and hardware. Frame shall be extruded aluminum, minimum 1/4" thick, with concrete anchors as part of the extrusion. All hardware shall be stainless steel. Covers shall have stainless steel hinges, complete with heavy duty springs, and open to 90 degrees and lock automatically in the open position. Covers shall close flush with the frame, resting on a 1/2" wide lip around the entire perimeter of the frame. A stainless steel safety chain shall be attached to both cover leafs. The chain shall help prevent a

person from falling into the pump station when the hatch covers are open. The rough opening size for the pump hatches shall be coordinated with the pre-cast manhole supplier.

2.3 ELECTRIC SUBMERSIBLE PUMPS

2.3.1 General

Two pumps shall be provided for each pumping station. The pumps shall be the electric, centrifugal, submersible, type with closed non-clog impellers. Each pump shall be capable of pumping solids up to 2" in diameter. The pumps in the station shall be designed to operate on guide rails or guide cables.

2.3.2 Nuts and Bolts

All bolts used in assembling each pump and its supporting members shall be of corrosion resisting steel and shall be hexagonal type. All nuts shall be silicon bronze. Stainless steel cap screws conforming to ASTM A 276, Type 316, and used with silicon bronze nuts or stainless steel nuts, will be permitted as will silicon bronze cap screws with tapped casting holes.

2.3.3 Capacities

Primary condition point: Discharge not less than 750 gallons per minute against a Total Dynamic Head (TDH) of 25 feet of water. Pumps shall be minimum 75% overall efficient at the primary condition point. Pumps shall also be capable of pumping down to 15 feet of TDH with no detrimental effects to the pumps.

2.3.4 Speed

The speed of the pumps shall not exceed 1800 revolutions per minute.

2.3.5 Pump Casings

Pump casings shall be made of ASTM A 48, Class 30, cast iron. The casing shall be of single piece design and shall have smooth fluid passages.

2.3.6 Wear Ring

A wear ring system shall be installed to provide efficient sealing between the volute and impeller. The wear ring shall consist of a stationary ring made of bronze insert which is press-fitted into the volute inlet, and a rotating stainless steel ASTM A 276, Type 316 ring which is force-fitted into the propeller runner.

2.3.7 Impellers

Impellers shall be gray cast iron conforming to ASTM A 48 Class 30, or of aluminum bronze conforming to ASTM B 148 Grade D; and double shrouded non-clogging design having a long thrulet without acute turns. The impellers shall be capable of handling solids found in wastewater.

2.3.7.1 Minor Surface Imperfections

Minor surface imperfections shall be filled and/or ground down as necessary to preserve the correct contour and outline of the impeller and restore the surface imperfections to the same degree of finish as the surrounding surfaces. Surface pits, depressions, projections, or overlaps showing greater than 1/16 of an inch variation from the general contour for that section shall be corrected. The method and procedure for accomplishing the repairs shall be as set forth in the bolted connections requirements in PARAGRAPH: FABRICATION AND MACHINING. Castings which exhibit surface imperfections as defined above covering an area of more than 10 percent of any surface of any blade will be rejected.

2.3.8 Shafts And Seals

Pump and drive shaft shall be a single combined shaft. The pump shaft and drive shaft shall be of ASTM A 276, Type 420 stainless steel or alternate stainless steel as approved and shall be completely isolated from the pumped liquid.Pump and drive shaft shall be a single combined shaft. The pump shaft and drive shaft shall be of ASTM A 276, Type 420 stainless steel or alternate stainless steel as approved and shall be completely isolated from the pumped liquid.

2.3.9 Tandem Mechanical Rotating Shaft Seal System

Each pump shall be provided with a tandem mechanical rotating shaft seal system. Seals shall run in a oil reservoir. Lapped seal faces must be hydrodynamically lubricated at a constant rate. The lower seal unit, between the oil sump and the volute, shall contain one stationary and one positively driven rotating tungsten-carbide ring. The upper seal unit, between the motor housing and oil sump, shall contain one positively driven rotating carbon ring and one stationary tungsten-carbide seal. Positively driven means the rotating seal is driven from the shaft by virtue of a mechanical connection (i.e., set screw, clip, key, etc.). The use of an elastomeric sealing member driving the seal face by friction on the shaft surface shall not be permitted. Each seal interface shall be held in contact by its own spring system. As alternate seal materials, silicon carbide/silicone carbide for the lower seal unit and carbon/tool steel for the upper seal unit shall be accepted. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Shaft seals without a positively driven rotating member or conventional double mechanical seals containing a common single spring acting between the upper and lower unit shall not be accepted. Each pump shall be provided with an oil chamber for the shaft sealing system. The oil chamber shall be designed to assure that air is left in the oil chamber, to absorb the expansion of the oil due to temperature variations. The drain and inspection ports, with positive anti-leak seal, shall be easily accessible from the outside of the pump.

2.3.10 Bearings

The pump shaft shall rotate on at least two permanently lubricated bearings. The upper bearing shall be the angular contact ball type and the lower bearing shall consist of one or more rows of angular contact ball

bearings. Each bearing shall have a minimum B10 bearing life (40,000 hours).

2.3.11 Pump Lifting System

Each pump shall be furnished with a lifting bar to facilitate handling. The lifting bars shall manufactured of stainless steel, chrome-nickel steel, or chrome-moly steel. The bar shall be so designed and arranged to allow safe handling of the pump as required during shipping, installation, and maintenance.

2.3.11.1 Guide System

Each pump shall be furnished with a stainless steel guide cable or guide bar system for lifting the pump in and out of the manhole and connecting to the discharge shoe. Guide bar system shall be either a single or double rail system. Guide bars shall be galvanized steel.

2.3.12 Cooling System

Each pump unit shall have an adequately designed cooling system, consisting of a water jacket which encircles the stator housing; alternatively, cooling fins may be used. The water jacket shall be provided with a separate circulation of the pumped liquid. Cooling media channels and ports shall be non-clogging by virtue of their dimensions. All cooling paths or ports shall be internal to the pump and motor water jacket to preclude clogging or physical abuse. Either type of cooling system shall be designed to allow for continuous pump operation at rated capacity with the external water level at the minimum pump submergence level.

2.3.13 Torsional Vibration And Critical Speeds

The assembled pumping unit, consisting of the motor and pump shall be free of critical speeds or harmful torsional vibrations at all speeds encountered within the operating range. When tested in the dry, in accordance with PARAGRAPH: FIELD TESTING, the vibration amplitude shall conform to those presented in the "General Machinery Vibration Severity Chart" and referred to the lower limit of "Fair". The "General Machinery Vibration Severity Chart" may be obtained from IRD Mechanalysis Inc., 6150 Huntley Road, Columbus Ohio 43229.

2.3.14 Painting

Pump exteriors shall be painted with a PVC epoxy primer and a chloric rubber paint, as approved.

2.3.15 Electrical

Pump motors shall be squirrel-cage, induction, shell type design, housed in an air filled watertight chamber, and NEMA Design B type. The pump unit and motor unit shall be closed coupled to form a single integral unit. The stator winding and stator leads shall be insulated with moisture resistant Class F insulation which will resist a temperature of 155 oC. The stator

shall be dipped and baked three times in Class F varnish. The motor shall be designed for continuous duty, capable of sustaining a minimum of ten starts per hour. The rotor bars and short circuit rings shall be made of copper or aluminum.

2.3.15.1 Rating

Each motor shall be wound for 3-phase, 60 Hz, alternating current, and 480 volt operation. Maximum horsepower shall be 10 horsepower. The motor shall be designed for operation in a 20 degrees C ambient temperature and all temperature rises shall be above this ambient temperature. The rated horsepower of the motor shall be not less than 110 percent of the determined maximum load requirement for the full capacity-head curve of the pump. The motor shall have a service factor of 1.10. The temperature rise above the ambient temperature for the class of insulation used shall be in accordance with paragraph MG 1-12.42 of NEMA MG 1.

2.3.16 Pump Cables

Each pump shall be supplied with 50' of electrical cable. Each motor cable shall be suitable for submersible pump application and such information shall be indicated by a code or legend permanently embossed on the cable. Cable sizing for pump motors shall conform to NFPA 70. A cable rack shall be provided for the purpose of supporting the motor leads and float switch leads. The location of the cable rack shall be submitted for approval. Cable end shall terminate in a plug per SECTION 16250: DUPLEX PUMP PANEL AND ELECTRICAL WORK.

2.3.16.1 Cable Entry

The cable entry water seal design shall preclude specific torque requirements to insure a water tight and submersible seal. The cable entry shall be comprised of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter. The assembly shall bear against a shoulder in the pump top. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the motor interior from foreign material gaining access through the pump top. The junction chamber, containing the terminal board, shall be sealed from the motor by elastomeric compression seal O-ring. Connection between the cable conductors and stator leads shall be made with threaded compressed type binding post permanently affixed to a terminal board and shall be made leak proof. Cable entries not meeting the above requirements and utilizing "potted" epoxy cable entry systems directly to the motor cavity will be considered an "equal".

2.3.17 Alarms

The following alarm features shall be provided for all the pumps including the sump pumps.

a) Over temperature alarm: The motor over temperature alarm circuit shall be actuated by three thermal sensors embedded in the stator windings of the pump motor (one switch in each stator phase). The pump motor shall stop on over temperature and not restart until the over temperature alarm is manually reset and the motor temperature has cooled to the appropriate temperature.

b) Overload alarm: The motor overload circuit on the pump motor shall stop the motor upon overload and not restart until the overload condition is corrected and manually reset.

c) Seal failure alarm: When the a seal failure alarm module detects a seal failure, the seal failure light on the control panel shall energize until the alarm has been manually reset.

2.4 SPARE PARTS AND SPECIAL TOOLS

2.4.1 Special Tools

The Contractor shall furnish all specials tools that are unique to the pump or control system for proper installation, testing, operation, and/or maintenance. Special tools shall be delivered with the pumps and controls.

2.4.2 Spare Parts

All spare parts shall be duplicates of the original parts furnished and shall be interchangeable with those parts. The Contractor shall furnish at a minimum the following spare parts:

(1) Two complete replacement sets of: seal assemblies; wear rings, stationary and rotating.

PART 3 EXECUTION

3.1 FABRICATION AND MACHINING

3.1.1 Machine Work

All tolerances, allowances, and gauges for metal fits between plain, non-threaded cylindrical parts shall conform to ASME B4.1 for the class of fit required.

3.1.2 Castings

Each casting shall have a mark number cast or stamped upon it. In addition, each casting weighing more than 500 pounds shall have the heat number cast

or stamped upon it. Warped or otherwise distorted castings that are oversize to an extent that could interfere with proper fit with other parts of the machinery or structure will be rejected. Cracked castings of non-weldable materials (i.e., cast iron, etc.) will be rejected. Repairs to castings shall not be made without prior approval.

3.1.2.1 Casting repair

Castings shall have all unsound material or defects removed by chipping, machining, air-arc gouging, or grinding; and shall be repaired by welding. Welding repairs shall conform to the welding procedures and approved for the type material involved. Stress relief annealing, where required, shall be accomplished prior to final machining.

3.1.3 Bolted Connections

Bolts, nuts, and washers shall conform to the applicable requirements of PARAGRAPH: MATERIALS AND MATERIAL STANDARDS for the types required.

3.1.4 Holes for Regular Bolts

Holes for regular bolts shall be drilled or sub-drilled and reamed in the shop. Holes shall be accurately located, smooth, perpendicular to the member, and cylindrical.

3.1.5 Holes for Fitted Bolts

Holes for fitted bolts shall be match-reamed or drilled in the shop. Holes shall be smooth, perpendicular to the member, and cylindrical. Burrs resulting from reaming shall be removed. The threads shall be entirely outside of the holes. The body diameter of the bolt shall have tolerances as recommended by ANSI B4.1 for the class of fit required. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

3.1.6 Holes for Hight-Strength Bolts

Holes for high-strength bolts shall be accurately spaced, perpendicular to the member, and cylindrical. If the thickness of the material is greater than the diameter of the bolt, the holes shall be either drilled full size or shall be sub-drilled and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting done during assembly shall not distort the metal or enlarge the holes. For slight mismatching, reaming to a larger diameter for the next standard size bolt will be allowed.

3.1.7 Metallic Coating

Zinc coatings shall be applied in a manner, thickness, and quality conforming to ASTM A 123. Where the zinc coating is destroyed by cutting, welding, or other causes, the affected areas shall be re-galvanized to the thickness and quality required for the original zinc coating.

3.2 FACTORY TEST

3.2.1 General

The factory test shall be conducted using the furnished submersible pumps. All the pumps shall be tested. No pumps shall be delivered to the project work site until the factory test has been completed and the Contracting Officer has accepted the factory test results. Testing shall be in accordance with HI Standards for Centrifugal, Rotary and Reciprocating Pumps.

3.2.2 Test Setup

Pump shall be test setup to simulate its actual field installed position. The Contractor shall submit for approval, within 45 calendar days after the contract notice to proceed, a description of the proposed test setup and proposed test procedures: this information must be submitted prior to the construction of the proposed test setup. The submittal shall include dimensioned drawings and cross-sectional views of the setup and pump, with the location of all instrumentation and the point of their connection indicated. Each instrument shall be described in detail giving all data applicable such as manufacturer's name, type, model number, the certified accuracy, coefficient ratios, specific gravity of manometer fluid to be used, and smaller scale divisions. When necessary for clarity, a sketch of the instruments or instrument arrangements shall be presented. Also include a fully detailed narrative description of each proposed method of instrumentation and the proposed test procedures.

3.2.3 Instrumentation

Head measurements shall be made using either a direct reading water column, mercury-air, mercury-water, or a meriam fluid manometer. Vacuums shall be measured with either a mercury-air or a mercury-water manometer. Fluctuations shall be dampened sufficiently to permit the column gauges to be read to either the closest one-hundredth of one foot of water or Meriam fluid, or the closest one tenth of one inch of mercury.

3.2.4 Capacity

Capacity shall be determined using a calibrated venturi flowmeter or a long radius ASME flow nozzle: orifice plates shall not be used. The venturi or nozzle tube shall be connected to column gages equipped with dampening devices which shall permit the differential head to be determined to either the closest one-hundredth of one foot of water or Meriam fluid, or the closest one tenth of one inch of mercury. A magnetic flowmeter will be acceptable provided a calibrated accuracy within 2.5 percent or 50 gallons per minute can be demonstrated.

3.2.5 Power Input Measurement

The power input to the pump shall be measured using calibrated electric meters and transformers. The method used shall permit the pump brake

horsepower to be determined to the closest + 0.75 of one horsepower. Calibrations shall include true input-output values of motor efficiency.

3.2.6 Performance Test

The test shall be sufficiently extensive and complete to demonstrate that the proposed pump operates without instability and complies with the required performance. Compliance with the contract requirements will be determined from the curves required below. The temperature of the water used for testing shall be approximately the same for all test runs.

3.2.7 Pump performance

The performance of the furnished pumps shall be determined by a series of test points sufficient in number to develop a constant speed curve over the range of total heads, from 5.0 feet to 30.0 feet inclusive, for the speeds involved. Tests shall be made using specified heads and a suction water elevation of 1.5 feet above the centerline of the propeller. A second curve shall be developed with suction water elevation at the top of pump volute. Head differentials between adjacent test points shall not exceed 2.0 feet. If the plot of the data indicates a possibility of instability in the head versus capacity curve, a sufficient number of additional points shall be made to clearly define the head-capacity characteristics.

3.2.8 Test results

The results of the tests shall be plotted to show total head, brake horsepower, net positive suction head required, and efficiency as ordinates; all plotted against the pump discharge in gallons per minute as the abscissa. The above curves shall be plotted to a scale that shall permit reading head directly to five-tenths of one foot, capacity to 100 gallons per minute, efficiency to one percent, and power input to 2 horsepower. Net positive suction head required data may be based on original design data or previous test information.

3.2.9 Test Report

The Contractor shall submit three bound copies of a report completely covering the test setup and the performance tests. Each test report shall include as a minimum the following:

(1) A statement of purposes of test, the project name, the contract number, and the design conditions. Where guaranteed values differ from the specified values, guaranteed values should be given.

(2) A resume of preliminary studies if such studies were made.

(3) A description of the pump. The information required under (2) above may be included here.

(4) A description of test procedure used.

(5) Complete sample computations.

(6) A discussion of test results.

(7) Conclusions.

(8) Pictures: 6 color, 8 inch by 10 inch, with labels.

(9) Copies of all recorded test data.

(10) Curves showing performance of furnished pump.

(11) Drawings of the test setup showing all pertinent dimensions and elevations; and a detailed, dimensioned, cross-section of the pump.

3.3 INSTALLATION

3.3.1 General

Installation of the new pumps shall be in accordance with the manufacturer's installation procedure as outlined in the approved installation manual.

3.3.2 Packaging, Marking, and Acceptance

The Contractor shall insure to have the pumps and control equipment delivered as completely assembled and wired as feasible in order to minimize site installation work. The manufacturer's standard packing method, as approved, for the pumps and control panels shall be submitted at least 10 calendar days prior to the shipping date. Items to be shipped shall be protected against moisture or water damage and kept dry at all times. The pumps and pump control panels shall be crated in order to protect them from damage during shipment and storage: crating shall allow vertical storage. Any relay or other device which cannot withstand the hazards of shipment when mounted in place shall be carefully packed and shipped separately.

3.3.2.1 Spare Parts And Special Tools

Spare parts and special tools shall be packed separately using the manufacturer's standard packing method as approved.

3.3.3 Packing Lists

Packing lists shall accompany all items shipped and be placed in moisture-proof containers securely fastened to the side of each item. Two copies of each packing list shall be submitted to the Government at least ten calendar days prior to each shipment date.

3.3.4 Labeling

All boxes and crates shall be tagged and/or labeled to clearly identify the contents. Spare parts and special tools shall be plainly marked. Packing lists shall include the following information:

(1) Project name

(2) Contract number

(3) Part description and quantity (including the manufacturer's name and the part number).

3.3.5 Inspection

Within five calendar days after delivery to the designated point of shipment, the items shall be inspected by the Contracting Officer. The inspection shall include an accounting of the items delivered and a visual inspection to determine any possible damage during shipment. If this inspection reveals any defects or deviations from contract requirements which could render the items unsuitable for the use intended, the Contractor shall repair each such identified deficiency. In the event deficiencies cannot be acceptably corrected, the equipment will be subject to rejection.

3.3.6 Services Of Pump Manufacturer Erecting Engineer

An erection engineer, regularly employed by the pump manufacturer or a pump manufacturer's representative shall inspect the submersible pump installation and determine the level of adherence to the approved installation instructions. Two calendar days on the site and two calendar days of transit time shall be provided for erection engineer services. The supervision of the setting of the discharge elbows, alignment and assembly of the pumps, and the initial testing and operation of the pumps shall be included in these services. The Contractor shall make all arrangements for the presence of the erecting engineer.

3.4 FIELD TESTING

3.4.1 General

All equipment shall be operated by the Contractor. Testing shall determine whether joints leak and if the pumps have been properly erected and connected. Such testing shall be made at the direction of the Contracting Officer. The Contractor shall furnish all the electricity, lubricants, and water required for the testing.

3.4.2 Field Testing

Field testing for the pump units shall be conducted within a reasonable time following completion of the equipment installation. The Contractor and Contracting Officer will jointly determine the date on which installation of the equipment is considered to have been completed to the extent that the testing can be performed. The testing shall thereafter proceed as expeditiously as practicable with all testing to be completed within 30 calendar days after the installation completion date.

3.4.3 Pump Testing

The submersible pumps shall be tested in the dry to determine whether they have been properly erected and connected. Such testing shall be made when and as directed. After the pumping units have been completely assembled, including all rotating elements, each pump unit shall be operated at full rated speed for two periods of 3 minutes in order to assure proper installation and satisfactory operation. The Contractor shall conduct vibration measurements on all the pump units. Results of the pump testing shall be submitted to Contracting Officer.

3.4.3.1 Pump Testing Under Operating Conditions

All pumping units shall be run under operating conditions to insure that there are no leaks at any of the joints. Pumps shall be run under operating conditions for a total period of four hours. Should there be insufficient water to perform the testing, the Contracting Officer may at its option waive such testing. The Contractor shall demonstrate the removal and installation procedures of the submersible pumps by removing two pumps and then reinstalling same.

3.4.3.2 Test Measurements

The Contractor shall measure and submit the following: each motor total electrical power draw (in KVA) and each motor active electric power draw (in KW) for both the dry and wet testing; and the recorded actual operating revolutions per minute of each pump.

3.5 WARRANTY

The following items shall be covered under a five year industry standard warranty. Parts and labor shall be covered for 2-1/2 years and parts only for an additional 2-1/2 years. Warranty shall go into effect from the date of acceptance by the Contracting Officer either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship.

(1) Electric Submersible Pumps.

3.5.1 Defects or Failures

Defects or failures which develop within the warranty period shall be construed as due to faulty workmanship, materials, and/or design. Exceptions shall include instances where it can be conclusively proven that failure was a result of the Government's improper operation of the equipment, either prior to or after acceptance by the Government. Affected parts shall be replaced promptly with new parts by the manufacturer at no additional cost to the Government.

-- End of Section --

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SECTION 15162

TRACTOR DRIVEN PUMPING EQUIPMENT

PART 1 GENERAL

1.1 SCOPE

This section covers the furnishing and installing of the vertical, mixed flow, pumps and associated gearboxes.

1.2 APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this section to the extent indicated by the references thereto:

American Gear Manufacturers Association (AGMA):

AGMA 297.02	(1983) Sound for Enclosed Helical, Herringbone, and Spiral Bevel Gear Drives.
AGMA 6010-E	(1988) Standard for Spur, Helical, and Spiral Bevel Enclosed Drives.
AGMA 6023-A	(1988) Design Manual for Enclosed Epicyclic Drives.

American Society of Mechanical Engineers (ASME):

ASME B4.1	(1967; R 1994) Preferred Limits and Fits for Cylindrical Parts.
ASME B16.5	(1996) Pipe Flanges and Flanged Fittings.
ASME B17.1	(1998) Keys and Keyseats.
ASME B46.1	(1985) Surface Texture (Surface Roughness, Waviness, and Lay).
ASME 16	**Ref Title**
ASME 17	(1992) Boiler and Pressure Vessel Code, Section IX-92: Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.

American Society for Testing and Materials (ASTM):

ASTM A 27	(1995) Steel Castings, Carbon, for General Application
ASTM A 36	(1997) Carbon Structural Steel

ASTM A 48	(1994a) Gray Iron Castings
ASTM A 53	(1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded, and Seamless
ASTM A 108	(1999) Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 193	(1999) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A 194	(1998 B) Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
ASTM A 276	(1998) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 285	(1990) Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength
ASTM A 516	(1990) Pressure Vessel Plates, Carbon Steel, for Moderate and Lower Temperature Service
ASTM A 564	(1999) Hot-Rolled and Cold-Finished Age-Hardening Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 576	(1990 B) Steel Bars, Carbon, Hot Rolled, Special Quality
ASTM A 668	(1996 E1) Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM A 743	(1998 A) Castings Iron-Chromium, Iron-Chromium-Nickel, Corrosion-Resistant, for general Use
ASTM B 148	(1992 A) Aluminum-Bronze Sand Castings
ASTM B 584	(1993A) Copper Alloy Sand Castings for General Applications
ASTM E 709	(1995) Magnetic Particle Examination

American Welding Society (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel

Hydraulic Institute (HI):

HI	(1994) Standards for Centrifugal, Rotary and Reciprocating Pumps.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C207	(1994) Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation. Submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330: SUBMITTAL PROCEDURES.

SD-04 Drawings

Pump Shop Drawings; GA

Shop drawings, including catalog cuts and manufacturer's data, shall be submitted for approval. Shop drawings shall be neat, legible, and of sufficient size so as to be easily read and/or reproduced. The following items shall be submitted:

a) Outline drawings of all proposed pumps showing all pertinent dimensions and weight of the various components of the pumps.

b) Dimensioned cross sectional drawings of the pumps and components including gearboxes. Pumps and gearboxes shall be shown as a complete assembly. Include shop drawings of pump/gearbox coupling.

c) The proposed coating (painting) systems and procedures for the pumps and components.

d) Pump capacity-head curves with the brake horsepower (BHP) and the net positive suction head required (NPSHR) requirements presented; operating points shall be indicated on these pump curves. Efficiency data shall be plotted.

e) Material listing and material certification of the proposed pumps. Include listing of all pump components. Include the associated industry standard for all materials and components.

f) Welding qualification and certification.

g) Installation Details. Include installation details for the proposed pumps. Scaled layout drawings of the pumping stations/manholes shall be submitted showing the installation of the new pumps. Include details for required rough opening in the top of slab.

h) Warranty. A copy of the warranty for each pump and gearbox provided shall be submitted.

I) Factory Testing. Factory test data shall be submitted as specified in Paragraph: FACTORY TEST.

j) Field Testing. Submit test data from field testing of the pumps as specified in Paragraph: Field Testing.

k) Listing of current pump installations for the vertical pumps.

l) Spare parts listing for the vertical pumps.

m) Lubrication system for the vertical pumps.

n) Outline drawings of all proposed gearboxes showing all pertinent dimensions. Included performance criteria, hp rating, strength rating, speed ratio, etc. Include details on PTO input shaft. Include material data sheet and parts data sheet.

SD-06 Instructions

Pump Installation and Erection Instructions; GA

The Contractor shall submit five copies of a printed and bound manual describing the procedures, to be followed by a pump installation contractor with supervision of an erecting engineer, for erecting, assembling, and installing the pumps and gearboxes. The proposed manuals shall be submitted with the pump shop drawing submittals.

The installation description shall be a complete, orderly, step-by-step explanation of the various operations required to install each pump. It shall describe all special procedures and outline special precautions. It shall also include such things as bolt torque values, permissible wear ring clearances, recommended instrument set-ups, recommended gages and instruments, bearing clearances, and similar details.

The description shall be complemented and supplemented by drawings, sketches, photographs, and similar materials as necessary. The overall result shall be a description which may be comprehended by an engineer or mechanic without extensive experience in erecting or installing pumps of the types required.

After review, the Government will furnish to the Contractor recommended revisions as necessary or desirable for the installation manual and return four copies of the previously submitted manual back to the Contractor. Differences of opinion between the Contractor, manufacturers, and the Contracting Officer shall be reconciled in a manner mutually agreeable to all parties, and five copies of the revised manual shall resubmitted. The final approved installation instructions shall be followed by the installation Contractor for the completion of pump installation work.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Manual; GA

The Contractor shall submit, prior to delivery of any pumps and gearboxes to the project work site, five copies of a manual containing complete information in connection with the operation, lubrication, adjustment, routine and special maintenance, disassembly, repair, and re-assembly of the pumps, gearboxes, and accessories. The manual shall also have a listing of special tools required for working on the pumps and gearboxes. Comprehensive as-built drawings, photographs, factory test results, and sketches of the pumps shall be included. The manual shall include complete diagnostic information on the pumps and all approved shop drawing submittals on the pump and gearboxes. The manual shall be complete enough and provide enough details so the pump stations and pumps can be operated using the manual.

The operation and maintenance manual shall have a complete parts list for the pumps and gearboxes including spare parts. The list shall clearly show all details and parts, and all parts shall be adequately described and have identification markings and include sources for all parts.

Manuals shall be made up with hard cover post type binders and printed on 8-1/2 inch by 11 inch high quality paper with indexed, tabbed section dividers. Large sheets shall be neatly folded and installed with post hole reinforcements such that sheets can unfold without need to open binder posts. Drawings, sketches, and parts lists incorporated in the manual may be reduced to page size provided such reductions are clear and easily legible: otherwise they may be folded into the manual.

1.4 WELDING QUALIFICATIONS

Welding operators, welders, and tack welders shall be qualified and, as necessary, re-qualified for the particular type of work. Qualification shall be in accordance with one of the following codes: Part III, Section 5 of AWS D1.1; or Section IX of ASME 17. Contractor shall certify by name to Contracting Officer the welders and welding operators so qualified, including date of qualification, code, and procedures under which each qualified. Prior qualification may be accepted provided the welder has performed satisfactory work under the code for which he qualified within the preceding three months. Contractor shall require welder or welding operator to repeat qualifying tests when, in the opinion of Contracting Officer, work indicates reasonable doubt as to welder's proficiency. In such cases, welder shall be re-certified as required above. The welder shall be considered disqualified until successful completion of retest. All expenses in connection with qualification and re-qualification shall be borne by Contractor.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Pumps shall be installed at the pumping locations as shown. The term "pump" shall mean the assembled pump-gearbox unit complete with base plate, discharge elbow, bowl assembly, etc. Pumps shall be installed inside pre-cast concrete manholes as shown.

2.1.1 Standard Products

All pumps supplied shall be the product of a pump manufacturer who has produced at least 100 units of the models required under this contract. Fifty (half) of these units shall have been operating in the United States for at least two years prior to the contract award date.

2.1.1.1 Gearboxes

Gearboxes shall be designed and manufactured by a firm regularly engaged in the manufacture of speed reducers and gearboxes. Reducer shall be designed to the appropriate AGMA standards either AGMA 6010-E or AGMA 6023-A.

2.1.2 Coordination

The pump supplier shall furnish the gearbox required for the contract work. All pump shop drawings will be rejected unless this work is properly coordinated. The vertical pump supplier shall be responsible for gearbox

selection and procurement. All pumps shall be furnished complete with gearboxes.

2.1.3 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type/style, model, serial number, and catalog number on a plate secured to the item of equipment. Nameplates shall be made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.4 Instruction Plates

As necessary, each item of equipment shall be equipped with suitably installed instruction plates including warnings and cautions describing special and important procedures to be followed during starting, operating, and servicing the equipment. The plates shall be made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.5 Verification of Dimensions

The Contractor shall be familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy prior to performing the work.

2.1.6 Guards and Covers

Safety guards and/or covers shall be provided wherever necessary to protect the operators from accidental contact with moving parts. Guards and covers shall be of sheet steel, expanded metal, or another acceptable material and removable for disassembly of the pump.

2.2 MATERIALS

2.2.1 Materials Not Specifically Described

Materials not specifically described shall, as far as practicable, conform to the latest approved industry standard(s) covering the appropriate class or types of materials.

2.2.2 Designated Materials

Designated items shall conform to the following:

Item	Requirements
Cast Iron	ASTM A 48, Class No. 30A, 30B and 30C
Cast Steel	ASTM A 27, Grade 65-35, annealed
Copper Alloy Castings	ASTM B 584, Alloy No. C93700 or C86300
Structural Steel	ASTM A 36
Cold Rolled Steel Bars	ASTM A 108, Minimum Working Strength 65,000 pounds per square inch
Hot Rolled Steel Bars	ASTM A 576, Grades: G10200, G10450, G11410
Hot Rolled Stainless	ASTM A 564, Grade 517400
Bars and Shapes:	
Steel Plates, Structural	ASTM A 285, Grade B
Steel Plates, Pressure	ASTM A 516, Grade 55

Vessel Steel Forgings	ASTM A 668, Class F

2.3 VERTICAL PUMPS

2.3.1 General

The pumps shall be the mixed flow, vertical, type as manufactured by Cascade, MWI, or equal. Each pump shall be capable of pumping solids up to 2" in diameter. Pumps are for the purpose of pumping storm water. Water pumped will not exceed 85 degrees F, will be relatively turbid, and may contain sand, silt, and vegetative trash capable of passing trash rack. Trash racks will have 2-inch clear openings. Pumps shall be designed to operate in the dry.

2.3.2 Pump Design

Design pump so that pump parts will fit within the limiting horizontal and vertical dimensions shown. Pump shall discharge into discharge system shown.

2.3.3 Capacities

(1) Condition Point #1: Discharge not less than 6000 gallons per minute against a Total Dynamic Head (TDH) of 20 feet of water. Pumps shall be minimum 85% overall efficient at this condition point.

(2) Condition Point #2: Capable of pumping down to 10 feet of T.D.H without any instability.

2.3.4 Speed

The speed of the pumps shall match the gearbox. The gearbox shall be designed for 900 RPM input and 900 RPM output.

2.3.5 Reverse Rotation

Pump and gearbox shall withstand, with no damage, full rotative speed caused by subjecting pump to reverse flow. Head used to determine this reverse rotative speed is calculated from the highest pipe discharge elevation and lowest pump intake water elevation.

2.3.6 Suction Bell

Suction bell shall be cast iron with a minimum tensile strength of 30,000 psi. Provide flanged connection for mating with impeller bowl. Suction bell shall be made in one piece. Suction bell shall be supported entirely by pump bowl casing. Supports from sump floor will not be acceptable. Umbrellas, if used, should be supported by suction bowl. Construct umbrella in two pieces, if a single piece umbrella could not be removed using pump opening in operating floor. Provide bolted flanges on each half of umbrella and provide for easily removable bolted connection to suction bowl. Provide sufficient lifting lugs on umbrella to aid in handling.

2.3.7 Impeller Bowl and Diffuser Bowl

The impeller bowl and diffuser bowl shall be cast iron with a minimum tensile strength of 30,000 psi. Provide flanges for mating with suction bell and pump column. The bowls may be combined into a single unit or furnished as separate units and mated with a flanged joint. Diffuser shall contain support for upper impeller shaft bearing and have vanes to guide the pumped flow. Equip diffuser bowl with a bypass drain to outside of pump from the diffuser cavity located between the enclosing tube connection and impeller. Furnish throttle bushing located in the cavity immediately above impeller. Bypass drain and throttle bushing should be designed to reduce water pressure on lower seal.

2.3.8 Pump Column and Discharge Elbow

The pump column and discharge elbow shall be steel with a minimum thickness of 0.375". Elbow shall be of mitered type or long radius type. Turning vanes shall not be used. Column and discharge elbow shall be designed to withstand internal pressures and external loadings associated with various conditions of pump operation. Provide flanges for mating individual segments together and for mating pump column to diffuser bowl. Flanges shall have rabbeted fits or four equally spaced dowels installed in flanges for initial alignment purposes and to maintain concentric alignment. The elbow shall terminate in a plain-end circular section. Diameter of discharge end of elbow shall be as shown and shall allow standard diameter flexible couplings to be used. Adjustable thrust rods and thrust lugs shall be used to transfer the load by bridging the coupling.

2.3.8.1 Column and Discharge Elbow Support

Pump column and discharge elbow shall be designed for suspension from a baseplate assembly specified in Paragraph: BASE PLATE AND SUPPORTS and located at operating floor level. If discharge elbow proposed requires a larger floor opening than shown, Contractor shall adjust floor opening size without additional cost to the Government.

2.3.9 Flanges

Machine flanges and drill bolt holes concentric with pump shaft vertical centerline, having tolerance of plus or minus one fourth of clearance between bolt and bolt hole. When fabricated from steel plate, flanges shall not be less than 1-1/2 inches thick after machining. Flange thickness after machining shall not vary more than 10 percent of greatest flange thickness. Provide external stiffeners, if needed. Construct fabricated flanges, as a minimum, to the dimensions of AWWA C207, Class B. Flanges on major components of pump casing (suction bell, impeller bowl, diffuser bowl, and column and elbow piping) shall be designed such that blindholes necessitating use of cap screws or stud bolts will not be used. Design flanges for connection to column pipe by at least two continuous fillet welds. One weld shall connect inside diameter of flange to pump column and the other shall connect outside diameter of pump column to flange. Final design of welds rests with manufacturer, and specified welds are the minimum requirement. They shall be parallel machined, when provided on each end of the same component, and mounted parallel to a plane that is normal to pump shaft centerline. Flanges on each end of the same component shall have parallel tolerance of 0.002 inch. Finish machine mating surface on flange to 125-microinch finish or better. Provide flanges with minimum of three jacking bolts to aid in disassembly of pump.

2.3.9.1 Flanged Joints

Design flanged joints to be air-and water-tight, without the use of preformed gaskets, against positive and negative operating pressures that will be experienced, except that "PERMATEX" or equal gasketing compound will be permitted. Provide mating flanges, unless of the male-female rabbet type, with not less than four tapered dowels equally spaced around flange. If rabbeted fit is not used, then Contractor shall provide the method used to determine concentricity of connected pieces.

2.3.10 Nuts and Bolts

Bolts used in assembling pump and its supporting members, including anchor bolts and dowels, shall be of 300 series stainless steel. Use only bronze nuts and hexagonal bolts and nuts. Washers used shall be 300 series of stainless steel.

2.3.11 Harnessed Coupling

Provide flexible mechanical coupling connecting pump discharge elbow to discharge piping equal to Dresser style 38 coupling, Straub Grip, or approved equal. Furnish middle ring without pipe stop to facilitate installation and removal of coupling. Bolts and nuts shall be stainless steel.

2.3.12 Discharge Piping

Specific requirements are given in SECTION 15060: DISCHARGE PIPELINES. Discharge piping shall consist of a transition section between the pump and the discharge piping outside the pump station. Transition section shall be as shown. Discharge piping outside station shall be restrained as shown.

2.3.13 Impeller

The impeller hub and impeller blades shall be cast aluminum bronze. They may be cast separately or together as a single unit. If cast separately, attach blades to hub in a manner that ensures them against loosening in service but that does not necessitate any damage during disassembly. Welding of blades to hub is acceptable. If this method of attachment is used, Contractor shall submit welding procedure to be used.

2.3.13.1 Minor Surface Imperfections

Minor surface imperfections shall be filled and/or ground down as necessary to preserve the correct contour and outline of the impeller and restore the surface imperfections to the same degree of finish as the surrounding surfaces. Surface pits, depressions, projections, or overlaps showing greater than 1/16 of an inch variation from the general contour for that section shall be corrected. The method and procedure for accomplishing the repairs shall be as set forth in the bolted connections requirements in PARAGRAPH: FABRICATION AND MACHINING. Castings which exhibit surface imperfections as defined above covering an area of more than 10 percent of any surface of any blade will be rejected.

2.3.13.2 Statically Balance

The finished impeller shall be statically balanced and then dynamically balanced at speeds up to 110% of operating speed.

2.3.14 Shafts

2.3.14.1 Impeller Shaft

Impeller shaft shall be ASTM A 276, Type 416, stainless steel. Design shafting so that any necessary vertical adjustment of impeller can be made from the operating room floor without interfering with shaft alignment. Also provide for removal of impeller from below without disassembly of pump above impeller bowl.

2.3.14.2 Line Shaft

Line shaft shall be steel, grade 1045, conforming to ASTM A 108. Line shaft shall have an enclosing tube. Shaft sections shall be joined together with sleeve-type couplings capable of taking rotation in either direction. Threads, except on fasteners, shall not be employed in construction of sleeve-type couplings. Couplings, including keys and fasteners, shall be constructed of stainless steel materials.

2.3.14.3 Pump and Gearbox Shafts

Pump and gearbox shafts shall be coupled together using sleeve type couplings or rigid flange couplings. Couplings shall be capable of transmitting the forces and torques involved. Coupling halves shall be bolted together and shall be maintained concentric with each other, by means of a rabbet fit, to within 0.002 inch. Shaft coupling nut, if used, shall be retained by fitted bolts, and all tolerances specified for the coupling shall apply. Finish machine the flange and bore in one setup to insure that flange of coupling shall be true to the bore. Flange shall be perpendicular to the bore, and parallel to the opposite end and mating flanges to within 0.002 inch. Flange shall be concentric to centerline of shaft to within 0.002 inch. The finished shaft assembly shall be concentric about shaft centerline to within 0.004 inch. Shop assemble couplings and pump shaft and inspect for compliance with contract requirements. After inspection, match mark parts, including fitted bolts, to their mating pieces. Sleeve-type couplings shall be capable of taking rotation in either direction. Threads, except on fasteners, shall not be employed in construction of sleeve type couplings. Couplings, including keys, split rings, and fasteners shall be constructed of stainless steel.

2.3.15 Removable and Renewable One-piece Journals

Provide stainless steel removable and renewable one-piece journals at each bearing and the packing gland. Securely fasten journals to shaft to prevent shifting. Keys and fasteners, if used, shall be made from corrosion-resisting steel. Fastening of journal sleeves to shaft by welding or by adhesives will not be permitted. Shaft finishes/construction at lower seal locations shall be as specified in subparagraph: GUIDE BEARINGS.

2.3.16 Lineshaft Enclosure

Lineshaft enclosing tube shall be ASTM A 53, Schedule 80 steel pipe. Provide shaft enclosure to cover intermediate shaft and couplings. It shall be placed in tension . External supports or bracing located in pump water passage shall not be used for support of the enclosing tube. Enclosing tube shall be furnished in interchangeable 5 foot sections. The lineshaft bearings shall be threaded externally to act as a coupling for the enclosing tube. Design enclosure to be watertight and for easy assembly and disassembly in the field. Provide shaft enclosure for grease-lubricated pumps with a drain to pump exterior. Locate drain at bottom of shaft

enclosure.

2.3.17 Guide Bearings

Provide pump with sleeve-type bearings designed for grease lubrication. Bearing shall have a bronze lining in contact with shaft journal and shall be removable and renewable type. Arrange bearing liner for maximum distribution of grease for lubrication of journal surface. Bearings shall have a surface finish of 32 rms or better. Bearing parts, especially seal rings, shall preclude entrance of foreign material between bearing and journal or journal sleeve and shaft due to differential water pressure. Bearings shall be Astaked@ or keyed to bearing housing.

2.3.18 Grease Lubrication Shaft Seals

Pumps designed for grease lubrication shall have a shaft seal consisting of lip seals. Seal system shall consist of a lip-type seal located on each end of bearing. Each seal shall contain a lip element having a stainless steel garter spring back-up and be constructed of TFE (Teflon). Lip element shall face bearing. Lowest bearing shall have an additional grease seat with lip facing away from bearing. Grind shaft journal to finish of 16 rms at seal location. Shaft surface under seal area shall have a hardness as recommended by seal manufacturer or shall be fitted with a replaceable stainless steel sleeve of manufacturer's recommended hardness. Use bullet-shaped assembly tool or other special tools over the end of shaft and shaft grooves to preclude damage to lip element during assembly.

2.3.19 Packing Gland

Provide grease-lubricated packing gland split longitudinally to facilitate removal or renewal. Arrange it to permit inspection, repair, removal, or replacement of packing without entering pump from below operating room floor. Provide eye bolts and tapped holes in each half of the split gland if halves weigh over 30 pounds each.

2.3.20 Lifting Lugs

Furnish major pump components with lifting lugs or eye bolts to facilitate handling. Design and arrange lugs or bolts to allow safe handling of pump components singly or collectively as required during shipping, installation, and maintenance.

2.3.21 Torsional Vibration And Critical Speeds

The assembled pumping unit, consisting of the gearbox and pump shall be free of critical speeds or harmful torsional vibrations at all speeds encountered within the operating range. When tested in the dry, in accordance with PARAGRAPH: FIELD TESTING, the vibration amplitude shall conform to those presented in the "General Machinery Vibration Severity Chart" and referred to the lower limit of "Fair". The "General Machinery Vibration Severity Chart" may be obtained from IRD Mechanalysis Inc., 6150 Huntley Road, Columbus Ohio 43229. Pump shall be capable of operation without instability over the entire range of heads required. Instability is defined, for this specification, as when one or more of the following conditions occur: (1) pump has two or more flow rates at the same total head; (2) head-capacity curve has a dip (region on curve where change in flow rate produces an abnormally low head); (3)when any point in usable range of head-capacity curve cannot be repeated within 10%; and (4) when a test point deviates from normal curve by 20%.

2.3.22 Painting

Pump interiors and exteriors shall be painted with the manufacturer's paint system, as approved. As a minimum, the pump shall be painted with 2 coats of Ameron Amerlock 400 or approved equal.

2.3.23 Baseplate and Supports

Baseplate shall be furnished by the pump supplier integral with the pump. Base plate shall be cast steel. The baseplate shall be proportioned to support the entire pump assembly, the motor and the loads (including the results of the dynamic analysis) to which it may be subjected during operation. It shall be supported and anchored as shown on the drawings. Lifting lugs or eye bolts, special slings, strongbacks, or other devices necessary to handle the pump during loading, unloading, erection, installation, and subsequent disassembly and assembly shall be furnished. A sole plate shall be provided under the baseplate. Jacking bolts shall be provided for leveling the baseplate assembly. An anchor bolt layout shall be provided to aid in placement of anchor bolts. All leveling jacking bolts shall be backed off after grouting so that they do not support any of the load. The pedestal supporting the motor shall contain a 1-inch lip to contain water leakage from the shaft packing. A threaded drain to the sump shall be provided.

2.3.24 Freeze Protection

All parts of the pump shall have drain holes to eliminate trapped water that could freeze. These drain provisions shall be self-draining without any requirement to enter the sump.

2.3.25 Factory Assembly

The pump shall be assembled at the manufacturer's plant to assure proper fitting and alignment of all parts. The motor shall also be assembled at this time. The suction bell, impeller housing, diffuser, and the discharge elbow shall be properly match marked and have their centerlines clearly marked on the outside of all flanges to facilitate erection and alignment in the field. The Contractor shall notify the Contracting Officer sufficiently in advance to permit a representative of the Contracting Officer to inspect and witness the pump assembly. All parts disassembled for shipment shall be match marked.

2.4 LUBRICATION SYSTEM FOR VERTICAL PUMPS

2.4.1 Pump Grease Lines

Pump greasing unit shall be installed on the pump base plate. Grease unit shall be manually operated. Grease lines for the pump shall be stainless steel tubing, Type 410. Flexible grease lines shall be provided between the pump column and the underside of the pump base plate. Flexible lines shall be stainless steel, reinforced hose a minimum of 12" long.

2.4.2 Lubrication System Accessories

A hand operated, heavy duty lever type, greasing system shall be provided for charging lubrication lines. Each pump shall be provided with this manual lubrication system. This system shall be similar to that manufactured by Farval or equal. Provide grease as recommended by the

vertical pump manufacturer.

2.4.3 Service Facilities

A service facility consisting of a portable hand operated transfer pump, a hand-towed dolly, and a 120 pound drum of lubricant, all assembled and ready for operation shall be provided. The pump shall be self-contained and designed for mounting on the grease drum to protect the contents from the entrance of foreign matter. The pump shall deliver not less than one pound in not more than eight strokes of the pump handle under normal temperature conditions. Furnish necessary hose and quick disconnect coupling for a complete system. The hand-towed dolly shall have a rigid platform with four anti-friction bearing mounted wheels, a towing handle and a provision for securing the lubricant barrel. The type of lubricant shall be as recommended by the vertical pump manufacturer.

2.5 GEARBOX

2.5.1 General

Contractor shall design and select gearbox so that it properly matches the pump. Gear box shall be right angle drive with power take off shaft input. Input speed shall be 900 RPM. Gearboxes shall be designed for pump applications. Gearbox shall be similar to that manufactured by Amarillo Gear Company or equal. Gearboxes shall display AGMA insignia, manufacturers name, model designation, serial number, unit rating, horsepower, speed, and reduction rating.

2.5.2 Gears

All drives shall consist of spiral, beveled gears. Gears shall be designed in accordance with AGMA standard AGMA 6010-E or AGMA 6023-A for both strength and durability. Application factor shall be 1.5.

2.5.3 Gearbox

Gearbox input shall be designed for connecting to a power take off unit on a hydraulic tractor. Output shaft size shall be compatible with the pump.

2.5.4 Oil Lubrication System

The gearbox shall be provided with an oil lubrication system that will provide continuous lubrication to the gears, bearings, and oil lubricated back stop. Oil circulating pump shall be driven directly from the speed reducer shaft. Oil pumps shall be positive displacement type. Lubricating system shall have two oil filters on the pump outlet side. One filter shall be for removing particles and one filter for water removal. Oil drain plug shall be located at the bottom of the gearbox.

2.5.4.1 Oil Heater

Provide a thermostat controlled, electric, 120 volt, single phase, oil heater in the gearbox. Oil temperature shall be maintained at 80 degrees Farenheit. The heater shall have a watt density no greater then 6 W/in2. The oil heater shall terminate in a plug outside the gearbox. The City will utilize a generator (not furnished under this contract) for powering the oil heater.

2.5.5 Gearbox Housing

Gearbox housing shall be cast or fabricated steel. It shall be stress relieved prior to machining. It shall be reinforced to carry all applied loads and to maintain gear alignment.

2.6 SPARE PARTS AND SPECIAL TOOLS

The Contractor shall furnish all specials tools that are unique to the pump or control system for proper installation, testing, operation, and/or maintenance. Special tools shall be delivered with the pumps and controls.

2.6.1 Spare Parts

All spare parts shall be duplicates of the original parts furnished and shall be interchangeable with those parts. The Contractor shall furnish at a minimum the following spare parts:

a. One complete replacement set of bearings, bearing shells, journal sleeves, shaft coupling, if applicable, and seals for one vertical pump.

b. One complete replacement set of wearing parts for the packing gland for one vertical pump, and sufficient packing for all vertical pumps.

PART 3 EXECUTION

3.1 FABRICATION AND MACHINING

3.1.1 Machine Work

All tolerances, allowances, and gauges for metal fits between plain, non-threaded cylindrical parts shall conform to ASME B4.1 for the class of fit required.

3.1.2 Castings

Each casting shall have a mark number cast or stamped upon it. In addition, each casting weighing more than 500 pounds shall have the heat number cast or stamped upon it. Warped or otherwise distorted castings that are oversize to an extent that could interfere with proper fit with other parts of the machinery or structure will be rejected. Cracked castings of non-weldable materials (i.e., cast iron, etc.) will be rejected. Repairs to castings shall not be made without prior approval.

3.1.2.1 Casting repair

Castings shall have all unsound material or defects removed by chipping, machining, air-arc gouging, or grinding; and shall be repaired by welding. Welding repairs shall conform to the welding procedures which shall have been submitted and approved for the type material involved. Stress relief annealing, where required, shall be accomplished prior to final machining.

3.1.2.2 Visually Examine

Visually examine each casting for defects. Examine visually defective impeller and other castings using Magnetic Particle Tests. Magnetic particle tests and inspection shall conform to Appendix 6 of ASME 16 and ASTM E 709. Do not use castings with defects in steel disclosed by magnetic particle test which exceed the degree permitted by Appendix 7 of

ASME 16.

3.1.2.3 Acceptance Criteria

Criteria for acceptance of castings and casting repairs, including the approved welding procedure for each material used, shall be developed by the Contractor. Standards that are not definitive or that delegate discretionary authority for acceptability of castings or casting repairs to manufacturer's representatives or other individuals are not acceptable. Castings not meeting approved criteria shall be either rejected or repaired as dictated by approved standards.

3.1.3 Bolted Connections

Bolts, nuts, and washers shall conform to the applicable requirements of PARAGRAPH: MATERIALS AND MATERIAL STANDARDS for the types required.

3.1.4 Holes for Regular Bolts

Holes for regular bolts shall be drilled or subdrilled and reamed in the shop. Holes shall be accurately located, smooth, perpendicular to the member, and cylindrical.

3.1.5 Holes for Fitted Bolts

Holes for fitted bolts shall be match-reamed or drilled in the shop. Holes shall be smooth, perpendicular to the member, and cylindrical. Burrs resulting from reaming shall be removed. The threads shall be entirely outside of the holes. The body diameter of the bolt shall have tolerances as recommended by ASME B4.1 for the class of fit required. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

3.1.6 Holes for High Strength Bolts

Holes for high-strength bolts shall be accurately spaced, perpendicular to the member, and cylindrical. If the thickness of the material is greater than the diameter of the bolt, the holes shall be either drilled full size or shall be subdrilled and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting done during assembly shall not distort the metal or enlarge the holes. For slight mismatching, reaming to a larger diameter for the next standard size bolt will be allowed.

3.1.7 Metallic Coating

Zinc coatings shall be applied in a manner, thickness, and quality conforming to ASTM A 123. Where the zinc coating is destroyed by cutting, welding, or other causes, the affected areas shall be regalvanized to the thickness and quality required for the original zinc coating.

3.1.8 Metalwork

3.1.8.1 Flame Cutting of Material

Flame cutting of material other than steel shall be subject to approval of Contracting Officer. Shearing shall be accurately done, and all portions of work neatly finished. Steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a smooth surface free from cracks and notches is secured. Surfaces and edges to be welded

shall be prepared in accordance with Section 3 of AWS D1.1. Chipping and/or grinding will not be required except where specified and as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Visible or exposed hand-guided cuts shall be chipped, ground, or machined to metal free of voids, discontinuities, and foreign materials.

3.1.8.2 Stress-Relieving Procedure

After all fabrication welding is completed, and prior to any machining, stress-relieve suction bell by heat treatment. Contractor shall submit proposed stress-relieving procedure for approval by Contracting Officer.

3.1.9 Surface Finishes

Where surface finishes are indicated, or on Contractor's drawings, or are specified herein, symbols used or finishes specified shall be in accordance with ASME B46.1. Values of roughness height specified are the arithmetical average deviation expressed in microinches. Roughness specified is the maximum value and any lesser degree will be satisfactory unless otherwise called for on drawings. Compliance with specified surface shall be determined by sense of feel and by visual inspection of work compared to Roughness Comparison Specimens, in accordance with provisions of ASME B46.1. Values of roughness width and waviness height are not specified, but shall be consistent with general type of finish specified by roughness height. Flaws such as scratches, ridges, holes, peaks, cracks, or checks, which will make part unsuitable for intended use, will be cause for rejection.

3.1.10 Welding

Unless otherwise authorized or specified, welding of steel shall be by electric arc-welding process, using a method that excludes atmosphere from molten metal. Welding of steel, unless specified otherwise, shall conform to applicable provisions of AWS D1.1. Temporary welds required for fabrication and erection shall be made under controlled conditions prescribed herein for permanent work. Each temporary weld shall be removed after serving its purpose and ground flush with adjacent surfaces.

3.1.11 Shop Assembly

Unless otherwise specified, each piece of machinery furnished, shall be assembled in the shop to determine correctness of fabrication and matching of component parts. Tolerances shall not exceed those specified or shown on Contractor's manufacturing drawings and each assembled unit shall be closely checked to ensure that all necessary clearances have been provided and that binding does not occur in any moving part. Assembly in shop shall be in the same position as final installation in the field unless otherwise specified. Perform assembly and disassembly work in the presence of a Government representative, unless waived in writing by Contracting Officer, and immediately remedy errors or defects disclosed without cost to Government. Before disassembly for shipment, matchmark each piece of a machine or structure to facilitate erection in the field. Indicate location of matchmarks by circling with a ring of white paint after the shop coat of paint has been applied, or as otherwise directed.

3.2 FACTORY TEST

3.2.1 General

The factory test shall be conducted using the furnished vertical pumps. All the proposed vertical pumps shall be factory tested. However, witness testing is only required on one pump. It is anticipated that two or three representatives from the Government will witness the factory test. No pumps shall be delivered to the project work site until the factory testing has been completed and the Contracting Officer has accepted the factory test results. Testing shall be in accordance with HI "Standards for Centrifugal, Rotary and Reciprocating Pumps".

3.2.2 Test Setup

Pump shall be test setup to simulate its actual field installed position. The Contractor shall submit for approval, within 45 calendar days after the contract notice to proceed, a description of the proposed test setup and proposed test procedures: this information must be submitted prior to the construction of the proposed test setup. The submittal shall include dimensioned drawings and cross-sectional views of the setup and pump, with the location of all instrumentation and the point of their connection indicated. Each instrument shall be described in detail giving all data applicable such as manufacturer's name, type, model number, the certified accuracy, coefficient ratios, specific gravity of manometer fluid to be used, and smaller scale divisions. When necessary for clarity, a sketch of the instruments or instrument arrangements shall be presented. Also include a fully detailed narrative description of each proposed method of instrumentation and the proposed test procedures.

3.2.3 Instrumentation

Head measurements shall be made using either a direct reading water column, mercury-air, mercury-water, or a meriam fluid manometer. Vacuums shall be measured with either a mercury-air or a mercury-water manometer. Fluctuations shall be dampened sufficiently to permit the column gauges to be read to either the closest one-hundredth of one foot of water or Meriam fluid, or the closest one tenth of one inch of mercury.

3.2.4 Capacity

Capacity shall be determined using a calibrated venturi flowmeter or a long radius ASME flow nozzle: orifice plates shall not be used. The venturi or nozzle tube shall be connected to column gages equipped with dampening devices which shall permit the differential head to be determined to either the closest one-hundredth of one foot of water or Meriam fluid, or the closest one tenth of one inch of mercury. A magnetic flowmeter will be acceptable provided a calibrated accuracy within 2.5 percent or 50 gallons per minute can be demonstrated.

3.2.5 Power Input

The power input to the pump shall be measured using calibrated electric meters and transformers. The method used shall permit the pump brake horsepower to be determined to the closest + 0.75 of one horsepower. Calibrations shall include true input-output values of actual motor efficiency.

3.2.6 Performance Test

The test shall be sufficiently extensive and complete to demonstrate that the proposed pump operates without instability and complies with the required performance. Compliance with the contract requirements will be

determined from the curves required below. The temperature of the water used for testing shall be approximately the same for all test runs.

3.2.7 Pump performance

The performance of the furnished pumps shall be determined by a series of test points sufficient in number to develop a constant speed curve over the range of total heads, from 5.0 feet to 30.0 feet inclusive, for the speeds involved. Tests shall be made using specified heads and a suction water elevation of 1.5 feet above the centerline of the impeller. A second curve shall be developed with suction water elevation at the top of pump volute. Head differentials between adjacent test points shall not exceed 2.0 feet. If the plot of the data indicates a possibility of instability in the head versus capacity curve, a sufficient number of additional points shall be made to clearly define the head-capacity characteristics.

3.2.8 Test results

The results of the tests shall be plotted to show total head, brake horsepower, net positive suction head required, and efficiency as ordinates; all plotted against the pump discharge in gallons per minute as the abscissa. The above curves shall be plotted to a scale that shall permit reading head directly to five-tenths of one foot, capacity to 100 gallons per minute, efficiency to one percent, and power input to 2 horsepower. Net positive suction head required data may be based on original design data or previous test information.

3.2.9 Witness Test

A witness test shall be performed. When the Contractor has been satisfied that the pumps perform in accordance with the contract requirements, he shall notify the Contracting Officer that the witness test is ready to proceed. Two copies of the curves required above, along with a set of sample calculations including all constants and conversion factors, shall be furnished. A minimum of 14 calendar days will be required for reviewing the data before the Government will be available to visit the Contractor's test site for witnessing the test. Should the witness test reveal that the pump does not perform in accordance with the contract requirements and the guaranteed values, the Contractor shall make such changes as needed in order to make it acceptable before again notifying the Contracting Officer that a witness retest is ready to proceed. Immediately upon completion of the witness test, a copy of all data taken during the test shall be furnished to the Contracting Officer witnessing the test for review and approval.

3.2.10 Test Report

The Contractor, within 15 calendar days after receipt of approval of the witness test, shall submit three bound copies of a report completely covering the test setup and the performance tests. Each test report shall include as a minimum the following:

(1) A statement of purposes of test, the project name, the contract number, and the design conditions. Where guaranteed values differ from the specified values, guaranteed values should be given.

(2) A resume of preliminary studies if such studies were made.

(3) A description of the pump. The information required under (2) above

may be included here.

(4) A description of test procedure used.

(5) Complete sample computations.

(6) A discussion of test results.

(7) Conclusions.

(8) Pictures: 6 color, 8 inch by 10 inch, with labels.

(9) Copies of all recorded test data.

(10) Curves showing performance of furnished pump.

(11) Drawings of the test setup showing all pertinent dimensions and elevations; and a detailed, dimensioned, cross-section of the pump.

3.3 INSTALLATION

3.3.1 General

Installation of the new pumps shall be in accordance with the manufacturer's installation procedure as outlined in the approved installation manual.

3.3.2 Packaging, Marking, and Acceptance

The Contractor shall insure to have the pumps delivered as completely assembled as feasible in order to minimize site installation work. The manufacturer's standard packing method, as approved, for the pumps shall be submitted at least 10 calendar days prior to the shipping date.

3.3.2.1 Spare Parts And Special Tools

Spare parts and special tools shall be packed separately using the manufacturer's standard packing method as approved.

3.3.3 Packing Lists

Packing lists shall accompany all items shipped and be placed in moisture-proof containers securely fastened to the side of each item. Two copies of each packing list shall be submitted to the Government at least ten calendar days prior to each shipment date.

3.3.4 Labeling

All boxes and crates shall be tagged and/or labeled to clearly identify the contents. Spare parts and special tools shall be plainly marked. Packing lists shall include the following information:

(1) Project name

(2) Contract number

(3) Part description and quantity (including the manufacturer's name and the part number).

3.3.5 Services Of Pump Manufacturer Erecting Engineer

An erection engineer, regularly employed by the pump manufacturer or a pump manufacturer's representative shall inspect the vertical pump and submersible sump pump installation and determine the level of adherence to the approved installation instructions. Five calendar days on the site and two calendar days of transit time shall be provided for erection engineer services. The supervision of the setting of the discharge columns, alignment and assembly of the pumps, and the initial testing and operation of the pumps shall be included in these services. The Contractor shall make all arrangements for the presence of the erecting engineer. When so requested, erecting engineers shall provide and be responsible for providing complete and correct direction during initial starting and subsequent operation of equipment until field tests are completed. Erecting engineer shall initiate instructions for actions necessary for proper receipt, inspection, handling, uncrating, assembly, and testing of equipment. The Erecting Engineer(s) shall also keep a record of measurements taken during erection, and shall furnish one copy to Contracting Officer on request or on completion of installation of assembly or part. Erecting engineer shall instruct Contracting Officer in operation and maintenance features of work.

3.3.6 Sole Plate Installation

All anchor bolts shall be furnished by the Contractor.

3.4 FIELD TESTING

3.4.1 General

All equipment shall be operated by the Contractor at his own expense to determine if joints leak and if the pumps have been properly erected and connected. Such testing shall be made at the direction of the Contracting Officer. The Contractor shall furnish all the electricity, lubricants, and water required for the testing.

3.4.2 Field Testing

Field testing for the pump units shall be conducted within a reasonable time following completion of the equipment installation. The Contractor and Contracting Officer will jointly determine the date on which installation of the equipment is considered to have been completed to the extent that the testing can be performed. The testing shall thereafter proceed as expeditiously as practicable with all testing to be completed within 30 calendar days after the installation completion date.

3.4.3 Pump Dry Testing

The pumps shall be tested in the dry to determine whether they have been properly erected and connected. Such testing shall be made when and as directed. After the pumping units have been completely assembled, including all rotating elements, each pump unit shall be operated at full rated speed for five periods of 3 minutes in order to assure proper installation and satisfactory operation. The Contractor shall conduct vibration measurements on all the pump units. Results of the pump testing shall be submitted to Contracting Officer.

3.4.3.1 Vibration Measurements

Vibration measurements, in both axial and radial directions, shall be made by the Contractor on all the pumps. Measurements will be made on pump casing flanges, pump base plate, motor, and, if possible, on bearing housings. Vibration measurements will be analyzed by Government personnel to determine acceptability of pumping installation.

3.4.4 Pump Wet Testing

All pumping units shall be run under operating conditions to insure that there are no leaks at any of the joints. Pumps shall be run under operating conditions for a total period of four hours. Should there be insufficient water to perform the testing, the Contracting Officer may at its option waive such testing.

3.5 WARRANTY

The following items shall be covered under a two year industry standard warranty including all parts and labor. Warranty shall go into effect from the date of acceptance by the Contracting Officer either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship.

(1) Vertical Pumps.

3.5.1 Warranty Period

Defects or failures which develop within the warranty period shall be construed as due to faulty workmanship, materials, and/or design. Exceptions shall include instances where it can be conclusively proven that failure was a result of the Governments improper operation of the equipment, either prior to or after acceptance by the Government. Affected parts shall be replaced promptly with new parts by the manufacturer at no additional cost to the Government.

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SECTION 16250

DUPLEX PUMP PANEL AND ELECTRICAL WORK

PART 1 GENERAL

1.1 SCOPE

This section includes the duplex pump control panels and installation and connection of all motors and electrical equipment. This section also includes the new electrical service, service disconnect, meter socket, conduit wiring, and grounding requirements.

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.

American National Standards Institute (ANSI)

ANSI C2	National Electrical Safety Code
ANSI C62.11	(IEEE Standard) Metal Oxide Surge Arrestors for AC Power Circuits
ANSI C80.1	Rigid Steel Conduit - Zinc Coated
ANSI C119.1	Sealed Insulated Underground Connector Systems Rated 600 Volts
ANSI C135.30	Zinc-Coated Ferrous Ground Rods for Overhead or Underground Line Construction (1988)

American Society for Testing and Materials (ASTM)

ASTM D 709	Molded Case Circuit Breakers and Molded Case Switches

National Electrical Manufacturers Association Publications (NEMA Pub. No.)

NEMA AB 1	Molded Case Circuit Breakers and Molded Case Switches
NEMA B300	**Ref Title**
NEMA FB 1	Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
NEMA ICS 1	Industrial Control and Systems

NEMA ICS 2	Industrial Control Devices, Controllers and Assemblies
NEMA ICS 3	Industrial Systems
NEMA ICS 4	Industrial Control and Systems Terminal Blocks
NEMA ICS 6	Industrial Controls and Systems Enclosures
NEMA RN 1	Polyvinyl-Chloride (PVC) Externally Coated Rigid Steel Conduit and Intermediate Metal Conduit
NEMA ST 20	Dry Type Transformers for General Applications
NEMA WD 1	(R1989) Wiring Devices - General Requirements
NEMA WD 6	Wiring Devices - Dimensional Requirements
NEMA 3R	**Ref Title**
NEMA 4X	**Ref Title**

National Fire Protection Association (NFPA)

NFPA 70	(1999) National Electrical Code (NEC)

Underwriters Laboratories, Inc. Standards (UL Std. No.)

UL 6	(1993) Rigid Metal Conduit
UL 44	(1991; Rev thru Jan 1995) Rubber-Insulated Wires and Cables
UL 83	(1991; Rev thru Oct 1994) Thermoplastic-Insulated Wires and Cables
UL 467	(1993) Grounding and Bonding Equipment
UL 498	(1996) Attachment Plugs and Receptacles
UL 508	(1993) Industrial Control Equipment
UL 943	(1993; Rev thru Jan 1995) Ground-Fault Circuit Interrupters

1.3 SUBMITTALS

Government approval is required for submittals with a GA designation. submittals having an FIO designation are for information only. the following shall be submitted in accordance with Section 01330: SUBMITTAL PROCEDURES.

SD-01 Data

Bill of Materials and Catalog Cuts; GA

Submit a bill of materials for all components and devices supplied. Identify each item by name, manufacturer, catalog number or model number and quantity furnished. Include catalog cuts of all material for approval.

SD-04 Drawings

Pump Panel Shop Drawings; GA

Submit shop drawings for equipment as follows:

a. Dimensioned outline drawing of the duplex pump panel enclosure. Include mounting supports.
b. Elementary and internal wiring diagrams for the power and control system.
c. Device nameplate list. Supply a sample nameplate.
d. Service equipment including the meter socket, disconnect switch, mounting pedestal, and foundation.

SD-13 Certificates

UL Certification; FIO

Submit written certification of the UL serialized label for the pump control panel.

SD-19 Operation and Maintenance Manuals
Operation and Maintenance Manual; GA

Submit 4 copies of the operation and maintenance manuals.

PART 2 PRODUCTS

2.1 GENERAL

The pump supplier shall furnish the duplex pump panels and equipment and supervise its installation. The equipment shall be supplied complete and ready for use without field modification. The pump panel control logic shall provide for the automatic operation and alternation of the submersible pumps. If the incoming flow exceeds the capacity of the lead-on pump, the lag pump shall automatically start. Pump panels are required at each submersible pump station.

2.1.1 RULES

Unless otherwise specified all work shall comply with the National Electrical Code, NFPA 70. The wet well is designated as a Class 1, Division 1 hazardous location.

2.1.2 UL Ratings

The pump control panel construction shall comply with the requirements of

Underwriter's Laboratories Industrial Control Panels listing and follow-up service. Panel designed and built per UL 508. Use only UL listed and recognized components.

2.1.3 Electrical Service

The Contractor shall coordinate all features of the installation of the electrical service. Power company is Ottertail Power. The Contractor shall coordinate the installation of a utility owned, pole mounted transformer, the underground service lateral, and the socket type meter. The Contractor shall pay all costs associated with the electric service installation. Electrical service is required at each submersible pumping station.

2.1.4 Coordination

Contractor shall be responsible for the final design of the pump control panel. Make all changes to the electrical design at no additional cost if the pumps supplied have electrical ratings and characteristics different from the pumps specified or shown. Provide the calculations used to make revised component selections. Revised selections shall comply with the specifications. Verify that final field adjustments comply with factory recommendations.

2.1.5 Storage and Shipment

Store all electrical materials and equipment at the site in trailers or temporary buildings which provide protection from the effects of weather. The Contracting Officer reserves the right to approve storage facilities for electrical materials and equipment. Wrap pump panel enclosure surfaces in a protective plastic wrap before crating and shipment. Crate the pump control panel to protect it from damage during shipment and storage.

2.1.6 Operation and Maintenance Manuals

Prepare an operation and maintenance manual for the duplex pump panel and control equipment. Manuals shall be made up with hard cover post type binders. Include index, tabbed section dividers, all approved shop drawings, installation, and maintenance instructions packed with equipment, and parts lists. Provide a written description of equipment operation, special features and maintenance requirements. Provide instructions for setting all adjustable components. Record the final field settings of all adjustable components in a comprehensive table. Large sheets shall be neatly folded and installed with post hole reinforcements such that sheets will unfold without need to open binder posts.

2.2 MATERIALS

2.2.1 Conductors

Cables shall conform to UL 83 and shall be of annealed copper. Conductor size shall be based on the requirements of the National Electrical Code. Cables shall be single-conductor type, unless otherwise noted.

2.2.1.1 Control Wire

Provide UL listed, #14 AWG., (41/31) flexible stranded, copper wire. Control wire insulation shall be 90 degree C, XLP type SIS, rated for 600 Volt operation.

2.2.1.2 Grounding Cables

Grounding cables shall be bare or shall have green, low-voltage insulation per UL 467.

2.2.1.3 Power and Control Cables

Multi-conductor flexible electrical power and control cables. The flexible cables for the pump motor and the floats shall be extra flexible with reinforced jacket, and resistant to impact and abrasion. Pump cable shall be supplied with the pump. Sizing shall conform to NFPA 70. All pump power, control, and float cables shall be individually installed in a braided, stainless steel outer jacket for rodent protection.

2.2.2 Conduit Systems

Provide all raceway, fittings, outlet boxes, junction and pull boxes, supports, sleeves, and other appurtenances required to provide a complete raceway system.

a. Rigid Heavy Wall Conduit. UL 6.

b. PVC Coated Rigid Steel Conduit. NEMA RN 1. All components and accessories for this type of raceway system shall be provided by one manufacturer

2.2.3 Duplex Pump Panel Enclosure

NEMA 3R enclosure, welded seamless construction. Material shall be 14 gauge, Type 304, stainless steel. Final design and dimensions of the panel shall be per the Contractor. A three position selector switch mounted on the inner door shall provide the hand, off, or automatic mode selection for each pump. The switches shall be oil-tight with ten-ampere rated contacts as required. A position indicating legend plate and an identifying engraved nameplate shall be provided with each switch. In hand position, the pumps shall run continuously without regard to level sensing. In automatic position, the pumps shall respond to the float switches and start and stop accordingly. In the off position, the pumps shall be locked out and not operate.

2.2.3.1 Weatherdoor

Gasketed continuously hinged, weather door(s) with doorstop kit. Three point latch with padlock provision.

2.2.3.2 Deadfront

Continuously hinged deadfront held closed with two slotted nickel plated brass captive panel screws with knurled edges to allow for finger or screwdriver tightening.

2.2.3.3 Backpanel

Fixed rigid backpanel, 12 gauge hot-dipped galvanized steel, white baked enamel finish.

2.2.3.4 Mounting Lugs

Mounting lugs shall be provided on the enclosure for attachment to the unistrut system as shown.

2.2.3.5 Hardware

Stainless steel bolts, nuts, washers, lockwashers, and machine screws.

2.2.3.6 Nameplate

Permanently affixed to the inside of the enclosure door shall be a nameplate with manufacturer name, address, phone number, pump voltage, hp, phase, and date manufactured.

2.2.4 Control Devices

2.2.4.1 Combination Magnetic Starters

Provide full voltage across-the-line magnetic type motor starters designed for use with Class 10, 20, and 30 rated overload devices. Provide molded construction coils. Replacement coil and contacts shall not require the removal of the starter or power wiring from the control panel. Starters shall meet NEMA ICS 1 and NEMA ICS 2, UL 508 and NEC requirements. Half-size rated starters not permitted. Size starter for motor supplied. Square D Class 8536, Type S, Allen-Bradley Bulletin 500, Cutler-Hammer File A10 or equal.

a. Motor Overload Protection. Provide manual reset temperature compensated, Melting alloy thermal overload relays. When applicable provide a manual reset temperature compensated overload to protect the motor start winding. Size overloads for motors supplied in accordance with the National Electrical Code.

2.2.4.2 Relays

Provide NEMA B300, general purpose plug-in relays. Operating temperature -45 degrees C to +45 degrees C. Three Form C (3PDT) Silver Cadmium Oxide contacts rated 120/240 volts, 10 amps continuous, 30/15 amps make, 3/1.5 amps break. Continuous rated coils with AC pickup voltages of 85% of nominal voltage at 60 Hertz, 25 degrees C. Coil voltage as required. Transparent polycarbonate dust cover, 11 blade plug-in base. Rail mounted relay base with retainer clips to secure relay in socket. Square D Class 8501, Type K, Allen-Bradley Bulletin 700, Type HB, Cutler- Hammer File D5 or equal.

a. Time Delay Relays. Provide NEMA B300, general purpose plug-in adjustable time delay relays. Operating temperature -10 degrees C to +55 degrees C. Two Form C (DPDT) silver cadmium oxide contacts rated 120/240 volts, 10 amps continuous, 30/15 amps make, 3/1.5 amps break. Voltage range +10%, -15% of nominal at 60 HZ for AC operation. Operating voltage as required. Repeat accuracy +/-1% for constant voltage and temperature, +/-10% for any variation of voltage and temperature within specifications. Timing range and "OFF" or "ON" delay as required for application. Polycarbonate dust cover with adjustable timing dial. Eight pin tube or blade type plug-in base. Rail mounted relay base with retainer clips to secure relay in socket. Square D Class 9050, Type JCK, Allen-Bradley Bulletin 700, Type H, or equal.

b. Alternator Relay. Provide general purpose, plug-in, duplex

alternating relay. Operating temperature -20 degrees C to +55 degrees

c. Two Form C (DPDT) Silver Cadmium Oxide contacts rated 120/240 volts, 10 amps continuous, 30/15 amps make, 3/1.5 amps break. Continuous rated operating duty. Solid-state alternating circuit driving electrical- mechanical relay coil. Coil shall have AC pickup voltages of 85% of nominal voltage at 60 Hertz, 25 degrees C. Coil voltage shall be as required. Relay enclosed in polycarbonate dust cover with state indicating LEDs in cover. 11 pin tube or blade type plug-in-base. Rail mounted relay base with retainer clips to secure relay in socket. TimeMark Model 261 series, Diversified Electronic, Inc. Duplexors or equal.

2.2.4.3 Push-button, Selector Switches and Pilot Lights

Provide heavy duty, oil-tight, watertight NEMA ICS 4 control units. 1-3/16 inch minimum knockout diameter. Pilot lights shall be push to test transformer type. Pilot lights and pushbuttons which require boots to make complete station watertight are NOT PERMITTED. Provide contact blocks suitable for side-by- side and tandem mounting to the operator base. Contact blocks shall have captive mounting screws, with drilled and tapped heads to permit easy tandem mounting of contact blocks. Square D Class 9001, Type X, Cutler- Hammer Type T, Allen Bradley Bulletin 800H, or equal.

2.2.4.4 Running Time Meters

Provide non-resetable hour indicating time meters with 6 digit registers. Numbers shall be at least 1/4 inch high. Registers shall have white numbers on black background. Last digit shall have contrasting colors to indicate tenths of an hour. enclosure shall be at least 3-1/2 inches square or round. Unit shall be designed for 120VAC operation. General Electric, Type 240, Simpson Model 2153ET, or equal.

2.2.4.5 Liquid Level Sensors

Provide direct acting float switches for level detection. Molded polyethylene body. Internal redundant polyurethane foam flotation. Potted switch and cable connections. Fine stranded 18 AWG cable with heavy duty synthetic rubber jacket. Length as required. Floats shall be connected to control circuitry via an intrinsically-safe, transducer signal module. Level sensors shall be provided for pump start, pump stop, and high alarm at each station.

2.2.4.6 Condensation Heater

Provide a thermostat controlled, fan driven heater for the control panel. Heater shall have anodized aluminum housing, adjustable thermostat, ball bearing fan, and terminal block. Size heater in accordance with control panel manufacturer's recommendation. Heater shall be 120 volt.

2.2.4.7 Terminal Blocks

Provide channel mounted sectional type terminal blocks rated 600 Volts, 20 Amp minimum. Provide terminal blocks with flat terminal connectors for power and control conductors No. 12 AWG and smaller. Provide terminal blocks with solderless box lugs for power and control conductors larger than No. 12 AWG. Square D, Class 9080, Type G, Allen-Bradley Bulletin 1492, Style C or equal.

2.2.4.8 Nameplates

Provide laminated sheet plastic nameplates, 1/16 inch thick conforming to ASTM D 709. Nameplates shall have matte black finish with white center core, square corners, beveled and minimum 3/16 inch block lettering. Minimum nameplate dimensions shall be 3/4 inch by 2- 2 inch. Fasten nameplates with rivets, sheet metal screws or permanent adhesive.

2.2.4.9 Transformer

Transformer shall be 480 volt primary, 120 volts AC secondary. Transformer shall supply power for pump controls circuitry, panel condensation heater, and the convenience receptacle.

2.2.4.10 Receptacles

Provide receptacle rated at 120 volt, 20 amps, 3-wire ground fault interrupter (GFI) type with weather proof cover. Receptacles shall conform to NEMA WD 1 for general purpose wiring devices.

2.2.5 Disconnect Switches

Provide Type HD, horsepower rated where applicable. Provide UL Service Equipment listing required when applicable.

2.2.6 Grounding and Bonding Equipment

UL 467

2.2.7 Alarm Beacon

The alarm beacon globe shall be NEMA 4X, red lexan. The globe shall be mounted to the pump panel enclosure with stainless steel screws and a closed cell neoprene gasket to insure watertight integrity. The bulb and socket shall be removable from the inside pump panel without the use of any tools. A 40 watt rough service lamp shall be used in the alarm beacon. The alarm light shall glow dim during normal operations and flash with normal intensity during alarm conditions. The flasher shall be solid state, totally encapsulated and shall flash the alarm beacon at a rate of approximately 60 flashes per minute.

2.2.8 Audible Alarm

Provide a weatherproof audible alarm horn on the exterior of the enclosure. The horn shall provide 103 db output adjustable on the front from 103 db to 78 db. Operating voltage as required.

2.2.9 Braided steel jacket

Provide a tubular braided steel jacket to protect each float electrical control cable in the wet well from rodents and other animals. The braided steel jacket shall be seamless, fabricated of 0.020 diameter (minimum) stainless steel wire, and flexible in order to allow for proper float operation. The braided jacket shall be sized to fit snug around the cable with a minimum of 95 percent coverage.

2.2.10 Motor electrical power receptacle

UL 498. Provide a 480 volt AC, horsepower rated, weatherproof, pin and sleeve type receptacle. The receptacle shall maintain the NEMA 3R rating of the enclosure when installed. A mating plug shall be provided on the motor power cable.

2.2.11 Motor temperature and seal sensors receptacle

UL 498, weatherproof receptacle for the multi-conductor cable containing the pump motor sensor control wires. The receptacle shall maintain the NEMA 3R rating of the enclosure when installed. A mating plug shall be provided on the pump motor sensor cable.

2.2.12 Service Equipment

2.2.12.1 Main disconnect switch

Service disconnect switch shall be located in the pump control panel. Provide a disconnect switch that is rated 100 ampere, 480 volt AC circuit breaker type, line side lugs to accommodate aluminum service conductors size 1/0 and a grounding lug for the neutral, padlockable in both open and closed positions in pump control panel enclosure. The disconnect switch and pump control panel shall be Underwriters Laboratories (UL) listed for use as service equipment.

2.2.12.2 Meter sockets

The Contractor shall coordinate the meter socket requirements with the local electrical power utility company. Provide self-contained 200 ampere continuous, 600 volts AC, 3 phase, 4 wire, UL Type HQ meter socket for underground service. Each meter socket shall be similar to Landis & Gyr, Model HQ-7U as manufactured Landis & Gyr Metering Inc., Lafayette, IN; or Superior Technology Inc., Model CU449(U) HQ-7 Block as manufactured by Superior Technology Inc., Canton, OH.

2.2.13 Circuit Breakers

The pump motor breakers shall be motor protector magnetic trip devices and provide for individual motor disconnect and short circuit protection as required by NEC. Breaker handles shall be totally accessible through the inner door. Magnetic trip rating shall be adjustable and the voltage rating be 600 volt. Circuit breakers shall conform to NEMA AB 1.

2.2.14 Lightning/Surge Arrestors

The control panel shall have lighting arrestor protection included within the panel to protect the motors and control equipment from lightning induced line surges. Equipment shall conform to ANSI/IEEE C62.11. Provide a lightning /surge arrestor on each phase.

PART 3 EXECUTION

3.1 Installation

3.1.1 Grounding and Bonding

Ground the electrical system in accordance with the National Electrical Code, NFPA 70. The pump panel, sump vent, access hatch frame, pump guide rails, and discharge piping shall be bonded together with an equipment

grounding conductor sized in accordance with the National Electrical Code. Each ground connection shall be made with mechanical connectors or exothermic welds (Cadweld) and shall be accessible for inspection and checking. Ground conductors shall be stranded copper. Grounding equipment shall conform to ANSI C135.30 and UL 467.

3.1.2 System Operation

Provide a four float duplex pump alternator control system to operate the sewage pumps in accordance with variations in wet well levels. One float shall be set to provide "Common-Off", "Pump- Alternation" operation. The remaining three floats shall provide "Lead", "Lag" and "High Level Alarm: operation respectively. The alternator circuit shall permit the selection of "1-2, Auto, 2-1" pump operation and provide staggered restart. Each level sensor alarm circuit shall include a three position, "Hand-Off-Auto" selector switch which will allow simulation of sensor operation for test purposes. The entire control assembly shall operate from a 24 volt DC power supply.

3.1.2.1 Alarms

Unless otherwise noted, each pump alarm shall actuate a separate seal-in circuit to prevent operation of the affected pump until the alarmed condition has been cleared and the circuit manually reset. Provide local indication of alarmed conditions. Use pilot lights with identification nameplates for local alarms. Provide Test and Reset pushbuttons for alarm circuits. Pump alarm circuit operation shall not be affected by momentary power interruptions.

a. Wet Well High Level Alarm. Provide "quelled" alarm float operation. High level alarm shall activate an indicator light on deadfront and an alarm beacon and horn mounted on the enclosure. Provide alarm silence push-button to acknowledge alarm and turn off horn. Beacon and indicator light shall reset when alarm condition has cleared.

b. Motor Over Temperature Alarm. The alarm circuit shall be actuated by thermal sectors embedded in the stator windings of the pump motors.

c. Motor Overload Tripped Alarm. The alarm circuit shall be actuated by the pump motor thermal overload relay.

d. Pump Seal Failure Alarm.

3.1.3 Enclosure

The enclosure shall be designed as specified in paragraph "MATERIALS". All selector switches, circuit breakers, and similar devices shall be semi-flush mounted on the deadfront so that all the components normally actuated by operating personnel are accessible without opening the deadfront, and yet are not exposed to the elements or to unauthorized personnel. The enclosure shall be designed and constructed to accept all of the control equipment as specified. The enclosure shall have suitable conduit openings in the bottom to accommodate incoming feeder, branch power, and control to eliminate field cutting the enclosure.

3.1.4 Control Wiring

Loop wire for proper twist rather than bending at hinge points. Bundle

power and control wire neatly. Use nylon tie wraps or continuous plastic spiral binding to secure wire bundles behind devices mounted through deadfront. Tie-wrap bases installed on the back-panel shall be screw attached. Tie-wrap bases installed on enclosure exterior wall shall be attached with a two-part epoxy approved by the Contracting Officer. Use "Panduit" wiring channel to route wire to devices mounted on backpanel. Use insulated fork type compression lugs on both ends of each control wire. The use of splices or wire nuts is not permitted.

3.1.5 Terminal Blocks

Locate terminal blocks for external connection near bottom of enclosure. Use no more than one wire per terminal point. Identify and segregate power conductors and terminals.

3.1.6 Identification

Identify each wire and device as indicated on approved elementary drawings. Provide screw-applied, engraved, black, laminated plastic nameplates with white letters for control equipment mounted on the deadfront and backpanel. Label control wires 2" from each termination with properly sized and oriented, heat-stamped, black on yellow PVC sleeve markers. Label all terminal blocks with pre-printed vinyl-cloth markers. The use of "DYMO" type labels is not permitted.

3.1.6.1 Power conductor identification

Phase conductors shall be identified by color coding. The color of the insulation on phases A, B and C respectively for three phase circuits shall be as follows:

a. 120/208 volt, three phase; black, red, and blue, neutral-white.
b. 480 volt, three phase; brown, orange, and yellow.
c. Ground; green insulation or bare copper.

Conductor phase and voltage identification shall be made with integrally pigmented color-coded insulation for all conductors No. 10 AWG and smaller. For conductors larger than No. 10 AWG, identification shall be made with integrally pigmented color-coded insulation, or conductors with black insulation identified with half-lapped bands of colored electrical tape, or colored heat-shrink tubing as submitted by the Contractor and approved by the Contracting Officer. Colored electrical table or heat shrink tubing shall be cover the insulation for a minimum of 3 inches of length from the ends of taps, splices and terminations. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made. Phase identification by a particular color shall be maintained for the length of the circuit, including junction boxes.

3.1.7 Control Components

The control system shall be designed and constructed to include the following control components installed in the specified enclosure, along with the necessary interconnecting wiring, terminal blocks and miscellaneous devices for a complete control system:

a. UL listed disconnect switch with provision for locking in the off position.
b. Individually mounted branch circuit breaker for each pump.

c. NEMA rated full voltage magnetic starters with ambient compensated overload elements in each phase for each pump.
d. Hand-Off-Automatic control stations, O.L. reset controls, and running time meter, for each pump motor.
e. Pump alternator with associated relays, and selector switches.
f. Pump Motor Over-temperature protector for each motor, including motor temperature sensor, manual reset PB, and switchable override.
g. Pump Required, Pump Run, OL Tripped, and Over-temp pilot lights and push-buttons for each pump.
h. Top mounted weatherproof high level alarm light and horn with servicing disconnect.
i. Sufficient space to permit convenient servicing.
j. Motor start or run capacitors, or any other device furnished with the motors and deemed by the motor supplier as necessary for the proper or efficient operation.
k. Supply and integrate all motor protection or control modules, required for the supplied pump. All sensors and alarm circuits shall be completely operational.
l. 20 amp GFI duplex receptacle (2 total).
m. Thermostat controlled condensation heater

3.1.8 Duplex Panel Installation

The duplex pump panel shall be rigidly mounted as indicated in the plans. All conduits entering the pump panel shall be sealed to prevent the entrance of moisture. Use explosion-proof fittings on conduit runs which enter the sump. Install and connect pump and float, power and control cables. Adjust float switches to operate at the elevations shown on the drawings.

3.1.8.1 Wet Well Connections

All conductors from the wet well to the junction box enclosure shall be installed without splice.

3.1.8.2 Sensors

Float level switches shall be supported from one vertical pipe riser. The sensors shall be supplied with sufficient cable.

3.1.9 Spare Parts

3.1.9.1 Accessories and Special Tools

Provide a complete set of accessories and special tools required to erect, handle, dismantle, test, and maintain the equipment supplied.

3.1.9.2 Spare Part Compatibility

Spare parts shall be identical in all respects to corresponding original equipment provided.

3.1.9.3 Spare Parts Required

a. One complete set of fuses, 10 fuses of each type and size.

b. One circuit breaker auxiliary contact, when used, for each type and size breaker.

c. One complete relay for each type provided.

d. One operating coil for each size of ac contactor provided.

e. One complete set of 3 pole or 2 pole stationary and moving contact assemblies for each size of ac contactor provided.

f. One set overload relays for each type and rating provided.

g. One pilot light with lens for each type provided.

h. One contactor auxiliary contact for each type provided.

3.2 FACTORY INSPECTION AND FIELD TESTS

3.2.1 General

After the installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this specification. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish all instruments and personnel required for the tests, and the Government will furnish the necessary electric power.

3.2.2 Duplex Pump Panel Test

Give each item of equipment supplied a routine functional test and also other tests specified. The pump panel shall not be shipped until it has been inspected at the factory by the Government. Before shipment from the factory and also after final field installation, check the operation and adjustment of all control devices, accessories and indicating lamps. These checks shall be made at rated voltage with power supplied to the control power circuit. Verify that adjustable devices are set in accordance with manufacturer's recommendations before shipment. Provide a list of the recommended device settings for shipment with the control panel and O&M manuals for future reference.

3.2.3 Field Testing

The completed station shall be tested and inspected for compliance with contract documents. Pumps shall be test run to insure proper motor rotation and pumping capacity. All control operations for manual and automatic operation of the pumps shall be tested and evaluated. The station incoming voltage and the running amperage of each phase shall be recorded. The controls shall be tested for proper performance of automatic operation.

-- End of Section --