



**W912DQ-04-B-0006**

**US Army Corps  
of Engineers**  
Kansas City District  
*You Matter - We Care*

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# **Brush Creek Channel Modifications, Woodland Avenue Reach**

## **Kansas City Missouri**

### **Construction Solicitation And Specifications**

**March 2004**

DEPARTMENT OF THE ARMY  
 Kansas City District, Corps of Engineers  
 757 Federal Building  
 Kansas City, Missouri 64106

SPECIFICATIONS FOR CONSTRUCTION OF  
 BRUSH CREEK CHANNEL MODIFICATIONS,  
 WOODLAND AVENUE REACH  
 KANSAS CITY, MISSOURI

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<b>SOLICITATION, OFFER, AND AWARD</b> <i>(Construction, Alteration, or Repair)</i>	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	W912DQ-04-B-0006-0001	<input checked="" type="checkbox"/> SEALED BID (IFB) <input type="checkbox"/> NEGOTIATED (RFP)	19-Mar-2004	1 OF 131

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

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. W58XUW-3329-3071	6. PROJECT NO.
7. ISSUED BY USACE, KANSAS CITY FEDERAL BLDG 601 E 12TH ST CT-C RM 757 KANSAS CITY MO 64106-2896 TEL: 816-983-3836	CODE W912DQ FAX: 816-426-5777	8. ADDRESS OFFER TO <i>(If Other Than Item 7)</i> CODE USACE, KANSAS CITY FEDERAL BLDG 601 E 12TH ST CT-C RM 757 KANSAS CITY MO 64106-2896 TEL: 816-983-3836 FAX: 816-426-5777
9. FOR INFORMATION CALL:	A. NAME GREGORY C GULLEDGE	B. TELEPHONE NO. <i>(Include area code) (NO COLLECT CALLS)</i> (816)983-3808

**SOLICITATION**

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

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

IFB No. W912DQ-04-B-0006  
FIRM FIXED PRICED CONSTRUCTION CONTRACT  
CONSTRUCTION OF WOODLAND AVE BRUSH CREEK CHANNEL MODIFICATIONS  
KANSAS CITY, MISSOURI

The work to be performed consists of straightening of the channel from the downstream end of the existing Paso Channel Project, through Woodland Avenue and tying into the water control structure built for the Woodland Avenue Emergency Repair project. The new work will tie into the existing upstream reach construction.

NAICS 238190  
FSC: Y299

Bids will be received in room 748.

11. The Contractor shall begin performance within 1 calendar days and complete it within 150 calendar days after receiving  award,  notice to proceed. This performance period is  mandatory,  negotiable. *(See 52-211-10)*

12 A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS?  
*(If "YES," indicate within how many calendar days after award in Item 12B.)*

YES  NO

12B. CALENDAR DAYS

1

13. ADDITIONAL SOLICITATION REQUIREMENTS:

- A. Sealed offers in original and 1 copies to perform the work required are due at the place specified in Item 8 by 02:00 PM (hour) local time 20 Apr 2004 (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  is,  is not required.
- C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.
- D. Offers providing less than 90 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

**SOLICITATION, OFFER, AND AWARD (Continued)**

*(Construction, Alteration, or Repair)*

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

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

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
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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 <i>(Type or print)</i>	20B. SIGNATURE	20C. OFFER DATE
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**AWARD (To be completed by Government)**

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA
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24. SUBMIT INVOICES TO ADDRESS SHOWN IN <i>(4 copies unless otherwise specified)</i>	<b>ITEM</b>	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 U.S.C. 2304(c) <input type="checkbox"/> 41 U.S.C. 253(c)
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26. ADMINISTERED BY	CODE	27. PAYMENT WILL BE MADE BY:	CODE
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**CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE**

<input type="checkbox"/> 28. NEGOTIATED AGREEMENT <i>(Contractor is required to sign this document and return _____ copies to issuing office.)</i> 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.	<input type="checkbox"/> 29. AWARD <i>(Contractor is not required to sign this document.)</i> Your offer on this solicitation, is hereby accepted as to the items listed. This award commutes the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
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30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN <i>(Type or print)</i>		31A. NAME OF CONTRACTING OFFICER <i>(Type or print)</i>	
30B. SIGNATURE	30C. DATE	TEL:	EMAIL:
		31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

## Section 00010 - Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001	Demolition and General Work FFP	1	Lump Sum		
	Demolition includes but not limited to, channel paving to be broken, removed and placed in areas, noted on the drawings (or indicated in the specifications); removal of existing upstream paved slope protection and concrete walls, as shown; and the removal of the asphalt pavement. The work also covers all work not covered by Item No. 0002 thru Item No. 0021. PURCHASE REQUEST NUMBER: W58XUW-3329-3071				

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 NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002	Storm Sewer Alterations FFP	1	Lump Sum		
	Includes all work required to remove existing sewer line, renovate manholes and inlets as required, construct sewer lines, manholes, inlets and perform ancillary work.				

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 NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003	Clearing and Grubbing FFP Includes all work required to perform Clearing and Grubbing. Cubic Yard	1	Lump Sum		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004	Rock Excavation FFP Includes all work required for the Excavation and Disposal of all Rock Units below the top of Hard Rock. (Hard Rock is defined as limestone.)	28,300	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005		32,300	Cubic Yard		

Common Evcavation

FFP

Includes all work required to perform excavation of all clay, silts, sand, gravel, pebbles, cobbles, boulders and all other materials not defined as Rock Excavation. The work also includes the disposal of all Common Excavation material not used as Earth Fill, Impervious Fill or Topsoil.

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 NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006		2,650	Cubic Yard		

Earth Fill

FFP

Includes all work required for transporting and placing of Common Excavation materials, suitable for Earth Fill.

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 NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007		2,300	Cubic Yard		

Topsoil

FFP

Includes all work required to transport and spread Common Excavation materials, suitable for Topsoil.

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 NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008	Impervious Fill FFP Includes all work require to transport and place Common Excavation materials, suitable for Impervious Fill.	110	Cubic Yard		
					<hr/>
					NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009	Pervious Fill FFP Includes all work required to furnish and place all materials suitable for Pervious Fill.	1,900	Cubic Yard		
					<hr/>
					NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010	Coarse Fill FFP Includes all work required to furnish and place all materials suitable for Coarse Filter.	325	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011	Modular Block Walls FFP Includes all work required to design and construct modular block walls, unreinforced concrete footings, geogrid strips, granular backfill, and related excavation and backfill.	1	Lump Sum		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0012	6-inch Concrete Paving FFP Includes all work required to construct 6-inch concrete paving, with wire mesh, surface subgrade preparation and compacted aggregate base course	510	Square Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013	9-inch Concrete Paving FFP Includes all work required to construct 9-inch concrete paving, with wire mesh, surface subgrade preparation and compacted aggregate base course.	875	Square Yard		
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014	18-inch Concrete Channel Pavement FFP Includes all work required to construct 18-inch concrete paving, located between Curve 0 and Curve 1, and between Curve 3 and Curve 10. This work includes paving anchors, reinforced concrete, reinforcing steel and channel drains. The locations of the Curves are shown on drawing S3.1	3,791	Square Yard		
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015	Seeding and Mulching FFP Includes all work required to provide seeding and mulching	1	Lump Sum		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016	Dam FFP Includes all work required to construct structural reinforced concrete, between Curve 1 and Curve 3. Curves are shown on Sheet S3.1.	204	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017	Anchored Walls FFP Includes all work required to construct reinforced concrete Anchor Walls, including wall anchors and wall drains.	137	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018	Gravity Walls FFP Includes all work required to construct un-reinforced concrete Gravity Walls.	96	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019	L-Walls FFP Includes all work required to construct reinforced concrete L-Walls.	794	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020	T-Walls FFP Includes all work required to construct reinforced concrete T-Walls.	11	Cubic Yard		

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021		1	Lump Sum		

Dam Intake Drainage Structure  
FFP

Includes all work required to construct the Dam Intake Drainage Structure, excavate the soils or shore and brace soils, place concrete with all steel and backfill control structure. The reinforced concrete pipe, associated with the structure, is considered incidental. Items associated with the Dam Intake Drainage Structure, (trash rack, grating, manhole cover, gate and gate assemble) are also included in this bid item.

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0022		1	Lump Sum		

OPTION Option 1 - Structural Wall and Slope Pro  
FFP

Includes all slope paving (except that covered by Item No. 0023), all turf reinforcing mat, structural walls from CP 19401 to CP19405 and structural walls from CP 20217A to CP 21203.

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023		1	Lump Sum		
OPTION	Option 2 - Structural Wall and 84-inch S FFP				

Includes all work required to construct the Structural Walls and the Slope Protection. The work also includes the 84-inch Outfall Structure, modifications to the existing 84-inch Sewer Line, the Structural Walls from CP 21101 to CP 21107 and from CP 21301 to 21310, the removal of the Bridge Abutment, demolition of the Grouted Rip-Rap, and Slope Paving from Sta. 144+60 to 146+00.

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024		1	Lump Sum		
OPTION	Option 3 - Pumpwell and Re-circulation FFP				

Includes all work required to construct the pumpwell and pumpwell pit; 6-inch channel paving; the recirculation line from the pumpwell to the Fountain Pedestal; the Fountain Pedestal; the Recirculation Pipe Outlet Structure; and the electrical conduit stub from the Fountain Pedestal to the Channel Wall. (This bid item does not include the Pump nor the Electrical Lines required to operate the Pump.)

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025		1	Lump Sum		
OPTION	Option 4 - Park Ammenities FFP Includes all work required to provide additional 6-inch concrete paving, additional 9-inch concrete paving, new 4-inch asphalt street paving, trees and curbs & gutters.				

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NET AMT

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026		1	Lump Sum		
OPTION	Option 5 - Electrical Work FFP Includes all work required to construct the Utility Duct, at (Approx.) Station 145+40. The work also includes all work required to provide the electrical work, from the SE corner of Swope Parkway & woodland Avenue, to the Utility Pole, near Emmanuel Cleaver Boulevard (Refer to Sheet C7.4 & E3.2 for location.) The work also includes the Relocation of Electric Line by KCPL. For Bidding Purposes, and Allowance of \$75,000 for relocation work shold be included in this item, however an equitable will be made to the contract for the actual cost of the relocation.				

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NET AMT

FOB: Destination

CLAUSES INCORPORATED BY FULL TEXT

NWK-00010-001 FIELD OFFICE OVERHEAD (JUL 2002)

NOTICE TO BIDDERS: For your bid to be responsive, you must declare below the single accounting practice that you apply to contracts to calculate field office overhead for all change orders, modifications and requests for equitable adjustment. Pursuant to Federal Acquisition Regulations (FAR) Parts 31.105(d)(3) and 31.203(d)(1), an accounting practice that varies from modification to modification is not allowable. Select one of the following:

1. TIME DISTRIBUTION BASE FOR A PER DIEM RATE

If you use this practice, see Special Clause "Field Office Overhead Per Diem Rate" -----

2. DIRECT COST DISTRUBITION BASE FOR A PERCENTAGE MARKUP

If you use this practice, see Special Clause "Field Office Overhead Percentage Markup" -----

3. OTHER ACCOUNTING PRACTICE THAT IS ALLOWABLE UNDER THE FAR AND THAT USES A SINGLE DISTRIBUTION BASE. -----

If you choose 3, you must describe the accounting practice in sufficient detail below to allow the contracting officer to determine what accounting practice is being utilized by your company and that it complies with the FAR.

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**FAILURE TO FULLY COMPLY WITH THE ABOVE REQUIREMENT OR, IF ALTERNATIVE 3 IS DECLARED AND YOUR DESCRIPTION DOES NOT CLEARLY STATE OR DESCRIBE A CONSISTENT ACCOUNTING PRACTICE USING A SINGLE DISTRIBUTION BASE, WILL BE CAUSE FOR YOUR BID TO BE REJECTED AS NON-RESPONSIVE.**

# ***CAUTION!***

**BEFORE SIGNING AND MAILING THIS BID, please take note of the following, as failure to perform any one of these actions may cause your bid to be rejected.**

1. AMENDMENTS: Have you acknowledged receipt of ALL Amendments? If in doubt as to number of amendments issued, please contact our office.
2. SEALED BIDS: Sealed envelopes containing bids shall be marked to show the bidders's name and address, the solicitation number, amendments received, and the date and time bids are due.
3. AMENDED BID PAGES: If any of the Amendments furnished amended bid pages, the amended bid pages must be used in submitting your bid.
4. LATE BIDS: In order for a late mailed bid to be considered, generally it must have been sent by either registered or certified mail not later than 5 calendar days before the receipt of bids date.

5. **BID GUARANTEE:** Sufficient bid guarantee in proper form must be furnished with your bid, if your bid exceeds \$50,000.
6. **MISTAKE IN BID:** Have you reviewed your bid prices for possible errors in calculations or work left out?
7. **TELEGRAPHIC MODIFICATIONS:** If you modify your bid by telegram, be sure to allow sufficient time for the telegram to reach us prior to the time set for receipt of bids. Any doubt should be resolved in favor of allowing Extra Time.
8. **FACSIMILE BIDS AND MODIFICATIONS:** Will not be considered. Facsimile withdrawals will be considered.
9. **SECTION 00600:** Certifications must be completed and submitted with your bid. Furthermore, prior to any award, the apparent low bidder must submit a Small Business and Small Disadvantaged Business Subcontracting Plan, found at the end of Section 00600, which must be approved prior to award.
10. **HAND-DELIVERED BID:** If bids are hand-delivered, you must be aware of enhanced security requirements in effect in the Federal Building and allow for extra time to clear security. You must have a valid picture ID in order to enter the building. No additional time will be allowed due to security requirements.
11. **BUY AMERICAN ACT:** All bidders are cautioned that, prior Government conduct notwithstanding, the Contractor's selection of a domestic construction material (as defined in SECTION 00700) which would require the subsequent selection of a foreign construction material for compatibility is not a justification for waiver of the Buy American Act. It is the Contractor's responsibility to verify, prior to submitting the materials for approval, that each system can be built to meet the contract specifications without the use of foreign construction materials.

**12. BONDS – Matter of All Seasons Construction, Inc. GAO Decision B-291166.2**  
**Bid Bonds must be accompanied by a Power of Attorney containing an original signature from the surety, which must be affixed to the Power of Attorney after the Power of Attorney has been generated. Computer generated and signed Power’s of Attorney will only be accepted if accompanied by an original certification from a current officer of the surety attesting to its authenticity and continuing validity.**

**13. BOLLING FEDERAL BUILDING ENHANCED SECURITY**

**Due to enhanced security in the Bolling Federal Building the Bid Opening Room, Room 747, will open 30 minutes prior to bid opening and will remain open until all bids are opened and read. Persons delivering bids, or attending bid openings, will no longer be allowed to remain on Corps of Engineers floors (6,7 & 8) other than in the Bid Opening Room. Until the Bid Opening Room is available all persons delivering bids or attending the bid opening may wait in the Federal Building cafeteria on the Ground level or outside the building. Under Federal Acquisition Regulations bids can not be accepted after the time set for bid opening. Accordingly, to ensure your bid is not late, all bidders are encouraged to complete their bids prior to arrival at the Bid Opening Room.**

## Section 00100 - Bidding Schedule/Instructions to Bidders

## CLAUSES INCORPORATED BY FULL TEXT

## 52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (OCT 2003)

(a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" or "DUNS+4" followed by the DUNS number or "DUNS+4" that identifies the offeror's name and address exactly as stated in the offer. The DUNS number is a nine-digit number assigned by Dun and Bradstreet, Inc. The DUNS+4 is the DUNS number plus a 4-character suffix that may be assigned at the discretion of the offeror to establish additional CCR records for identifying alternative Electronic Funds Transfer (EFT) accounts (see Subpart 32.11) for the same parent concern.

(b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one.

(1) An offeror may obtain a DUNS number--

(i) If located within the United States, by calling Dun and Bradstreet at 1-866-705-5711 or via the Internet at <http://www.dnb.com>; or

(ii) If located outside the United States, by contacting the local Dun and Bradstreet office.

(2) The offeror should be prepared to provide the following information:

(i) Company legal business name.

(ii) Tradestyle, doing business, or other name by which your entity is commonly recognized.

(iii) Company physical street address, city, state and Zip Code.

(iv) Company mailing address, city, state and Zip Code (if separate from physical).

(v) Company telephone number.

(vi) Date the company was started.

(vii) Number of employees at your location.

(viii) Chief executive officer/key manager.

(ix) Line of business (industry).

(x) Company Headquarters name and address (reporting relationship within your entity).

(End of provision)

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (JAN 2004)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--

(a) From the ASSIST database via the Internet at <http://assist.daps.dla.mil>; or

(b) By submitting a request to the--Department of Defense Single Stock Point (DoDSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2179, Facsimile (215) 697-1462.

(End of provision)

#### 52.211-14 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be DX rated order; DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation. [Contracting Officer check appropriate box.]

(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.

(End of provision)

#### 52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

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

(End of provision)

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

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

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

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

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

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

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

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

(e) Bids may be withdrawn by written notice received at any time before the exact time set for receipt of bids. If the IFB authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for

receipt of bids, subject to the conditions specified in the provision at 52.214-31, Facsimile Bids. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(End of provision)

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

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

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

(1) Lump sum bidding;

(2) Alternate prices;

(3) Units of construction; or

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

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

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

(End of provision)

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

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

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

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

(d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

(End of provision)

## 52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)

Offers submitted in response to this solicitation shall be in the English language. Offers received in other than English shall be rejected.

(End of provision)

## 52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

Offers submitted in response to this solicitation shall be in terms of U.S. dollars. Offers received in other than U.S. dollars shall be rejected.

(End of provision)

## 52.214-5000 ARITHMETIC DISCREPANCIES (MAR 1995)

- (a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the 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 the basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.
- (c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

(End of Statement)

## 52.216-1 TYPE OF CONTRACT (APR 1984)

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

(End of clause)

## 52.228-1 BID GUARANTEE (SEP 1996)

- (a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.
- (b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as

practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.-

(c) The amount of the bid guarantee shall be \_\_\_\_\_ percent of the bid price or \$\_\_\_\_\_, whichever is less.-

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

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

(End of clause)

#### 52.233-2 SERVICE OF PROTEST (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 601 East 12<sup>th</sup> Street, Kansas City, Missouri 64106

(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) & PRE- BID CONFERENCE

(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) Pre-Bid Conference will be held at the following location :

TIME: 10:00AM

DATE: 31 March 2004

LOCATION: Brush Creek Community Center – 3801 Emanuel Clever Blvd. Kansas City, Missouri

(End of provision)

#### 252.204-7004 REQUIRED CENTRAL CONTRACTOR REGISTRATION ALTERNATE A (NOV 2003)

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

“Central Contractor Registration (CCR) database” means the primary Government repository for contractor information required for the conduct of business with the Government.

“Commercial and Government Entity (CAGE) code” means--

- (1) A code assigned by the Defense Logistics Information Service (DLIS) to identify a commercial or Government entity; or
- (2) A code assigned by a member of the North Atlantic Treaty Organization that DLIS records and maintains in the CAGE master file. This type of code is known as an “NCAGE code.”

“Data Universal Numbering System (DUNS) number” means the 9-digit number assigned by Dun and Bradstreet, Inc. (D&B) to identify unique business entities.

“Data Universal Numbering System +4 (DUNS+4) number” means the DUNS number assigned by D&B plus a 4-character suffix that may be assigned by a business concern. (D&B has no affiliation with this 4-character suffix.) This 4-character suffix may be assigned at the discretion of the business concern to establish additional CCR records for identifying alternative Electronic Funds Transfer (EFT) accounts (see Subpart 32.11 of the Federal Acquisition Regulation) for the same parent concern.

“Registered in the CCR database” means that--

- (1) The Contractor has entered all mandatory information, including the DUNS number or the DUNS+4 number, into the CCR database;
- (2) The Contractor's CAGE code is in the CCR database; and
- (3) The Government has validated all mandatory data fields and has marked the records “Active.”

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee shall be registered in the CCR database prior to award, during performance, and through final payment of any contract, basic agreement, basic ordering agreement, or blanket purchasing agreement resulting from this solicitation.

(2) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation “DUNS” or “DUNS +4” followed by the DUNS or DUNS +4 number that identifies the offeror's name and address exactly as stated in the offer. The DUNS number will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(c) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one.

(1) An offeror may obtain a DUNS number--

(i) If located within the United States, by calling Dun and Bradstreet at 1-866-705-5711 or via the Internet at <http://www.dnb.com>; or

(ii) If located outside the United States, by contacting the local Dun and Bradstreet office.

(2) The offeror should be prepared to provide the following information:

(i) Company legal business.

(ii) Tradestyle, doing business, or other name by which your entity is commonly recognized.

(iii) Company Physical Street Address, City, State, and Zip Code.

(iv) Company Mailing Address, City, State and Zip Code (if separate from physical).

(v) Company Telephone Number.

(vi) Date the company was started.

(vii) Number of employees at your location.

(viii) Chief executive officer/key manager.

(ix) Line of business (industry).

(x) Company Headquarters name and address (reporting relationship within your entity).

(d) If the Offeror does not become registered in the CCR database in the time prescribed by the Contracting Officer, the Contracting Officer will proceed to award to the next otherwise successful registered Offeror.

(e) Processing time, which normally takes 48 hours, should be taken into consideration when registering. Offerors who are not registered should consider applying for registration immediately upon receipt of this solicitation.

(f) The Contractor is responsible for the accuracy and completeness of the data within the CCR database, 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 review and update on an annual basis from the date of initial registration or subsequent updates its information in the CCR database to ensure it is current, accurate and complete. Updating information in the CCR does not alter the terms and conditions of this contract and is not a substitute for a properly executed contractual document.

(g)(1)(i) If a Contractor has legally changed its business name, "doing business as" name, or division name (whichever is shown on the contract), or has transferred the assets used in performing the contract, but has not completed the necessary requirements regarding novation and change-of-name agreements in Subpart 42.12, the Contractor shall provide the responsible Contracting Officer a minimum of one business day's written notification of its intention to (A) change the name in the CCR database; (B) comply with the requirements of Subpart 42.12 of the FAR; and (C) agree in writing to the timeline and procedures specified by the responsible Contracting Officer. The Contractor must provide with the notification sufficient documentation to support the legally changed name.

(ii) If the Contractor fails to comply with the requirements of paragraph (g)(1)(i) of this clause, or fails to perform the agreement at paragraph (g)(1)(i)(C) of this clause, and, in the absence of a properly executed novation or change-of-name agreement, the CCR information that shows the Contractor to be other than the Contractor indicated in the contract will be considered to be incorrect information within the meaning of the "Suspension of Payment" paragraph of the electronic funds transfer (EFT) clause of this contract.

(2) The Contractor shall not change the name or address for EFT payments or manual payments, as appropriate, in the CCR record to reflect an assignee for the purpose of assignment of claims (see FAR Subpart 32.8, Assignment of Claims). Assignees shall be separately registered in the CCR database. Information provided to the Contractor's CCR record that indicates payments, including those made by EFT, to an ultimate recipient other than that Contractor will be considered to be incorrect information within the meaning of the "Suspension of payment" paragraph of the EFT clause of this contract.

(h) Offerors and Contractors may obtain information on registration and annual confirmation requirements via the internet at <http://www.ccr.gov> or by calling 1-888-227-2423, or 269-961-5757.

(End of clause)

## NWK-00100-002 FIELD OFFICE OVERHEAD PER DIEM RATE

If any change to the contract, issued pursuant to the Changes Clause or otherwise, for which the Government is responsible, causes an increase or decrease in the Contractor's cost of, or the time required for, performance under the contract, the Contracting Officer shall make an equitable adjustment and modify the contract in writing.

Under such equitable adjustment, no payment of field office overhead shall be allowed for any changes when the completion of the contract is not extended by reason of the change, except the Contractor may be reimbursed any variable expense it incurs due to the change, provided it can substantiate the variables. The Contractor shall be reimbursed for field office overhead on a per diem basis when the completion of the contract is extended by reason of the change issued under any clause except the Default clause. Equitable adjustment shall be made for the costs that are incurred or are to be incurred due to the change. The Contractor shall provide a detailed breakdown of its proposed increase or decrease of costs as required by Contract Clause DFARS 252.236-7001 MODIFICATION OF PROPOSALS – PRICE BREAKDOWN.

## NWK-00100-003 BID BOND REQUIREMENTS (DEC 1989) (FAR 28.101-2)

If your bid exceed \$50,000.00, the bid bond shall be in the amount of 20% of the bid price or \$3,000,000, whichever is the lesser amount. (See CONTRACT CLAUSE titled "Bid Guarantee.")

## NWK-00100-004 PLANS AND SPECIFICATIONS

Plans and specifications will be available by web site only. Internet at <http://www.nwk.usace.army.mil/contract/contract.html>.

## NWK-00100-001 MAGNITUDE OF PROJECT (FAR 36.204)

The magnitude of this project is represented by the following estimated price range: between \$1,000,000.00 and \$5,000,000.00.

## NWK-00100-007 U.S. ARMY CORPS OF ENGINEERS SAFETY AND HEALTH REQUIREMENTS MANUAL , EM 385-1-1

This paragraph applies to contracts and purchase orders that require the contractor to comply with EM 385-1-1 (e.g., contracts that include the Accident Prevention clause at FAR 52.236-13 and/or other safety provisions). EM 385-1-1 and its changes are available at <http://www.hq.usace.army.mil> (at the HQ homepage, select Safety and Occupational Health). The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

(End of Clause)

## Section 00600 - Representations &amp; 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 provision \_\_\_\_\_ (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 clause)

## 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.

(1) 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 (DEC 2001)

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

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

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

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

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

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

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

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

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

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

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

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was

placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.214-14 PLACE OF PERFORMANCE--SEALED BIDDING (APR 1985)

(a) The bidder, in the performance of any contract resulting from this solicitation, [ ] intends, [ ] does not intend [check applicable box] to use one or more plants or facilities located at a different address from the address of the bidder as indicated in this bid.

(b) If the bidder checks "intends" in paragraph (a) above, it shall insert in the spaces provided below the required information:

Place of Performance	Name and Address of Owner
(Street, Address, City, and Operator of the Plant or County, State, Zip Code)	Facility if Other than Bidder

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-----	-----
-----	-----
-----	-----

(End of provision)

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002)

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

(2) The small business size standard is ( ) (insert size standard).

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

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

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

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

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

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

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

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

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

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

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

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

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

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

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

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

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

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

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

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

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

## (d) Notice.

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

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

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

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

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

(End of provision)

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

## (a) Definition.

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

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

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

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

No. of Employees    Avg. Annual Gross Revenues

\_\_\_ 50 or fewer    \_\_\_ \$1 million or less

\_\_\_ 51 - 100    \_\_\_ \$1,000,001 - \$2 million

\_\_\_ 101 - 250    \_\_\_ \$2,000,001 - \$3.5 million

\_\_\_ 251 - 500    \_\_\_ \$3,500,001 - \$5 million

\_\_\_ 501 - 750    \_\_\_ \$5,000,001 - \$10 million

\_\_\_ 751 - 1,000    \_\_\_ \$10,000,001 - \$17 million

\_\_\_\_ Over 1,000 \_\_\_\_ Over \$17 million

(End of provision)

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

The offeror represents that --

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

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

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

(End of provision)

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

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

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

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

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

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

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

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

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

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

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

(C) Major group codes 20 through 39.

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

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

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

(End of clause)

#### 252.204-7001 COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (AUG 1999)

(a) The offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter "CAGE" before the number.

(b) If the offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Information Service (DLIS). The Contracting Officer will--

(1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of a Commercial and Government Entity (CAGE) Code;

(2) Complete section A and forward the form to DLIS; and

(3) Notify the Contractor of its assigned CAGE code.

(c) Do not delay submission of the offer pending receipt of a CAGE code.

(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 (DEC 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) Commercial item means--

(1) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and that--

(i) Has been sold, leased, or licensed to the general public; or

(ii) Has been offered for sale, lease, or license to the general public;

(2) Any item that evolved from an item described in paragraph (c)(1) of this clause through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation;

(3) Any item that would satisfy a criterion expressed in paragraphs (c)(1) or (c)(2) of this clause, but for--

(i) Modifications of a type customarily available in the commercial marketplace; or

(ii) Minor modifications of a type not customarily available in the commercial marketplace made to meet Federal Government requirements. "Minor" modifications means modifications that do not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor;

(4) Any combination of items meeting the requirements of paragraphs (c)(1), (2), (3), or (5) of this clause that are of a type customarily combined and sold in combination to the general public;

(5) Installation services, maintenance services, repair services, training services, and other services if--

(i) Such services are procured for support of an item referred to in paragraph (c)(1), (2), (3), or (4) of this definition, regardless of whether such services are provided by the same source or at the same time as the item; and

(ii) The source of such services provides similar services contemporaneously to the general public under terms and conditions similar to those offered to the Federal Government;

(6) Services of a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed under standard commercial terms and conditions. This does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed. For purposes of these services--

- (i) Catalog price means a price included in a catalog, price list, schedule, or other form that is regularly maintained by the manufacturer or vendor, is either published or otherwise available for inspection by customers, and states prices at which sales are currently, or were last, made to a significant number of buyers constituting the general public; and
- (ii) Market prices means current prices that are established in the course of ordinary trade between buyers and sellers free to bargain and that can be substantiated through competition or from sources independent of the offerors.
- (7) Any item, combination of items, or service referred to in subparagraphs (c)(1) through (c)(6), notwithstanding the fact that the item, combination of items, or service is transferred between or among separate divisions, subsidiaries, or affiliates of a Contractor; or
- (8) A nondevelopmental item, if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local Governments.
- (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.
- (g) "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.
- (h) 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.

(End of clause)

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

(d) 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.

(e) 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.

(f) "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.

(g) 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.

(End of clause)

#### 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.
- (End of clause)

#### 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)

#### 52.203-11 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.

(2) 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)

52.203-11 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.

(3) 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)

52.204-4 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 debar 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 principals, 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)

#### 52.211-13 TIME EXTENSIONS (SEP 2000)

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide an equitable readjustment of liquidated damages under the new completion schedule.

(End of clause)

#### 52.211-15 DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEP 1990)

This is a rated order certified for national defense use, and the Contractor shall follow all the requirements of the Defense Priorities and Allocations System regulation (15 CFR 700).

(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.

#### 52.214-7 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)

#### 52.214-26 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 date 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.

(End of clause)

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.

(End of clause)

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).

(End of clause)

52.214-29 ORDER OF PRECEDENCE--SEALED BIDDING (JAN 1986)

Any inconsistency in this solicitation or contract shall be resolved by giving precedence in the following order: (a) the Schedule (excluding the specifications); (b) representations and other instructions; (c) contract clauses; (d) other documents, exhibits, and attachments; and (e) the specifications.

(End of clause)

## 52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)

Offers submitted in response to this solicitation shall be in the English language. Offers received in other than English shall be rejected.

(End of provision)

## 52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

Offers submitted in response to this solicitation shall be in terms of U.S. dollars. Offers received in other than U.S. dollars shall be rejected.

(End of provision)

## 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)

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

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

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

(ii) Otherwise successful offers from small business concerns;

(iii) Otherwise successful offers of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is exceeded (see 25.402 of the Federal Acquisition Regulation (FAR)); and

(iv) Otherwise successful offers where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government.

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

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

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

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

\_\_\_ Offeror elects to waive the evaluation preference.

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

- (1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;
- (2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;
- (3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be will be spent on the concern's employees or the employees of other HUBZone small business concerns; or
- (4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.
- (e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.
- (f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

(End of clause)

#### 52.219-8 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 (JAN 2002)--ALTERNATE I (OCT 2001).

(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. 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 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)

## 52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)

If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice, including all relevant information, to the Contracting Officer.

(End of clause)

## 52.222-3 CONVICT LABOR (JUN 2003)

(a) Except as provided in paragraph (b) of this clause, the Contractor shall not employ in the performance of this contract any person undergoing a sentence of imprisonment imposed by any court of a State, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, or the U.S. Virgin Islands.

(b) The Contractor is not prohibited from employing persons--

(1) On parole or probation to work at paid employment during the term of their sentence;

(2) Who have been pardoned or who have served their terms; or

(3) Confined for violation of the laws of any of the States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, or the U.S. Virgin Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

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

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

(iii) 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;

(iv) 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

(v) 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.

(4) 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.

(End of clause)

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.

(End of clause)

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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(c) 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.

(End of clause)

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.

(End of clause)

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.

(End of clause)

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.

(End of clause)

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).

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

(End of clause)

52.222-26 EQUAL OPPORTUNITY (APR 2002)

(a) Definition. United States, as used in this clause, means the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.

(b) 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 paragraphs (b)(1) through (b)(11) of this clause, except for work performed outside the United States by employees who were not recruited within the United States. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(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.

(End of clause)

#### 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).

(End of clause)

52.222-35 EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)

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

All employment openings means 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.

Executive and top management means any employee--

(1) Whose primary duty consists of the management of the enterprise in which the individual is employed or of a customarily recognized department or subdivision thereof;

(2) Who customarily and regularly directs the work of two or more other employees;

(3) Who has the authority to hire or fire other employees or whose suggestions and recommendations as to the hiring or firing and as to the advancement and promotion or any other change of status of other employees will be given particular weight;

(4) Who customarily and regularly exercises discretionary powers; and

(5) Who does not devote more than 20 percent or, in the case of an employee of a retail or service establishment, who does not devote more than 40 percent of total hours of work in the work week to activities that are not directly and closely related to the performance of the work described in paragraphs (1) through (4) of this definition. This paragraph (5) does not apply in the case of an employee who is in sole charge of an establishment or a physically separated branch establishment, or who owns at least a 20 percent interest in the enterprise in which the individual is employed.

Other eligible veteran means any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized.

Positions that will be filled from within the Contractor's organization means employment openings for which the Contractor will give no consideration to persons outside the Contractor's organization (including any affiliates, subsidiaries, and parent companies) and includes any openings 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.

Qualified special disabled veteran means a special disabled veteran who satisfies the requisite skill, experience, education, and other job-related requirements of the employment position such veteran holds or desires, and who, with or without reasonable accommodation, can perform the essential functions of such position.

Special disabled veteran means--

(1) A veteran who is entitled to compensation (or who but for the receipt of military retired pay would be entitled to compensation) under laws administered by the Department of Veterans Affairs for a disability--

(i) Rated at 30 percent or more; or

(ii) Rated at 10 or 20 percent in the case of a veteran who has been determined under 38 U.S.C. 3106 to have a serious employment handicap (i.e., a significant impairment of the veteran's ability to prepare for, obtain, or retain employment consistent with the veteran's abilities, aptitudes, and interests); or

(2) A person who was discharged or released from active duty because of a service-connected disability.

Veteran of the Vietnam era means a person who--

(1) Served on active duty for a period of more than 180 days and was discharged or released from active duty with other than a dishonorable discharge, if any part of such active duty occurred--

(i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or

(ii) Between August 5, 1964, and May 7, 1975, in all other cases; or

(2) Was discharged or released from active duty for a service-connected disability if any part of the active duty was performed--

(i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or

(ii) Between August 5, 1964, and May 7, 1975, in all other cases.

(b) General. (1) The Contractor shall not discriminate against the individual because the individual is a special disabled veteran, a veteran of the Vietnam era, or other eligible veteran, regarding any position for which the employee or applicant for employment is qualified. The Contractor shall take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans without discrimination based upon their disability or veterans' status 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) Rate 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 apprenticeship, and on-the-job training under 38 U.S.C. 3687, 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 shall comply with the rules, regulations, and relevant orders of the Secretary of Labor issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended (38 U.S.C. 4211 and 4212).
- (c) Listing openings. (1) The Contractor shall immediately list all employment openings that exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract, and including those occurring at an establishment of the Contractor other than the one where the contract is being performed, but excluding those of independently operated corporate affiliates, at an appropriate local public employment service office of the State wherein the opening occurs. Listing employment openings with the U.S. Department of Labor's America's Job Bank shall satisfy the requirement to list jobs with the local employment service office.
- (2) The Contractor shall make the listing of employment openings with the local employment service office at least concurrently with using any other recruitment source or effort and shall involve the normal obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing of employment openings 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.
- (3) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State public employment agency 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 agency, it need not advise the State agency of subsequent contracts. The Contractor may advise the State agency 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, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, the Virgin Islands of the United States, and Wake Island.
- (e) Postings. (1) The Contractor shall post employment notices in conspicuous places that are available to employees and applicants for employment.
- (2) The employment notices shall--
- (i) State the rights of applicants and employees as well as the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants who are special disabled veterans, veterans of the Vietnam era, and other eligible veterans; and
- (ii) Be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, Department of Labor (Deputy Assistant Secretary of Labor), and provided by or through the Contracting Officer.

(3) The Contractor shall ensure that applicants or employees who are special disabled veterans are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled veteran, or may lower the posted notice so that it can be read by a person in a wheelchair).

(4) 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 special disabled veterans, veterans of the Vietnam era, and other eligible veterans.

(f) Noncompliance. If the Contractor does not comply with the requirements of this clause, the Government may take appropriate actions under the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(g) Subcontracts. The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor. The Contractor shall act as specified by the Deputy Assistant Secretary of Labor 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 SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)

(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 determine 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 at which 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) through (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 (AUG 2003)

(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 in 40 CFR 372.65;
- (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 the following Standard Industrial Classification (SIC) codes or their corresponding North American Industry Classification System sectors:
  - (i) Major group code 10 (except 1011, 1081, and 1094.
  - (ii) Major group code 12 (except 1241).
  - (iii) Major group codes 20 through 39.
  - (iv) Industry code 4911, 4931, or 4939 (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce).
  - (v) Industry code 4953 (limited to facilities regulated under the Resource Conservation and Recovery Act, Subtitle C (42 U.S.C. 6921, et seq.)), 5169, 5171, or 7389 (limited to facilities primarily engaged in solvent recovery services on a contract or fee basis); or
- (5) The facility is not located in the United States or its outlying areas.
  - (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).

(End of clause)

## 52.225-9 BUY AMERICAN ACT—CONSTRUCTION MATERIALS (JUN 2003)

(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 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 construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the 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, the District of Columbia, and outlying areas.

(b) Domestic preference. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) 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: [Contracting Officer to list applicable excepted materials or indicate "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;

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

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

(c) Request for determination of inapplicability of the Buy American Act. (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(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 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 applies, use of foreign construction material is noncompliant with the Buy American Act.

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

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) \1\
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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)

52.225-10 NOTICE OF BUY AMERICAN ACT REQUIREMENT--CONSTRUCTION MATERIALS (MAY 2002)

(a) Definitions. Construction material, domestic construction material, and foreign construction material, as used in this provision, are defined in the clause of this solicitation entitled "Buy American Act --Construction Materials" (Federal Acquisition Regulation (FAR) clause 52.225-9).

(b) Requests for determinations of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act 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 the clause at FAR 52.225-9 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act 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, based on claimed unreasonable cost of domestic construction material, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(3)(i) of the clause at FAR 52.225-9.

(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 not listed by the Government in this solicitation in paragraph (b)(2) of the clause at FAR 52.225-9, the offeror also may submit an alternate offer based on use of equivalent domestic 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 the clause at FAR 52.225-9 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 the clause at FAR 52.225-9 does not apply, the Government will evaluate only those offers based on use of the equivalent

domestic construction material, and the offeror shall be required to furnish such domestic 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)

#### 52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JAN 2004)

(a) Except as authorized by the Office of Foreign Assets Control (OFAC) in the Department of the Treasury, the Contractor shall not acquire, for use in the performance of this contract, any supplies or services if any proclamation, Executive order, or statute administered by OFAC, or if OFAC's implementing regulations at 31 CFR chapter V, would prohibit such a transaction by a person subject to the jurisdiction of the United States.

(b) Except as authorized by OFAC, most transactions involving Cuba, Iran, Libya, and Sudan are prohibited, as are most imports from North Korea, into the United States or its outlying areas. Lists of entities and individuals subject to economic sanctions are included in OFAC's List of Specially Designated Nationals and Blocked Persons at TerList1.html. More information about these restrictions, as well as updates, is available in the OFAC's regulations at 31 CFR chapter V and/or on OFAC's Web site at <http://www.treas.gov/ofac>.

(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 constitute 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.)

(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.

(End of clause)

#### 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 (APR 2003)

(a) As used in this clause--

"Contract date" 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" 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" 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" 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.

Local taxes includes taxes imposed by a possession or territory of the United States, Puerto Rico, or the Northern Mariana Islands, if the contract is performed wholly or partly in any of those areas.

(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)

#### 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (SEP 2002)

(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) All payments due to subcontractors and suppliers from previous payments received under the contract have been made, 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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(End of clause)

#### 52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (OCT 2003)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment 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, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (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 is 14 days after the designated billing office receives a proper payment request. 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 is the 14th day after the date of the Contractor's payment request, provided the designated billing office receives a proper payment request 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, is as specified in the contract or, if not specified, 30 days after approval by the Contracting Officer for release to the Contractor.

(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 is the later of the following two events:

(1) The 30th day after the designated billing office receives a proper invoice from the Contractor.

(2) The 30th day after Government acceptance of the work or services completed by the Contractor. For a final invoice when the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance is deemed to occur on the effective date of the contract settlement.

(B) 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 is the 30th day after the date of the Contractor's invoice, provided the designated billing office receives a proper invoice and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(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 paragraphs (a)(2)(i) through (a)(2)(xi) of this clause. If the invoice does not comply with these requirements, the designated billing office must return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should 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., discount for prompt payment 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 notify in the event of a defective invoice.

(viii) For payments described in paragraph (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) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(x) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232-38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration, or 52.232-34, Payment by Electronic Funds Transfer--Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(xi) Any other information or documentation required by the contract.

(3) Interest penalty. The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (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, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment 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 Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval is deemed to occur constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty 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 prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are 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. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.

(5) Discounts for prompt payment. The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with the prompt payment regulations at 5 CFR part 1315.

(6) Additional interest penalty. (i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR part 1315 in addition to the interest penalty amount only if--

(A) The Government owes an interest penalty of \$1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The Contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor 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) If there is no postmark or the postmark is illegible--

(1) The designated payment office that receives the demand will annotate it with the date of receipt provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(b) Contract financing payments. If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(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 use:

(i) Include a payment clause and an interest penalty clause conforming to the standards set forth in paragraphs (c)(1) and (c)(2) of this clause in each of its subcontracts; and

(ii) 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) The Contractor furnishes to the Contracting Officer a copy of any notice issued by a Contractor pursuant to paragraph (d)(3)(i) of this clause.

(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 paragraph (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 paragraph (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 paragraph (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 paragraph (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 paragraph (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 paragraph (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 paragraph (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 paragraph (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. The Contractor shall issue a written notice of any withholding to a subcontractor (with a copy furnished to the Contracting Officer), 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 Government is a party. The Government 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 Government for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(l) Overpayments. If the Contractor becomes aware of a duplicate contract financing or invoice payment or that the Government has otherwise overpaid on a contract financing or invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment.

(End of clause)

#### 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER—CENTRAL CONTRACTOR REGISTRATION (OCT 2003)

(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) 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.

(f) 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.

(g) 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 separately in the CCR database and shall be paid by EFT in accordance with the terms of this clause. Notwithstanding any other requirement of this contract, payment to an ultimate recipient other than the Contractor, or a financial institution properly recognized under an assignment of claims pursuant to subpart 32.8, is not permitted. 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.

(h) 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.

(i) 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)

52.232-34 PAYMENT BY ELECTRONIC FUNDS TRANSFER—OTHER THAN 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 payment due dates until such time as the Government makes payment by EFT (but see paragraph (d) of this clause).

(b) Mandatory submission of Contractor's EFT information. (1) The Contractor is required to provide the Government with the information required to make payment by EFT (see paragraph (j) of this clause). The Contractor shall provide this information directly to the office designated in this contract to receive that information (hereafter: “designated office”) by (the Contracting Officer shall insert date, days after award, days before first request, the date specified for receipt of offers if the provision at 52.232-38 is utilized, or “concurrent with first request” as prescribed by the head of the agency; if not prescribed, insert “no later than 15 days prior to submission of the first request for payment”). If not otherwise specified in this contract, the payment office is the designated office for receipt of the Contractor's EFT information. If more than one designated office is named for the contract, the Contractor shall provide a separate notice to each office. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the designated office(s).

(2) If the Contractor provides EFT information applicable to multiple contracts, the Contractor shall specifically state the applicability of this EFT information in terms acceptable to the designated office. However, EFT information supplied to a designated office shall be applicable only to contracts that identify that designated office as the office to receive EFT information for that contract.

(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. (1) The Government is not required to make any payment under this contract until after receipt, by the designated office, of the correct EFT payment information from the Contractor. Until receipt of the correct EFT information, 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.

(2) If the EFT information changes after submission of correct EFT information, the Government shall begin using the changed EFT information no later than 30 days after its receipt by the designated office to the extent payment is made by EFT. However, the Contractor may request that no further payments be made until the updated EFT information is implemented by the payment office. If such suspension would result in a late payment under the prompt payment terms of this contract, the Contractor's request for suspension shall extend the due date for payment by the number of days of the suspension.

(e) 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) shall apply.

(f) 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.

(g) 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 provide the EFT information required by paragraph (j) of this clause to the designated office, 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.

(h) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information provided by the Contractor's financial agent.

(i) 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 in the contract.

(j) EFT information. The Contractor shall provide the following information to the designated office. The Contractor may supply this data for this or multiple contracts (see paragraph (b) of this clause). The Contractor shall designate a

single financial agent per contract capable of receiving and processing the EFT information using the EFT methods described in paragraph (c) of this clause.

- (1) The contract number (or other procurement identification number).
- (2) The Contractor's name and remittance address, as stated in the contract(s).
- (3) The signature (manual or electronic, as appropriate), title, and telephone number of the Contractor official authorized to provide this information.
- (4) The name, address, and 9-digit Routing Transit Number of the Contractor's financial agent.
- (5) The Contractor's account number and the type of account (checking, saving, or lockbox).
- (6) If applicable, the Fedwire Transfer System telegraphic abbreviation of the Contractor's financial agent.
- (7) If applicable, the Contractor 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 Contractor's financial agent is not directly on-line to the Fedwire Transfer System; and, therefore, not the receiver of the wire transfer payment.

(End of clause)

#### 52.233-1 DISPUTES. (JUL 2002)

- (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. 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. 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 dispute 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)

#### 52.236-2 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.

(End of clause)

#### 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 preliminarily 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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(End of clause)

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.

(End of clause)

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.

(End of clause)

## 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.

(End of clause)

## 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.

(End of clause)

## 52.236-13 ACCIDENT PREVENTION (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.

(6) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(End of clause)

#### 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.

(End of clause)

#### 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.

(End of clause)

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.

(End of clause)

#### 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.

(End of clause)

## 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.

(End of clause)

## 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.

(End of clause)

(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)

52.249-8 DEFAULT (FIXED-PRICE SUPPLY AND SERVICE) (APR 1984) - ALTERNATE I (APR 1984)

(a)(1) The Government may, subject to paragraphs (c) and (d) of this clause, by written notice of default to the Contractor, terminate this contract in whole or in part if the Contractor fails to--

(i) Pick up the commodities or to perform the services, including delivery services, within the time specified in this contract or any extension;

(ii) Make progress, so as to endanger performance of this contract (but see subparagraph (a)(2) of this clause); or

(iii) Perform any of the other provisions of this contract (but see subparagraph (a)(2) of this clause).

(2) The Government's right to terminate this contract under subdivisions (a)(1)(ii) and (1)(iii) of this clause, may be exercised if the Contractor does not cure such failure within 10 days (or more if authorized in writing by the Contracting Officer) after receipt of the notice from the Contracting Officer specifying the failure.

(b) If the Government terminates this contract in whole or in part, it may acquire, under the terms and in the manner the Contracting Officer considers appropriate, supplies or services similar to those terminated, and the Contractor will be liable to the Government for any excess costs for those supplies or services. However, the Contractor shall continue the work not terminated.

(c) Except for defaults of subcontractors at any tier, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises from causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (1) acts of God or of the public enemy, (2) acts of the Government in either its sovereign or contractual capacity, (3) fires, (4) floods, (5) epidemics, (6) quarantine restrictions, (7) strikes, (8) freight embargoes, and (9) unusually severe weather. In each instance the failure to perform must be beyond the control and without the fault or negligence of the Contractor.

(d) If the failure to perform is caused by the default of a subcontractor at any tier, and if the cause of the default is beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either, the Contractor shall not be liable for any excess costs for failure to perform, unless the subcontracted supplies or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery schedule.

(e) If this contract is terminated while the Contractor has possession of Government goods, the Contractor shall, upon direction of the Contracting Officer, protect and preserve the goods until surrendered to the Government or its agent. The Contractor and Contracting Officer shall agree on payment for the preservation and protection of goods. Failure to agree on an amount will be a dispute under the Disputes clause.

(f) If, after termination, it is determined that the Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Government.

(7) 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.

(End of clause)

#### 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.

(End of clause)

#### 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.

(8) 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.

(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.
- (9) 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 ALTERNATE A (NOV 2003)

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

“Central Contractor Registration (CCR) database” means the primary Government repository for contractor information required for the conduct of business with the Government.

“Commercial and Government Entity (CAGE) code” means--

- (1) A code assigned by the Defense Logistics Information Service (DLIS) to identify a commercial or Government entity; or
- (2) A code assigned by a member of the North Atlantic Treaty Organization that DLIS records and maintains in the CAGE master file. This type of code is known as an “NCAGE code.”

“Data Universal Numbering System (DUNS) number” means the 9-digit number assigned by Dun and Bradstreet, Inc. (D&B) to identify unique business entities.

“Data Universal Numbering System +4 (DUNS+4) number” means the DUNS number assigned by D&B plus a 4-character suffix that may be assigned by a business concern. (D&B has no affiliation with this 4-character suffix.) This 4-character suffix may be assigned at the discretion of the business concern to establish additional CCR records for identifying alternative Electronic Funds Transfer (EFT) accounts (see Subpart 32.11 of the Federal Acquisition Regulation) for the same parent concern.

“Registered in the CCR database” means that--

- (1) The Contractor has entered all mandatory information, including the DUNS number or the DUNS+4 number, into the CCR database;
- (2) The Contractor's CAGE code is in the CCR database; and
- (3) The Government has validated all mandatory data fields and has marked the records “Active.”

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee shall be registered in the CCR database prior to award, during performance, and through final payment of any contract, basic agreement, basic ordering agreement, or blanket purchasing agreement resulting from this solicitation.

(2) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation “DUNS” or “DUNS +4” followed by the DUNS or DUNS +4 number that identifies the offeror's name and address exactly as stated in the offer. The DUNS number will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(c) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one.

(1) An offeror may obtain a DUNS number--

(i) If located within the United States, by calling Dun and Bradstreet at 1-866-705-5711 or via the Internet at <http://www.dnb.com>; or

(ii) If located outside the United States, by contacting the local Dun and Bradstreet office.

(2) The offeror should be prepared to provide the following information:

(i) Company legal business.

(ii) Tradestyle, doing business, or other name by which your entity is commonly recognized.

(iii) Company Physical Street Address, City, State, and Zip Code.

(iv) Company Mailing Address, City, State and Zip Code (if separate from physical).

(v) Company Telephone Number.

(vi) Date the company was started.

(vii) Number of employees at your location.

(viii) Chief executive officer/key manager.

(ix) Line of business (industry).

(x) Company Headquarters name and address (reporting relationship within your entity).

(d) If the Offeror does not become registered in the CCR database in the time prescribed by the Contracting Officer, the Contracting Officer will proceed to award to the next otherwise successful registered Offeror.

(e) Processing time, which normally takes 48 hours, should be taken into consideration when registering. Offerors who are not registered should consider applying for registration immediately upon receipt of this solicitation.

(f) The Contractor is responsible for the accuracy and completeness of the data within the CCR database, 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 review and update on an annual basis from the date of initial registration or subsequent updates its information in the CCR database to ensure it is current, accurate and complete. Updating information in the CCR does not alter the terms and conditions of this contract and is not a substitute for a properly executed contractual document.

(g)(1)(i) If a Contractor has legally changed its business name, "doing business as" name, or division name (whichever is shown on the contract), or has transferred the assets used in performing the contract, but has not completed the necessary requirements regarding novation and change-of-name agreements in Subpart 42.12, the Contractor shall provide the responsible Contracting Officer a minimum of one business day's written notification of its intention to (A) change the name in the CCR database; (B) comply with the requirements of Subpart 42.12 of the FAR; and (C) agree in writing to the timeline and procedures specified by the responsible Contracting Officer. The Contractor must provide with the notification sufficient documentation to support the legally changed name.

(ii) If the Contractor fails to comply with the requirements of paragraph (g)(1)(i) of this clause, or fails to perform the agreement at paragraph (g)(1)(i)(C) of this clause, and, in the absence of a properly executed novation or change-of-name agreement, the CCR information that shows the Contractor to be other than the Contractor indicated in the contract will be considered to be incorrect information within the meaning of the "Suspension of Payment" paragraph of the electronic funds transfer (EFT) clause of this contract.

(2) The Contractor shall not change the name or address for EFT payments or manual payments, as appropriate, in the CCR record to reflect an assignee for the purpose of assignment of claims (see FAR Subpart 32.8, Assignment of Claims). Assignees shall be separately registered in the CCR database. Information provided to the Contractor's CCR record that indicates payments, including those made by EFT, to an ultimate recipient other than that Contractor will be considered to be incorrect information within the meaning of the "Suspension of payment" paragraph of the EFT clause of this contract.

(h) Offerors and Contractors may obtain information on registration and annual confirmation requirements via the internet at <http://www.ccr.gov> or by calling 1-888-227-2423, or 269-961-5757.

(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)

## 252.225-7014 PREFERENCE FOR DOMESTIC SPECIALTY METALS (APR 2003)

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

(1) Qualifying country means any country listed in subsection 225.872-1 of the Defense Federal Acquisition Regulation Supplement.

(2) Specialty metals means--

(i) Steel--

(A) With a maximum alloy content exceeding one or more of the following limits: manganese, 1.65 percent; silicon, 0.60 percent; or copper, 0.60 percent; or

(B) Containing more than 0.25 percent of any of the following elements: aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, or vanadium;

(ii) Metal alloys consisting of nickel, iron-nickel, and cobalt base alloys containing a total of other alloying metals (except iron) in excess of 10 percent;

(iii) Titanium and titanium alloys; or

(iv) Zirconium and zirconium base alloys.

(b) Any specialty metals incorporated in articles delivered under this contract shall be melted in the United States, its possessions, or Puerto Rico.

(c) This clause does not apply to specialty metals --

(1) Melted in a qualifying country or incorporated in an article manufactured in a qualifying country; or

(2) Purchased by a subcontractor at any tier.

(End of clause)

252.225-7031 SECONDARY ARAB BOYCOTT OF ISRAEL (APR 2003)

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

(1) Foreign person means any person (including any individual, partnership, corporation, or other form of association) other than a United States person.

(2) United States person is defined in 50 U.S.C. App. 2415(2) and means--

(i) Any United States resident or national (other than an individual resident outside the United States who is employed by other than a United States person);

(ii) Any domestic concern (including any permanent domestic establishment of any foreign concern); and

(iii) Any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern that is controlled in fact by such domestic concern.

(b) Certification. If the offeror is a foreign person, the offeror certifies, by submission of an offer, 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. 2407(a) prohibits a United States person from taking.

(End of provision)

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.

(End of clause)

252.237-7007 TERMINATION FOR DEFAULT. (DEC 1991)

(a) This clause supplements and is in addition to the Default clause of this contract.

(b) The Contracting Officer may terminate this contract for default by written notice without the ten day notice required by paragraph (a)(2) of the Default clause if --

- (1) The Contractor, through circumstances reasonably within its control or that of its employees, performs any act under or in connection with this contract, or fails in the performance of any service under this contract and the act or failures may reasonably be considered to reflect discredit upon the Department of Defense in fulfilling its responsibility for proper care of remains;
- (2) The Contractor, or its employees, solicits relatives or friends of the deceased to purchase supplies or services not under this contract. (The Contractor may furnish supplies or arrange for services not under this contract, only if representatives of the deceased voluntarily request, select, and pay for them.);
- (3) The services or any part of the services are performed by anyone other than the Contractor or the Contractor's employees without the written authorization of the Contracting Officer;
- (4) The Contractor refuses to perform the services required for any particular remains; or
- (5) The Contractor mentions or otherwise uses this contract in its advertising in any way.

#### 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.

252.247-7008 EVALUATION OF BIDS. (DEC 1991)

(a) The Government will evaluate bids on the basis of total aggregate price of all items within an area of performance under a given schedule.

(1) An offeror must bid on all items within a specified area of performance for a given schedule. Failure to do so shall be cause for rejection of the bid for that area of performance of that Schedule. If there is to be no charge for an item, an entry such as "No Charge," or the letters "N/C" or "0," must be made in the unit price column of the Schedule.

(2) Any bid which stipulates minimum charges or graduated prices for any or all items shall be rejected for that area of performance within the Schedule.

(b) In addition to other factors, the Contracting Officer will evaluate bids on the basis of advantages or disadvantages to the Government that might result from making more than one award (multiple awards).

(1) In making this evaluation, the Contracting Officer will assume that the administrative cost to the Government for issuing and administering each contract awarded under this solicitation would be \$500.

(2) Individual awards will be for the items and combinations of items which result in the lowest aggregate cost to the Government, including the administrative costs in paragraph (b)(1).

(c) When drayage is necessary for the accomplishment of any item in the bid schedule, the Offeror shall include in the unit price any costs for bridge or ferry tolls, road use charges or similar expenses.

(d) Unless otherwise provided in this solicitation, the Offeror shall state prices in amounts per hundred pounds on gross or net weights, whichever is applicable. All charges shall be subject to, and payable on, the basis of 100 pounds minimum weight for unaccompanied baggage and a 500 pound minimum weight for household goods, net or gross weight, whichever is applicable.

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAY 2002)

(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 Maritime Administration, Office of Cargo Preference, U.S. Department of Transportation, 400 Seventh Street SW., 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 shall 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

CONTRACT

QUANTITY

DESCRIPTION	LINE ITEMS
-----	-----
-----	-----
-----	-----
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) In the award of subcontracts for the types of supplies described in paragraph (b)(2) of this clause, the Contractor shall flow down the requirements of this clause as follows:

(1) The Contractor shall insert the substance of this clause, including this paragraph (h), in subcontracts that exceed the simplified acquisition threshold in part 2 of the Federal Acquisition Regulation.

(2) The Contractor shall insert the substance of paragraphs (a) through (e) of this clause, and this paragraph (h), in subcontracts that are at or below the simplified acquisition threshold in part 2 of the Federal Acquisition Regulation.

(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)

## Section 00800 - Special Contract Requirements

## CLAUSES INCORPORATED BY FULL TEXT

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

The Contractor shall be required to (a) commence work under 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 **Base Schedule 150 calendar days**

**Option work may be awarded within 90 calendar days after notice of award.**

**Option work shall be completed within 150 calendar days after notice of award of the option.**

(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 **\$567.00** 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)

52.231-5000 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 V. 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)

#### 52.232-5000 PAYMENT FOR MATERIALS DELIVERED OFF-SITE (MAR 1995)--EFARS

(a) Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (3) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

(b) Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. In addition to petroleum products, payment for materials delivered off-site is limited to the following items:

**REFORCING STEEL.** \_\_\_\_\_

(End of clause)

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

The Contractor shall perform on the site, and with its own organization, work equivalent to at least **one hundred** 100% 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.

(End of clause)

#### 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 Each Bidder Shall satisfy himself before submitting his bid as to hazards likely to arise from weather conditions. Complete weather records and reports may be obtained from the local National Weather Service Office.

(c) Transportation facilities Each bidder before submitting his bid should obtain necessary data as to access highway and railroad facilities. The unavailability of transportation facilities shall not become a basis for claims for damages or extension of time for completion of work.

(End of clause)

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)

252.225-7030 RESTRICTION ON ACQUISITION OF CARBON, ALLOY, AND ARMOR STEEL PLATE (APR 2003)

Carbon, alloy, and armor steel plate shall be melted and rolled in the United States or Canada if the carbon, alloy, or armor steel plate--

(a) Is in Federal Supply Class 9515 or is described by specifications of the American Society for Testing Materials or the American Iron and Steel Institute; and

(b) Will be delivered to the Government or will be purchased by the Contractor as a raw material for use in a Government-owned facility or a facility under the control of the Department of Defense.

(End of clause)

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: **(see index sheet G-1.2)**

(End of clause)

General Decision Number: MO030001 04/02/2004 MO1

Superseded General Decision Number: MO020001

State: Missouri

Construction Types: Heavy and Highway

Counties: Missouri Statewide.

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	06/13/2003
1	04/02/2004

CARP0007-008 04/01/2001

CASS (Richards-Gebauer AFB ONLY), CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
Carpenters:		
CARPENTERS & PILEDRIVERS....	\$ 25.50	6.88

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CARP0008-003 05/01/2002

ST. LOUIS COUNTY AND CITY

	Rates	Fringes
Carpenter.....	\$ 28.64	6.83

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\* CARP0011-001 05/01/2002

	Rates	Fringes
Carpenter and Piledriver		
ADAIR, KNOX, PUTNAM,		
SCHUYLER AND SULLIVAN		
COUNTIES.....	\$ 23.63	6.99
ATCHISON, ANDREW,		
BATES, CALDWELL,		
CARROLL, DAVIESS,		
DEKALB, GENTRY,		
GRUNDY, HARRISON,		
HENRY, HOLT,		
LIVINGSTON, MERCER,		
NODAWAY, ST. CLAIR,		
SALINE AND WORTH		
COUNTIES.....	\$ 22.53	6.74
AUDRAIN (East of		
Hwy.19), RALLS, MARION,		
LEWIS, CLARK AND		

SCOTLAND COUNTIES.....\$ 24.03	7.56
AUDRAIN (West of Hwy 19), BOONE, COOPER, HOWARD.....\$ 23.63	6.99
BARRY, BARTON, CAMDEN, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE, HICKORY, JASPER, LACLEDE, LAWRENCE, MCDONALD, NEWTON, OZARK, POLK, STONE, TANEY, VERNON, WEBSTER AND WRIGHT COUNTIES.....\$ 22.18	6.74
BENTON, MORGAN AND PETTIS COUNTIES.....\$ 22.33	6.99
BOLLINGER, BUTLER, CAPE GIRARDEAU, DUNKLIN, MISSISSIPPI, NEW MADRID, PEMISCOT, PERRY, STE. GENEVIEVE, SCOTT, STODDARD AND WAYNE COUNTIES.....\$ 24.56	7.18
BUCHANAN, CLINTON, JOHNSON AND LAFAYETTE COUNTIES.....\$ 23.18	6.74
CALLAWAY, COLE, MILLER, MONITEAU, OSAGE.....\$ 23.63	6.99
CARTER, HOWELL, OREGON AND RIPLEY COUNTIES.....\$ 23.64	7.18
CHARITON, LINN, MACON, MONROE, RANDOLPH AND SHELBY COUNTIES.....\$ 23.63	6.99
CRAWFORD, DENT, GASCONADE, IRON, MADISON, MARIES, MONTGOMERY, PHELPS, PULASKI, REYNOLDS, SHANNON AND TEXAS COUNTIES.....\$ 23.88	7.56
FRANKLIN COUNTY.....\$ 25.93	7.56
JEFFERSON AND ST. CHARLES COUNTIES.....\$ 28.44	7.56
LINCOLN COUNTY.....\$ 25.54	7.56
PIKE, ST. FRANCOIS AND WASHINGTON COUNTIES.....\$ 24.59	7.56
WARREN COUNTY.....\$ 25.93	6.56

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ELEC0001-002 06/01/2002

BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, DUNKLIN, FRANKLIN,  
IRON, JEFFERSON, LINCOLN, MADISON, MISSISSIPPI, NEW MADRID,  
PEMISCOT, PERRY, REYNOLDS, RIPLEY, ST. CHARLES, ST. FRANCOIS,  
ST. LOUIS (City and County), STE. GENEVIEVE, SCOTT, STODDARD,  
WARREN, WASHINGTON AND WAYNE COUNTIES

	Rates	Fringes
Electrician.....	\$ 29.20	15.64

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 \* ELEC0002-001 12/01/2002

ADAIR, AUDRAIN, BOONE, CALLAWAY, CAMDEN, CARTER, CHARITON,  
 CLARK, COLE, COOPER, CRAWFORD, DENT, FRANKLIN, GASCONADE,  
 HOWARD, HOWELL, IRON, JEFFERSON, KNOX, LEWIS, LINCON, LINN,  
 MACON, MARIES, MARION, MILLER, MONITEAU, MONROE, MONTGOMERY,  
 MORGAN, OREGON, OSAGE, PERRY, PHELPS, PIKE, PULASKI, PUTNAM,  
 RALLS, RANDOLPH, REYNOLDS, RIPLEY, ST. CHARLES, ST. FRANCOIS,  
 ST. LOUIS (City and County), STE. GENEVIEVE, SCHUYLER,  
 SCOTLAND, SHANNON, SHELBY, SULLIVAN, TEXAS, WARREN AND  
 WASHINGTON COUNTIES

	Rates	Fringes
Line Construction:		
Groundman Equipment		
Operator.....	\$ 25.32	3.25+41.30%
Groundman, Groundman		
Driver.....	\$ 20.04	3.25+41.30%
Groundman-Winch Driver.....	\$ 20.81	3.25+41.30%
Groundmen Equipment		
Operator.....	\$ 25.32	3.25+41.30%
Lineman and Cable		
Splicer.....	\$ 28.28	3.25+41.30%

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 ELEC0053-004 08/27/2000

	Rates	Fringes
Line Construction:		
ANDREW, ATCHINSON,		
BARRY, BARTON,		
BUCHANAN, CALDWELL,		
CEDAR, CHRISTIAN,		
CLINTON, DADE, DALLAS,		
DAVISS, DE KALB,		
DOUGLAS, GENTRY,		
GREENE, GRUNDY,		
HARRISON, HICKORY,		
HOLT, JASPER, LACLEDE,		
LAWRENCE, LIVINGSTON,		
McDONALD, MERCER,		
NEWTON, NODAWAY, OZARK,		
POLK, ST. CLAIR, STONE,		
TANEY, VERNON, WEBSTER,		
WORTH, AND WRIGHT		
COUNTIES.		
Groundman Powderman.....	\$ 18.69	7.37
Groundman.....	\$ 17.30	6.98
Lineman Operator.....	\$ 25.41	9.30
Lineman.....	\$ 26.75	9.69

BATES, BENTON, CARROLL,  
CASS, CLAY, HENRY,  
JACKSON, JOHNSON,  
LAFAYETTE, PETTIS,  
PLATTE, RAY, AND SALINE  
COUNTIES.

Groundman Powderman.....	\$ 19.45	7.59
Groundman.....	\$ 18.49	7.31
Lineman Operator.....	\$ 25.97	9.46
Lineman.....	\$ 27.80	9.99

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ELEC0095-001 06/01/2001

BARRY, BARTON, CEDAR, CRAWFORD, DADE, JASPER, LAWRENCE,  
MCDONALD, NEWTON, ST CLAIR, AND VERNON COUNTIES

	Rates	Fringes
Electricians:		
Cable Splicers.....	\$ 20.86	5.68
Electricians.....	\$ 20.51	5.68

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\* ELEC0124-007 09/29/2003

BATES, BENTON, CARROLL, CASS, CLAY, COOPER, HENRY, JACKSON,  
JOHNSON, LAFAYETTE, MORGAN, PETTIS, PLATTE, RAY AND SALINE  
COUNTIES:

	Rates	Fringes
Electricians:.....	\$ 30.73	13.82

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ELEC0257-003 03/01/2002

AUDRAIN (Except Cuivre Township), BOONE, CALLAWAY, CAMDEN,  
CHARITON, COLE, CRAWFORD, DENT, GASCONADE, HOWARD, MARIES,  
MILLER, MONITEAU, OSAGE, PHELPS AND RANDOLPH COUNTIES

	Rates	Fringes
Electricians:		
Cable Splicers.....	\$ 23.50	11.395
Electricians.....	\$ 22.50	11.395

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\* ELEC0350-002 12/01/2003

ADAIR, AUDRAIN (East of Highway 19), CLARK, KNOX, LEWIS, LINN,  
MACON, MARION, MONROE, MONTGOMERY, PIKE, PUTNAM, RALLS,  
SCHUYLER, SCOTLAND, SHELBY AND SULLIVAN COUNTIES

	Rates	Fringes
Electrician.....	\$ 25.05	10.715

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ELEC0453-001 09/01/2001

	Rates	Fringes
Electricians:		
CHRISTIAN, DALLAS, DOUGLAS, GREENE, HICKORY, HOWELL, LACLEDE, OREGON, OZARK, POLK, SHANNON, WEBSTER AND WRIGHT COUNTIES.....	\$ 20.85	5.37+10%
PULASKI AND TEXAS COUNTIES.....	\$ 25.50	5.37+10%
STONE AND TANEY COUNTIES....	\$ 14.45	4.97+10%

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ELEC0545-003 06/01/2002

ANDREW, BUCHANAN, CLINTON, DEKALB, ATCHISON, HOLT, MERCER,  
GENTRY, HARRISON, DAVIESS, GRUNDY, WORTH, LIVINGSTON, NODAWAY,  
AND CALDWELL COUNTIES

	Rates	Fringes
Electricians:.....	\$ 26.35	9.54

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ELEC0702-004 01/01/2002

BOLLINGER, BUTLER, CAPE GIRARDEAU, DUNKLIN, MADISON,  
MISSISSIPPI, NEW MADRID, PEMISCOT, SCOTT, STODDARD AND WAYNE  
COUNTIES

	Rates	Fringes
Line Construction:		
Groundman - Class A.....	\$ 17.07	2.45+25.5%
Groundman Equipment Operator (all crawler type equipment D-4 and larger).....	\$ 24.48	2.45+25.5%
Lineman.....	\$ 28.68	2.45+25.5%

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\* ENGI0101-001 05/01/2003

ANDREW, ATCHISON, BATES, BENTON, BUCHANAN, CALDWELL, CARROLL,  
CHARITON, CLINTON, COOPER, DAVIESS, DEKALB, GENTRY, GRUNDY,  
HARRISON, HENRY, HOLT, HOWARD, JOHNSON, LAFAYETTE, LINN,  
LIVINGSTON, MERCER, NODAWAY, PETTIS, SALINE, SULLIVAN AND WORTH  
COUNITIES

	Rates	Fringes
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Power equipment operators:

GROUP 1.....	\$ 23.15	9.30
GROUP 2.....	\$ 22.75	9.30
GROUP 3.....	\$ 20.75	9.30

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt roller operator, finish; asphalt paver and spreader; asphalt plant operator; auto grader or trimmer or sub-grader; backhoe; blade operator (all types); boilers - 2; booster pump on dredge; bulldozer operator; boring machine (truck or crane mounted); clamshell operator; concrete mixer paver; concrete plant operator; concrete pump operator; crane operator; derrick or derrick trucks; ditching machine; dragline operator; dredge engineman; dredge operator; drill cat with compressor mounted (self-contained) or similar type self-propelled rotary drill (not air tract); drilling or boring machine (rotary-self-propelled); finishing machine operator; greaser; high loader-fork lift-skid loader (all types); hoisting engineer (2 active drums); locomotive operator (standard guage); mechanics and welders (field and plants); mucking machine operator; pile drive operator; pitman crane or boom truck (all types); push cat; quad track; scraper operators (all types); shovel operator; sideboom cats; side discharge spreader; skimmer scoop operators; slip form paver operator (CMI, Rex, Gomeco or equal); la tourneau rooter (all tiller types); tow boat operator; truck crane; wood and log chippers (all types).

GROUP 2: A-frame truck operator; articulated dump truck; back filler operator; boilers (1); chip spreader; churn drill operator; compressor; concrete mixer operator, skip loader; concrete saws (self-propelled); conveyor operator; crusher operator; distributor operator; elevating grader operator; farm tractor (all attachments); fireman rig; float operator; form grade operator; hoisting engine (one drum); maintenance operator; multiple compactor; pavement breaker, self-propelled hydra-hammer (or similar type); paymill operator; power shield; pumps; roller operator (with or without blades); screening and washing plant; self-propelled street broom or sweeper; siphons and jets; straw blower; stump cutting machine; siphons and jets; tank car heater operator (combination boiler and booster); welding machine; vibrating machine operator (not hand held); welding machine.

GROUP 3: Oiler; oiler driver; mechanic.

HOURLY PREMIUMS:

THE FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$ .25) ABOVE GROUP 1 RATE: Dragline operator - 3 yds. & over; shovel 3 yds. & over; clamshell 3 yds. & over; Crane, rigs or piledrivers, 100' of boom or over (incl. jib.), hoist - each additional active drum over 2 drums

THE FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$ .50) ABOVE GROUP 1 RATE: Tandem scoop operator; crane, rigs or piledrivers 150' to 200' of boom (incl. jib.)

THE FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$ .75) ABOVE  
 GROUP 1 RATE: Crane rigs, or piledrivers 200 ft. of boom or  
 over (including jib.)

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 \* ENGI0101-005 03/01/2004

CASS, CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 25.59	10.17
GROUP 2.....	\$ 24.55	10.17
GROUP 3.....	\$ 20.08	10.17
GROUP 4.....	\$ 23.43	10.17

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt roller operator, finish; asphalt paver and  
 spreader; asphalt plant operator; auto grader or trimmer or  
 sub-grader; backhoe; blade operator (all types); boilers-2;  
 booster pump on dredge; boring machine (truck or crane  
 mounted); bulldozer operator; clamshell operator; concrete  
 cleaning decontamination machine operator; concrete mixer  
 paver; concrete plant operator; concrete pump operator;  
 crane operator; derrick or derrick trucks; ditching machine;  
 dragline operator; dredge engineman; dredge operator;  
 drillcat with compressor mounted (self-contained) or similar  
 type self propelled rotary drill (not air tract); drilling or  
 boring machine (rotary - self-propelled); finishing machine  
 operator; greaser; heavy equipment robotics  
 operator/mechanic; horizontal directional drill operator;  
 horizontal directional drill locator; loader-forklift - skid  
 loader (all types); hoisting engineer (2 active drums);  
 locomotive operator (standard guage); master environmental  
 maintenance mechanic; mechanics and welders (field and  
 plants); mucking machine operator; piledrive operator; pitman  
 crane or boom truck (all types); push cat; quad-track;  
 scraper operators (all types); shovel operator; side  
 discharge spreader; sideboom cats; skimmer scoop operator;  
 slip-form paver (CMI, REX, Gomaco or equal); la tourneau  
 rooter (all tiller types); tow boat operator; truck crane;  
 ultra high perssure waterjet cutting tool system  
 operator/mechanic; vacuum blasting machine operator/mechanic;  
 wood and log chippers (all types)

GROUP 2: "A" Frame truck operator; articulated dump truck;  
 back filler operator; boilers (1); chip spreader; churn drill  
 operator; concrete mixer operator, skip loader; concrete saws  
 (self-propelled); conveyor operator; crusher operator;  
 distributor operator; elevating grader operator; farm tractor  
 (all attachments); fireman rig; float operator; form grader  
 operator; hoisting engine (1 drum); maintenance operator;  
 multiple compactor; pavement breaker, self-propelled hydra-  
 hammer (or similar type); power shield; paymill operator;  
 pumps; siphons and jets; stump cutting machine; tank car  
 heater operator (combination boiler and booster); compressor;

roller operator (with or without blades); screening and washing plant; self-propelled street broom or sweeper; straw blower; tank car heater operator (combination boiler and booster); vibrating machine operator (not hand held)

GROUP 3: Oilers

GROUP 4: Oiler Driver (All Types)

FOOTNOTE:

HOURLY PREMIUMS FOLLOWING CLASSIFICATIONS SHALL RECEIVE (\$.25) ABOVE GROUP 1 RATE:

Clamshells - 3 yd. capacity or over; Cranes or rigs, 80 ft. of boom or over (including jib); Draglines, 3 yd. capacity or over;

Piledrivers 80 ft. of boom or over (including jib);

Shovels & backhoes, 3 yd. capacity or over.

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ENGI0101-022 05/01/2003

BARRY, BARTON, CAMDEN, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE, JASPER, LAWRENCE, HICKORY, LACLEDE, MCDONALD, NEWTON, OZARK, POLK, ST. CLAIR, STONE, TANEY, VERNON, WEBSTER AND WRIGHT COUNTIES and CITY OF SPRINGFIELD

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 20.92	7.45
GROUP 2.....	\$ 20.57	7.45
GROUP 3.....	\$ 20.37	7.45
GROUP 4.....	\$ 18.32	7.45

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt finishing machine & trench widening spreader; asphalt plant console operator; autograder; automatic slipform paver; backhoe; blade operator - all types; boat operator - tow; boilers-2; central mix concrete plant operator; clamshell operator; concrete mixer paver; crane operator; derrick or derrick trucks; ditching machine; dozer operator; dragline operator; dredge booster pump; dredge engineman; dredge operator; drill cat with compressor mounted on cat; drilling or boring machine rotary self-propelled; highloader; hoisting engine - 2 active drums; launch hammer wheel; locomotive operator; - standard guage; mechanic and welders; mucking machine; off-road trucks; piledriver operator; pitman crane operator; push cat operator; quad trac; scoop operator - all types; shovel operator; sideboom cats; skimmer scoop operators; trenching machine operator; truck crane.

GROUP 2: A-frame; asphalt hot-mix silo; asphalt plant fireman (drum or boiler); asphalt plant man; asphalt plant man; asphalt plant mixer operator; asphalt roller operator; backfiller operator; barber-greene loader; boat operator (bridges and dams); chip spreader; concrete mixer operator -

skip loader; concrete plant operator; concrete pump operator; crusher operator; dredge oiler; elevating grader operator; fork lift; greaser-fleet; hoisting engine - 1; locomotive operator - narrow gauge; multiple compactor; pavement breaker; powerbroom - self-propelled; power shield; rooter; side discharge concrete spreader; slip form finishing machine; stumpcutter machine; throttle man; tractor operator (over 50 h.p.); winch truck.

GROUP 3: Boilers - 1; chip spreader (front man); churn drill operator; clef plane operator; concrete saw operator (self-propelled); curb finishing machine; distributor operator; finishing machine operator; flex plane operator; float operator; form grader operator; pugmill operator; roller operator, other than high type asphalt; screening & washing plant operator; siphons & jets; sub-grading machine operator; spreader box operator, self-propelled (not asphalt); tank car heater operator (combination boiler & booster); tractor operator (50 h.p. or less); Umac, Ulric or similar spreader; vibrating machine operator, not hand;

GROUP 4: Grade checker; Oiler; Oiler-Driver

HOURLY PREMIUMS:

The following classifications shall receive \$ .25 above GROUP 1 rate:

Clamshells - 3 yds. or over; Cranes - Rigs or Piledrivers, 100 ft. of boom or over (including jib); Draglines - 3 yds. or over; Hoists - each additional active drum over 2 drums; Shovels - 3 yds. or over;

The following classifications shall receive \$ .50 above GROUP 1 rate:

Tandem scoop operator; Cranes - Rigs or Piledrivers, 150 ft. to 200 ft. of boom (including jib); Tandem scoop.

The following classifications shall receive \$ .75 above GROUP 1 rate:

Cranes - Rigs or Piledrivers, 200 ft. of boom or over (including jib.).

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ENGI0513-004 05/07/2003

FRANKLIN, JEFFERSON, LINCOLN, ST CHARLES, AND WARREN COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 25.27	13.00
GROUP 2.....	\$ 23.97	13.00
GROUP 3.....	\$ 20.97	13.00
GROUP 4.....	\$ 23.52	13.00

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Backhoe, Cable; Backhoe, Hydraulic (2 cu yds bucket

and under regardless of attachment, one oiler for 2 or 3, two oilers for 4 through 6); Backhoe, Hydraulic over 2 cu yds; Cableway; Crane, Crawler or Truck; Crane, Hydraulic - Truck or Cruiser mounted, 16 tons and over; Crane, Locomotive; crane with boom including jib over 100 ft from pin to pin; Crane using rock socket tool; Derrick, Steam; Derrick Car and Derrick Boat; Dragline, 7 cu yds and over; Dredge; Gradall, Crawler or tire mounted; Locomotive, Gas, Steam & other powers; Pile Driver, Land or Floating; Scoop, Skimmer; Shovel, Power (Electric, Gas, Steam or other powers); Shovel, Power (7 cu yds and over); Switch Boat; Whirley; Air Tugger with air compressor; Anchor Placing Barge; Asphalt Spreader; Athey Force Feeder Loader, self-propelled; Backfilling Machine; Boat Operator - Push Boat or Tow Boat (job site); Boiler, High Pressure Breaking in Period; Boom Truck, Placing or Erecting; Boring Machine, Footing Foundation; Bullfloat; Cherry Picker; Combination Concrete Hoist and Mixer (such as Mixermobile); Compressor, Two 125 CFM and under; Compressor, Two through Four over 125 CFM; Compressor when operator runs throttle; Concrete Breaker (Truck or Tractor mounted); Concrete Pump (such as Pumpcrete machine); Concrete Saw (self-propelled); Concrete Spreader; Conveyor, Large (not selfpropelled) hoisting or moving brick and concrete into, or into and on floor level, one or both; Crane, Climbing (such as Linden); Crane, Hydraulic - Rough Terrain, self-propelled; Crane, Hydraulic - Truck or Cruiser mounted - under 16 tons; Drilling machine - Self-powered, used for earth or rock drilling or boring (wagon drills and any hand drills obtaining power from other sources including concrete breakers, jackhammers and Barco equipment no engineer required); Elevating Grader; Engine Man, Dredge; Excavator or Powerbelt Machine; Finishing Machine, self-propelled oscillating screed; Forklift; Generators, Two through Six 30 KW or over; Grader, Road with power blade; Greaser; Highlift; Hoist, Concrete and Brick (Brick cages or concrete skips operating or on tower, Towermobile, or similar equipment); Hoist, Three or more drums in use; Hoist, Stack; Hydro-Hammer; Lad-A-Vator, hoisting brick or concrete; Loading Machine such as Barber-Greene; Mechanic on job site

GROUP 2: Air Tugger with plant air; Boiler (for power or heating shell of building or temporary enclosures in connection with construction work); Boiler, Temporary; Compressor, One over 125 CFM; Compressor, truck mounted; Conveyor, Large (not self-propelled); Conveyor, Large (not self-propelled) moving brick and concrete (distributing) on floor level; Curb Finishing Machine; Ditch Paving Machine; Elevator (outside); Endless Chain Hoist; Fireman (as required); Form Grader; Hoist, One Drum regardless of size (except brick or concrete); Lad-A-Vator, other hoisting; Manlift; Mixer, Asphalt, over 8 cu ft capacity; Mixer, one bag capacity or less; Mixer, without side loader, two bag capacity or more; Mixer, with side loader, regardless of size, not Paver; Mud Jack (where mud jack is used in conjunction with an air compressor, operator shall be paid \$ .55 per hour in addition to his basic hourly rate for covering both operations); Pug Mill operator; Pump, Sump -

self powered, automatic controlled over 2"; Scissor Lift (used for hoisting); Skid Steer Loader; Sweeper, Street; Tractor, small wheel type 50 HP and under with grader blade and similar equipment; Welding Machine, One over 400 amp; Winch, operating from truck

GROUP 3: Boat operator - outboard motor, job site; Conveyors (such as Con-Vay-It) regardless of how used; Elevator (inside); Heater operator, 2 through 6; Sweeper, Floor

GROUP 4: Crane type

HOURLY PREMIUMS:

Backhoe, Hydraulic 2 cu yds or less without oiler - \$2.00; Certified Crane Operator - \$1.50; Certified Hazardous Material Operator \$1.50; Crane, climbing (such as Linden) - \$.50; Crane, Pile Driving and Extracting - \$ .50; Crane with boom (including job) over 100 ft from pin to pin - add \$.01 per foot to maximum of \$4.00); Crane, using rock socket tool - \$ .50; Derrick, diesel, gas or electric hoisting material and erecting steel (150 ft or more above ground) - \$ .50; Dragline, 7 cu yds and over - \$ .50; Hoist, Three or more drums in use - \$ .50; Scoop, Tandem - \$.50; Shovel, Power - 7 cu yds and over - \$ .50; Tractor, Tandem Crawler - \$ .50; Tunnel, man assigned to work in tunnel or tunnel shaft - \$ .50; Wrecking, when machines are working on second floor or higher - \$ .50

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ENGI0513-006 05/01/2003

ADAIR, AUDRAIN, BOLLINGER, BOONE, BUTLER, CALLAWAY, CAPE GIRARDEAU, CARTER, CLARK, COLE, CRAWFORD, DENT, DUNKLIN, GASCONADE, HOWELL, IRON, KNOX, LEWIS, MACON, MADISON, MARIES, MARION, MILLER, MISSISSIPPI, MONITEAU, MONROE, MONTGOMERY, MORGAN, NEW MADRID, OREGON, OSAGE, PEMISCOT, PERRY, PHELPS, PIKE, PULASKI, PUTNAM, RALLS, RANDOLPH, REYNOLDS, RIPLEY, ST. FRANCOIS, STE. GENEVIEVE, SCHUYLER, SCOTLAND, SCOTT, SHANNON, SHELBY, STODDARD, TEXAS, WASHINGTON, AND WAYNE COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 21.70	13.00
GROUP 2.....	\$ 21.35	13.00
GROUP 3.....	\$ 21.15	13.00
GROUP 4.....	\$ 17.50	13.00

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Asphalt finishing machine & trench widening

spreader, asphalt plant console operator; autograder; automatic slipform paver; back hoe; blade operator - all types; boat operator tow; boiler two; central mix concrete plant operator; clam shell operator; concrete mixer paver; crane operator; derrick or derrick trucks; ditching machine; dozer operator; dragline operator; dredge booster pump; dredge engineman; dredge operator; drill cat with compressor mounted on cat; drilling or boring machine rotary self-propelled; highloader; hoisting engine 2 active drums; launchhammer wheel; locomotive operator standrad guage; mechanics and welders; mucking machine; piledriver operator; pitman crane operator; push cat operator; quad-trac; scoop operator; sideboom cats; skimmer scoop operator; trenching machine operator; truck crane, shovel operator.

GROUP 2: A-Frame; asphalt hot-mix silo; asphalt roller operator asphalt plant fireman (drum or boiler); asphalt plant man; asphalt plant mixer operator; backfiller operator; barber-greene loader; boat operator (bridge & dams); chip spreader; concrete mixer operator skip loader; concrete plant operator; concrete pump operator; dredge oiler; elevating graded operator; fork lift; grease fleet; hoisting engine one; locomotive operator narrow guage; multiple compactor; pavement breaker; powerbroom self-propelled; power shield; rooter; slip-form finishing machine; stumpcutter machine; side discharge concrete spreader; throttleman; tractor operator (over 50 hp); winch truck; asphalt roller operator; crusher operator.

GROUP 3: Spreader box operator, self-propelled not asphalt; tractor operator (50 h.p. or less); boilers one; chip spreader (front man); churn drill operator; compressor over 105 CFM 2-3 pumps 4" & over; 2-3 light plant 7.5 KWA or any combination thereof; clef plane operator; compressor maintenance operator 2 or 3; concrete saw operator (self-propelled); curb finishing mancine; distributor operator; finishing machine operator; flex plane operator; float operator; form grader operator; pugmill operator; riller operator other than high type asphalt; screening & washing plant operator; siphons & jets; subgrading machine operator; tank car heater (combination boiler & booster); ulmac, ulric or similar spreader; vibrating machine operator; hydrobroom.

GROUP 4: Oiler; grout machine; oiler driver; compressor over 105 CFM one; conveyor operator one; maintenance operator; pump 4" & over one.

FOOTNOTE: HOURLY PREMIUMS

Backhoe hydraulic, 2 cu. yds. or under Without oiler - \$2.00  
Certified Crane Operator - \$1.50;  
Certified Hazardous Material Operator \$1.50;  
Crane, climbing (such as Linden) - \$0.50;  
Crane, pile driving and extracting - \$0.50;  
Crane, with boom (including jib) over 100' from pin to pin  
add \$0.01 per foot to maximum of \$4.00;

Crane, using rock socket tool - \$0.50;
Derrick, diesel, gas or electric, hoisting material and erecting steel (150' or more above the ground) - \$0.50;
Dragline, 7 cu. yds, and over - \$0.50;
Hoist, three or more drums in use - \$0.50; Scoop, Tandem - \$0.50;
Shovel, power - 7 cu. yds. or more - \$0.50;
Tractor, tandem crawler - \$0.50;
Tunnel, man assigned to work in tunnel or tunnel shaft - \$0.50;
Wrecking, when machine is working on second floor or higher - \$0.50;

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ENGI0513-007 05/07/2003

ST. LOUIS CITY AND COUNTY

Table with 3 columns: Rates, Fringes, and Power equipment operators. Rows include GROUP 1 through GROUP 5 with corresponding rates and fringe percentages.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Backhoe, cable or hydraulic; cableway; crane crawler or truck; crane, hydraulic-truck or cruiser mounted 16 tons & over; crane locomotive; derrick, steam; derrick car & derrick boat; dragline; dredge; gradall, crawler or tire mounted; locomotive, gas, steam & other powers; pile driver, land or floating; scoop, skimmer; shovel, power (steam, gas, electric or other powers); switch boat; whirley.

GROUP 2: Air tugger w/air compressor; anchor-placing barge; asphalt spreader; athey force feeder loader (self-propelled); backfilling machine; backhoe-loader; boat operator-push boat or tow boat (job site); boiler, high pressure breaking in period; boom truck, placing or erecting; boring machine, footing foundation; bull- float; cherry picker; combination concrete hoist & mixer (such as mixer mobile); compressor (when operator runs throttle); concrete breaker (truck or tractor mounted); concrete pump, such as pump-crete machine; concrete saw (self-propelled), concrete spreader; conveyor, large (not self-propelled), hoisting or moving brick and concrete into, or into and on floor level, one or both; crane, hydraulic-rough terrain, self-propelled; crane hydraulic-truck or cruiser mounted-under 16 tons; drilling machines, self-powered use for earth or rock drilling or boring (wagon drills nd any hand drills obtaining power from other sources including concrete breakers, jackhammers and barco equipment-no engineer required); elevating grader; engineman, dredge; excavator or powerbelt machine; finishing machine, self-propelled oscillating screed; forklift; grader, road with power blade; highlift.

greaser; hoist, stack, hydro-hammer; loading machine (such as barber-greene); machanic, on job site; mixer, pipe wrapping machines; plant asphalt; plant, concrete producing or ready-mix job site; plant heating-job site; plant mixing-job site; plant power, generating-job site; pumps, two through six self-powered over 2"; pumps, electric submersible, two through six, over 4"; quad-track; roller, asphalt, top or sub-grade; scoop, tractor drawn; spreader box; sub-grader; tie tamper; tractor-crawler, or wheel type with or without power unit, power take-offs and attachments regardless of size; trenching machine; tunnel boring machine; vibrating machine automatic, automatic propelled; welding machines (gasoline or diesel) two through six; well drilling machine

GROUP 3: Conveyor, large (not self-propelled); conveyor, large (not self-propelled) moving brick and concrete distributing) on floor level; mixer two or more mixers of one bag capacity or less; air tugger w/plant air; boiler, for power or heating on construction projects; boiler, temporary; compressor (mounted on truck; curb finishing machine; ditch paving machine; elevator; endless chain hoist; form grader; hoist, one drum regardless of size; lad-a-vator; manlift; mixer, asphalt, over 8 cu. ft. capacity, without side loader, 2 bag capacity or more; mixer, with side loader, regardless of size; pug mill operator; pump, sump-self-powered, automatic controlled over 2" during use in connection with construction work; sweeper, street; welding machine, one over 400 amp.; winch operating from truck; scissor lift (used for hoisting); tractor, small wheel type 50 h.p. & under with grader blade & similar equipment

GROUP 4: Boat operator-outboard motor (job site); conveyor (such as con-vay-it) regardless of how used; sweeper, floor

GROUP 5: Oiler on dredge and on truck crane.

HOURLY PREMIUMS:

Backhoe, hydraulic	
2 cu. yds. or under without oiler	\$2.00
Certified Crane Operator	1.50
Certified Hazardous Material Operator	1.50
Crane, climbing (such as Linden)	.50
Crane, pile driving and extracting	.50
Crane, with boom (including jib) over 100' (from pin to pin) add \$.01 per foot to maximum of	4.00
Crane, using rock socket tool	.50
Derrick, diesel, gas or electric, hoisting material and erecting steel (150' or more above ground)	.50
Dragline, 7 cu. yds. and over	.50
Hoist, three (3) or more drums in use	.50
Scoop, Tandem	.50
Shovel, power - 7 cu. yds. or more	.50
Tractor, tandem crawler	.50
Tunnel, man assigned to work in tunnel or tunnel shaft	.50

Wrecking, when machine is working on  
second floor or higher .50

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IRON0010-012 04/01/2003

	Rates	Fringes
Ironworkers:		
ANDREW, ATCHISON, BARTON, BATES, BENTON, CALDWELL, CAMDEN, CARROLL, CEDER CHARITON, CHRISTIAN, CLINTON, COOPER, DADE, DALLAS, DAVIESS, DE KALB, GENTRY, GREENE, GRUNDY, HARRISON, HENRY, HICKORY, HOLT, HOWARD, LACLEDE, LINN, LIVINGSTON, MERCER, MONITEAU, MORGAN, NODAWAY, PETTIS, POLK, PUTNAM, RANDOLPH, ST. CLAIR, SALINE, SULLIVAN, TANEY, VERNON, WEBSTER, WRIGHT and WORTH Counties; and portions of ADAIR, BOONE, MACON, MILLER, and RANDOLPH Counties.....	\$ 21.10	13.73
BUCHANAN, CASS, CLAY, JACKSON, JOHNSON, LAFAYETTE, PLATTE AND RAY Counties.....	\$ 24.10	13.73

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IRON0321-002 12/31/2002

DOUGLAS, HOWELL and OZARK COUNTIES

	Rates	Fringes
Ironworker.....	\$ 18.00	8.06

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IRON0396-004 07/31/2002

ST. LOUIS (City and County), ST. CHARLES, JEFFERSON, IRON,  
FRANKLIN, LINCOLN, WARREN, WASHINGTON, ST. FRANCOIS, STE.  
GENEVIEVE, and REYNOLDS Counties; and portions of MADISON,  
PERRY, BOLLINGER, WAYNE, and CARTER Counties

	Rates	Fringes
Ironworker.....	\$ 26.54	11.73

\* IRON0396-009 08/01/2003

AUDRAIN, CALLAWAY, COLE, CRAWFORD, DENT, GASCONADE, MARIES, MONTGOMERY, OSAGE, PHELPS, PIKE, PULASKI, TEXAS, and WRIGHT Counties; and portions of CAMDEN, DOUGLAS, HOWELL, MILLER, OREGON, BOONE, SHANNON, LACLEDE, MONROE, and RALLS Counties

	Rates	Fringes
Ironworker.....	\$ 21.87	13.00

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IRON0577-005 06/01/2002

ADAIR, CLARK, KNOX, LEWIS, MACON, MARION, MONROE, RALLS, SCHUYLER, SCOTLAND, AND SHELBY COUNTIES

	Rates	Fringes
Ironworker.....	\$ 20.85	9.16

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\* IRON0584-004 06/01/2003

BARRY, JASPER, LAWRENCE, MCDONALD, NEWTON AND STONE Counties

	Rates	Fringes
Ironworkers:.....	\$ 18.90	8.47

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\* IRON0782-003 09/01/2003

CAPE GIRARDEAU, MISSISSIPPI, NEW MADRID, SCOTT, & STODDARD Counties; and portions of BOLLINGER, BUTLER, CARTER, DUNKLIN, MADISON, PEMISCOT, PERRY, RIPLEY, and WAYNE Counties

	Rates	Fringes
Ironworkers:		
All Other Work.....	\$ 21.95	9.73

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LABO0042-003 03/03/2003

ST. LOUIS (City and County)

	Rates	Fringes
Laborers:		
Plumber Laborers.....	\$ 23.97	7.43

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LABO0042-005 03/03/2003

ST. LOUIS (City and County)

	Rates	Fringes
Laborers:		
Dynamiter, Powderman.....	\$ 24.28	7.43
Laborers, Flagperson.....	\$ 23.78	7.43
Wrecking.....	\$ 23.66	7.43

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 \* LABO0424-002 05/01/2003

	Rates	Fringes
Laborers:		
ADAIR, AUDRAIN, BOLLINGER, BOONE, BUTLER, CALLAWAY, CAPE GIRARDEAU, CARTER, CHARITON, CLARK, COLE, COOPER, CRAWFORD, DENT, DUNKLIN, GASCONADE, HOWARD, HOWELL, IRON, KNOX, LEWIS, LINN, MACON, MADISON, MARIES, MARION, MILLER, MISSISSIPPI, MONITEAU, MONROE, NEW MADRID, OREGON, OSAGE, PEMISCOT, PERRY, PHELPS, PIKE, PULASKI, PUTNAM, RALLS, RANDOLPH, REYNOLDS, RIPLEY, ST. FRANCOIS, STE. GENEVIEVE, SCHUYLER, SCOTLAND, SCOTT, SHANNON, SHELBY, STODDARD, SULLIVAN, TEXAS, WASHINGTON, AND WAYNE COUNTIES		
GROUP 1.....	\$ 20.32	7.03
GROUP 2.....	\$ 20.92	7.03
FRANKLIN COUNTY		
GROUP 1.....	\$ 21.77	7.03
GROUP 2.....	\$ 22.37	7.03
JEFFERSON COUNTY		
GROUP 1.....	\$ 21.82	7.03
GROUP 2.....	\$ 22.42	7.03
LINCOLN, MONTGOMERY AND WARREN COUNTIES		
GROUP 1.....	\$ 20.57	7.03
GROUP 2.....	\$ 21.17	7.03

LABORERS CLASSIFICATIONS

GROUP 1 - General laborer-flagman, carpenter tenders;  
 salamander Tenders; Dump Man; Ticket Takers; loading trucks  
 under bins, hoppers, and conveyors; track man; cement  
 handler; dump man on earth fill; georgie buggy man; material

batch hopper man; spreader on asphalt machine; material mixer man (except on manholes); coffer dams; riprap pavers rock, block or brick; scaffolds over ten feet not self-supported from ground up; skip man on concrete paving; wire mesh setters on concrete paving; all work in connection with sewer, water, gas, gasoling, oil, drainage pipe, conduit pipe, tile and duct lines and all other pipe lines; power tool operator; all work in connection with hydraulic or general dredging operations; form setters, puddlers (paving only); straw blower nozzle man; asphalt plant platform man; chuck tender; crusher feeder; men handling creosote ties or creosote materials; men working with and handling epoxy material; topper of standing trees; feeder man on wood pulverizers, board and willow mat weavers and cabelee tiers on river work; deck hands; pile dike and revetment work; all laborers working on underground tunnels less than 25 ft. where compressed air is not used; abutement and pier hole men working six (6) ft. or more below ground; men working in coffer dams for bridge piers and footing in the river; barco tamper; jackson or any other similar tamp; cutting torch man; liners, curb, gutters, ditch lines; hot mastic kettlemen; hot tar applicator; hand blade operator; mortar men or brick or block manholes; rubbing concrete, air tool operator under 65 lbs.; caulker and lead man; chain or concrete saw under 15 h.p.; signal Gan; Guard rail and sign erectors.

GROUP 2 - Skilled laborers - Vibrator man; asphalt raker; head pipe layer on sewer work; batterboard man on pipe and ditch work; cliff scalers working from bosun's chairs; scaffolds or platforms on dams or power plants over 10 ft. high; air tool operator over 65 lbs.; stringline man on concrete paving; sandblast man; laser beam man; wagon drill; churn drill; air track drill and all other similar type drills, gunite nozzle man; pressure grout man; screed man on asphalt; concrete saw 15 h.p. and over; grade checker; strigline man on electronic grade control; manhole builder; dynamite man; powder man; welder; tunnel man; waterblaster - 1000 psi or over; asbestos and/or hazardous waste removal and/or disposal

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LABO0579-005 05/01/2003

Rates                      Fringes

Laborers: (ANDREW,  
ATCHISON, BARRY, BARTON,  
BATES, BENTON, CALDWELL,  
CAMDEN, CARROLL, CEDAR,  
CHRISTIAN, CLINTON, DADE,  
DALLAS, DAVIESS, DEKALB,  
DOUGLAS, GREENE, GENTRY,  
GRUNDY, HARRISON, HENRY,  
HICKORY, HOLT, JASPER,  
JOHNSON, LACLEDE, LAWRENCE,  
LIVINGSTON, MCDONALD,  
MERCER, MORGAN, NEWTON,  
NODAWAY, OZARK, PETTIS,

POLK, ST. CLAIR, SALINE,  
STONE, TANEY, VERNON,  
WEBSTER, WORTH AND WRIGHT  
COUNTIES.)

GROUP 1.....	\$ 17.29	7.24
GROUP 2.....	\$ 17.84	7.24

Laborers: (BUCHANAN AND  
LAFAYETTE COUNTIES)

GROUP 1.....	\$ 18.74	7.49
GROUP 2.....	\$ 19.09	7.49

LABORERS CLASSIFICATIONS

GROUP 1: General Laborers - Carpenter tenders; salamander tenders; loading trucks under bins; hoppers & conveyors; track men & all other general laborers; air tool operator; cement handler-bulk or sack; dump man on earth fill; georgie buggy man; material batch hopper man; material mixer man (except on manholes); coffer dams; riprap pavers - rock, block or brick; signal man; scaffolds over ten feet not self-supported from ground up; skipman on concrete paving; wire mesh setters on concrete paving; all work in connection with sewer, water, gas, gasoline, oil drainage pipe, conduit pipe, tile and duct lines and all other pipe lines; power tool operator, all work in connection with hydraulic or general dredging operations; puddlers (paving only); straw blower nozzle man; asphalt plant platform man; chuck tender; crusher feeder; men handling creosote ties or creosote materials; men working with and handling epoxy material or materials (where special protection is required); rubbing concrete; topper of standing trees; batter board man on pipe and ditch work; feeder man on wood pulverizers; board and willow mat weavers and cable tiers on river work; deck hands; pile dike and revetment work; all laborers working on underground tunnels less than 25 feet where compressed air is not used; abutment and pier hole men working six (6) feet or more below ground; men working in coffer dams for bridge piers and footings in the river; ditchliners; pressure groutmen; caulker; chain or concrete saw; cliffscalers working from scaffolds, bosuns' chairs or platforms on dams or power plants over (10) feet above ground; mortarmen on brick or block manholes; toxic and hazardous waste work.

GROUP 2: Skilled Laborers - Head pipe layer on sewer work; laser beam man; Jackson or any other similar tamp; cutting torch man; form setters; liners and stringline men on concrete paving, curb, gutters; hot mastic kettleman; hot tar applicator; sandblasting and gunite nozzle men; air tool operator in tunnels; screed man on asphalt machine; asphalt raker; barco tamper; churn drills; air track drills and all similar drills; vibrator man; stringline man for electronic grade control; manhole builders-brick or block; dynamite and powder men; grade checker.

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LABO0660-006 03/05/2003

ST. CHARLES COUNTY

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 22.69	7.10
GROUP 2.....	\$ 23.19	7.10

LABORERS CLASSIFICATIONS

GROUP 1: General laborer; carpenter tender; salamander tender; dump man; ticket takers; flagman; loading trucks under bins, hoppers, and conveyors; track men; cement handler; dump man on earth fill; Georgie buggie man; material batch hopper man; spreader on asphalt machine; material mixer man (except on manholes); coffer dams; riprap paver - rock, block, or brick; signal man; scaffolds over 10 ft not self-supported from ground up; skipman on concrete paving; wire mech setters on concrete paving; all work in connection with sewer, water, gas, gasoline, oil, drainage pipe, conduit pipe, tile and duct lines and all other pipe lines; power tool operator; all work in connection with hydraulic or general dredging operations; form setters; puddlers (paving only); straw blower nozzle man; asphalt plant platform man; chuck tender; crusher feeder; men handling creosote ties or creosote materials; men working with and handling epoxy material; topper of standing trees; feeder man on wood pulverizer; board and willow mat weavers and cable tiers on river work; deck hands; pile dike and revetment work; all laborers working on underground tunnels less than 25 ft where compressed air is not used; abutment and pier hole men working 6 ft or more below ground; men working in coffer dams for bridge piers and footings in the river; Barco tamper, Jackson or any other similar tamp; cutting torch man; liners, curb, gutters, ditchliners; hot mastic kettleman; hot tar applicator; hand blade operators; mortar men on brick or block manholes; rubbing concrete; air tool operator under 65 pounds; caulker and lead man; chain saw under 15 hp; guard rail and sign erectors

GROUP 2: Vibrator man; asphalt raker; hand pipe layer on sewer work; batterboard man on pipe and ditch work; cliff scalers working from Bosun's chairs, scaffolds or platforms on dams or power plants over 10 ft high; air tool operator over 65 pounds; stringline man on concrete paving etc.; sand blast man; laser beam man; wagon drill; churn drill; air track drill and all other similar type drills; gunnite nozzle man; pressure grout man; screed man on asphalt; concrete saw 15 hp and over; grade checker; stringline man on electronic grade control; manhole builder; dynamite man; powder man; welder; tunnel man; waterblaster - 1000 psi and over; asbestos and/or hazardous waste removal and or disposal;

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\* LABO0663-002 03/22/2004

CASS, CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 22.12	8.09
GROUP 2.....	\$ 23.29	8.09

LABORERS CLASSIFICATIONS

GROUP 1: General laborers, Carpenter tenders, salamander tenders, loading trucks under bins, hoppers and conveyors, track men and all other general laborers, air tool operator, cement handler (bulk or sack), chain or concrete saw, deck hands, dump man on earth fill, Georgie Buggies man, material batch hopper man, scale man, material mixer man (except on manholes), coffer dams, abutments and pier hole men working below ground, riprap pavers rock, black or brick, signal man, scaffolds over ten feet not self-supported from ground up, skipman on concrete paving, wire mesh setters on concrete paving, all work in connection with sewer, water, gas, gasoling, oil, drainage pipe, conduit pipe, tile and duct lines and all other pipelines, power tool operator, all work in connection with hydraulic or general dredging operations, straw blower nozzleman, asphalt plant platform man, chuck tender, crusher feeder, men handling creosote ties on creosote materials, men working with and handling epoxy material or materials (where special protection is required), topper of standing trees, batter board man on pipe and ditch work, feeder man on wood pulverizers, board and willow mat weavers and cable tiers on river work, deck hands, pile dike and revetment work, all laborers working on underground tunnels less than 25 feet where compressed air is not used, abutment and pier hole men working six (6) feet or more below ground, men working in coffer dams for bridge piers and footings in the river, ditchliners, pressure groutmen, caulker and chain or concrete saw, cliffscalers working from scaffolds, bosuns' chairs or platforms on dams or power plants over (10) feet above ground, mortarmen on brick or block manholes, signal man.

GROUP 2: Skilled Laborer - spreader or screed man on asphalt machine, asphalt raker, grade checker, vibrator man, concrete saw over 5 hp., laser beam man, barco tamper, jackson or any other similar tamp, wagon driller, churn drills, air track drills and other similar drills, cutting torch man, form setters, liners and stringline men on concrete paving, curb, gutters and etc., hot mastic kettleman, hot tar applicator, hand blade operators, mortar men on brick or block manholes, sand blasting and gunnite nozzle men, rubbing concrete, air tool operator in tunnels, head pipe layer on sewer work, manhole builder (brick or block), dynamite and powder men.

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\* PAIN002-002 09/01/2003

CLARK, FRANKLIN, JEFFERSON, LEWIS, LINCOLN, MARION, PIKE, RALLS, ST. CHARLES, ST. LOUIS (CITY & COUNTY), AND WARREN COUNTIES

	Rates	Fringes
Painters:		
Brush.....	\$ 24.93	8.65
Spray.....	\$ 26.93	8.65

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PAIN0002-006 02/01/2003

ADAIR, AUDRAIN, BOONE, CALLAWAY, CHARITON, COLE, GASCONADE,  
HOWARD, KNOX, LINN, MACON, MONROE, MONTGOMERY, OSAGE, PUTNAM,  
RANDOLPH, SCHUYLER, SCOTLAND, SHELBY AND SULLIVAN COUNTIES and  
the City of Booneville.

	Rates	Fringes
Painters:		
Bridges, Dams, Locks or Powerhouses.....	\$ 20.44	5.33
Brush, Roller, Paperhanger, Tapers.....	\$ 18.44	5.33
Sandblasting; Epoxy or Any Two Part Coating; Stage or Other Aerial Work Platforms Over 50 ft. high; Lead Abatement....	\$ 19.44	5.33
Spray; Water Base Epoxy; Stage Under 50 ft.; Structural Steel (except for stairs and railings).....	\$ 18.94	5.33
Tapers using Ames or comparable tools (bazooks, etc.).....	\$ 18.69	5.33

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PAIN0003-004 04/01/2000

BATES, BENTON, CALDWELL, CARROLL, CASS, CLAY, CLINTON, COOPER,  
DAVISS, GRUNDY, HARRISON, HENRY, JACKSON, JOHNSON, LAFAYETTE,  
LIVINGSTON, MERCER, MONITEAU, MORGAN, PETTIS, PLATTE, RAY AND  
SALINE COUNTIES

	Rates	Fringes
Painters:		
Bazooka; Paperhanger.....	\$ 22.60	6.01
Brush & Roller; Taper.....	\$ 22.10	6.01
Lead Abatement; Sprayman....	\$ 23.10	6.01
Sandblast (Bridge, Stage, Erected Steel and Storage Bin and Tanks).....	\$ 23.60	6.01
Sprayman (Storage Bin & Tanks, Elevated Tanks); Stageman (Spray);		

Bridgeman (Spray); Steelman (Spray).....	\$ 23.85	6.01
Steeplejack - Spray or Sandblast (other than Elevated Tanks).....	\$ 27.79	6.01
Steeplejack (other than Elevated Tanks).....	\$ 26.79	6.01
Storage Bin & Tanks (Roller or Brush); Elevated Tanks (Roller or Brush); Stageman; Beltman; Bridgeman; Steelman; Sand Blast (Base); Elevator Shaft.....	\$ 22.85	6.01

PAIN0098-002 05/01/2000

ANDREW, ATCHISON, BUCHANAN, DE KALB, GENTRY, HOLT, NODAWAY &  
WORTH COUNTIES

	Rates	Fringes
Painters:		
Brush & Roller.....	\$ 20.50	4.40
Sandblasters.....	\$ 21.50	4.40
Steeple Jack.....	\$ 23.50	4.40

PAIN0203-001 04/01/2002

BARRY, BARTON, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE,  
HICKORY, HOWELL, JASPER, LAWRENCE, MCDONALD, NEWTON, OZARK,  
POLK, ST. CLAIR, STONE, TANEY, VERNON, WEBSTER and WRIGHT  
COUNTIES

	Rates	Fringes
Painters:		
Painters.....	\$ 17.58	4.89
Sandblasters & Highman (over 40').....	\$ 18.13	4.89
Tapers.....	\$ 17.67	4.53

\* PAIN1265-003 07/01/2003

CAMDEN, CRAWFORD, DENT, LACLEDE, MARIES, MILLER, PHELPS,  
PULASKI AND TEXAS COUNTIES

	Rates	Fringes
Painters:		
Brush and Roller.....	\$ 18.79	8.12
Lead Abatement.....	\$ 21.04	8.12
Spray.....	\$ 19.29	8.12
Structural Steel,		

Sandblasting and All  
Tank Work.....\$ 20.04 8.12

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PAIN1292-002 07/01/2001

BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, DUNKLIN,  
MISSISSIPPI, NEW MADRID, OREGON, PEMISCOT, PERRY, REYNOLDS,  
RIPLEY, SCOTT, SHANNON, STODDARD and WAYNE COUNTIES

	Rates	Fringes
Painters:		
Bridges, Stacks & Tanks.....	\$ 22.89	5.97
Commercial.....	\$ 15.44	5.97
Industrial.....	\$ 17.94	5.97
Spray & Abrasive Blasting.....	\$ 17.44	5.97
Taper (Tools).....	\$ 15.69	5.97
Waterblasting.....	\$ 17.44	5.97

Height Rates (All Areas):  
Over 60 ft. \$0.50 per hour.  
Under 60 ft. \$0.25 per hour.

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PAIN1292-003 07/01/2001

IRON, MADISON, ST. FRANCOIS, STE. GENEVIEVE and WASHINGTON  
COUNTIES

	Rates	Fringes
Painters:		
Bridges, Stacks & Tanks.....	\$ 22.89	5.97
Commercial.....	\$ 17.54	5.97
Industrial.....	\$ 18.54	5.97
Lead Abatement.....	\$ 18.29	5.97
Spray & Abrasive Blasting.....	\$ 19.54	5.97
Tapers (Tools).....	\$ 17.79	5.97
Waterblasting.....	\$ 19.54	5.97

Height Rates (All Areas):  
Over 60 ft. \$0.50 per hour  
Under 60 ft. \$0.25 per hour.

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PLAS0518-006 04/01/2002

BARRY, BARTON, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE,  
HOWELL, JASPER, LACLEDE, LAWRENCE, MCDONALD, NEWTON, OZARK,  
POLK, STONE, TANEY, VERNON, WEBSTER, AND WRIGHT COUNTIES

	Rates	Fringes
Cement Masons:.....	\$ 17.31	3.84

\* PLAS0518-007 03/22/2004

CASS (Richards-Gebaur AFB only), CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
Cement Masons:.....	\$ 21.25	11.45

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PLAS0518-011 05/01/2001

ANDREW, ATCHISON, BUCHANAN, BATES, CALDWELL, CARROLL, CASS (Except Richards-Gebaur AFB) CLINTON, DAVIESS, DEKALB, GENTRY, GRUNDY, HARRISON, HOLT, JACKSON, LAFAYETTE, LIVINGSTON, MACON, MERCER, NODAWAY AND WORTH COUNTIES

	Rates	Fringes
Cement Masons:.....	\$ 23.13	7.15

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PLAS0527-001 05/01/2003

	Rates	Fringes
Cement Masons: FRANKLIN, LINCOLN, AND WARREN COUNTIES.....	\$ 25.01	9.36
JEFFERSON, ST. CHARLES COUNTIES AND ST. LOUIS (City and County).....	\$ 26.18	9.36

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PLAS0527-004 05/01/2003

CRAWFORD, DENT, IRON, MADISON, MARION, PHELPS, PIKE, PULASKI, RALLS, REYNOLDS, ST. FRANCOIS, STE. GENEVIEVE, SHANNON, TEXAS, WASHINGTON COUNTIES

	Rates	Fringes
Cement Mason.....	\$ 23.70	9.28

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PLAS0908-001 05/01/2002

BOLLINGER, BUTLER, CAPE GIRARDEAU, CARTER, DUNKLIN, MISSISSIPPI, NEW MADRID, OREGON, PEMISCOT, PERRY, RIPLEY, SCOTT, STODDARD, AND WAYNE COUNTIES

	Rates	Fringes
Cement Mason.....	\$ 17.40	8.95

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PLAS0908-005 03/01/2002

BENTON, CALLAWAY, CAMDEN, COLE, GASCONADE, HENRY, HICKORY,  
JOHNSON, MARIES, MILLER, MONTGOMERY, MORGAN, OSAGE, PETTIS,  
SALINE & ST. CLAIR COUNTIES

	Rates	Fringes
Cement Mason.....	\$ 17.81	7.65

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\* PLUM0008-003 06/01/2003

	Rates	Fringes
Plumber BATES, BENTON, CARROLL, HENRY, LAFAYETTE, MORGAN , PETTIS, RAY, ST. CLAIR, SALINE and VERNON COUNTIES.....	\$ 26.00	11.61
CASS, CLAY, JACKSON, JOHNSON and PLATTE COUNTIES.....	\$ 28.83	13.22

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PLUM0035-002 01/01/2000

CAMDEN, COLE, CRAWFORD, FRANKLIN, JEFFERSON, MARIES, MILLER,  
MONITEAU, OSAGE, PHELPS, PULASKI, ST. CHARLES, ST. LOUIS (City  
and County), WARREN and WASHINGTON COUNTIES

	Rates	Fringes
Plumber.....	\$ 26.105	9.74

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\* PLUM0045-003 09/01/2003

ANDREW, ATCHISON, BUCHANAN, CALDWELL, CLINTON, DAVIESS, DEKALB,  
GENTRY, HARRISON, HOLT, NODAWAY AND WORTH COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 28.20	11.70

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PLUM0178-003 11/01/2001

BARRY, CEDAR, CHRISTIAN, DADE, DALLAS, DOUGLAS, GREENE,  
HICKORY, LACLEDE, LAWRENCE, POLK, STONE, TANEY, WEBSTER, AND  
WRIGHT COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 22.10	7.37

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PLUM0317-002 07/01/1995

BOONE, CALLAWAY, COOPER, HOWARD, AND RANDOLPH COUNTY (Southern half)

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 19.18	3.17

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PLUM0533-004 06/01/2002

BATES, BENTON, CARROLL, CASS, CLAY, HENRY, HICKORY, JACKSON, JOHNSON, LAFAYETTE, MORGAN, PETTIS, PLATTE, RAY, SALINE, ST. CLAIR AND VERNON COUNTIES

	Rates	Fringes
Pipefitter.....	\$ 29.78	11.68

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PLUM0562-004 07/01/2002

ADAIR, AUDRAIN, BOLLINGER, BOONE, BUTLER, CALLAWAY, CAMDEN, CAPE GIRARDEAU, CARTER, CHARITON, CLARK, COLE, COOPER, CRAWFORD, DENT, DUNKLIN, FRANKLIN, GASCONADE, GRUNDY, HOWARD, HOWELL, IRON, JEFFERSON, KNOX, LEWIS, LINCOLN, LINN, LIVINGSTON, MACON, MADISON, MARIES, MARION, MERCER, MILLER, MISSISSIPPI, MONITEAU, MONROE, MONTGOMERY, NEW MADRID, OREGON, OSAGE, PEMISCOTT, PERRY, PHELPS, PIKE, PULASKI, PUTNAM, RALLS, RANDOLPH, REYNOLDS, RIPLEY, ST. CHARLES, ST. FRANCOIS, STE. GENEVIEVE, ST. LOUIS, SCHUYLER, SCOTLAND, SCOTT, SHANNON, SHELBY, STODDARD, SULLIVAN, TEXAS, WARREN, WASHINGTON, AND WAYNE COUNTIES.

	Rates	Fringes
Pipefitter.....	\$ 28.75	12.08

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PLUM0658-002 07/01/1998

BARTON, JASPER, MCDONALD, AND NEWTON COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 16.73	5.33

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TEAM0013-001 05/01/2002

	Rates	Fringes
Truck drivers: ADAIR, BUTLER, CLARK, DUNKIN, HOWELL, KNOX, LEWIS, OREGON, PUTNAM,		

RIPLEY, SCHUYLER, AND  
SCOTLAND COUNTIES

GROUP 1.....	\$ 21.79	5.50
GROUP 2.....	\$ 21.95	5.50
GROUP 3.....	\$ 21.94	5.50
GROUP 4.....	\$ 22.06	5.50

AUDRAIN, BOLLINGER,  
BOONE, CALLAWAY, CAPE  
GIRARDEAU, CARTER,  
COLE, CRAWFORD, DENT,  
GASCONADE, IRON, MACON,  
MADISON, MARIES,  
MARION, MILLER,  
MISSISSIPPI, MONROE,  
MONTGOMERY, NEW MADRID,  
OSAGE, PEMISCOT, PERRY,  
PHELPS, PIKE, PULASKI,  
RALLS, REYNOLDS, ST.  
FRANCOIS, STE.  
GENEVIEVE, SCOTT,  
SHANNON, SHELBY,  
STODDARD, TEXAS,  
WASHINGTON, AND WAYNE  
COUNTIES

GROUP 1.....	\$ 22.52	5.50
GROUP 2.....	\$ 22.68	5.50
GROUP 3.....	\$ 22.67	5.50
GROUP 4.....	\$ 22.79	5.50

TRUCK DRIVERS CLASSIFICATIONS:

GROUP 1: Flat Bed Trucks, Single Axle; Station Wagons;  
Pickup Trucks; Material Trucks, Single Axle; Tank Wagon,  
Single Axle

GROUP 2: Agitator and Transit Mix Trucks

GROUP 3: Flat Bed Trucks, Tandem Axle; Articulated Dump  
Trucks; Material Trucks, Tandem Axle; Tank Wagon, Tandem Axle

GROUP 4: Semi and/or Pole Trailers; Winch, Fork & Steel  
Trucks; Distributor Drivers and Operators; Tank Wagon,  
Semi-Trailer; Insley Wagons, Dumpsters, Half-Tracks,  
Speedace, Euclids and other similar equipment; A-Frame and  
Derrick Trucks; Float or Low Boy

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TEAM0056-001 05/01/2002

Rates Fringes

Truck drivers:

ANDREW, BARTON, BATES,  
BENTON, CALDWELL,  
CAMDEN, CARROLL, CEDAR,  
CHARITON, CHRISTIAN,  
CLINTON, COOPER, DADE,  
DALLAS, DAVIESS,

DEKALB, DOUGLAS,  
 GREENE, HENRY, HICKORY,  
 HOWARD, JASPER,  
 LACLEDE, LAWRENCE,  
 LINN, LIVINGSTON,  
 MONITEAU, MORGAN,  
 NEWTON, PETTIS, POLK,  
 RANDOLPH, ST CLAIR,  
 SALINE, VERNON,  
 WEBSTER, AND WRIGHT  
 COUNTIES

GROUP 1.....	\$ 22.22	5.50
GROUP 2.....	\$ 22.38	5.50
GROUP 3.....	\$ 22.37	5.50
GROUP 4.....	\$ 22.49	5.50
GROUP 5.....	\$ 22.12	5.50

ATCHISON, BARRY,  
 GENTRY, GRUNDY,  
 HARRISON, HOLT,  
 MCDONALD, MERCER,  
 NODADWAY, OZARK, STONE,  
 SULLIVAN, TANEY AND  
 WORTH COUNTIES

GROUP 1.....	\$ 21.49	5.50
GROUP 2.....	\$ 21.65	5.50
GROUP 3.....	\$ 21.64	5.50
GROUP 4.....	\$ 21.76	5.50
GROUP 5.....	\$ 21.39	5.50

BUCHANAN, JOHNSON AND  
 LAFAYETTE COUNTIES

GROUP 1.....	\$ 23.43	5.50
GROUP 2.....	\$ 23.54	5.50
GROUP 3.....	\$ 23.58	5.50
GROUP 4.....	\$ 23.65	5.50
GROUP 5.....	\$ 23.33	5.50

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Flat bed trucks single axle; station wagons; pickup trucks; material trucks single axle; tank wagons single axle.

GROUP 2: Agitator and transit mix-trucks.

GROUP 3: Flat bed trucks tandem axle; articulated dump trucks; material trucks tandem axle; tank wagons tandem axle.

GROUP 4: Semi and/or pole trailers; winch, fork & steel trucks; distributor drivers & operators; tank wagons semi-trailer; insley wagons, dumpsters, half-tracks, speedace, euclids & other similar equipment; A-frames and derrick trucks; float or low boy.

GROUP 5: Warehousemen.

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 TEAM0245-001 03/25/1998

BARRY, BARTON, CAMDEN, CEDAR, CHRISTIAN, DALLAS, DENT, DOUGLAS,

GREENE, HICKORY, HOWELL, JASPER, LACLEDE, LAWRENCE, MCDONALD, MILLER, NEWTON, OZARK, PHELPS, POLK, PULASKI, SHANNON, STONE, TANEY, TEXAS, VERNON, WEBSTER AND WRIGHT COUNTIES

	Rates	Fringes
Truck drivers:		
Traffic Control Service		
Driver.....	\$ 12.90	3.56+a

PAID HOLIDAYS: New Year's Day, Decoration Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day, employee's birthday and 2 personal days.

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\* TEAM0541-001 03/22/2004

CASS, CLAY, JACKSON, PLATTE AND RAY COUNTIES

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 24.40	8.00
GROUP 2.....	\$ 23.85	8.00
GROUP 3.....	\$ 23.34	8.00

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Mechanics and Welders, Field; A-Frame Low Boy-Boomeruck Driver.

GROUP 2: Articulated Dump Truck; Insley Wagons: Dump Trucks, Excavating, 5 cu yds and over; Dumpsters; Half-Tracks: Speedace: Euclids & similar excavating equipment Material trucks, Tandem Two teams; Semi-Trailers; Winch trucks-Fork trucks; Distributor Drivers and Operators; Agitator and Transit Mix; Tank Wagon Drivers, Tandem or Semi; One Team; Station Wagons; Pickup Trucks; Material Trucks, Single Axle; Tank Wagon Drivers, Single Axle

GROUP 3: Oilers and Greasers - Field

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TEAM0541-002 03/25/2000

BATES, CASS, CLAY, HENRY, JACKSON, JOHNSON, LAFAYETTE, PLATTE, AND RAY COUNTIES

	Rates	Fringes
Truck drivers:		
Traffic Control Service		
Driver.....	\$ 14.15	2.44+a

a. PAID HOLIDAYS: New Year's Day, Decoration Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day, Employee's birthday and 2 personal days.

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\* TEAM0682-002 05/01/2003

ST LOUIS CITY AND COUNTY

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 22.635	3.91+a+b
GROUP 2.....	\$ 22.835	3.91+a+b
GROUP 3.....	\$ 22.935	3.91+a+b
GROUP 4.....	\$ 22.125	3.91+a+b

a. PENSION: \$25.60 per day, \$128.00 maximum per week.

b. HAZMAT PREMIUM: If Hazmat certification on a job site is required by a state or federal agency or requested by project owner or by the employer, employees on that job site shall receive \$1.50 premium pay.

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - Pick-up trucks; forklift, single axle; flatbed trucks; job site ambulance, and trucks or trailers of a water level capacity of 11.99 cu. yds. or less

GROUP 2 - Trucks or trailers of a water level capacity of 12.0 cu yds. up to 22.0 cu yds. including euclids, speedace and similar equipment of same capacity and compressors

GROUP 3 - Trucks or trailers of a water level capacity of 22.0 cu. yds & over including euclids, speedace & all floats, flatbed trailers, boom trucks, winch trucks, including small trailers, farm wagons tilt-top trailers, field offices, tool trailers, concrete pumps, concrete conveyors & gasoline tank trailers and truck mounted mobile concrete mixers

GROUP 4 - Warehousemen.

FOOTNOTE FOR TRUCK DRIVERS:

a. PAID HOLIDAYS: Christmas Day, Independence Day, Labor Day, Memorial Day, Veterans Day, New Years Day, Thanksgiving Day

PAID VACATION: 3 days paid vacation for 600 hours of service in any one contract year; 4 days paid vacation for 800 hours of service in any one contract year; 5 days paid vacation for 1,000 hours of service in any one contract year. When such an employee has completed 3 years of continuous employment with the same employer and then works the above required number of hours, he shall receive double the number of days of vacation specified above. When such an employee has completed 10 years of continuous employment with the same employer and then works the above required number of hours, he shall receive triple the number of days of vacation specified above. When such an employee has completed 15 years of continuous employment with the same employer and then works the above required number of hours, he shall receive 4 times

the number of days of vacation specified above.

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TEAM0682-003 05/01/2002

ST.CHARLES, FRANKLIN, JEFFERSON, LINCOLN AND WARREN COUNTIES

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 22.435	3.46+a+b+c
GROUP 2.....	\$ 22.635	3.46+a+b+c
GROUP 3.....	\$ 22.735	3.46+a+b+c
GROUP 4.....	\$ 21.925	3.46+a+b+c

a.PAID HOLIDAYS: Christmas, Fourth of July, Labor Day, Memorial Day, Veterans Day, to be celebrated on either its National Holiday or on the day after Thanksgiving, whichever is agreed upon by the Association and the Union, New Year's Day and Thanksgiving Day.

PAID VACATION: 3 days paid vacation for 600 hours of service in any one contract year; 4 days paid vacation for 800 hours of service in any one contract year; 5 days paid vacation for 1,000 hours of service in any one contract year. When such an employee has completed 3 years of continuous employment with the same employer and then works the above required number of hours, he shall receive double the number of days of vacation specified above. When such an employee has completed 10 years of continuous employment with the same employer and then works the above required number of hours, he shall receive triple the number of days of vacation specified above. When such an employee has completed 15 years of continuous employmen with the same employer and then works the above required number of hours, he shall receive 4 times the number of days of vacation specified above. b.Pension: \$22.80 per day either worked or compensated to a maximum of \$114.00 per week.

c.Hazmat Pay: If Hazmat Certification on a job site is required by a state or federal agency or requested by project owner or by the employer, employees on that job site shall receive \$1.50 per hour premium pay.

TRUCK DRIVER CLASSIFICATIONS:

GROUP 1: Trucks or Trailers of a Water Level Capacity of 11.99 cu. yds. or less, Forklift Trucks, Job Site Ambulances, Pickup Trucks, Flatbed Trucks.

GROUP 2: Trucks or Trailers of a Water Level Capacity of 12.0 cu. yds. up to 22 cu. yds., Euclids, Speedace and Similar Equipment of Same Capacity and Compressors.

GROUP 3: Trucks or Trailers of a Water Level Capacity of 22.0 cu. yds. and over, Euclids and all Floats, Flatbed Trailers, Boom Trucks, Winch Trucks, Including Small Trailers, Farm Wagons, Tilt Top Trailers, Tool Trailers, Concrete Pumps,

Concrete Conveyors, Gasoline TankTrailers, Truck Mounted  
Mobile Concrete Mixers, End Dump, Side Dump and Articulated  
Dump Trucks

GROUP 4: Warehousemen.

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

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

Branch of Construction Wage Determinations

Wage and Hour Division

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

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

Wage and Hour Administrator

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

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

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

Administrative Review Board

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

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

=====

END OF GENERAL DECISION

**DIVISION 1 - GENERAL REQUIREMENTS**

<u>Section No.</u>	<u>Title</u>
01090	Sources for Referenced Publications
01100	General
01312A	Quality Control System (QCS)
01320A	Project Schedule
01330	Submittal Procedures
01354	Environmental protection For Civil Works
01356A	Storm Water Pollution Prevention Measures
01451A	Contractor Quality Control
01500	Temporary Construction Facilities
01550	Hydrology
01780	Closeout Submittals

SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS

06/00

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>  
AOK 6/00

ACOUSTICAL SOCIETY OF AMERICA (ASA)

2 Huntington Quadrangle  
Melville, NY 11747-4502  
Ph: 516-576-2360  
Fax: 516-576-2377  
email: [asa@aip.org](mailto:asa@aip.org)  
Internet: <http://asa@aip.org>  
AOK 6/00

AGRICULTURAL MARKETING SERVICE (AMS)

Seed Regulatory and Testing Branch  
USDA, AMS, LS Div.  
Room 209, Bldg. 306, BARC-East  
Beltsville, MD 20705-2325  
Ph: 301-504-9430  
Fax: 301-504-8098  
Internet: <http://www.ams.usda.gov/lsg>  
e-mail: [james\\_p\\_tripplitt@usda.gov](mailto:james_p_tripplitt@usda.gov)  
AOK 6/00

AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

4301 North Fairfax Dr., Suite 425  
ATTN: Pubs Dept.  
Arlington, VA 22203  
Ph: 703-524-8800  
Fax: 703-528-3816  
E-mail: ari@ari.org  
Internet: www.ari.org  
AOK 6/00

AIR CONDITIONING CONTRACTORS OF AMERICA (ACCA)

1712 New Hampshire Avenue, NW  
Washington, DC 20009  
Ph: 202-483-9370  
FAX: 202-588-1217  
Intrnet: www.acca.org  
AOK 6/00

AIR DIFFUSION COUNCIL (ADC)

104 So. Michigan Ave., No. 1500  
Chicago, IL 60603  
Ph: 312-201-0101  
Fax: 312-201-0214  
Internet: www.flexibleduct.org  
AOK 6/00

AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

30 W. University Dr.  
Arlington Heights, IL 60004-1893  
Ph: 847-394-0150  
Fax: 847-253-0088  
Internet: www.amca.org  
AOK 6/00

ALUMINUM ASSOCIATION (AA)

900 19th Street N.W.  
Washington, DC 20006  
Ph: 202-862-5100  
Fax: 202-862-5164  
Internet: www.aluminum.org  
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AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

1827 Walden Ofc. Sq.  
Suite 104  
Schaumburg, IL 60173-4268  
Ph: 847-303-5664  
Fax: 847-303-5774  
Internet: www.aamanet.org  
AOK 6/00

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

444 N. Capital St., NW, Suite 249  
Washington, DC 20001  
Ph: 800-231-3475 202-624-5800  
Fax: 800-525-5562 202-624-5806  
Internet: [www.aashto.org](http://www.aashto.org)  
AOK 6/00

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

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

P.O. Box 12215  
1 Davis Drive  
Research Triangle Park, NC 27709-2215  
Ph: 919-549-8141  
Fax: 919-549-8933  
Internet: [aatcc.org](http://aatcc.org)  
AOK 6/00

AMERICAN BEARING MANUFACTURERS ASSOCIATION (AFBMA)

1200 19th Street, NW, Suite 300  
Washington, DC 20036-2422  
Ph: 202-429-5155  
Fax: 202-828-6042  
Internet: [abma-dc.org](http://abma-dc.org)  
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AMERICAN BOILER MANUFACTURERS ASSOCIATION (ABMA)

950 North Glebe Road, Suite 160  
Arlington, Virginia 22203-1824  
Ph: 703-522-7350  
Fax: 703-522-2665  
Internet: [abma.com](http://abma.com)  
AOK 6/00

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)

222 West Las Colinas Blvd., Suite 641  
Irving, TX 75039-5423  
Ph: 972-506-7216  
Fax: 972-506-7682  
Internet: <http://www.concrete-pipe.org>  
e-mail: [info@concrete-pipe.org](mailto:info@concrete-pipe.org)  
AOK 6/00

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

1330 Kemper Meadow Dr.  
Suite 600  
Cincinnati, OH 45240  
Ph: 513-742-2020  
Fax: 513-742-3355

Internet: [www.acgih.org](http://www.acgih.org)  
E-mail: [pubs@acgih.org](mailto:pubs@acgih.org)  
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AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)

American Wood Council  
ATTN: Publications Dept.  
1111 Nineteenth St. NW, Suite 800  
Washington, DC 20036  
Ph: 800-294-2372 202-463-2700  
Fax: 202-463-2471  
Internet: <http://www.afandpa.org>  
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AMERICAN GAS ASSOCIATION (AGA)

400 N. Capitol St. N.W. Suite 450  
Washington, D.C. 20001  
Ph: 202-824-7000  
Fax: 202-824-7115  
Internet: [www.aga.org](http://www.aga.org)  
AOK 6/00

AMERICAN GAL ASSOCIATION LABORATORIES (AGAL)

Address  
Ph:  
Fax:  
Internet:

AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA)

1500 King St., Suite 201  
Alexandria, VA 22314-2730  
Ph: 703-684-0211  
Fax: 703-684-0242  
Internet: [www.agma.org](http://www.agma.org)  
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AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

One East Wacker Dr., Suite 3100  
Chicago, IL 60601-2001  
Ph: 312-670-2400  
Publications: 800-644-2400  
Fax: 312-670-5403  
Internet: [www.aisc.org](http://www.aisc.org)  
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AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

7012 So. Revere Parkway, Suite 140  
Englewood, CO 80112  
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Fax: 303-792-0669  
Internet: [www.aitc-glulam.org](http://www.aitc-glulam.org)  
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AMERICAN IRON AND STEEL INSTITUTE (AISI)

1101 17th St., NW Suite 1300  
Washington, DC 20036  
Ph: 202-452-7100

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AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

11 West 42nd St  
New York, NY 10036  
Ph: 212-642-4900  
Fax: 212-398-0023  
Internet: [www.ansi.org/](http://www.ansi.org/)  
Note: Documents beginning with the letter "S" can be ordered from:  
Acoustical Society of America  
P. O. Box 1020  
Sweickley, PA 15143-9998  
Ph: 412-741-1979  
Fax: 412-741-0609  
Internet: [asa.aip.org](http://asa.aip.org)  
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Ph: 202-789-2900  
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Washington, DC 20005-4070  
Ph: 202-682-8000  
Fax: 202-962-4776  
Internet: <http://www.api.org>  
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Landover, MD 20785-2230  
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Fax: 301-459-8077  
Internet: [www.arema.org](http://www.arema.org)  
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1711 Arlingate Lane  
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Columbus, OH 43228-0518  
Ph: 800-222-2768  
Fax: 614-274-6899  
Internet: [www.asnt.org](http://www.asnt.org)

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P.O. Box 3005  
Milwaukee, WI 53201-3005  
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Internet: <http://www.asq.org>  
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100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959  
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Fax: 610-832-9555  
Internet: [www.astm.org](http://www.astm.org)  
AOK 6/00

NOTE: The annual ASTM Book of Standards (66 Vol) is available for \$3500.00. Prices of individual standards vary.

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

1801 Alexander Bell Drive  
Reston, VA 20190-4400  
Ph: 703-295-6300 - 800-548-2723  
Fax: 703-295-6222  
Internet: [www.asce.org](http://www.asce.org)  
e-mail: [marketing@asce.org](mailto:marketing@asce.org)  
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AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

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Atlanta, GA 30329  
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Fax: 404-321-5478  
Internet: <http://www.ashrae.org>  
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901 Canterbury, Suite A  
Westlake, OH 44145  
Ph: 440-835-3040  
Fax: 440-835-3488  
E-mail: [asse@ix.netcom.com](mailto:asse@ix.netcom.com)  
Internet: [www.asse-plumbing.org](http://www.asse-plumbing.org)  
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6666 West Quincy  
Denver, CO 80235  
Ph: 800-926-7337 - 303-794-7711  
Fax: 303-347-0804  
Internet: [www.awwa.org](http://www.awwa.org)  
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AMERICAN WELDING SOCIETY (AWS)

550 N.W. LeJeune Road  
Miami, FL 33126  
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Fax: 305-443-7559  
Internet: <http://www.amweld.org>  
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AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

3246 Fall Creek Highway, Suite 1900  
Grandbury, TX 76049-7979  
Ph: 817-326-6300  
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.

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

2130 Barrett Park Dr., Suite 102  
Kennesaw, GA 30144-3681  
Ph: 770-427-9371  
Fax: 770-423-1703  
Internet: [www.apawood.org](http://www.apawood.org)  
Note: Prices are available only by calling APA

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

1952 Isaac Newton Square West  
Reston, VA 20190  
Ph: 703-733-0600  
Fax: 703-733-0584  
Internet: [www.awinet.org](http://www.awinet.org)

ARMY ENVIRONMENTAL CENTER (AEC)

(Add Address, Telephone)

ARMY PAMPHLET (DAPAM)

(Add Address, Telephone)

ASBESTOS CEMENT PIPE PRODUCERS ASSOCIATION (ACPPA)

1745 Jefferson Davis Highway, Suite 406

Arlington, VA 22202  
Ph: 703-412-1153  
Fax: 703-412-1152

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Three Park Avenue  
New York, NY 10016-5990  
Ph: 212-591-7722  
Fax: 212-591-7674  
Internet: [www.asme.org](http://www.asme.org)

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](http://www.asphaltinstitute.org)  
e-mail: [asphalti@asphaltinstitute.org](mailto:asphalti@asphaltinstitute.org)

ASSOCIATED AIR BALANCE COUNCIL (AABC)

1518 K St., NW, Suite 503  
Washington, DC 20005  
Ph: 202-737-0202  
Fax: 202-638-4833

ASSOCIATION FOR THE ADVANCEMENT OF MEDICAL INSTRUMENTATION (AAMI)

3330 Washington Blvd., Suite 400  
Arlington, VA 22201-4598  
Ph: 703-525-4890  
Fax: 703-276-0793  
Internet: [www.aami.org](http://www.aami.org)

ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)

600 No. 18th St.  
P.O. Box 2641  
Birmingham, AL 35291-0992  
Ph: 205-257-2530  
Fax: 205-257-2540  
Internet: <http://www.aeic.org/index.htm>  
E-Mail: [veazey-white@apc.com](mailto:veazey-white@apc.com)

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS (AHAM)

20 No. Wacker Dr., Suite 1231  
Chicago, IL 60606  
Ph: 312-984-5800  
Fax: 312-984-5823  
Internet: <http://www.aham.org>

ASSOCIATION OF IRON AND STEEL ENGINEERS (AISE)

ASSOCIATION OF IRON AND STEEL ENGINEERS (AISE)

Three Gateway Center, Suite 1900  
Pittsburg, PA 15222-1004  
Ph: 412-281-6323

BIFMA INTERNATIONAL (BIFMA)

2680 Horizon Drive SE, Suite A-1  
Grand Rapids, MI 49546-7500  
Ph: 616-285-3963  
Fax: 616-285-3765  
Internet: [www.bifma.com](http://www.bifma.com)  
E-mail: [email@bifma.com](mailto:email@bifma.com)

BIOCYCLE, JOURNAL OF WASTE RECYCLING

BRICK INSTITUTE OF AMERICA (BIA)

11490 Commerce Park Dr., Suite 308  
Reston, VA 22091  
Ph: 703-620-0010  
Fax: 703-620-3928

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

355 Lexington Ave. New York, NY 10017-6603  
Ph: 212-297-2100  
Fax: 212-370-9047  
Internet: [www.buildershardware.com](http://www.buildershardware.com)

BUILDING OFFICIALS & CODE ADMINISTRATORS INTERNATIONAL (BOCA)

4051 W. Flossmoor Rd.  
Country Club Hills, IL 60478  
Ph: 708-799-2300  
Fax: 708-799-4981  
E-mail: [boca@aecnet.com](mailto:boca@aecnet.com)

BUREAU OF RECLAMATION (BOR)

Dept. of the Interior  
P.O. Box 25007  
Denver, CO 80225  
Ph: 303-236-0305, ext. 457  
Order from:  
National Technical Information  
Services (NTIS)  
5285 Port Royal Rd.  
Springfield, VA 22161  
Ph: 703-605-6000  
Fax: 703-605-6900  
Internet: <http://www.fedworld.gov/ntis/ntishome.html>

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CDT)

Publication Distribution Unit  
1900 Royal Oaks Dr.

Sacramento, CA 95815  
Ph: 916-445-3520 or 916-227-7000 (CA Transportation Lab)  
Fax: 916-324-8997

CALIFORNIA REDWOOD ASSOCIATION (CRA)

405 Enfrente Ave., Suite 200  
Novato, CA 94949  
Ph: 415-382-0662  
Fax: 415-382-8531

CARPET AND RUG INSTITUTE (CRI)

310 Holiday Ave.  
P.O. Box 2048  
Dalton, GA 30722-2048  
Ph: 706-278-0232  
Fax: 706-278-8835  
Internet: carpet-rug.com

CAST IRON SOIL PIPE INSTITUTE (CISPI)

5959 Shallowford Rd., Suite 419  
Chattanooga, TN 37421  
Ph: 423-892-0137  
Fax: 423-892-0817

CEILINGS & INTERIOR SYSTEMS CONSTRUCTION ASSOCIATION (CISCA)

1500 Lincoln Highway, Suite 202  
St. Charles, IL 60174  
Ph: 708-584-1919  
Fax: 708-584-2003

CHLORINE INSTITUTE (CI)

2001 L St., NW  
Washington, DC 20036  
Ph: 202-775-2790  
Fax: 202-223-7225

CODE OF FEDERAL REGULATIONS (CFR)

Order from:  
Government Printing Office  
Washington, DC 20402  
Ph: 202-512-1800  
Fax: 202-275-7703  
Internet: <http://www.pls.com:8001/his/cfr.html>

COMMERCIAL ITEM DESCRIPTIONS (CID)

Order from:  
General Services Administration  
Federal Supply Service Bureau  
470 E L'Enfant Plaza, S.W., Suite 8100  
Washington, DC 20407  
Ph: 202-619-8925  
Internet: <http://pub.fss.gsa.gov/h1-pub.html>

COMPRESSED GAS ASSOCIATION (CGA)

1725 Jefferson Davis Highway, Suite 1004  
Arlington, VA 22202-4102  
Ph: 703-412-0900  
Fax: 703-412-0128  
Internet: [www.cganet.com](http://www.cganet.com)  
e-mail: [Customer\\_Service@cganet.com](mailto:Customer_Service@cganet.com)

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

933 No. Plum Grove Rd.  
Schaumburg, IL 60173-4758  
Ph: 847-517-1200  
Fax: 847-517-1206  
Internet: <http://www.crsi.org>

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

Washington, DC 20207  
Ph: 301-504-0580

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA)

9384-D Forestwood Lane  
Manassas, VA 22110  
Ph: 703-330-7079  
Fax: 703-330-7984

COOLING TOWER INSTITUTE (CTI)

530 Wells Fargo Dr., Suite 218, Houston, TX 77090  
Ph: 281-583-4087  
Fax: 281-537-1721

COPPER DEVELOPMENT ASSOCIATION (CDA)

260 Madison Ave.  
New York, NY 10016  
Ph: 212-251-7200  
Fax: 212-251-7234  
E-mail: <http://www.copper.org>

CORPS OF ENGINEERS (COE)

Order from:  
U.S. Army Engineer Waterways Experiment Station  
ATTN: Technical Report Distribution Section, Services  
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.

COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO)

5203 Leesburg Pike, Suite 708  
Falls Church, VA 22041  
Ph: 703-931-4533  
Fax: 703-379-1546

DEPARTMENT OF AGRICULTURE (USDA)

14TH STREET & INDEPENDENCE AVE. S.W.  
WASHINGTON, D.C. 20250  
Ph: (202) 720-2791  
Publications: 301-344-2340

DEPARTMENT OF COMMERCE (DOC)

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National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
Ph: 703-605-6000  
Fax: 703-605-6900  
Internet: <http://www.ntis.gov>

DEPARTMENT OF DEFENSE (DOD)

Order from:  
National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
Ph: 703-487-4650  
FAX: 703-321-8547

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

Order from:  
HUD User  
P.O. Box 6091  
Rockville, MD 20850  
Ph: 800-245-2691  
e-mail: [Huduser@aspensys.com](mailto:Huduser@aspensys.com)

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Palm Beach, FL 33480-5535  
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Chantilly, VA 20151-1209  
Ph: 703-803-2980  
Fax: 703-803-3732  
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SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

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Fax: 412-829-0844

SOUTHERN PINE INSPECTION BUREAU (SPIB)

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Fax: 850-433-5594  
e-mail: spib@spib.org

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

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Pittsburgh, PA 15222-4656  
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Internet: www.sspc.org

NOTE: SSPC documents, except as noted otherwise, are available only as a part of the 1995 Steel Structures Painting Manual, 7th Edition @ \$115.00.

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e-mail: janet@sdi.org

STEEL DOOR INSTITUTE (SDOI)

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Fax: 847-438-8766  
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e-mail: technic@interaccess.com

STEEL WINDOW INSTITUTE (SWI)

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TILE COUNCIL OF AMERICA (TCA)

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TRUSS PLATE INSTITUTE (TPI)

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Fax: 847-272-8129  
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Dallas, TX 75234  
Ph: 214-243-3902  
Fax: 214-243-3907

U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY (USAEHA)

Waste Disposal Engineering Division

Aberdeen Proving Ground, MD 21010-5422  
Ph: 410-436-3652

WATER ENVIRONMENT FEDERATION (WEF)

601 Wythe St.  
Alexandria, VA 22314-1994  
Ph: 703-684-2452  
Fax: 703-684-2492  
Internet: www.wef.org

WATER QUALITY ASSOCIATION (WQA)

4151 Naperville Rd.  
Lisle, IL 60532  
Ph: 630-505-0160  
Fax: 630-505-9637

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

P.O. Box 23145  
Portland, OR 97281  
Ph: 503-639-0651  
Fax: 503-684-8928

WESTERN WOOD PRESERVERS INSTITUTE (WWPI)

7017 N.E. Highway 99 # 108  
Vancouver, WA 98666  
Ph: 360-693-9958  
Fax: 360-693-9967

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

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Suite 500  
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Ph: 503-224-3930  
Fax: 503-224-3934

WOOD MOULDING AND MILLWORK PRODUCERS ASSOCIATION (WMMPA)

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Woodland, CA 95695  
Ph: 916-661-9591  
Fax: 916-661-9586

-- End of Section --

SECTION 01100

GENERAL

PART 1 GENERAL

1.1 INQUIRIES

Pursuant to SECTION 00100 paragraph titled "**Explanation to Prospective Bidders**", any inquiries regarding this Invitation, before bids are opened, should be addressed to the District Engineer, Kansas City District, Corps of Engineers, 700 Federal Building, Kansas City, Missouri 64106, ATTN: **Ms. Cindy Moses**. Inquiries for which oral explanation or advice on the plans and specifications will suffice may be referred to **Ms. Moses** by calling Area Code 816-983-**3256**. Telephone calls concerning the mailing of plans and specifications should be made to Contracting Division at Area Code 816-983-3975. Collect telephone calls will not be accepted. (KCDO APR 84)

1.2 IDENTIFICATION OF EMPLOYEES

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display identification as may be approved and directed by the Contracting Office. All prescribed identification shall immediately be delivered to the Contracting Officer, for cancellation upon the release of any employee. When required by the Contracting Officer the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project.

1.3 APPLICATION OF WAGE RATES

The inclusion of the Davis-Bacon Act General Wage Decision or the Service Contract Act Wage Determination in the solicitation is a statutory requirement. It is not a representation by the U.S. Army Corps of Engineers that any specific work task can be performed by any specific trade. Which work tasks can be performed by what trades depends on and is determined by the prevailing area practice for the local area where the contract is being performed. It is the sole responsibility of the **bidder** to determine and comply with the prevailing area practice. Inquiries regarding a prevailing area practice should be directed to the Corps of Engineers, Contractor Industrial Relations Specialist (telephone number 816-983-3723) or to the Department of Labor Regional Wage and Hour Division.

Application of wage rates and fringe benefits: For the application of the wage rates and fringe benefits contained in the Decision of the Secretary of Labor; attached to and a part of this contract, all work shall be considered Heavy Construction.

1.4 PAYMENTS TO SUBCONTRACTORS

The Contractor's attention is directed to CONTRACT CLAUSE titled "Payment Under Fixed-Price Construction Contracts." In addition to the requirements

set forth in the referenced paragraph, the Government will reimburse the Contractor, upon request, for amount of premiums paid by the subcontractors for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor furnishes evidence of full payment to the surety.

1.5 PAYMENTS TO CONTRACTOR (KCD MAY 90 - FORMERLY FAR 52.2/9101(a))

The following is an example of a Contractor's release of claims clauses required to comply with the provisions of paragraph (h) of the CONTRACT CLAUSE titled "Payments Under Fixed-Price Construction Contracts":

RELEASE OF CLAIMS

The undersigned Contractor under contract dated \_\_\_\_\_, 2000, between the United States of America and said Contractor for the \_\_\_\_\_ located at \_\_\_\_\_, in accordance with paragraph (h) of the CONTRACT CLAUSE titled "Payments Under Fixed-Price Construction Contracts" of said contract, hereby releases the United States, its officers, agents, and employees from any and all claims arising under or by virtue of said contract or any modification or change thereof except with respect to those claims, if any, listed below:

(Here itemize claims and amounts due.)

1.6 PARTNERING

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractor. This partnership will be structured to draw on the strengths of each organization to identify and achieve mutual goals with the intent to complete the Contract within budget, on schedule and in accordance with plans and specifications. This partnership will be bilateral in makeup, and participation will be totally voluntary. Any cost associated with implementing this partnership will be agreed to by the Contractor and the Government, and will be shared equally with no change in Contract price. To implement this partnership initiative, it is anticipated that thirty (30) days after Notice to Proceed, a team building workshop will be conducted. Follow-up workshops will be held periodically throughout the duration of the Contract as agreed to by the Contractor and the Government.

1.7 PROSPECTIVE CONTRACTOR RESPONSIBILITY

Each bidder shall furnish, within 3 calendar days after receipt of request therefor, data which will show the bidder's ability to perform the work or services required by this Invitation for Bids. Such data shall include as a minimum: Bank certification of financial capability, or a financial statement not over 60 days old, which will be treated as confidential (if over 60 days old, a certificate shall be attached thereto stating that the financial condition is substantially the same or, if not the same, the changes that have taken place); names of commercial and financial reporting agencies from whom credit reports may be obtained; trade creditors; name and address of bonding company; business and construction experience; past record of performance of Government contracts; and construction plant and

equipment available for this job, with resume of work in progress or other data that will assure that the bidder is in a position to perform the work within the time specified.

In addition, if the bid exceeds \$1,000,000, the bidder shall furnish upon request, a certified statement listing:

(a) Each contract awarded to him within the preceding three-month period exceeding \$1,000,000 in value with brief description of the contract.

(b) Each contract awarded to him within the preceding three-year period not already physically completed and exceeding \$5,000,000 in value with brief description of the contract.

(c) If the prospective Contractor is a joint venture, each joint venture member will be required to submit the above defined certification. There shall also be furnished any other available information which will serve to substantiate the bidder's qualifications as a responsible prospective Contractor. (KCD APR 84)

#### 1.8 PERFORMANCE OF WORK BY CONTRACTOR

Bidder's attention is directed to SPECIAL CLAUSE titled "Performance of Work by Contractor." The successful bidder will be required to furnish the Contracting Officer, a description of the work which he will perform with his own organization (e.g., earthwork, paving, etc.), the percentage of the total work this represents, and the estimated cost thereof. Such description of work to be performed by the Contractor's own organization shall be furnished to the Contracting Officer within 10 days after award of the contract.

#### 1.9 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 the CONTRACT CLAUSE titled "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. (KCD)

#### 1.10 LIMITS OF RIGHT-OF-WAY

Limits of right-of-way within private property shall be established as soon as practicable and at least 30 days prior to commencing work in the immediate vicinity, to allow time for relocation of fences by owners of property adjacent to the location of the work.

1.11 UNAVAILABILITY OF UTILITIES

The responsibility shall be upon the Contractor to provide and maintain at his own expense, adequate utilities for his 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.

1.12 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

(a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE titled "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 for the duration of the project.

Note: After the original contract completion date has passed, adverse weather that causes delay for the completion of the project will be granted day-for-day without deducting anticipated adverse weather delay days.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY

WORK DAYS BASED ON (5) DAY WORK WEEK

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(8)	(4)	(4)	(5)	(5)	(5)	(4)	(4)	(4)	(4)	(3)	(5)

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

\* Monthly anticipated weather delay days shall be adjusted proportionally if work is performed in a work week with greater than or less than a

five-day work week. The following formula shall be used to adjust the monthly anticipated weather delays:

adjusted monthly anticipated weather delays - **A** multiplied by (**B** divided by **C**; where:

**A** = The monthly anticipated adverse weather delay for a particular month based on a five-day work week.

**B** = The actual average number of days worked per week during that particular month.

**C** = The number five (5).

eg., If the monthly anticipated adverse weather delay for January based on a five day work week is 10 days, but the Contractor actually worked an average of a six-day work week for that month, the monthly anticipated weather delay would be adjusted by applying the above formula as follows:  
 $10 \times (6/5) = 12$  days.

#### 1.13 REQUIRED INSURANCE SCHEDULE

In accordance with CONTRACT CLAUSE titled "Insurance - Work On A Government Installation," the Contractor shall procure and maintain during the entire period of his performance under this contract the following minimum insurance.

Type	Amount
Workmen's Compensation	coverage complying with applicable State Statute
Employers' Liability	minimum amount of \$100,000.00
General Liability on Comprehensive Form of Policy	minimum limits of \$500,000 per occurrence for bodily injury which includes, but is not limited to, insurance for all work required herein
Comprehensive Automobile Liability	minimum limits of \$200,000 per person and \$500,000 per occurrence for bodily injury, and \$20,000 per occurrence for property damage

(End of clause)

#### 1.14 INTERRUPTIONS TO UTILITY SERVICES

A schedule showing the approximate times of interruptions of utility services and roads shall be submitted approximately 30 days in advance of interrupting services to make connections. Where it is necessary to interrupt services to make connections and the period of interruption will last more than 2 hours, the connections shall be performed on Saturday or Sunday, unless otherwise approved by the Contracting Officer. Final arrangements shall be made with the Contracting Officer at least 72 hours

in advance of the scheduled times of interruptions.

1.15 COORDINATION BETWEEN CONTRACTORS

(See CONTRACT CLAUSE titled "Other Contracts.") Construction work on another contract, "Prospect Bridge Replacement and Brush Creek Channel Modifications", is underway concurrently with this Contract. The obligations of the Contractor under this Contract will include jointly planning and scheduling the work (i.e. the release of temporary stored water from the temporary dam) on a cooperative basis, with the other Contractor involved in order to minimize delays and interferences.

1.16 COOPERATION BETWEEN THE CONTRACTOR AND UTILITY COMPANIES

Relocation of utilities by the utility companies listed in SECTION 02001 will be necessary concurrently with the work under this contract. All coordinating shall be through, or with the knowledge of, the Contracting Officer. (KCD)

Coordination: The Contractor shall coordinate and schedule the work in cooperation with each utility company, to minimize delays and interferences. After receipt of notice to proceed, the Contractor shall notify each utility company and make the necessary arrangements for the utility relocation. The Contractor shall also notify each utility company 30 days in advance of commencing construction work within the vicinity of the utility line.

1.17 CONTRACTOR-FURNISHED EQUIPMENT DATA

At or before 30 days prior to final inspection and acceptance of the work, the Contractor shall submit the data mentioned in the following subclauses.

(1) Equipment List. An itemized equipment list showing unit retail value and nameplate data including serial number, model number, size, manufacturer, etc., for all Contractor-furnished items of mechanical equipment, electrical equipment, and fire protection systems installed under this contract.

(2) Guarantees. A list of all equipment items which are specified to be guaranteed accompanied by a copy of each specific guarantee therefor. For each specific guaranteed item, a name, address, and telephone number shall be shown on the list for subcontractor who installed equipment, equipment supplier or distributor and equipment manufacturer. The completion date of the guarantee period shall correspond to the applicable specification requirements for each guaranteed item.

(3) Warranty Service Calls. The Contractor shall furnish to the Contracting Officer the names of local service representatives and/or Contractors that are available for warranty service calls and who will respond to a call within the time periods as follows: 4 hours for heating, air-conditioning, refrigeration, air supply and distribution, and critical electrical service systems and food service equipment, and 24 hours for all other systems. The names, addresses, and telephone numbers for day, night,

weekend, and holiday service responses shall be furnished to the Contracting Officer and also posted at a conspicuous location in each mechanical and electrical room or close to the unit.

1.18 SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1)

(a) EM 385-1-1 and its changes are available at <http://www.hq.usace.army.mil> (at the HQ homepage, select Safety and Occupational Health). See Section 00700, Contract Clause titled "Accident Prevention."

(b) Before initiation of work at the job site, an accident prevention plan, written by the prime contractor for the specific work and hazards of the contract and implementing in detail the pertinent requirements of EM 385-1-1, will be reviewed and found acceptable by designated Government personnel.

1.19 COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

The Contractor shall comply with OSHA standards as well as the most current edition of the Corps of Engineers General Safety Requirements Manual (EM 385-1-1). The OSHA standards are subject to change and such changes may affect the Contractor in his performance under the contract. It is the Contractor's responsibility to know such changes and effective dates of changes.

1.20 CONSTRUCTION EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

Whenever a modification or equitable adjustment of contract price is required, the Contractor's cost proposal for equipment ownership and operating expenses shall be as set forth in SPECIAL CLAUSE titled "Equipment Ownership and Operating Expense Schedule." A copy of EP 1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" dated August 1995 can be ordered from the Government Printing Office (GPO) by calling Telephone No. 202-512-1800.

1.21 SHOP DRAWINGS

The Contractor's attention is directed to clause "Specifications and Drawings for Construction" of the Contract Clauses.

1.22 SUBMITTALS

(a) Submittal Procedures. See Division One SECTION: SUBMITTAL PROCEDURES.

(b) Shop Drawings shall be submitted in ample time to secure approval prior to the time the items covered thereby are to be delivered to the site. ENG Form 4025 and 4026 shall be used for the transmittal of shop drawings. Unless otherwise specified, shop drawings shall be submitted not less than 30 days before commencement of fabrication of fabricated items and not less than 15 days before delivery of standard stock manufactured items. Where materials are stock with the manufacturer, catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. When catalog includes nonapplicable data, the applicable data

shall be clearly designated and identified by item number, item name, and name of manufacturer. Shop drawings submitted (including initial and final submittals) shall be reproductions on high quality paper with clear and legible print. Drawings shall generally be bordered a minimum of one inch and trimmed to neat lines and unless otherwise specified, the minimum scale shall be 3/8-inch to the foot. Shop drawings quality will be subject to approval. Each shop drawing, including catalog data, shall be identified with a title block including the name of Contractor, contract number, name and location of project, and name of item of work or structure to which the shop drawing applies. Material fabricated or delivered to the site before approved shop drawings have been returned to the Contractor will be subject to rejection. NO CONSTRUCTION OR INSTALLATION SHALL BE DONE FOR ANY ITEM REQUIRING SHOP DRAWINGS, UNTIL ALL SHOP DRAWINGS FOR THAT ITEM HAVE BEEN APPROVED.

(c) As-Built Shop Drawings: Upon completion of the work under this contract, the Contractor shall furnish five complete sets of prints or one complete set of reproducibles of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted. The quality of the reproducibles and prints is subject to approval.

(d) As-Built Drawings: The Contractor shall maintain three separate sets of red-lined, full scale, as-built construction drawings marked up to fully indicate 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. In addition, the Contractor shall indicate on the As-Built Drawings, the brand-name, description, location, and quantity of any and all materials used which contain asbestos. The Contractor shall also be responsible for updating the Government-furnished CADD files to reflect the current as-built conditions throughout the duration of the project. The updated CADD design files shall be maintained in the Intergraph Microstation format consistent with the graphic standards established in the CADD contract drawings provided by the Government. The Contractor will be provided a copy of the Tri-Service CADD standards to facilitate his efforts in the maintenance of design files. The updated CADD files shall be reviewed by the Government on a monthly basis during the progress payment evaluation. The Contractor shall be prepared to demonstrate the status of the updated CADD files in his on-site office. The as-built utility drawings shall show locations and elevations of all underground new utilities and existing utilities encountered, including dimensions from permanent structures and/or survey locations. The submittal requirements for as-built utility drawings shall be shown as separate activities on the Contractor-prepared network analysis. Upon completion of the work, the marked-up drawings and the updated CADD files shall be furnished to the Contracting Officer on CD. In multiphased construction where portions of a system are to be turned over to the user prior to completion of the project, the marked-up drawings for that portion shall be furnished to the Contracting Officer at that time. (MRD ltr 30 Oct 70 and KCD 8 Apr 91)

(e) CADD Files: The Government will provide to the Contractor, within 30 calendar days after Notice of Award, copies of the CADD computer files of the contract drawings for the production of as-built drawings. These files will be in Intergraph Microstation format. The Government provides no warranty, expressed or implied, of the CADD computer files. The Contractor shall assume all responsibility to verify the CADD drawing files. The Contractor will not utilize the CADD drawing computer files to resolve dimensional or other discrepancies. The Government will not guarantee the measurable accuracy of the CADD drawing computer files.

(f) Purchase Orders: Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project, shall be maintained on file at the Contractor's field office for inspection and review by Government representatives. Each purchase order shall (1) be clearly identified with applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating. At the option of the Contractor, the copies of the purchase orders may or may not indicate the price of the articles purchased. (MRD Ltr 22 Oct 74)

#### 1.23 SPECIAL REFERENCES

(a) Shop Drawings. Bidder's attention is directed to SPECIAL CLAUSE titled "Shop Drawings." The basic requirements for Shop Drawings are set forth in the CONTRACT CLAUSES and SPECIAL CLAUSES.

(b) Approved Equal. Bidder's attention is directed to SPECIAL CLAUSE titled "Approved Equal."

(c) Payment to Subcontractors. Bidder's attention is directed to SPECIAL CLAUSE titled "Payments to Subcontractors."

#### 1.24 DIFFERENCES IN DRAWINGS

In addition to the provisions of CONTRACT CLAUSE paragraph "Specifications and Drawings for Construction," the structural drawings shall govern in cases where they differ from the architectural drawings.

#### 1.25 LAYOUT OF WORK (1965 APR OCE)

(a) The Contractor shall furnish, at his own expense, such stakes, templates, platforms, equipment, tools and material, and all labor as may be required in laying out any part of the work from the base lines and benchmarks established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established by the Contracting Officer until authorized to remove them, and if such marks are destroyed, by the Contractor or through his negligence prior to their authorized removal they may be replaced by the Contracting Officer, at his discretion, and the expense of replacement will be deducted from any amounts due or to become due the Contractor. The Contracting Officer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to

permit checking of the work.

(b) Records of Contractor-performed survey activities shall be kept in complete, accurate, and legible field notes. The format shall conform to established standards for such records. Prior to any surveys, the Contractor shall submit the field note format for approval.

(c) The layout of work shall be under the direction of a competent survey party chief who has the following minimum qualifications: (1) high school graduate; (2) 7 years survey experience; (3) 4 years experience on construction related survey activities, and (4) 1 year experience as survey party chief.

#### 1.26 PLANTS AVAILABLE

Each bidder shall, upon request of the Contracting Officer, furnish a list of the plants available to the bidder and proposed for use on the work.

#### 1.27 QUANTITY SURVEYS USING DRAWING FINISH LINES

Where the TECHNICAL PROVISIONS provide for using the finish lines on drawings as the final lines for quantity measurement purposes, the Contractor shall, in addition to the requirements set forth in SPECIAL CLAUSE paragraph titled "Quantity Surveys", make final surveys at least at all locations (stations) where the Contractor performed original surveys. (KCD 23 Jan 76)

#### 1.28 DAMAGE TO WORK (1966 MAR OCE)

(a) The responsibility for damage to any part of the work to be performed under this contract shall be as set forth in the CONTRACT CLAUSE titled "Permits and Responsibilities." However, if any part of the permanent work is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precaution or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such damaged work, an equitable adjustment pursuant to Contract Clause entitled, Changes, of the contract, will be made as full compensation therefor.

#### 1.29 AGGREGATE SOURCES (1965 MAY OCE)

(a) Concrete aggregates may be furnished from source listed in SECTION 03301 or at the option of the Contractor may be furnished from any other source designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated.

(B) After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregate from a

source or from sources not listed above, he may designate only a single source or single combination of sources for aggregates. If a source for coarse or fine aggregate 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 coarse or fine aggregate, as the case may be, from an approved source listed above at no additional cost to the Government.

(d) Listing of a concrete aggregate source is not to be construed as approval of all material from the source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels when such materials are unsuitable for concrete aggregate as determined by the Contracting Officer. Materials produced from an approved source shall meet all the requirements of SECTION 03301 of these specifications.

#### 1.30 WORK ADJACENT TO ROADS AND HIGHWAYS

Where the construction work is on or adjacent to, or involves hauling over public or private roads, streets, or highways, all herein referred to as "roads," the said roads shall, except as otherwise specified or directed, be kept open for traffic at all times during the construction period. Further, the Contractor shall, during said construction, provide, erect and maintain warning signs, lanterns or torches or other safety devices and, when necessary, provide flagmen for protection of traffic to the satisfaction of the Contracting Officer and local authorities. The Contractor shall keep the right-of-way of the roads free of debris that might be caused to accumulate thereon by his operations, and upon completion of the work, shall clean up the said roads and repair any damage to the roads occasioned by his operations under this contract to the satisfaction of the Contracting Officer and local authorities having jurisdiction. The drainage from the roads shall not be obstructed by the construction work. The Contractor shall be responsible for obtaining and paying for all permits required for operation on all roads.

#### 1.31 APPROVED EQUAL

The drawings and the TECHNICAL PROVISIONS of these specifications may, in some instances, refer to certain items of equipment, material, or article by trade name. References of this type shall not be construed as limiting competition, but shall be regarded as establishing a standard of quality. In this respect, the Contractor's attention is directed to CONTRACT CLAUSE titled "Material and Workmanship."

#### 1.32 SCHEDULE OF WORK

The Contractor's attention is directed to CONTRACT CLAUSE titled "Schedule for Construction Contracts," wherein 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.

1.33 PROTECTION OF UTILITY LINES

It shall be the Contractor's responsibility to protect all existing utility lines from damage during excavation for utilities systems. Any damage resulting to existing utility systems shall be repaired by the Contractor, to the satisfaction of the contracting officer, at no additional cost to the Government.

1.34 MODIFICATIONS PRIOR TO DATE SET FOR OPENING BIDS

The right is reserved, as the interest of the Government may require, to revise or amend the specifications or drawings or both prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by an amendment or amendments to this Invitation for Bids. If the revisions and amendments are of a nature which requires material changes in quantities or prices bid or both, the date set for opening bids may be postponed by such number of days as in the opinion of the issuing officer will enable bidders to revise their bids. In such cases, the amendment will include an announcement of the new date for opening bids. (KCD APR 84)

1.35 PROFIT

1.35.1 Weighted Guidelines

Weighted guidelines method of determining profit shall be used on any equitable adjustment change order or modification issued under this contract. The profit factors, expressed as percent, shall be as follows:

<u>Factor</u>	<u>Rate</u>	<u>Weight</u>	<u>Value</u>
Degree of Risk	20		
Relative Difficulty of Work	15		
Size of Job	15		
Period of Performance	15		
Contractor's Investment	5		
Assistance by Government	5		
Subcontracting	<u>25</u>		
	100	Profit%	_____

1.35.2 Values

Based on the circumstances of each procurement action, each of the above factors shall be weighted from 0.03 to 0.12 as indicated below. The value shall be obtained by multiplying the rate by the weight. The value column when totaled indicates the fair and reasonable profit percentage under the circumstances of the particular procurement.

1.35.2.1 Degree of Risk

Where the work involves no risk or the degree of risk is very small, the weighting should be 0.03; as the degree of risk increases, the weighting should be increased up to a maximum of 0.12. Lump sum items will have, generally, a higher weighted value than the unit price items for which

quantities are provided. Other things to consider: the portion of the work to be done by subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, and whether the negotiation is before or after performance of work.

1.35.2.2 Relative Difficulty of Work

If the work is most difficult and complex, the weighting should be 0.12 and should be proportionately reduced to 0.03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Some things to consider: the nature of the work, by whom it is to be done, where, and what is the time schedule?

1.35.2.3 Size of Job

All work not in excess of \$100,000 shall be weighted at 0.12. Work estimated between \$100,000 and \$500,000,000 shall be proportionately weighted from 0.12 to 0.05. Work from \$500,000,000 to \$10,000,000 shall be weighted at 0.04, and work in excess of \$10,000,000 at 0.03.

1.35.2.4 Period of Performance

Modifications in excess of 24 months are to be weighted at 0.12. Modifications of lesser duration are to be proportionately weighted to a minimum of 0.03 for jobs not to exceed 30 days. No weight where additional time is not required.

1.35.2.5 Contractor's Investment

To be weighted from 0.03 to 0.12 on the basis of below average, average, and above average. Things to consider: amount of subcontracting, mobilization payment item, Government furnished property, equipment and facilities, and expediting assistance.

1.35.2.6 Assistance by Government

To be weighted from 0.12 to 0.03 on the basis of average to above average. Things to consider: use of Government-owned property, equipment and facilities, and expediting assistance.

1.35.2.7 Subcontracting

To be weighted inversely proportional to the amount of subcontracting. Where 80 percent or more of the work is to be subcontracted, the weighting is to be 0.03 and such weighting proportionately increased to 0.12 where all the work is performed by the Contractor's own forces.

1.36 EXPEDITING NOTICE TO PROCEED

Notwithstanding the requirements of Block 12 on page 00010-1 of SECTION 00010 and SECTION 00100 paragraph titled "Late Submissions, Modifications, and Withdrawals of Bids," in order to expedite award of contract and issuance of NOTICE TO PROCEED, it is requested that an officer of the

company or corporation determined to be the successful bidder shall appear in the office of the Commander, Kansas City District, Corps of Engineers, 700 Federal Building, 601 East 12th Street, Kansas City, Missouri, for signing contract documents. Therefore, upon written acceptance of this bid, mailed or otherwise furnished within 60 calendar days after the date of opening of bids, it is requested that the successful bidder shall within 24 hours after receipt of notification appear in the office of the Commander and execute Notice to Proceed documents, and give performance and payment bonds on Government Standard forms 25 and 25A with good and sufficient surety. It is also requested that the successful bidder furnish insurance certificates required in SPECIAL CLAUSE titled "Required Insurance Schedule" at this time.

#### 1.37 UNEXPECTED HAZARDOUS SUBSTANCES

In the event that suspected hazardous substances are revealed during construction activities, all such construction activities in the immediate area shall be immediately suspended. Hazardous substances for purposes of this specification only, shall be defined as CERCLA hazardous substances, infectious or radioactive wastes, asbestos or oil. The Contractor shall leave the materials undisturbed and shall immediately report the find to the Contracting Officer's Representative (COR) so that proper authorities can be notified. The Contractor shall not resume construction activities in the vicinity of the suspected hazardous substances until written clearance is received from the COR. Identification and removal of any such materials will be conducted in accordance with all Federal, state and local environmental laws and regulations according to the CONTRACT CLAUSE titled "Differing Site Conditions."

#### 1.38 SURVEY MARKERS

Reference is made to CONTRACT CLAUSE titled "Permits and Responsibilities", Chapter 60 of the Missouri Revised Statutes 1969, and rules titled "Maintenance of the Original US Public Land Survey Corners" adopted by the Division of Geology and Land Survey, Missouri Department of Natural Resources. The Contractor shall be responsible for removing and relocating survey markers. Relocation shall be performed by a professional registered Land Surveyor.

#### 1.39 DEMOLITION

Disposal of demolition waste shall be in accordance with all applicable Federal, State and local regulations, including "Chapter 260, RSMO" of the "Missouri Department of Natural Resources."

#### 1.40 EXCAVATION NOTIFICATION

Prior to any excavation on either public or private properties, Missouri law requires that you notify all owners and operators of underground facilities in your dig site. Missouri One Call System (MOCS) can help you comply with the law; "Chapter 319, RSMO" of the "Missouri Department of Natural Resources," by calling this one toll-free number 1-800-344-7483.

1.41 MISSOURI SALES AND USE TAX

In accordance with FAR Clause 52.229, notice is given that the contract price excludes the Missouri sales tax and compensating (use) tax on all sales of tangible personal property and materials purchased by the Contractor or subcontractors for the construction of projects, including repairing or remodeling facilities, for the United States. In accordance with Section 144.062, RSMo., the Contracting Officer will issue and furnish to the Contractor an exemption certificate (example copy appears at the end of this section) for this project with the Notice to Proceed. The Contractor and the subcontractors will use the exemption certificate for this project in the purchase of supplies, materials and furnishings for incorporation in the project. The Contractor and the subcontractors shall furnish a copy of such certificate to all suppliers/materialmen from whom such purchases are made, and the suppliers shall execute invoices covering the same bearing the number of such certificate. (KCD OC)

1.42 MILESTONE DATES

The Contractor shall perform the following items of work within the time period indicated:

- a. Complete 95% of the Total rock excavation involved in the base bid within 19 weeks of NTP.
- b. Place 800 CY of concrete reinforced channel wall (L-wall and G-wall) within 19 weeks of NTP.
- c. Place 1600 CY of 18-inch Channel Paving within 19 weeks of NTP.

1.43 1.42 WEEKLY COORDINATION MEETINGS

In order to closely coordinate work under this contract, the Contractor shall prepare for and attend weekly coordination meetings with the Contracting Officer and representatives from Kansas City, Mo. at which time the Contractor shall discuss his progress and his proposed schedule for the next 2-week period. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings. The Weekly Coordination Meetings are in addition to the Periodic Progress Meeting, required by 01320A - PROJECT SCHEDULE.

1.44 #.1 DOCUMENTATION OF EXISTING CONDITIONS

Prior to the start of construction, the Contractor shall provide the Resident Engineer with a copy of a SD-01, Vidio Tape of Existing Site Conditions;RE. The Contractor shall notify the Resident Engineer of the time and date of the recording, so the Contracting Officer may be present.

W912DQ-04-B-0006-0002

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

\* \* \* \* \*

EXAMPLE

STATE OF MISSOURI

PROJECT EXEMPTION CERTIFICATE FOR EXEMPT ENTITY CONSTRUCTION

UNITED STATES OF AMERICA

NAME OF EXEMPT ENTITY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

TAX IDENTIFICATION NUMBER (None required)

PROJECT IDENTIFICATION NUMBER \_\_\_\_\_

PLEASE PROVIDE THE PROJECT LOCATION AND A BRIEF DESCRIPTION BELOW:

CONTRACT DATE \_\_\_\_\_

CERTIFICATE EXPIRATION DATE \_\_\_\_\_

Contractors are required to provide a copy of this project exemption certificate to their vendors.

This project exemption certificate does not allow contractors to purchase machinery, equipment, or tools used in fulfilling this contract, tax exempt.

Suppliers accepting this project exemption certificate are required to render to the contractor invoices bearing the name of the exempt entity and the project identification number.

An exempt entity that fails to revise the expiration date on this certificate as necessary to complete any work required by the contract will be liable for any sales tax determined due as a result of an audit of the contractor.

The Contractor shall provide this project exemption to all subcontractors purchasing construction materials for this project.

SIGNATURE OF AUTHORIZED AGENT

EXHIBIT A

-- End of Section --

SECTION 01312A

QUALITY CONTROL SYSTEM (QCS)  
03/04

PART 1 GENERAL

1.1 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. The Contractor module, user manuals, updates, and training information can be downloaded from the RMS web site. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Import/Export of Data

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01320A, PROJECT SCHEDULE, Section 01330, SUBMITTAL PROCEDURES, and Section 01451A, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. The Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on 3-1/2 inch high-density diskettes or CD-ROM. Any

program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

### 1.3 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

#### **Hardware**

IBM-compatible PC with 500 MHz Pentium or higher processor  
128+ MB RAM for workstation / 256+ MB RAM for server  
1 GB hard drive disk space for sole use by the QCS system  
3 1/2 inch high-density floppy drive  
Compact disk (CD) Reader, 8x speed or higher  
SVGA or higher resolution monitor (1024 x 768, 256 colors)  
Mouse or other pointing device  
Windows compatible printer (Laser printer must have 4+ MB of RAM)  
Connection to the Internet, minimum 56 BPS

#### **Software**

MS Windows 98, ME, NT, or 2000  
Word Processing software compatible with MS Word 97 or newer  
Latest version of Netscape Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher  
Electronic mail (E-mail), MAPI compatible  
Virus protection software that is regularly upgraded with all issued manufacturer's updates

### 1.4 RELATED INFORMATION

#### 1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website; the Contractor can obtain the current address from the Government. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

#### 1.4.2 Contractor Quality Control(CQC) Training

The Contractor will receive instruction from the Government on the use of QCS.

## 1.5 CONTRACT DATABASE

The Government will provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by files attached to E-mail. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

## 1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of E-mail (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM). The QCS database typically shall include current data on the following items:

### 1.6.1 Administration

#### 1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

#### 1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail. The Contractor shall update the database for any additional subcontractors.

#### 1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number with no numbers missing or duplicated. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C". All Contractor correspondence shall be forwarded in the original and three copies. If requested, the Contractor shall also forward an additional copy to a separate designated location. All copies provided shall be legible. Enclosures attached or transmitted with the correspondence shall also be furnished with the original and each copy. Each serial letter shall make reference to the contract name and contract number, and shall have only one subject.

#### 1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment

planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

#### 1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

#### 1.6.2 Finances

##### 1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

##### 1.6.2.2 Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

#### 1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451A, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

##### 1.6.3.1 Daily Contractor Quality Control (CQC) Reports.

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451A, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of

either mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government an original and one copy, both signed, of the daily CQC report.

#### 1.6.3.2 Deficiency Tracking.

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

#### 1.6.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

#### 1.6.3.4 Accident/Safety Tracking.

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 200.

#### 1.6.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

#### 1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

#### 1.6.4 Submittal Management

The Government will provide the initial submittal register, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

#### 1.6.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts", or Section 01320A, PROJECT SCHEDULE, as applicable. This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01320A PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

#### 1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data using SDEF.

#### 1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

#### 1.8 DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

##### 1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

##### 1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

##### 1.8.3 File Names

The Government will provide the file names to be used by the Contractor with the QCS software.

#### 1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the

Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01320A

PROJECT SCHEDULE  
05/02

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11 (1995) Progress, Schedules, and Network Analysis Systems

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 (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. 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 all progress payments.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer 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, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the

Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

### 3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

### 3.3.2 Level of Detail Required

The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. 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

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days).

#### 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 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

#### 3.3.2.3 Critical Activities

The following activities shall be listed as separate line activities on the Contractor's project schedule:

- a. Submission and approval of mechanical/electrical layout drawings.
- b. Submission and approval of O & M manuals.
- c. Submission and approval of as-built drawings.
- d. Submission and approval of 1354 data and installed equipment lists.
- e. Submission and approval of testing and air balance (TAB).
- f. Submission of TAB specialist design review report.
- g. Submission and approval of fire protection specialist.
- h. Submission and approval of testing and balancing of HVAC plus

commissioning plans and data.

- i. Air and water balance dates.
- j. HVAC commissioning dates.
- k. Controls testing plan.
- l. Controls testing.
- m. Performance Verification testing.
- n. Other systems testing, if required.
- o. Prefinal inspection.
- p. Correction of punchlist from prefinal inspection.
- q. Final inspection.

#### 3.3.2.4 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 Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

#### 3.3.2.5 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

#### 3.3.2.6 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

#### 3.3.2.7 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

#### 3.3.2.8 Bid Item

All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

### 3.3.2.9 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

### 3.3.2.10 Category of Work

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

### 3.3.2.11 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. 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 NTP to the contract completion date.

#### 3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

#### 3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

#### 3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to 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.

#### 3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

#### 3.3.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

#### 3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

### 3.3.5 Default Progress Data Disallowed

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. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

### 3.3.6 Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

### 3.3.7 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. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

#### 3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 60 calendar days shall be submitted for approval within 20 calendar days after the NTP is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after NTP.

#### 3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after NTP. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

#### 3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

#### 3.4.4 Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

### 3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every periodic project schedule update throughout the life of the project:

#### 3.5.1 Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A.

##### 3.5.1.1 File Medium

Required data shall be submitted on 3.5 disks, formatted to hold 1.44 MB of data, under the MS-DOS Version 5. or 6.x, unless otherwise approved by the Contracting Officer.

##### 3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The

label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the MS-DOS version used to format the disk.

#### 3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

#### 3.5.2 Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis.

#### 3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

#### 3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

##### 3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

##### 3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

##### 3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

#### 3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the NTP until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

#### 3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

##### 3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

##### 3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

##### 3.5.5.3 Critical Path

The critical path shall be clearly shown.

##### 3.5.5.4 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.

##### 3.5.5.5 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.

The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

### 3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler 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 the 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. As a minimum, the Contractor shall address the following items on an activity by activity basis during each progress meeting.

#### 3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed .

#### 3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations shall be based on Remaining Duration for each activity.

#### 3.6.3.3 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 quality defects. A portion of the overall project amount may be retained based on delays of activities.

#### 3.6.3.4 Logic Changes

All logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

#### 3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule which does not represent the actual or planned prosecution and progress of the work.

### 3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

#### 3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request.

The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, 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 for each request for a change in the contract completion date of under 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

#### 3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

### 3.8 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will 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 with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until

revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

### 3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

-- End of Section --

SECTION 01330

SUBMITTAL PROCEDURES  
03/04

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers and titles as follows:

- SD-01 Preconstruction Submittals
- SD-02 Shop Drawings
- SD-03 Product Data
- SD-04 Samples
- SD-05 Design Data
- SD-06 Test Reports
- SD-07 Certificates
- SD-08 Manufacturer's Instructions
- SD-09 Manufacturer's Field Reports
- SD-10 Operation and Maintenance Data
- SD-11 Closeout Submittals

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only.

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 Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, all design extensions, 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. Any "Information Only" submittal found to contain errors or unapproved deviations shall be resubmitted. The Contractor shall direct specific attention to any revisions on corrected submittals that have not been requested by the Approving Authority on prior submissions. **Caution:** The Contractor is cautioned that for each Contractor's resubmittal required beyond the initial submittal and one resubmittal for corrections required by the Contracting Officer, the Contracting Officer will assess Administrative Deductions in the amount of \$500.00 from the progress payments due the Contractor. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

#### 1.5 WITHHOLDING OF PAYMENT

In accordance with FAR 52.232-5, "Payments Under Fixed-Price Construction Contracts", the Government will make progress payments to the Contractor based on estimates of work accomplished which meets the standards of quality established under the contract. No payment will be made for materials and/or work when required submittal approvals for such materials/work have not been obtained or when "Information Only" submittals for related materials/work have been found to contain errors or unrequested deviations. Payment will not be made until the Government establishes that a submittal reflects the standards of quality required by the contract. The Contractor shall not invoice for materials and/or work associated with deficient submittals.

### PART 2 PRODUCTS (Not used)

### 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. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Where materials are stock with the manufacturer, catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. Catalog cuts or other descriptive data that depicts more than one model, size or type of equipment or that presents optional items shall be clearly marked to indicate the model, size or type of equipment proposed along with any proposed optional items. Prior to submittal, all items shall be checked

and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. The Contractor shall not use red markings on submittals. Red markings are reserved for use by the Government. 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. Shop drawings submitted (including initial and final submittals) shall be reproductions on high quality paper with clear and legible print. Drawings shall generally be bordered a minimum of one inch and trimmed to neat lines and unless otherwise specified, the minimum scale shall be 3/8-inch to the foot. Shop drawings 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 item of work or structure to which the shop drawing applies. Material fabricated or delivered to the site before approved shop drawings have been returned to the Contractor will be subject to rejection. NO CONSTRUCTION OR INSTALLATION SHALL BE DONE FOR ANY ITEM REQUIRING SHOP DRAWINGS UNTIL ALL SHOP DRAWINGS FOR THAT ITEM HAVE BEEN APPROVED.

### 3.2 SUBMITTAL REGISTER

At the end of this section is a submittal register showing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor shall complete and submit the forms to the Contracting Officer for approval concurrently with the Initial Project Schedule. In the event a Preliminary Schedule is submitted, forms addressing submittals related to activities on the Preliminary Schedule shall be submitted concurrently with the Preliminary Schedule. The Contractor shall maintain a submittal register for the project and submit a monthly update, unless another frequency is specified. For those contracts which require QCS, the updates shall be in accordance with Section 01312A. The Contractor is required to provide additional entries in the submittal register for all items requiring multiple submittals. The submittal register and project schedule 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. Submittals dependent for approval on conditions, items, or materials included in separate, subsequent submittals may be returned without review pending coordination with all pertinent submittals. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of thirty (30) calendar days, unless specified otherwise, exclusive of mailing time) shall be allowed and shown on the register for review and approval. The Contractor shall consider and allow for possible resubmittals. No delay damages or time extensions will be allowed for time lost in late submittals.

### 3.4 TRANSMITTAL FORM (ENG FORM 4025)

ENG Form 4025 shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. 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 PROCEDURES

Submittals shall be made as follows, unless otherwise specified in Divisions 1 through 16.

#### 3.5.1 Procedures

##### 3.5.1.1 Designer Review

For items to be reviewed by the designer, submittals shall be sent to the Kansas City District Office, addressed as follows, where distribution will be made to the appropriate reviewer:

US Army Engineer District, Kansas City  
ATTN: EC-DS (Shop Drawing Coordinator)  
Federal Building, 601 East 12th Street  
Kansas City, Missouri 64106-2896

The Contractor shall furnish one copy of ENG Form 4026, five copies of ENG Form 4025, and five copies of the shop drawing information to the designer.

For each item submitted to the designer, one copy of the corresponding ENG Form 4025 and all shop drawing enclosures shall be submitted to the Area Office. For all military projects, an additional copy of all submittals related to fire protection/detection systems shall be submitted to the Fire Chief of the Installation.

##### 3.5.1.2 Area Office Approval

For items which require review and approval by the Area Office, the Contractor shall furnish four copies of ENG Form 4025 and four copies of the shop drawing information to the Area Office.

##### 3.5.1.3 Information Only

For Information only submittals, the Contractor shall furnish two copies of ENG Form 4025 and two copies of the submittal data to the Area Office.

##### 3.5.1.4 Other Addressees

The Government will provide any mailing addresses not stated above to the Contractor.

##### 3.5.1.5 Submittal Quantities

Submittal quantities, such as those for O&M Manuals, stated elsewhere in Divisions 1 through 16 shall govern over those in this section, should there be a difference. The number of copies of ENG Form 4025 shall remain as previously stated in this paragraph, "Procedures".

### 3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason and benefits for any deviations and annotate such deviations on the submittal. If a benefit is cost savings, an estimate of such savings shall be included. When proposing a variation for approval, the Contractor warrants that contract requirements have been reviewed to confirm that the variation, if approved, will be compatible with other elements of work. In addition to the normal submittal review period, an additional ten (10) calendar days will be allowed for consideration by the Government of submittals with proposed variations. 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

Where the review authority is designated to the Government, the Contractor is required to sign the certification on the ENG Form 4025 in the box beside the remarks block in Section I. Upon completion of review of submittals requiring Government approval, the Government will assign action codes and sign in Section II as the approving authority. Two copies of each submittal will be returned to the Contractor, except for samples and O&M Manuals for which two copies of the transmittal form only 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 Contractor is required to sign the certification on the ENG Form 4025 in the box beside the remarks block in Section I and sign the approval action block in Section II as the approving authority. 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. Any submittal without a submittal classification and submittal reviewer identifier on the ENG Form 4288 is considered to be an information only submittal.

### 3.9 FIELD TEST REPORTS

Routine tests such as soil density, concrete field tests, pressure testing, etc., shall be delivered to the Quality Assurance Representative with the daily Quality Control Reports and shall be cross-referenced to the Quality Control Report for the day of the test(s).

3.10 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

<p>CONTRACTOR</p> <p>(Firm Name)</p> <p>_____ Approved</p> <p>_____ Approved with corrections as noted on submittal data and/or attached sheets(s).</p> <p>SIGNATURE: _____</p> <p>TITLE: _____</p> <p>DATE: _____</p>
--

-- End of Section --



## 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.   | E -- Disapproved (See attached).  |
| B -- Approved, except as noted on drawings.   | F -- Receipt acknowledged.  |
| C -- Approved, except as noted on drawings.<br>Refer to attached sheet resubmission required. | FX -- Receipt acknowledged, does not comply<br>as noted with contract requirements. |
| D -- Will be returned by separate correspondence.   | G -- Other ( <i>Specify</i> )   |

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

**ROUTING OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES  
OF COMPLIANCE FOR APPROVAL**

*(Used to route ENG Form 4025 with items attached. Not to become a part of the Contractor's record.)*

<b>1</b>	TO:	FROM:	DATE
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The attached items listed on ENG Form 4025 are forwarded for approval action.

CONTRACT NUMBER	CONTRACTOR		
TRANSMITTAL NUMBER	PROJECT TITLE AND LOCATION		
COMMENTS <i>(Attach additional sheet, if necessary.)</i>			
NO. OF ENCL.	TYPED NAME AND TITLE	SIGNATURE	

<b>2</b>	TO:	FROM:	DATE
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COMMENTS *(Attach additional sheet, if necessary.)*

NO. OF ENCL.	TYPED NAME AND TITLE	SIGNATURE	
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<b>3</b>	TO:	FROM:	DATE
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COMMENTS *(Attach additional sheet, if necessary.)*

NO. OF ENCL.	TYPED NAME AND TITLE	SIGNATURE	
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<b>4</b>	TO:	FROM:	DATE
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The following action codes are given to items listed on ENG Form 4025.

<b>ACTIONS CODES</b>  A - APPROVED AS SUBMITTED. B - APPROVED, EXCEPT AS NOTED ON DRAWINGS. RESUBMISSION NOT REQUIRED. C - APPROVED, EXCEPT AS NOTED ON DRAWINGS.	D - WILL BE RETURNED BY SEPARATE CORRESPONDENCE. E - DISAPPROVED <i>(SEE ATTACHED)</i> F - RECEIPT ACKNOWLEDGED G - OTHER <i>(specify)</i>
--	---

ACTION CODES TO BE INSERTED IN COLUMN G, SECTION I, ENG FORM 4025 *(Attach sheets, when required.)*

<b>ITEM NO.</b> <i>(Taken from ENG Form 4025)</i>									
<b>CODE GIVEN</b>									

REMARKS			
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NO. OF ENCL.	TYPED NAME AND TITLE	SIGNATURE	
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**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
WOODLAND AVENUE CHANNEL Brush Creek						CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY						
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
		01354	SD-08 Manufacturer's Instructions Retention Pond Removal Plan		G												
		01356A	SD-07 Certificates Mill Certificate or Affidavit	2.1.3	G RE												
		01780	SD-11 Closeout Submittals As-Built Drawings Warranty Management Plan Warranty Tags Final Clean-Up		G RE G RE G RE G RE												
		02001	SD-07 Certificates Plan of Operations Interim Plan	1.4 1.4.1	G RE G RE												
		02316a	SD-06 Test Reports Field Density Tests EC Testing of Backfill Materials	3.4.3 3.4.2													
		02770a	SD-03 Product Data Equipment Placing Schedule Mixture Proportions Concrete SD-06 Test Reports Field Quality Control		G GD												
		03101a	SD-02 Shop Drawings Shop Drawings	1.4													
					02												

**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION WOODLAND AVENUE CHANNEL Brush Creek						CONTRACTOR											
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REV DATE	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03101a	SD-03 Product Data Materials	2.1													
					03												
			SD-04 Samples Sample Panels	1.5	G RE												
			SD-06 Test Reports Inspection	3.3													
					06												
			Formwork Not Supporting Weight of Concrete	3.2.1	G RE												
		03150a	SD-03 Product Data Preformed Expansion Joint Filler RE	2.1	G												
			Sealant	2.2	G												
			SD-04 Samples Lubricant for Preformed Compression Seals RE	2.2.2	G												
			Field-Molded Type	2.2.3	G												
			SD-07 Certificates Preformed Expansion Joint Filler RE	2.1	G												
			Sealant	2.2	G												
		03200a	SD-02 Shop Drawings Reinforcement	3.1	G RE												
			SD-07 Certificates														

**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION WOODLAND AVENUE CHANNEL Brush Creek						CONTRACTOR											
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REV OR DATE	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03200a	Reinforcing Steel	2.3													
		11310A	SD-02 Shop Drawings														
			Equipment Installation	3.1													
			SD-03 Product Data														
			Sewage and Sludge Pump System		G G												
			Spare Parts		G EC												
			SD-06 Test Reports														
			Field Testing and Adjusting Equipment	3.3	G EC												
			SD-10 Operation and Maintenance Data														
			Sewage and Sludge Pump System		G EC												
		13110A	SD-02 Shop Drawings														
			Drawings	1.3.9	G EC												
			Contractor's Modifications	1.3.2	G EC												
			SD-03 Product Data														
			Equipment		G EC												
			Spare Parts	3.9													
			G, RE														
			SD-06 Test Reports														
			Tests and Measurements	3.5	G RE												
			Contractor's Modifications	1.3.2	G RE												
			SD-07 Certificates														
			Cathodic Protection System														

**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION  
WOODLAND AVENUE CHANNEL Brush Creek

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		13110A	G RE Services of 'Corrosion Expert' SD-10 Operation and Maintenance Data Cathodic Protection System	1.3.1	G RE												
			G RE Training Course	3.6													
		15200A	SD-02 Shop Drawings Pipe and Equipment SD-03 Product Data Qualifications Welders Waste Water Disposal Assistance and Training Delivery, Storage and Handling Materials and Equipment Installation Pipe Schedule Valve Schedule Operator Schedule SD-06 Test Reports Pipe Leakage Tests Hydrostatic Tests Valve Testing SD-07 Certificates Plastic Piping System	3.1.1  1.5 1.5.2 3.16 3.6.1 1.7  1.10.2  2.6.2 2.6.13.1	G EC  G EC G EC												

**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION WOODLAND AVENUE CHANNEL Brush Creek						CONTRACTOR											
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REV OR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		15200A	Contractor's Installation		G EC												
			SD-10 Operation and Maintenance Data														
			Piping and Appurtenances		G EC												
		16375	SD-01 Preconstruction Submittals														
			Manufacturer's Catalog Data		G RE												
			Material, Equipment, Lists		G RE												
			Installation Procedures		G RE												
			SD-04 Samples														
			Electrical Distribution System		G RE												
			As-Built Drawings		G RE												
			SD-09 Manufacturer's Field Reports														
			Factory Test		G RE												
			Field Testing		G RE												
			Test Reports		G RE												
			Materials and Equipment	1.6	G RE												
			Cable Installer Qualifications		G RE												
			Electrical Distribution System		G RE												









SUBMITTAL REGISTER  
(ER 415 1-10)

CONTRACT NO.  
W912DQ-04-B-0006

TITLE AND LOCATION  
BRUSH CREEK WOODLAND AVENUE, Anchors and Drains

CONTRACTOR

SPECIFICATION SECTION  
02715

ACTIVITY NO.	TRANSMITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		GOVERNMENT ACTION		REMARKS		
					DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED		REVIEWER	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT		CODE	DATE
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			02715	ANCHORS AND DRAINS																						
			C.1	SHOP DRAWINGS		X										X										
			C.2	REINFORCING STEEL, TEST REPORTS						X						X										
			C.3	GROUT	X					X	X						X									









SUBMITTAL REGISTER  
(ER 415 1-10)

CONTRACT NO.  
W912DQ-04-B-0006

TITLE AND LOCATION  
BRUSH CREEK WOODLAND AVENUE, Gatewell Drainage System

CONTRACTOR

SPECIFICATION SECTION  
05300

ACTIVITY NO.	TRANSMITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL													CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		GOVERNMENT ACTION		REMARKS	
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	DATE	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE		DATE
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			C.1 (a)	DRAWINGS		X										X	X									
			C.1 (B)	INSTRUCTIONS	X		X								X											
			C.1 (C)	MATERIALS AND EQUIPMENT												X										
			C.2	BOLTS								X				X										
			C.3	OPERATIONS AND MAINTENANCE MANUAL			X									X	X									
				X = ENGR/CONSTR REVIEW BLANK = R																						



SECTION 01354

ENVIRONMENTAL PROTECTION FOR CIVIL WORKS

10/95

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.

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261 Identification and Listing of Hazardous Waste

ENGINEERING MANUALS (EM)

EM 385-1-1 (1996) U.S. Army Corps on Engineers Safety and Health Requirements Manual

1.2 DEFINITIONS

Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of plant or animal communities; or degrade the environment from an aesthetic, cultural or historic perspective. Environmental protection is the prevention/control of pollution and habitat disruption that may occur during construction. The control of environmental pollution and damage requires consideration of air, water, land, biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive materials; and other pollutants.

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-08 Statements

Retention Pond Removal Plan; G.

Submit plan detailing Contractor's procedures for testing and removal of retention pond sediment.

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

The Contractor shall comply with all applicable Federal, State, and local laws and regulations. The Contractor shall provide environmental protective measures and procedures to prevent and control pollution, limit habitat disruption, and correct environmental damage that occurs during

construction.

#### 1.4.1 Protection of Features

This section supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984). The Contractor shall prepare a list of features requiring protection under the provisions of the contract clause which are not specially identified on the drawings as environmental features requiring protection. The Contractor shall protect those environmental features, indicated specially on the drawings, in spite of interference which their preservation may cause to the Contractor's work under the contract.

#### 1.4.2 Permits

This section supplements the Contractor's responsibility under the contract clause PERMITS AND RESPONSIBILITIES to the extent that the Government has already obtained the 404 environmental permit. The Government has applied for the 401 environmental permit and the city of Kansas City has agreed to grant the NPDES permit. The Contractor shall comply with the terms, and conditions of these permits. The Contractor shall also comply with other environmental commitments made by the Government. Copies of permit terms and conditions as well as those other commitments made by the Government are available upon request.

#### 1.4.3 Special Environmental Requirements

The Contractor shall comply with the special environmental requirements included at the end of this section. These special environmental requirements are an outgrowth of environmental commitments made by the Government during the project development.

#### 1.4.4 Environmental Assessment of Contract Deviations

The Contract specifications have been prepared to comply with the special conditions and mitigation measures of an environmental nature which were established during the planning and development of this project. The Contractor is advised that deviations from the drawings or specifications (e.g., proposed alternate borrow areas, disposal areas, staging areas, alternate access routes, etc.) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the construction methods and procedures indicated by the plans and specifications which may have an environmental impact will require an extended review, processing, and approval time by the Government. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

#### 1.5 ENVIRONMENTAL PROTECTION PLAN

Within 20 calendar days of Notice of Award, the Contractor shall submit an Environmental Protection Plan for review and acceptance by the Contracting Officer. The Government will consider an interim plan for the first 30 days of operations. However, the Contractor shall furnish an acceptable final plan not later than 30 calendar days after receipt of the Notice to Proceed. Acceptance is conditional and is predicated upon satisfactory performance during construction. The Government reserves the right to require the Contractor to make changes in the Environmental Protection Plan

or operations if the Contracting Officer determines that environmental protection requirements are not being met. The plan shall detail the actions which the Contractor shall take to comply with all applicable Federal, State, and local laws and regulations concerning environmental protection and pollution control and abatement, as well as the additional specific requirements of this contract. No physical work at the site shall begin prior to acceptance of the Contractor's plan or an interim plan covering the work to be performed. The environmental protection plan shall include, but not be limited to, the following:

1.5.1 List of State and Local Laws and Regulations

The Contractor shall provide as part of the Environmental Protection Plan a list of all State and local environmental laws and regulations which apply to the construction operations under the Contract.

1.5.2 Spill Control Plan

The Contractor shall include as part of the environmental protection plan, a Spill Control Plan. The plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by the Emergency Response and Community Right-to-Know Act or regulated under State or local laws or regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

- a. The name of the individual who will be responsible for implementing and supervising the containment and cleanup.
- b. Training requirements for Contractor's personnel and methods of accomplishing the training.
- c. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
- d. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
- e. The methods and procedures to be used for expeditious contaminant cleanup.
- f. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity spill occurs. The plan shall contain a list of the required reporting channels and telephone numbers.

1.5.3 Recycling and Waste Minimization Plan

The Contractor shall submit a Recycling and Waste Minimization Plan as a part of the Environmental Protection Plan. The plan shall detail the Contractor's actions to comply with the following recycling and waste minimization requirements:

a. The Contractor shall participate in State and local government sponsored recycling programs to reduce the volume of solid waste materials at the source.

#### 1.5.4 Contaminant Prevention Plan

As a part of the Environmental Protection Plan, the Contractor shall prepare a contaminant prevention statement identifying potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, water, or ground. The Contractor shall detail provisions to be taken to meet Federal, State, and local laws and regulations regarding the storage and handling of these materials.

#### 1.5.5 Environmental Monitoring

The Contractor shall include in the plan the details of environmental monitoring requirements under the laws and regulations and a description of how this monitoring will be accomplished.

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.1 SPECIAL ENVIRONMENTAL PROTECTION REQUIREMENTS

##### 3.1.1 Tree Protection

No ropes, cables, or guys shall be fastened to or attached to any tree(s) for anchorage unless specifically authorized by the Contracting Officer. Where such special use is permitted, the Contractor shall provide effective protection to prevent damage to the tree and other land and vegetative resources. Unless specifically authorized by the Contracting Officer, no construction equipment or materials shall be placed or used within the drip line of trees shown on the drawings to be saved. No excavation or fill shall be permitted within the drip line of trees to be saved except as shown on the drawings.

##### 3.1.2 U.S. Department of Agriculture (USDA) Quarantined Considerations

The Contractor shall thoroughly clean all construction equipment at the prior job site in a manner that ensures all residual soil is removed and that egg deposits from plant pests are not present. The Contractor shall consult with the USDA Plant Protection and Quarantine (USDA - PPQ) jurisdictional office for additional cleaning requirements that may be necessary.

##### 3.1.3 Soil Disposal Areas on City Property

Soil disposal within the limits of construction shall be made only in those areas designated on the contract drawings. Hazardous, toxic, and radiological wastes (HTRW) shall not be disposed of onsite. Disposal operations shall be managed and controlled to prevent erosion of soil or sediment from entering nearby waters or wetlands. Disposal operations shall be developed and managed in accordance with the grading plan shown on the drawings or as approved by the Contracting Officer.

### 3.1.4 Disposal of Solid Wastes

Solid waste is rubbish, debris, waste materials, garbage, and other discarded solid materials (excluding clearing debris and hazardous waste as defined in following paragraphs). Solid waste shall be placed in containers and disposed on a regular schedule. All handling and disposal shall be conducted in such a way as to prevent spillage and contamination.

The Contractor shall transport all solid waste off Government property and dispose in compliance with Federal, State, and local requirements.

### 3.1.5 Clearing Debris

Clearing debris is trees, tree stumps, tree trimmings, and shrubs, and leaves, vegetative matter, excavated natural materials (e.g., dirt, sand, and rock), and demolition products (e.g., brick, concrete, glass, and metals).

a. The Contractor shall collect trees, tree stumps, tree trimmings, shrubs, leaves, and other vegetative matter; and shall transport from Construction limits for proper disposal in compliance with City requirements. The Contractor shall segregate the matter where appropriate for proper disposal. Untreated and unpainted scrap lumber may be disposed of with this debris where appropriate.

b. Excavated natural materials shall be transported offsite for proper disposal in compliance with City requirements.

c. Demolition products shall be transported offsite for proper disposal in compliance with City requirements.

### 3.1.6 Disposal of Contractor Generated Hazardous Wastes

Hazardous wastes are wastes as defined in 40 CFR 261, and as defined by applicable State and local regulations. Hazardous waste generated by construction activities shall be removed from the work area and be disposed in compliance with Federal, State, and local requirements. The Contractor shall segregate hazardous waste from other materials and wastes, and shall protect it from the weather by placing it in a safe covered location; precautionary measures against accidental spillage such as berming or other appropriate measures shall be taken. Hazardous waste shall be removed from Government property within 60 days. Hazardous waste shall not be dumped onto the ground, into storm sewers or open water courses, or into the sanitary sewer system.

### 3.1.7 Fuels and Lubricants

Fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants and waste oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with Federal, State, and local laws and regulations.

## 3.2 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

### 3.2.1 Discovered Historic, Archaeological, and Cultural Resources

If during construction activities, items are observed that may have historic or archaeological value (e.g., Native American human remains or associated objects are discovered), such observations shall be reported

immediately to the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall prevent his employees from trespassing on, removing, or otherwise disturbing such resources.

### 3.3 PROTECTION OF WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters.

#### 3.3.1 Wastewater

Wastewater directly derived from construction activities shall not be discharged before being treated to remove pollutants. Wastewater shall be collected and placed in retention ponds as shown on the drawings so the suspended materials can settle. See paragraph SETTLING POND REMOVAL for disposal procedures.

### 3.4 PROTECTION OF AIR RESOURCES

Special management techniques as set out below shall be implemented to control air pollution by the construction activities. These techniques supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

#### 3.4.1 Particulates

Airborne particulates, including dust particles, from construction activities and processing and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas free from airborne dust which would cause a hazard or nuisance.

### 3.5 INSPECTION

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall inform the Contracting Officer of proposed corrective action and take such action to correct the noncompliance. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

-- End of Section --

SECTION 01356A

STORM WATER POLLUTION PREVENTION MEASURES  
08/96

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 4439	(1997) Standard Terminology for Geosynthetics
ASTM D 4491	(1996) 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	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01354 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 SUBMITTALS

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

SD-07 Certificates

Mill Certificate or Affidavit; G, RE

Certificate attesting that the Contractor has met all specified requirements.

#### 1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

##### 1.4.1 Stabilization Practices

The stabilization practices to be implemented shall include temporary seeding, mulching, geotextiles, vegetative buffer strips, erosion control matts, protection of trees, preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

##### 1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

##### 1.4.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

##### 1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices. Contractor practices as submitted.

##### 1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. Final removal of silt fence barriers shall be upon approval by the Contracting Officer.

##### 1.4.2.2 Straw Bales

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment immediately after completing each

phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where straw bales are to be used are shown on the drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided as follows:

- a. Along the downhill perimeter edge of all areas disturbed.
- b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
- c. Along the toe of all cut slopes and fill slopes of the construction areas.
- d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 20 feet apart.
- e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 20 feet apart.
- f. At the entrance to culverts that receive runoff from disturbed areas.

#### 1.4.2.3 Diversion Dikes

Diversion dikes shall have a maximum channel slope of 2 percent and shall be adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet and the minimum top width shall be 2 feet. The Contractor shall ensure that the diversion dikes are not damaged by construction operations or traffic. Diversion dikes shall be located as shown on the drawings.

## PART 2 PRODUCTS

### 2.1 COMPONENTS FOR SILT FENCES

#### 2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

## FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile Elongation (%)	ASTM D 4632	100 lbs. min. 30 % max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

## 2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used, and shall have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.

## 2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

## 2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

## 2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. The bales shall have a standard cross section of 14 inches by 18 inches. All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 inches x 2 inches in cross section and shall have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 3 feet.

## PART 3 EXECUTION

## 3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 16 inches above the ground surface and shall not exceed 34 inches above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be

spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

### 3.2 INSTALLATION OF STRAW BALES

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 18 inches deep into the ground to securely anchor the bales.

### 3.3 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

#### 3.3.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921A SEEDING AND MULCHING.

#### 3.3.2 Straw Bale Maintenance

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Bale rows used to retain sediment shall be turned uphill at each end of

each row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921A SEEDING AND MULCHING.

### 3.3.3 Diversion Dike Maintenance

Diversion dikes shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921A SEEDING AND MULCHING.

## 3.4 INSPECTIONS

### 3.4.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.

### 3.4.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

### 3.4.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

### 3.4.4 Monthly Inspection Report and Certification Form for Erosion and Sediment Controls

On the first working day of each month the Contractor shall complete, sign, and submit the original form.

On the first working day of each month the Contractor shall also furnish one copy of the form submitted to the to the Contracting Officer as part of

the Contractor's daily CQC Report and attach a copy of the completed form to the Plan. Unless otherwise notified by the , the Contractor shall submit the Monthly Inspection Report and Certification Forms for an additional two months after the final completion of all storm water pollution prevention measures required in this contract have been implemented.

-- End of Section --

SECTION 01451A

CONTRACTOR QUALITY CONTROL  
03/04

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	(2001) 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	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 20 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 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.

### 3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the Project Manager or someone higher in the Contractor's organization. Project Manager in this context shall mean the individual with responsibility for the overall management of the project, including quality and production. If the Project Manager and Project Superintendent are the same person, the CQC System Manager shall report to someone higher in the Contractor's organization than the Project Manager.
- 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 shall be validated by the Corps of Engineers Material Testing Center (MTC). The Contractor shall incorporate all tests required by the contract (including systems commissioning and operating tests) to derive the above list of testing information which shall be presented in matrix form as part of the CQC Plan. This matrix shall be suitable for use by the Contractor and the Government as a checklist to control testing to be done on the contract. The Contractor shall coordinate any additional test submission or plan requirements for Mechanical and Electrical Systems with appropriate specialized specification sections if applicable.
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation. The Contractor shall provide a matrix of

Preparatory and Initial Inspections including specification reference paragraph, the name of the Definable Feature of Work, and spaces for date performed, results, and names of attendees.

- 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 feature under a particular section. This list will be agreed upon during the coordination meeting.
- j. Contractor's plan for training all CQC personnel in the CQC System.

### 3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

### 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 2 years construction experience on construction similar to this contract, or a construction person with a minimum of 5 years experience in related 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 be assigned no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: materials technician. These individuals may be employees of the prime or subcontractor. These employees shall be responsible to the CQC System Manager; shall be physically present at the construction site during work on their areas of responsibility; and shall have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals shall have no other duties other than quality control.

Experience Matrix

Area	Qualifications
a. Concrete, Pavements and Soils	Materials Technician with 2 yrs experience for the

## Experience Matrix

Area	Qualifications
	appropriate area

## 3.4.4 Additional Requirement

In addition to the above experience and/or educational requirements, the CQC System Manager, Alternate CQC System Manager, and Superintendent shall have completed the course entitled "Construction Quality Management for Contractors" within the past five years and shall be in possession of a valid certificate of instruction. If the individuals designated as CQC System Manager and Alternate CQC System Manager do not currently meet this training requirement, it is mandatory that the training be successfully completed within ninety calendar days of appointment to the positions of CQC System Manager and Alternate. The Contractor's CQC System Manager and Alternate may be appointed and serve fully in their capacities pending certification, providing all other qualifications are met. If the CQC System Manager or Alternate fails to successfully complete the training, the Contractor shall promptly appoint a new CQC System Manager or Alternate who shall then attend the next available course if he/she does not have a current course certification. The certification is valid for five years at which time retraining is required. If the Contractor needs this training, it will be provided by Government personnel after award of the contract. The cost for the training course shall be borne by the Contractor and will not exceed one hundred dollars (\$100.00) per course, per person. Payment shall be by check in advance of the training. The Contractor shall contact the Contracting Officer upon award of the contract to arrange for course participation.

## 3.4.5 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. All contractor forms for submitting test results are subject to Contracting Officer approval.

## 3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of the construction work as follows:

## 3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are

approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

### 3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance.

Verify required control inspection and testing.

- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 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 shall be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

### 3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

### 3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

## 3.7 TESTS

### 3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers validated testing laboratory or establish a validated testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and

comply with testing standards.

- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract. The Contractor shall maintain test logs of all tests performed by Specification Section and type of test.

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Validation

The testing laboratory for aggregate, concrete, bituminous materials, soil, and rock shall be validated by the Corps of Engineers Materials Testing Center (MTC) for all tests required by the contract. The validation of a laboratory is site specific and cannot be transferred or carried over to a facility at a different location. Any and all costs associated with this validation shall be borne by the Contractor. If the selected laboratory fails the validation, the Contractor shall also be responsible for the costs of each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. The costs shall be the amounts on the MTC web site at the time the validation procedure is performed. Validation of a laboratory is not granted for the entire laboratory activity, but only of the specific procedures requested by the inspected laboratory. The inspected laboratory has full choice of the procedures to be inspected except that the Quality Assurance portion of ASTM E 329 and tests required by the contract are mandatory to be inspected.

##### a. Validation Procedures

Validation of a laboratory may consist of either an inspection or audit as defined herein. The MTC determines whether the laboratory will be inspected or audited. Validation of all material testing laboratories shall be performed by the MTC. Validation may be accomplished by one of the following processes:

1. Inspection. Inspection shall be performed by the MTC in accordance with American Society for Testing and Materials (ASTM) standards ASTM E 329 and ASTM D 3740.
2. Audit. A laboratory may be validated by auditing if it has been accredited by the Concrete and Cement Reference Laboratory (CCRL) or AASHTO Materials Reference Laboratory (AMRL) within the past two years in accordance with ASTM E 329. Audit shall be performed by the MTC. Inspection by MTC may be required after

auditing if one or more of the critical testing procedures required in the project specifications were not included in the CCRL or AMRL inspection report or if there is any concern that the laboratory may not be able to provide required services.

b. Validation Schedule

1. For all laboratories testing aggregate, concrete, bituminous materials, soils, and rock, a validation shall be performed at least every two (2) years, unless extended by the MTC.

2. All laboratories shall be revalidated at any time at the discretion of the Corps of Engineers when conditions are judged to differ substantially from the conditions when last validated.

c. Validation Process

If a validated laboratory is unavailable or the Contractor elects to use a laboratory which is not validated, the Contractor shall coordinate with the Corps of Engineers Material Testing Center (MTC) in Vicksburg, MS, to obtain validation and pay all associated costs. Point of Contact at MTC is Daniel Leavell, telephone (601) 634-2496, fax (601) 634-4656, e-mail: daniel.a.leavell@erdc.usace.army.mil, at the following address:

U.S. Army Corps of Engineers  
Materials Testing Center  
Waterways Experiment Station  
3909 Halls Ferry Road  
Vicksburg, MS 39180-6199

The procedure for Corps of Engineers validation, including qualifications and inspection/audit request forms, is available at the MTC web site: <http://www.wes.army.mil/SL/MTC/mtc.htm>.

The Contractor shall comply with all requirements on the web site.

The Contractor shall coordinate directly with the MTC to obtain validation.

The Contractor is cautioned the validation process is complicated and lengthy, may require an onsite inspection by MTC staff, correction of identified deficiencies, and the submittal and approval of significant documentation. A minimum of 60 days shall be estimated to schedule an inspection/submittal and receive a validation. The Contractor shall be as expeditious and punctual as possible in his coordination and submittal activities with the MTC. The Contractor shall copy the Contracting Officer of all correspondence and submittals to the MTC for purposes of laboratory validation.

3.7.2.2 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 the CONTRACT CLAUSE titled "Inspection of Construction". 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. 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.

### 3.7.3 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 Government-contract laboratory designated by the Area Office.

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

## 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 Clause, "Commencement, Prosecution, and Completion of Work", or elsewhere in the contract, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

### 3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional personnel including, but not limited to, those from the customer, or Owner, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final

acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

### 3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

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, both signed, of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report. A Contractor Quality Control Report shall be prepared for each calendar day of the Contract. 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 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.

-- End of Section --

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES  
02/97

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

The amount of each utility service consumed shall be paid for by the Contractor. The contractor shall contract directly with the utility companies.

1.2.2 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.2.3 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities.

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily

accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

#### 1.3.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as shown on the drawings. The signs shall be erected within 15 days after receipt of the notice to proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed from the site.

#### 1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

##### 1.4.1 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.

##### 1.4.2 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.

#### 1.5 CONTRACTOR'S TEMPORARY FACILITIES

##### 1.5.1 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.

##### 1.5.2 Storage Area

The Contractor shall construct a temporary 6 foot high chain link fence with triple barbed wire around trailers and materials. The fence shall include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site.

Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

##### 1.5.3 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site. Fencing of materials or equipment will not be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

##### 1.5.4 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed.

##### 1.5.5 Maintenance of Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary

to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

#### 1.5.6 New Building

In the event a new building is constructed for the temporary project field office, it shall be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. It shall be equipped with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. It shall be provided with a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building shall be waterproof, shall be supplied with heater, shall have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities shall be furnished. The windows and doors shall be screened and the doors provided with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins shall be non-removable. The windows shall be arranged to open and to be securely fastened from the inside. Glass panels in windows shall be protected by bars or heavy mesh screens to prevent easy access to the building through these panels. In warm weather, air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F, shall be furnished. Any new building erected for a temporary field office 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 site. All charges for telephone service for the temporary field office shall be borne by the Contractor, including long distance charges up to a maximum of \$75.00 per month.

#### 1.5.7 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's and the Government's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field offices. The Contractor shall provide the Government's Temporary Facilities with a monitored / reporting alarm system, security patrols, and locksets, at no additional expense to the Government.

#### 1.6 deleted

#### 1.7 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.

1.8 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. 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. For additional requirements of the TEMPORARY FENCING refer to SECTION 02001 - CONSTRUCTION, GENERAL.

1.9 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

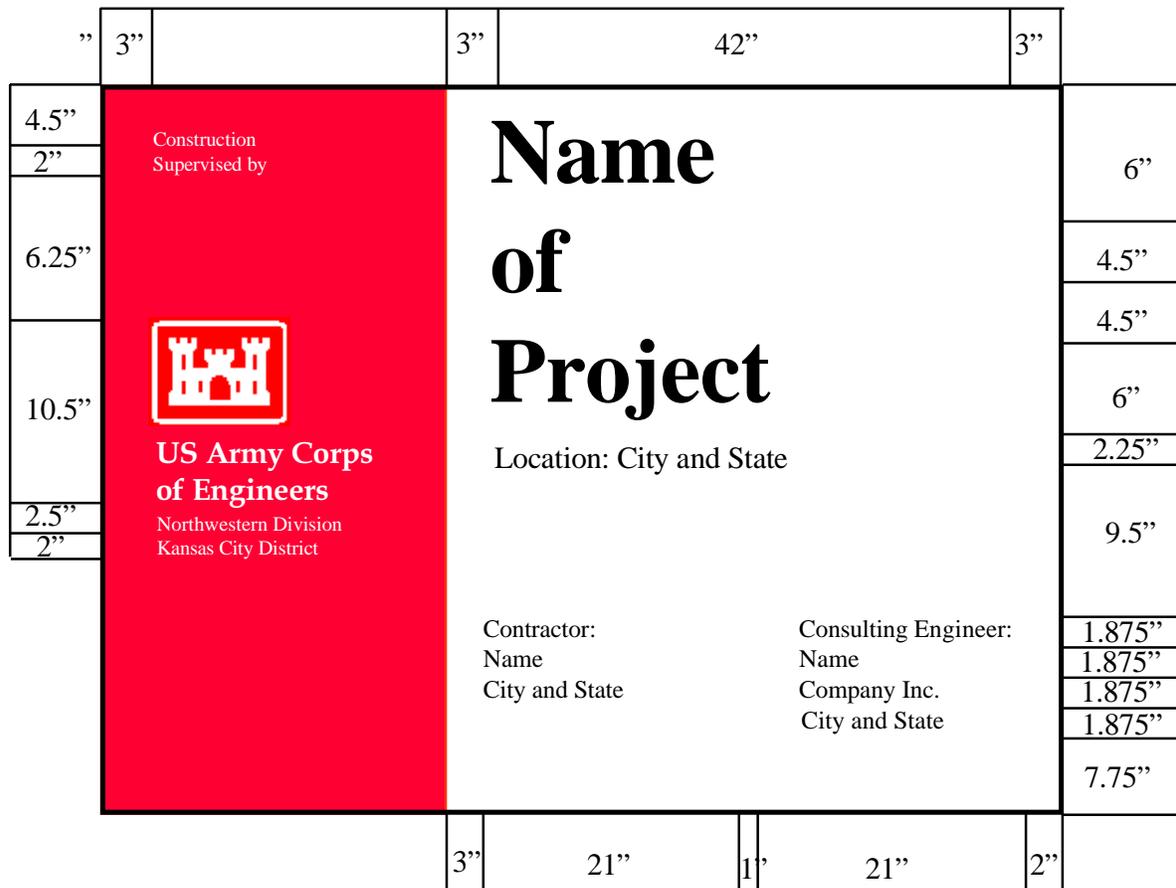
1.10 RESTORATION OF STORAGE AREA AND STAGING AREA

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, Staging Areas and other areas disturbed by the Contractor's activities, 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.

-- End of Section --

The graphic format for this 4'x 6' sign panel follows the legend guidelines and layout as specified below. The large 4'x 4' section of panel on the right is to be white with black legend. The 2'x 4' section of the sign on the left with the full Corps signature (reverse version) is to be screen printed Communications Red on the White background.

This sign is to be placed with the Safety Performance Sign (See Fig. 2).



Legend Group 1: One to two-line description of Corps relationship to project  
 Color: White  
 Typeface: 1.25" Helvetica Regular  
 Maximum line length: 19"

Legend Group 2: Division\ District Name Placed below 10.5" Reverse Signature (6" Castle).  
 Color: White  
 Typeface: 1.25" Helvetica Regular

Legend Group 3: 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"

Legend Group 4: One- to two-line identification of project or facility (civil works) or name of sponsoring department (military).  
 Color: Black  
 Typeface: 1.5" Helvetica Regular  
 Maximum line length: 42"

Cross-align the first line of Legend Group 4 with the first line of the Corps Signature (US Army Corps) as shown.

Legend Groups 5a-b: One- to five-line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state. Use of Legend Group 5 is optional.  
 Color: Black  
 Typeface: 1.25" Helvetica Regular  
 Maximum line length: 21"

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

Sign Type	Legend Size	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-01	Various	4' x 6'	4' x 4'	HDO-3	48"	WH-RD/BK

**CONSTRUCTION SIGN (CORPS OF ENGINEERS DESIGN)**  
 (Use with Fig 2)

Fig. 1

All Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer and shall conform to size, format, and typographic standards.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign Legend orders.

The sign panels are to be fabricated from .75" High Density Overlay Plywood.

Sign graphics to be prepared on a white non-reflective vinyl film with positionable adhesive backing.

All graphics except for the Communications Red background with Corps signature on the project sign are to die-cut or computer cut nonreflective vinyl, pre-spaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown.

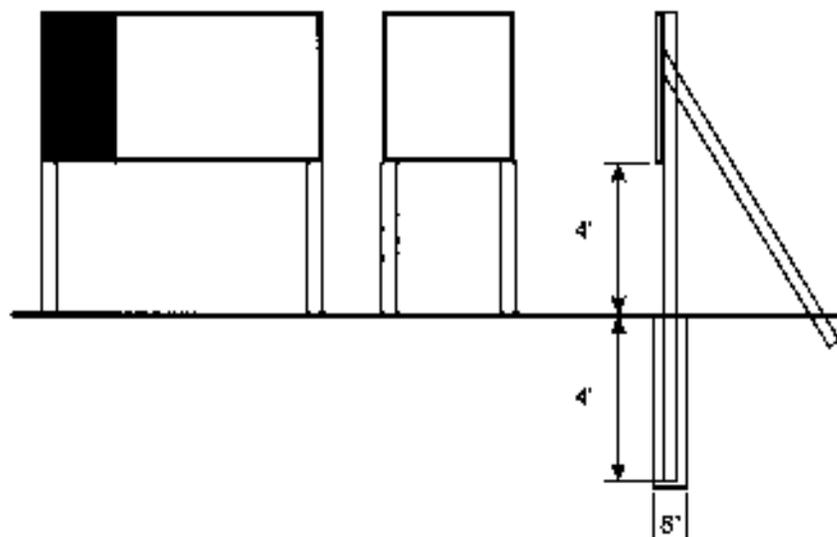
The 2' x 4' Communications Red panel (to match PMS-032) with full Corps signature (reverse version) is to be screen printed on the white background identification of the District / Division may be applied under the signature with white cut vinyl letters prepared to Corps standards.

Drill and insert six (6) .375 T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

Apply Graphic panel to prepared HDO plywood panel following manufactures instructions.

Sign uprights to be structural grade 4" x 4" treated Douglas Fir or Southern Yellow Pine, No 1 or better. Post to be 12' long Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (5") back of hole to accept socket head cap screw (4" x .375").

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4" hole. Local soil conditions and/or wind loading may require bolting additional 2" x 4" structs on inside face of uprights to reinforce installation shown.



Construction Project Sign  
Legend Group 1

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

Legend Group 2 Division/District Names

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

Legend Group 3 Project Title

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

Legend Group 4 Facility Name

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

Legend Group 5a Contractor/A&E

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_

Legend Group 5b Contractor/A&E

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_

Safety Performance Sign  
Legend Group 1: Project Title

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

Legend Group 2: Contractor/A&E

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

# SAFETY PERFORMANCE SIGN

Each contractor's safety record is to be posted on Corps managed or supervised construction projects and mounted with the construction project identification sign.

The graphic format, color, size and typefaces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign and the performance record captions are standard for all signs of the type. Legend Groups 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown.

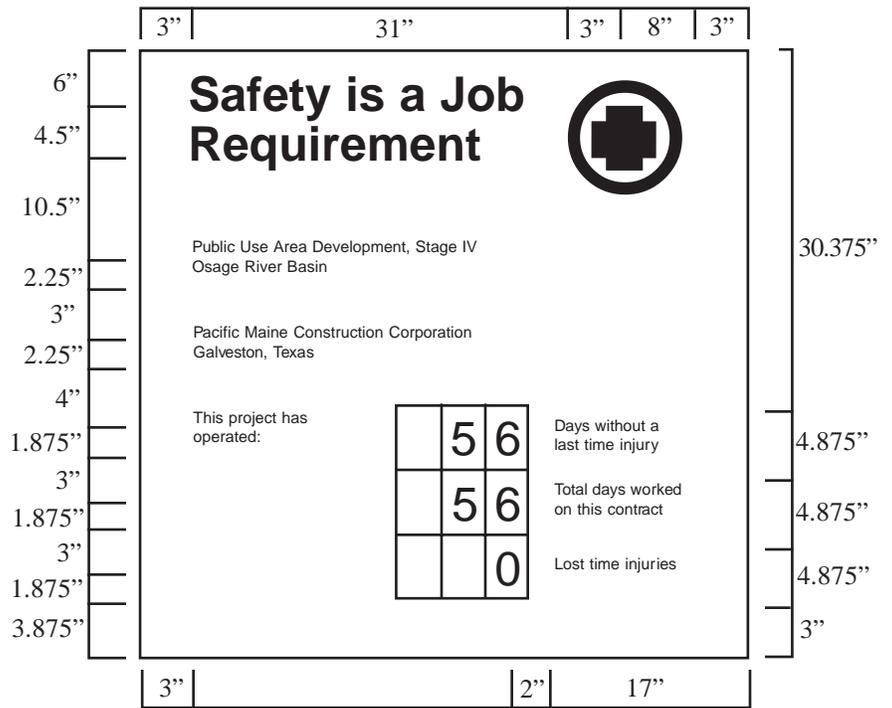
Safety record numbers are mounted on individual metal plates and are screw mounted to the background to allow for daily revisions to posted safety performance record.

**Legend Group 1:** Standard two-line title "Safety is a Job requirement" with (8 od.) Safety Green First Aid logo.  
Color: to match PMS 347  
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.  
Color: Black  
Typeface: 1.5" Helvetica Regular  
Maximum line length: 42"

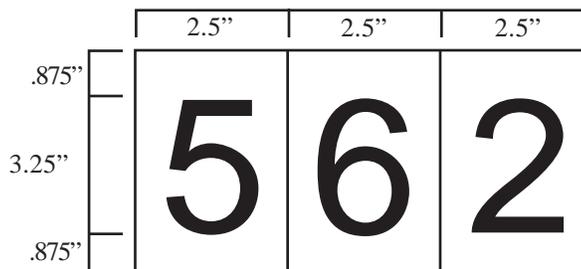
**Legend Group 3:** One to two-line identification; name of prime contractor and city, state address.  
Color: Black  
Typeface: 1.5" Helvetica Regular  
Maximum line length: 42"

**Legend Group 4:** Standard safety record captions as shown.  
Color: Black  
Typeface: 12.5" Helvetica Regular



Sign Type	Legend Size	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-02	Various	4' X 4'	4" X 4"	HDO-3	48"	WH/BK - GR

Replaceable numbers are to be mounted on white .060 aluminum plates and screw-mounted to background.  
Color: Black  
Typeface: 3" Helvetica Regular  
Plate size: 2.5" X 5"



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.

Fig. 2

## SECTION 01550

## HYDROLOGY

## PART 1 GENERAL

## 1.1 GENERAL

Brush Creek flows were monitored by a stream gage installed on the Main Street bridge. Stage or water surface elevation data were collected from October 1972 through September 1978. The largest flood during this period occurred on 12 September 1977. About 5 a.m. a peak of 5,800 c.f.s. was recorded from rain falling after midnight. At 8 p.m. a second storm occurred which caused Brush creek flow to increase from less than 100 c.f.s. to a peak of 19,230 c.f.s. two hours later. Twelve hours later flows had receded to about 1,000 c.f.s. and 24 hours after the peak, flows were again less than 100 c.f.s. The September 1977 flood was the largest and most damaging flood that could be found in any newspaper or other record available. However, a flood which was estimated by Black & Veatch Consulting Engineers for the J.C. Nichols Company to have a peak discharge of 17,360 c.f.s. occurred in 1906.

## 1.2 FLOOD DURATION

## 1.2.1 High flows

Mean Daily Discharges data for six years, 1973 through 1978 (2,191 days), were used to evaluate the persistence of high and low flows. The average daily (mean daily) flow was used which in the case of Brush Creek is only a fraction of the peak experienced if a peak occurred in that day. For example, the mean daily flow for 12 September 1977 was 2,190 c.f.s. while two distinct peaks much larger actually occurred. Table 1 gives flow duration data for mean daily flow. The table shows the flow expected for various durations. The probable errors within the table increases as the duration period increases and as the annual exceedence probability decreases.

ANNUAL EXCEEDENCE PROBABILITY	AVERAGE RECURRENCE INTERVAL (YRS)	AVERAGE DISCHARGE IN C.F.S.*				
		1 DAY	3 DAYS	7 DAYS	15 DAYS	30 DAYS
.99	1.01	48	37	18	13	10
.50	2.00	424	160	97	52	35
.20	5.00	1,047	452	250	127	77
.10	10.00	1,723	889	443	222	127
.04	25.00	2,988	2,028	869	435	230
.02	50.00	4,313	3,668	1,389	701	353
.01	100.00	6,045	6,509	2,169	1,109	532

\*The short streamflow record reduces the accuracy of statistical flow

duration analyses. Values in this table may vary + of - 40 percent from the true value. Values at each frequency should decrease for each successive longer duration.

1.2.2 Low Flows

For Low Flow Duration results, our investigation of the same six years of data shows that for all durations up to 120 days and frequencies on the average of once-in-two-years or less frequent, flows will be 2.1 c.f.s. or smaller. On an annual frequency (1.02 year return interval) one 14 day period may average less than one c.f.s. Annually, one 60, 90, or 120 day period may average less than 10.6 c.f.s.

1.2.3 Flow Exceedance Values

The period of record (2,191 days) flows show that all mean daily flows are classified as follows:

Table 2. FLOW EXCEEDENCE VALUES

NO. OF DAYS	FLOW VALUE EXCEEDED
202	12 cfs
99	31 cfs
41	81 cfs
28	110 cfs
12	210 cfs
6	400 cfs
2	770 cfs (but not greater than 2,190)

PART 2 PRODUCTS - NOT APPLICABLE

PART 3 EXECUTION - NOT APPLICABLE

-- End of Section --

SECTION 01780

CLOSEOUT SUBMITTALS

11/99

PART 1 GENERAL

1.1 SUBMITTALS

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

SD-11 Records

As-Built Drawings; G-RE.

Drawings showing final as-built conditions of the project. The final CADD as-built drawings shall consist of one set of electronic CADD drawing files in the specified format and three sets of the approved red-line as-built drawings.

Warranty Management Plan; G-RE.

One set of the warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. The Contractor shall furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

Warranty Tags; G-RE.

Two record copies of the warranty tags showing the layout and design.

Final Clean-Up; G-RE.

Two copies of the listing of completed final clean-up items.

1.2 PROJECT RECORD DOCUMENTS

1.2.1 As-Built Drawings

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings which are revised to be used for final as-built drawings.

1.2.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file as-built drawings.

#### 1.2.1.2 Monthly As-Built Review Meeting

A monthly as-built review meeting will be conducted during the construction project. Each member of the construction team will attend the meeting and provide information or documentation as required. The meeting will be conducted in a mutually agreed upon location. To minimize difficulty in coordinating schedules, efforts will be made for a standing meeting in the same location, at the same time, and on the same day of the week each month.

- a. The Government will chair the meeting and serve as the information conduit.
- b. The Government will provide an agenda for the meeting.
- c. The Contractor shall bring two updated CDs (or diskettes) to the meeting.
- d. The Contractor shall bring current redline drawings to the meeting.
- e. The Contractor shall display updated CADD as-built files on screen, demonstrating that CADD files match features on redline drawings, and making changes if necessary.
- f. The Contractor shall leave one CD (or diskette) with the Government. The Contractor shall have updated this copy to include any changes made during the meeting.

#### 1.2.1.3 Exterior Utility Systems

At intervals of 30 days from the time work is begun on new utility systems or on revising existing systems, as-built CADD files shall be submitted showing the condition of new and altered utility systems. The as-built exterior utility drawings shall show locations and elevations of all underground new and existing utilities encountered, including dimensions for permanent structures and/or survey locations. **The submittal requirements for as-built utility drawings shall be shown as separate activities on the Contractor-prepared network analysis.**

#### 1.2.1.4 Working As-Built and Final As-Built Drawings

The Contractor shall revise three (3) sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a daily basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. **In addition, the Contractor shall indicate on the as-built drawings the brand-name, description, location, and quantity of any and all materials used which contain asbestos.** Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following

information:

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

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

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

d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

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

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

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

h. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

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

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

(2) A Modification Circle shall be placed at the location of each deletion.

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

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

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

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

(7) The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

#### 1.2.1.5 Drawing Preparation

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

#### 1.2.1.6 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same graphic standards specified for original drawings. **The Contractor will be provided a copy of the Tri-Service CADD standards to facilitate his efforts in the maintenance of design files.** The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD files. The electronic files will be supplied on compact disc, read-only memory (CD-ROM). The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make required corrections, changes, additions, and deletions.

a. CADD colors shall be the "base" colors of red, green, and blue. Color code for changes shall be as follows:

- (1) Deletions (red) - Deleted graphic items (lines) shall be colored red with red lettering in notes and leaders.
- (2) Additions (Green) - Added items shall be drawn in green with green lettering in notes and leaders.
- (3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes shall be in blue.

b. The Contract Drawing files shall be renamed in a manner related to the contract number (i.e., 98-C-10.DGN). Marked-up changes shall be made only to those renamed files. All changes shall be made on the layer/level as the original item. There shall be no deletions of existing lines; existing lines shall be over struck in red. Additions shall be in green with line weights the same as the drawing. Special notes shall be in blue on layer #63.

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

d. Within 20 days after Government approval of all of the working as-built drawings for a phase of work, the Contractor shall prepare the final CADD as-built drawings for that phase of work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days the Contractor shall revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 20 days of substantial completion of all phases of work, the Contractor shall submit the final as-built drawing package for the entire project. The submittal shall consist of one set of electronic files on compact disc read-only memory (CD-ROM), a sheet index showing sufficient planimetric data to indicate the geographical location of the project, and three sets of the approved red-line as-built drawings. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final as-built drawing files and marked prints as specified shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

e. Within 60 days after turning over the facility, the Contractor shall provide as-built CADD files containing all of the red-line mark-ups incorporated and reflecting the completed as-built conditions of the project, including buildings, exterior utility systems, and all other features.

#### 1.2.1.7 Payment

No separate payment will be made for as-built drawings required under this contract, and all costs accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

#### 1.2.2 Final Approved Shop Drawings

The Contractor shall furnish final approved project shop drawings 30 days after transfer of the completed facility.

### 1.3 WARRANTY MANAGEMENT

#### 1.3.1 Warranty Management Plan

The Contractor shall develop a warranty management plan which shall contain information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure

that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

- a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.
- b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include pumps, motors, and transformers.
- c. A list for each warranted equipment, item, feature of construction or system indicating:
  1. Name of item.
  2. Model and serial numbers.
  3. Location where installed.
  4. Name and phone numbers of manufacturers or suppliers.
  5. Names, addresses and telephone numbers of sources of spare parts.
  6. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.
  7. Cross-reference to warranty certificates as applicable.
  8. Starting point and duration of warranty period.
  9. Summary of maintenance procedures required to continue the warranty in force.
  10. Cross-reference to specific pertinent Operation and Maintenance manuals.
  11. Organization, names and phone numbers of persons to call for warranty service.
  12. Typical response time and repair time expected for various warranted equipment.
- d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- e. Procedure and status of tagging of all equipment covered by extended warranties.
- f. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

### 1.3.2 Performance Bond

The Contractor's Performance Bond shall remain effective throughout the construction period.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

### 1.3.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

### 1.3.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the time frames specified, the Government will perform the work and backcharge the construction warranty payment item established.

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-Electrical

- (1) Power failure
- (2) Security lights

Code 3-Electrical

- (1) Street lights.

Code 1-Gas

- (1) Leaks and breaks.

Code 1-Plumbing

- (1) Leaking water supply pipes.

Code 3-All other work not listed above.

#### 1.3.5 Warranty Tags

At the time of installation, each warranted item shall be tagged with a durable, oil and water resistant tag approved by the Contracting Officer. Each tag shall be attached with a copper wire and shall be sprayed with a silicone waterproof coating. The date of acceptance and the QC signature shall remain blank until project is accepted for beneficial occupancy. The tag shall show the following information.

- a. Type of product/material\_\_\_\_\_.
- b. Model number\_\_\_\_\_.
- c. Serial number\_\_\_\_\_.
- d. Contract number\_\_\_\_\_.
- e. Warranty period\_\_\_\_\_from\_\_\_\_\_to\_\_\_\_\_.
- f. Inspector's signature\_\_\_\_\_.
- g. Construction Contractor\_\_\_\_\_.
- Address\_\_\_\_\_.
- Telephone number\_\_\_\_\_.
- h. Warranty contact\_\_\_\_\_.
- Address\_\_\_\_\_.
- Telephone number\_\_\_\_\_.

i. Warranty response time priority code\_\_\_\_\_.

j. WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.

1.4 MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING

Prior to final inspection and transfer of the completed facility; all reports, statements, certificates, and completed checklists for testing, adjusting, balancing, and commissioning of mechanical systems shall be submitted to and approved by the Contracting Officer as specified in applicable technical specification sections.

1.5 OPERATION AND MAINTENANCE MANUALS

Operation manuals and maintenance manuals shall be submitted as specified. Operation manuals and maintenance manuals provided in a common volume shall be clearly differentiated and shall be separately indexed.

1.6 FINAL CLEANING

The premise shall be left broom clean. Stains, foreign substances, and temporary labels shall be removed from surfaces. Equipment and fixtures shall be cleaned to a sanitary condition. Filters of operating equipment shall be replaced. Debris shall be removed from drainage systems, gutters, and downspouts. Paved areas shall be swept and landscaped areas shall be raked clean. The site shall have waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

Section No.      Title

**DIVISION 2 - SITE WORK**

02001	Construction, General
02111	Clearing, Grubbing and Demolition
02201	Earthwork
02205	Filter Fabric
02270	Erosion Control
02276	Modular Block Wall
02316A	Excavation, Trenching, and Backfilling for Utilities Systems
02600	Storm Sewers
02610	Adjustment of Existing Manholes
02715	Anchors and Drains
02770A	Concrete Sidewalks, Curbs and Gutters
02801	Flagstone
02820	Turf Reinforcing Mat
02921A	Seeding and Mulching
02923	Topsoil Material and Application
02924	Tree Preservation
02930a	Exterior Planting

SECTION 02001

CONSTRUCTION, GENERAL  
08/03

PART 1 GENERAL

1.1 REFERENCES

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

1.2 SUBMITTALS

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

SD-07 Certificates

Plan of Operations; G, RE

Interim Plan; G, RE

1.3 SCOPE

This section outlines general construction requirements. Detailed requirements are specified in subsequent sections.

1.4 PLAN OF OPERATIONS

The work shall be performed in accordance with a Plan of Operations submitted by the Contractor for review, SD-07, GA-RE. See also paragraph: Construction Sequencing, hereinafter. The work shall assure that nonflood period normal channel flows are not impeded at all times unless approved by the Contracting Officer. The Plan shall cover the detailed features of the work and shall be submitted within 60 days after Notice to Proceed. The Contractor shall plan his operations to prevent damage to, or interference with, existing power and underground utility lines, bridges, and roads which cross, parallel, or pass longitudinally along the construction right-of-way. The Plan shall include, but not be limited to: water control, access, haul routes, noise and dust control, disposal plan, temporary stockpiles, traffic control, concrete placement, scheduling of work on

sanitary sewers and water main, and overall sequencing. As work progresses, the Plan shall be modified in writing as necessary to meet field conditions. The Plan and any changes thereto will be reviewed by the Contracting Officer for adherence to the contract. The Contracting Officer may suspend work for Contractor's failure to furnish a Plan of Operations within the specified time.

#### 1.4.1 Interim Plan

An Interim Plan shall be submitted within ten (10) days from Notice to Proceed, SD-07, G-RE. This plan shall describe work to be conducted during the first 60 days. The Plan of Operations shall supersede the Interim Plan if submitted prior to the 60th day.

#### 1.4.2 Working Hours

All work shall be performed between the hours of 6:30 a.m. and 8:00 p.m. There shall be no work performed on Sundays. These restrictions may be relaxed, for performing operations incidental to the required work, such as concrete sawing, when submitted for approval at least 48 hours in advance of the proposed work

#### 1.5 CHANNEL WORK

The geologic profiles shown in the channel work was developed from the test borings provided in the informational drawings as well as bedrock exposures. Geologic boring logs and test report information used in channel design is available at the US Army Corps of Engineers - Kansas City, 601 East 12th Street, Kansas City, Missouri. It remains the responsibility of the bidder to verify actual field conditions.

#### 1.6 CONSTRUCTION WORK AREA LIMITS

The construction work area shall be the composite area defined by the project limits and any temporary easement boundaries.

##### 1.6.1 General

The Contractor will be assigned project work area limits as shown on the drawings. The project limits shown shall be observed unless otherwise approved by the City of Kansas City, Missouri (the City or KCMO), through the Contracting Officer. The Contractor will not have sole access to the assigned work areas, and the use of the area shall be coordinated with the Government for the performance of the required work within these areas. Additional work area required for the performance of this contract shall be subject to the following conditions.

##### 1.6.2 Staging Area

The Contractor will be provided an area adjacent to the channel work for

storing equipment, materials and supplies used for the construction of channel improvements. The location of the staging area is shown in the drawings.

1.6.2.1 Legal Description

Not Applicable

1.6.3 Disposal Areas

Disposal areas are available to the Contractor subject to the limitations stated in SECTION: 02111 CLEARING, GRUBBING AND DEMOLITION.

1.6.4 Area Not Controlled By Government

Should the Contractor make arrangements for utilization of any privately owned areas, he shall obtain a three-party written agreement between the Contractor, the property owner and the City. The Contractor shall relieve the Government of any claims for damages in writing, prior to operating off-site.

1.7 CONSTRUCTION SEQUENCING

1.7.1 General

The utility trench shall be completed no later than 45 days after notice to proceed(or award date of option). (This requirement is to allow the utilities with overhead cables to remove and place them into the utility trench ducts. Early removal of the overhead cables is highly desirable to reduce the risk of construction outages for which the contractor is responsible.) The Contractor shall limit the area under construction to a reach of the channel approved by the Contracting Officer to minimize disruption of the overall project limits. Construction of utilities may be in advance of channel excavation and is not restricted by any predetermined limits. Clearing, grubbing, excavation, and demolition shall not proceed more than 500 feet ahead of the finished channel unless approved by the Contracting officer. Finished channel shall include all required channel modifications, excluding seeding and mulching. The Contractor may continue to use the channel bottom for access and shall remain responsible for its condition during the entire contract. Stockpiling of excavated materials and construction materials shall be minimized and shall be contained within the construction right-of-way, provided adequate safety of the excavated slopes is maintained in all construction areas.

Kansas City Power and Light (KCPL), Time Warner Cable (TWC), Kansas City Missouri Water Services, Kansas City Water & Sewer Department, and other appropriate agencies shall be contacted for coordination and relocation of utility lines adjacent to the channel and other appurtenant structures.

1.7.2 City streets and roads and parking areas

City streets and roads and parking areas within and outside the project limits shall be kept free of dirt, mud, rock, or other materials spilled or

dropped from equipment. Dust shall be controlled by sprinkling water, washing, sweeping, or other methods as approved by the Contracting officer.

In using the roads, the Contractor shall conform to any regulations or weight restrictions required by the City of Kansas City, Missouri, Missouri Department of Transportation, and the weight restrictions in the Special Clauses. Roads shall be repaired to preconstruction conditions. Photographic documentation is optional but recommended to establish pre construction conditions.

1.7.3 Cooperation Between Contractors

Construction work on utility will be under way concurrently with this contract. The obligations of the Contractor under this contract will include jointly planning and scheduling the work, on a cooperative basis, with the other Contractors involved in order to minimize delays and interferences. Contracts to perform the work described hereinafter will be underway concurrently with this contract.

Contracting Agency	Description of Work	Estimated Completion Date or Completion Time
US Army Corps of Engineers, NWK	Const. Brush Ck	November 2004
Kansas City Power And Light	Relocation of OHE	Coordinate KCPL
Mo. Gas Energy	NONE	
Water Services Department	Storm Sewer Relocation	Coordinate with KCMO
Southwestern Bell	NONE	
Time Warner Cable	Relocation of OH cables	Coordinate with TWC
Fiber Optic	Relocation of OH cables	Coordinate with Xspedia

1.7.4 SEQUENCE OF CONSTRUCTION

The plan of operations shall be submitted to detail the proposed sequence of construction. The Contractor shall take into consideration the following limitation while developing the plan of operation.

1.7.4.1 Curb, gutter, street Construction

Provide type III barricades at intersection of Woodland and Swope Parkway.

1.7.4.2 Utilities

All utility work shall be completed in accordance with requirements on the drawings as needed to stage the construction of the channel.

1.7.4.3 Drop Structure Construction

Drop Structure construction shall proceed to allow for adequate drainage of the channel flows without causing excessive erosion or damages to the required structures under normal channel flows. In the event of anticipated flooding of the channel due to extreme wet weather, the contractor shall take action to protect partially completed structures. This action shall be identified in the plan of operation as a Flood Contingency Plan.

1.7.4.4 Utility relocations

1.7.4.5 KCPL, Fiber Optic and TWB work

Contractor shall provide utility conduits for KCPL, SWB, and TWB relocations. KCPL, SWB, and TWB will provide the adjacent manholes, poles, and such. Coordination with these utilities is required so they may run their cables and make connections as soon as possible.

1.8 PERMITS

1.8.1 Highway Permits

The Contractor shall obtain the necessary construction permits Kansas City Traffic Control (Jere Meredith, 816-513-2665), and Missouri Department of Transportation (Vernon Koch, 816-622-0417 or Norman Beeman, 816-622-0413) for work near the Bruce Watkins and Cleaver II roadways.

1.8.2 Other permits

The Contractor shall obtain all other necessary permits for work along Brush Creek, other than the NPDES, 404, and 401 permits.

1.9 TEMPORARY FENCING

The Contractor shall provide fencing around any areas under construction to minimize public access. Fencing shall be as continuous as possible excluding the channel bottom. Daily maintenance of fence is required to repair damage to fence.

1.9.1 Minimum Height

Fence shall have a minimum height of 4 feet.

1.9.2 Fence Fabric

Fence fabric shall consist of high density polyethylene or copolymer. The fabric shall be orange in color, U.V. Stabilized, and have a yield strength of not less than 500 pounds per foot.

1.9.3 Fence Posts

Fence fabric shall be mounted on posts driven not less than 18 inches into the ground and spaced at not more than 15-feet horizontally.

1.9.4 Construction Easement Fence

Where fences must be maintained across the construction easement, gates shall be installed, and kept locked unless in use.

1.9.5 Storage Area Fence

Chain link fencing for storage and work areas may be temporarily installed at contractor expense.

1.10 UTILITIES

1.10.1 General

**Water**, communication, power, storm drainage and sewer lines exist within the construction limits. The approximate location of each is shown on the plans and is the best information available at this time. **Those lines that occur within the excavation limits shall be altered by the Contractor as required.** The Contractor shall notify the appropriate utility companies within 7 days following contract award of construction work over, under, or adjacent to utility services. The Contractor shall organize and conduct a meeting for the purpose of coordinating and scheduling utilities work for the project. The meeting shall be conducted within two (2) weeks of submitting the Contractor's Interim Plan of Operation. The following persons (as applicable) shall be contacted for the meeting, and as necessary when construction work coincides with utilities.

Mike Rukgaber  
KCMO-Traffic  
816-513-2670

Billy L. Courtney  
Manager-Engineering Design  
SBC Southwestern Bell Tele Co.  
5400 Foxridge - Room 500  
Mission Ks. 66202

913-676-0378

Time Warner Cable  
Attn : Artie Pippin - Construction Dept.  
6550 Winchester Ave.  
KC Mo. 64133  
816-358-5360--5613

Xspedia  
Mike Carter  
816-221-0903-22 913-207-6898  
Michael.carter@xspedius.com

Ron Dejarnette  
KCPL  
8619 Prospect Ave.  
K.C. Mo. 64132  
816-276-5540

Call for approval before placing concrete around 6 inch conduits.  
George King (KCPL) 816-898-2214

Call for approval before placing concrete around 6 inch conduits.  
Gary Spandle (KCPL) 816-810-5829

Dig-Rite  
1-800-dig-rite

Dennis McMan  
Manager Parks & Recreation, City of Kansas City, Mo.  
816-513-7625

Michael Herron  
Parks & Recreation Department  
City of Kansas City, Missouri  
6601 Swope Parkway  
Kansas City, Missouri 64106  
(816) 523-5613

Andy Shively  
K.C.MO Water Services  
816-513-2204

C. Ted Turney  
Engineering Services Division  
Water & Pollution Control Depts.  
City of Kansas City, Missouri  
414 East 12th Street  
Kansas City, Missouri 64106  
(816) 274-1755

KCMO Water Services  
513-8000

Storm Water  
Arvin Hayes  
564-8540

Sanitary Sewers  
Arvin Riley  
564-0065

Jim  
Real Estate Department  
Kansas City Power & Light Company  
Post Office Box 679  
Kansas City, Missouri 64141  
(816) 245-3732

Joseph F. Reichert  
Chief of Planning & Scheduling  
Public Works Department  
City of Kansas City, Missouri  
414 East 12th Street  
Kansas City, Missouri 64106  
(816) 274-2069

MoGas Energy - Engineering  
223 Gillis  
KC Mo. 64120  
816-472-3464

#### 1.10.2 Storm Sewer Alterations

All storm sewer and combined sewer outfalls that are affected by channel excavation shall be modified as indicated, and shall be kept open and free-flowing at all times. The Contractor shall verify the exact location of each utility prior to excavation.

#### 1.10.3 Operation of Existing Facilities

Existing utilities or sewers which lie adjacent to and/or to which new sanitary sewers connect shall be kept in continuous operation throughout the construction period. No interruption will be permitted which adversely affects the degree of service provided. Provided permission is obtained from owner in advance, portions of the existing facilities may be taken out of service for short periods corresponding with periods of minimum service demands.

Contractor shall provide temporary facilities and make temporary modifications as necessary to keep the existing facilities in operation during the construction period. Under no circumstances shall sewage be

discharged to any channel or creek.

1.10.4 Gas Line Relocations

None.

1.10.5 Work Along and Across KCPL Easement

The Contractor shall notify KCPL prior to construction in the area of all pole structures and power lines. Notification shall be given to allow sufficient time for a KCPL representative to be present at the jobsite during the period of construction.

Further stipulations are as follows:

- a. The cost incurred to maintain a KCPL inspector on the site, when deemed necessary, and the cost of construction incurred by KCPL for the protection of any power line, such as temporarily relocating anchors, stabilizing structures or otherwise protecting a power line, and the repair of any damages to a power line resulting from work under this contract shall be borne by the Contractor.
- b. Equipment working under KCPL lines shall follow safety rules of clearances as specified in the National Electrical Safety Code and as prescribed by OSHA, in addition to safety requirements herein.
- c. There shall be no stockpiling of dirt or other materials under KCPL lines that would jeopardize normal clearances which are prescribed by the National Electrical Safety Code.
- d. There shall be no open ditches or excavations closer than 10 feet from KCPL distribution or transmission poles.

1.10.6 Temporary Drainage Provisions

Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property. Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to Contractor's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect owner's facilities and the work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

1.10.7 Pollution Control

Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance shall be permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.

1.10.8 Water Line Relocations

Water Lines Relocated by the Contractor are as follows:

NONE.

1.11 STOCKPILES

Stockpiles of materials to be used in construction may be stored within the project limits designated for Contractor use on the drawings. 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 by rubber-tired equipment. Stockpiles of 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. Locations shall be coordinated with the Contracting Officer and the City of Kansas City Missouri. Areas disturbed by construction operations shall be left graded and seeded. Stockpiled material shall be protected from erosion and be above **790** feet elevation.

1.12 HAUL ROADS

1.12.1 General

All haul roads and ramps shall be constructed at no cost to the Government. Upon completion of work, all haul roads and ramps shall be removed, and the area restored to its original condition. The Contractor shall provide all necessary lights, flagmen, signs, barricades and markings at access locations. Dust control shall be such that no dust leaves the site, and adequate to ensure safe operations at all times. Total haul weights shall be restricted to the limits stated in SPECIAL CLAUSES paragraph: Restrictions on Hauling Vehicles. If the Contractor elects to use the channel bottom as a haul route, he shall take adequate precautions to protect the finished channel bottom and underlying rock. Any damage to the finished channel bottom shall be repaired at no expense to the Government. Plans for repairs shall be submitted for approval to the Contracting Officer.

1.12.2 Standards For Haul Roads

The minimum width of maintained traveled surface constructed by the Contractor shall be in accordance with the following formulas and shall provide a 2-ft. minimum shoulder width on each side of the traveled surface. The maximum allowable grade shall be in accordance with EM 385-1-1, Section 30.D. ROADS. Haul road design including grades and widths shall be submitted with the plan of operation.

(a) One-way roads:

For Vehicles up to 12 Feet in Width (W)

Minimum width (in feet) =  $W + 8$

For Vehicles 12 Feet and Over in Width (W)

Minimum width (in feet) =  $W + 12$

(b) Two-way roads:

Minimum width (W) (in feet) =  $2W + 18$

W is the maximum width in feet of the widest construction vehicle normally using the road. Fractional widths of roads shall be rounded to the next larger foot.

1.13 HAULING PERMITS

All necessary permits for hauling shall be the Contractor's responsibility.

1.13.1 Use of Boulevards

The following person shall be contacted regarding the use of roadways under Kansas City Parks, Recreations, and Boulevards jurisdiction.

Mr. Mike Herron  
Parks and Recreation Department  
City of Kansas City, Missouri  
6601 Swope Parkway  
Kansas City, Missouri 64106  
(816) 523-5613

The Contractor shall obtain a special permit from Director of Parks, Recreation and Boulevards which will authorize the applicant to operate or move a vehicle or combination of vehicles of length or weight exceeding the maximum specified in the Code, SD18-FIO-RE. Such a permit will be issued subject to the following conditions:

1.13.1.1 Special Permit

The special permit shall prohibit operation before 6 a.m. and after 6 p.m. and shall be limited to 108 feet maximum total vehicular length, including combination of vehicles, and 80,000 pounds total weight.

1.13.1.2 Protection of Streets, Sidewalks and Boulevard Systems

The Contractor shall protect all streets, sidewalks and Boulevard systems, and shall make all arrangements and necessary repairs at his own expense. Any sidewalks or roadways affected by the construction shall be appropriately signed in accordance with the latest edition of the Manual on Uniform Traffic Control Devices, and its most current revisions. A Street Closure Permit will be required and shall be obtained from the Kansas City, Missouri Public Work Department - Street and Traffic Division prior to start of work.

1.13.1.3 Protection of Trees and Shrubs

The Contractor shall protect at his discretion all trees and shrubs within the route, by fencing, staking or other physical means to prevent damages to the plants. Should damage occur to any of the existing trees and shrubs the Contractor will be required to physically protect the remaining trees and shrubs as directed and it shall be the discretion of the Director of Parks, Recreation, and Boulevards to seek compensation for damages incurred, or replacement of the damaged stock with that of equal or better quality.

1.13.1.4 Protection of Streets and Boulevards

The Contractor shall remove any dirt, earth, rock, sand, shale, debris, rubbish, or other materials deposited, spilled, or dropped on any street in the performance of the work contemplated, and shall restore such street to its former condition to the satisfaction of the Director of Parks, Recreation, and Boulevards immediately after the incident.

1.13.1.5 Use of Other City Streets

The following person shall be contacted regarding the use of roadways under Kansas City Public Works jurisdiction.

Mr. Albert Gandara  
Public Works Department  
City Hall  
Kansas City, Missouri 64106  
(816) 274-2481

1.14 GRAFFITI

The Contractor shall take the necessary steps to minimize vandalism, and shall remove graffiti from retaining walls and other surfaces prior to final acceptance of the project. Incremental acceptance of permanent work shall not relieve the Contractor from this responsibility prior to acceptance of the total work.

1.15 ACCEPTANCE OF THE PUMPBACK AND DRAINAGE SYSTEMS

The systems shall be fully operational before acceptance. Approval and acceptance of the systems shall be based on the performance of the system during operation. All coordination involved to conduct performance tests at each location are the responsibility of the Contractor.

1.16 PAYMENT

Payment shall be in accordance with the bidding schedule. Graffiti protection shall be subsidiary to related Concrete Bid Item.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

-- End of Section --

02111            CLEARING, GRUBBING AND DEMOLITION

A. GENERAL:

1. Scope: This section covers clearing, grubbing, demolition and removal of structures including culverts, (except the storm sewer pipe alterations), bridge abutments, channel rock walls and pavement, complete.

2. General: Clearing, grubbing, and demolition shall only be performed within the construction limits and as necessary for construction of haul roads. Contractor shall, to the maximum extent possible, protect all trees, shrubs, pavements and structures that occur beyond excavation limits.

(a) Existing Channel: The existing channel pavement and masonry stone walls, where required to be removed, shall be broken into pieces whose greatest dimension shall not exceed two feet (24 inches). Care shall be taken not to disturb existing conditions beyond the new construction limits. Concrete pieces shall not have any reinforcement extending more than one inch beyond the surface of the concrete. This material, except reinforcing steel, may be placed in the existing channel as random fill where it is to be abandoned. Placement of random fill in the channel shall be as described in specification section EARTHWORK.

3. Clearing: Clearing shall consist of removal to the ground surface of all trees and stumps, down timber, snags, brush, rubbish, and other obstructions.

4. Grubbing: Grubbing shall consist of removal of all stumps, roots larger than 2 inches in diameter, and matted roots, to a depth not less than 24 inches below finish grade or natural ground, whichever is lower. Grubbing is required for areas disturbed by construction including but not limited to channel work, walks, ramps, pavements, concrete pads, etc.

5. Demolition: Demolition shall include, but not be limited to, items such as existing pavements (including rock walls), fences, retaining walls, paved slope protection, drainage structures, pipes, bridge piers and abutments and other subsurface structures. Existing channel pavement and other structures may require pneumatic rams, demolition balls, rippers or non-explosive demolition agents. Subsurface demolition shall extend to a minimum of 2 feet below final

grade. : Blasting is not permitted

B. DISPOSAL. All cleared and grubbed wood materials and concrete and stone rubble shall be disposed of in a permitted sanitary landfill or disposed of for some useful purpose at the Contractor's option. Disposal of material by burning will not be permitted. On site disposal is limited to rock, concrete (without reinforcing steel extending beyond 1 inch), asphalt. Such material shall be covered by at least 18 inches of clean fill unless used as noted in paragraph 5 above.

C. MEASUREMENT AND PAYMENT: Clearing, Grubbing and Demolition shall be paid as designated below and not included in contract quantities as channel excavation. Hauling and disposal shall be subsidiary costs to this work.

<u>Item</u>	<u>Unit</u>
"Clearing and Grubbing"	lump sum
"Demolition, General"	lump sum

\* \* \* \* \*

02201      EARTHWORK

## A. GENERAL:

1. Related Documents: Drawings and general provisions of the Contract, including General Conditions and Division-1 specification sections, apply to work specified in this section.

## AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM C 33-01	(1999) Concrete Aggregate
ASTM D 422	(1998) Particle-Size Analysis of Soils
ASTM D 698	(1998) Laboratory Compaction Soils Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. )
ASTM D 1140	(1997) Amount of Materials in Soils Finer than the No. 200
ASTM D 1556	(1996) Density and unit weight of Soil in Place by the Sand-Cone Method
ASTM D 2167	(1994) Density and unit weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(1992) Classification of Soils for Engineering Purposes (Unified Soil Classification)
ASTM D 2922	(1996) Density of Soil-Aggregate in Place by the Nuclear Density Method
ASTM D 3017	(1996) Density of Soil and Rock in Place by the Nuclear Methods (Shallow Depth)
ASTM D 4253	(1996) Maximum Index Density and Unit Weight of Soils Using a Vibratory

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Table

ASTM D 4254	(1996) Minimum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D 4318	(1998) Liquid Limit, plastic Limit, and Plasticity of Soils
ASTM D 4643	(1993) Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
ASTM D 5195	(1996) Density of Soil and Rock in Place Below the Surface by Nuclear Methods

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements
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2. General: The work covered by this section consists of rock excavation, common excavation, and the placing and compacting of suitable materials obtained from required excavation and approved sources for utilization in the construction of backfill.

B. EXCAVATION:

1. Common Excavation: Common excavation includes all material removed to form the channel banks and floor as well as the sidewalks and ramps that meets the definition. Common excavation shall consist of the removal and disposition of all materials between the top of existing ground and the final excavation limits or top of hard rock, as defined below. These materials consist of topsoil, clay, silt, sand, gravel, loose rock and shale. Prior to beginning channel excavation, the Contractor shall cross section the area of work. Quantities for channel excavation payment shall be computed using the initial cross section data compared with a cross section taken after excavation to final limits or top of hard rock has been made.

2. Rock Excavation: Rock excavation is defined as all material below the top of hard bedrock, which is defined as a limestone. Excavation shall consist of the removal and disposition of all materials between the top of the hard bedrock and the final excavation limits. These materials consist of limestone, shale, siltstone and sandstone. Prior to beginning rock excavation, the Contractor shall cross section the area of work. Quantities for rock excavation payment shall be computed using the initial cross section data compared with a cross section taken after excavation to final limits has been made.

3. Excavation of Rock:

(a) Excavation Methods: The Contractor shall submit an excavation plan to the Contracting Officer at least two weeks prior to beginning any excavation, SD09GA-RE. The Contractor may generally use any conventional method or equipment for rock excavation provided that they are acceptable to the Contracting Officer. It is anticipated that all shales can be excavated using conventional earth moving equipment, although reaches exist which may require rippers. Concrete slabs and other structures may also require pneumatic rams, demolition balls, rippers or non-explosive demolition agents.

(b) Sensitive Excavation Areas: Certain areas, regardless of the method of excavation, will require the Contractor to take added precautions to prevent damage to existing structures. Specific attention is directed to existing channel walls, sidewalks and slope protection at the upstream end of the work, utilities, and any other structures which could be damaged by excessive vibrations or dislodged foundation rock caused by excavation. The Contractor shall bear full responsibility for any and all damages caused by excavation and shall restore any damaged structure to a condition, which is equivalent to the original and acceptable to the Contracting Officer.

(c) Shales - General: Shales in the project area are soft and subject to incising by water and/or rutting by construction equipment. The Contractor shall include plans for shale protection in his excavation plan. Shales, which become unsuitable for paving foundations or other concrete placement because of protection failure, shall be removed and replaced with concrete fill at Contractor expense.

(d) Shales - Hushpuckney Shale: The Hushpuckney Shale occurs immediately below the Bethany Falls Limestone in which much of the channel work will be excavated. This shale has high swell potential and measures must be taken to limit swell promoting conditions. Hushpuckney Shale exposed by excavation for channel walls or channel floor shall be immediately isolated from air exposure by inundation with water or placement of fill concrete. Excavation for the pump well requires exposure of the

Hushpuckney Shale. The excavation limits shall provide for a minimum of 2-feet thickness of specified backfill between the pump well walls and the exposed Hushpuckney Shale in the excavation wall.

(e) Scaling: Scaling of all excavated surfaces, regardless of the method used, will be required throughout the life of this contract. Scaling shall be done so that surfaces are free of loose or unstable rock.

4. Lines, Grades, and Tolerances:

(a) Overburden: Final grades shall conform to the minimum lines and grades shown on the drawings. A tolerance of plus or minus six inches will be permitted on overburden final grades.

(b) Rock: The excavation limits established on the drawings are minimum neat lines for backfill and no payment will be made for excavation beyond these established limits.

(c) Minimum excavation limits for backfill are further defined by lines, control points, and elevations on plan and profile drawings which delineate final configurations of walls, channel paving and other structures. Additional backfill required because of over excavation shall be furnished by the Contractor at no additional cost to the Government.

(d) Excavated bedrock surfaces against which concrete is to be placed will be classified as special surfaces. All vertical special surfaces shall be machine sawed, pre-split, or line drilled. No rock shall project or extend beyond the special surface excavation limits into the area to be covered with concrete.

(e) Vertical special surface tolerances shall be six inches beyond the minimum neat lines, however no additional payment will be made for either excess rock excavation or for additional concrete required to complete the structure to conform to the final finished design lines. If over breakage/ over excavation in excess of six inches occurs on vertical special surfaces, the contractor shall, at his expense, reform a surface with concrete fill against which to place the required structure. Such surfaces shall conform to the excavation lines and grades shown for the original rock faces replaced. Verification of final lines shall be made by measuring from the front of concrete forms to the face of the excavated rock walls.

(f) Horizontal special surfaces, which support concrete structures such as the channel paving, dams, walls, etc., shall be excavated to the depths shown on the drawings.

Unsatisfactory material removed below indicated depths at the direction of the Contracting Officer will be considered channel excavation and will be paid for accordingly. Satisfactory material removed below the depths shown without specific authorization or direction from the Contracting Officer shall be replaced by increasing the thickness of the concrete structure at no additional cost to the Government.

5. Foundation Preparation: All rock against which concrete is to be placed shall be prepared to the satisfaction of the Contracting Officer. Such rock surfaces shall be prepared by picking, barring, wedging, or other similar methods which will leave the rock in the best possible condition to bond with concrete. The rock surfaces, including joints or seams encountered, shall be cleaned of all loose or decomposed rock, earth, sand, clay or other objectionable materials by the use of picks, shovels, or similar tools if necessary, and by the use of high velocity air-water jets or other means approved to the Contracting Officer. Any rock foundation preparation method that results in erosion, degradation, or other damage to the rock foundation shall be adjusted to achieve the desired result or discontinued and another approved method used. Exposed shale surfaces against which concrete is to be placed must be protected to prevent desiccation and slaking and/or rutting by vehicles or water flow. The Contractor shall provide for this protection by means of vapor barriers such as RC 500, material such as burlap or visqueen, compacted earth, or any other acceptable method, which will preserve the exposed shale. Payment for shale protection shall be incidental to the applicable structural work item.

(a) Preparation of foundations on soil. At all locations where walls will be founded on native soil or fill, the soil foundation shall be compacted to a minimum depth of twelve inches below the elevation to receive coarse filter material. Compaction of the soil foundation shall be to a minimum of 95 percent Standard Proctor Density at plus (+) or minus (-) 3% of optimum water content as defined in the Standard Proctor Density Test (ASTM D-698).

6. Disposal of Excess Excavation: The Contractor shall be responsible for proper disposal of excess excavated material not used as "Earth Fill or Impervious Fill".

#### C. BACKFILL:

##### 1. Backfill for Channel Retaining Walls and Channel Slopes:

(a) Earth fill to be used for the channel retaining walls or channel slopes shall consist of suitable material. It shall be free of plant growth, roots, and humus. The

random fill shall contain no individual rocks or pieces of rubble with a maximum dimension of nine inches or three-fourths the lift thickness, whichever is smaller. Random fill shall be dumped or spread in successive horizontal layers of loose material not more than 6 inches in depth where hand operated compactors are used and 12 inches in depth elsewhere. This material, except for random fill under walls or other structural concrete features shall be compacted to a minimum of 90 percent Standard Proctor Density as determined by ASTM D 698 within the tolerance of the moisture for the type of material at ninety percent of maximum density as shown on the moisture density curve obtained. Random fill on which structural concrete features will be constructed shall be compacted to a minimum of 92 percent and a maximum of 98 percent Standard Proctor Density at 0 to 4 percent wet of optimum moisture content in accordance with ASTM D 698.

(b) Impervious fill to be used at the drop structure shall consist of CL and CH materials with a liquid limit not greater than 60. It shall be free of plant growth, roots, and humus. The impervious fill shall contain no individual rocks or pieces of rubble with a maximum dimension exceeding 3 inches. The impervious fill shall be dumped or spread in successive horizontal layers of loose material not more than 6 inches in depth where hand operated compactors are used and 9 inches in depth elsewhere. The material shall be compacted to a minimum of 95 percent Standard Proctor Density at plus (+) or minus (-) 3% of optimum water content as defined in the Standard Proctor Density Test (ASTM D-698).

(c) Pervious fill to be used as backfill for the channel retaining walls shall be obtained from approved off site sources on the Missouri or Kansas Rivers. It shall be clean, free-draining, durable, siliceous, natural sand free of clay-balls and within the following gradation ranges as determined by washing over the specified sieves.

<u>Sieve size</u>	<u>Percent by weight passing</u>
3/4 inch	100
No. 4	90 - 100
No. 16	55 - 85
No. 50	5 - 20
No. 200	0 - 5

Pervious fill shall be placed in layers not more than 6 inches in depth. The material shall be essentially saturated and then compacted to a relative density of not less than 50 percent and not greater than 75 percent. Maximum and minimum densities shall be determined by ASTM D 4253 and D 4254.

(d) Coarse filter to be used as backfill for the channel retaining walls, under the drop structure paving, and drain material for the slope paving shall be crushed Bethany Falls limestone, ASTM size number 7, meeting the grading and quality requirements of ASTM C 33, except that the LA abrasion loss shall not exceed 40.

(1) Compaction for wall backfill. The coarse filter material shall be placed and compacted such that the top surface is even with or slightly above the adjacent pervious. The material shall be placed in layers not more than 9 inches in depth and compacted with two passes of a vibratory plate meeting the requirements of paragraph C.2(a)(1).

(2) Compaction for wall foundations. When required for wall foundation material, coarse filter shall be placed in layers not more than 6 inches in depth. The material shall be compacted with three passes of a vibratory roller meeting the requirements of paragraph C.2(a)(3).

(e) At the Contractor's discretion, pervious may be replaced by coarse filter as wall backfill material. If the Contractor chooses this option, filter fabric shall be required between the coarse filter and existing overburden material and earth fill.

(f) Topsoil shall be placed in accordance with the lines and grades shown on the drawings for channel construction and shall comply with specification section TOPSOIL MATERIAL AND APPLICATION. All disturbed areas within the channel construction receiving topsoil or otherwise disturbed by the Contractor's activities shall be seeded in accordance with section SEEDING AND MULCHING except those areas designated for sodding.

## 2. Backfilling Around Structures:

(a) General: Backfill shall not be placed against concrete walls prior to the in-place concrete reaching the specified 28-day strength. As far as practical, backfill shall be brought up evenly on both sides of the retaining walls. Heavy equipment, producing an equivalent surcharge of greater than 360 psf, shall not be operated closer to any concrete structure than a distance equal to the height of the backfill above the top of the footing. The area remaining shall be compacted with compaction equipment meeting the following requirements:

(1) Vibratory Plates: Vibratory plates shall be limited to hand-operated equipment. The static weight shall not exceed 750 pounds. Contact pressure is

defined as the static weight plus dynamic force divided by the plate area, and shall not exceed 10 pounds per square inch.

(2) Rammer/Impact Equipment: Rammer plates, tampers or other impact type equipment shall be limited to hand-operated equipment. The static weight shall not exceed 250 pounds. Contact pressure is defined as the static weight plus dynamic force divided by the plate area, and shall not exceed 20 pounds per square inch.

(3) Rollers: Rollers shall include smooth drum or tamping type, and may be either self propelled or pull-type. Pulling equipment shall meet the surcharge restrictions as stated above. Weight per linear foot of the roller shall be defined as the static weight plus dynamic force divided by the roller width, and shall not exceed 1500 pounds per linear foot.

3. Testing: Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Contracting Officer. Field in-place density shall be determined at locations selected by the Field Inspector. Field in-place density testing shall be in accordance with ASTM D 1556 or D 2922 and shall be performed as outlined below:

<u>Material</u>	<u>One In-Place Density Test Per:</u>	<u>Accompanying Laboratory Test</u>
Foundation on Soil	50 lin. ft. of wall	ASTM D 698 for each type of material.
Random Fill	500 cu. yds.	ASTM D 698 for each type of material.
Impervious Fill	500 cu. yds.	ASTM D 698 for each type of material.
Pervious	1,000 cu. yds.	ASTM D 422, D 4253, and D 4254 for each in-place test.
Coarse Filter	None	ASTM D 422 for each 200 cubic yards.

When test results indicate that material is not as specified, the material shall be removed, replaced, and recompacted to meet specification requirements.

D. MEASUREMENT:

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1. Common excavation shall be measured by surveyed cross sections taken before and after the required excavation has been completed. Initial cross sections for excavation quantities will be taken following demolition and removal of channel paving. Top of rock shall be defined on the cross sections for defining limits of lines, grades, and tolerances.

2. No measurement will be made to determine the quantities of materials used for the required shoring.

3. Top soil shall be measured to the lines and grades shown in the drawings.

4. No measurement will be made to determine the quantities of structural excavation.

F. PAYMENT:

1. Payment for topsoil shall be made at the contract unit price per cubic yard for Top Soil as listed in the proposal. Such payment and price shall constitute the full compensation for all labor, equipment and materials and for the performance of all work necessary to complete the item.

2. Payment for Common and Rock Excavation shall be made at the contract unit price per cubic yard as listed in the proposal. Such payment and price shall constitute the full compensation for all labor, equipment and materials and for the performance of all work necessary to complete the item.

3. Payment shall be made for earth fill, pervious fill, coarse filter and impervious fill at the contract unit price per cubic yard as listed in the proposal. Such payment and price shall constitute the full compensation for all labor, equipment and materials and for the performance of all work necessary to complete the item.

<u>Item</u>	<u>Unit</u>
Top Soil	Cu. Yd.
Common Excavation	Cu. Yd.
Rock Excavation	Cu. Yd.
Impervious Fill	Cu. Yd.
Earth Fill	Cu. Yd.

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Pervious Fill  
Coarse Filter

Cu. Yd.  
Cu. Yd.

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02205      FILTER FABRIC

A. GENERAL: This section covers filter fabric to be used at various locations within the channel work for this project.

B. MATERIALS:

1. Filter Fabric: Filter fabric shall be a nonwoven pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall consist of a long chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, amide, or vinylidene-chloride. The geotextile shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the filaments inert to commonly encountered chemicals, and hydrocarbons and resistant to mildew, rot exposure ultraviolet or infrared radiation, insects and rodents. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile. The geotextile shall conform to the criteria presented in Table 1, and these requirements shall be based on the Minimum Average Roll Value (MARV) which is defined as the value that can be expected, with 95 percent confidence, to be the minimum test average obtained on a roll sampled and tested in accordance with ASTM D 4759.

Table 1 - Physical Requirements

<u>Physical Property</u>	<u>Test Procedure</u>	<u>Min. Acceptance Criteria</u>
Grab Strength	ASTM D 4632	200 lbs
Puncture Strength	ASTM D 3787	80 lbs
Burst Strength	ASTM D 3786	260 psi
Trapezoidal Shear Strength	ASTM D 4533	75 lbs
Apparent Opening Size (AOS)	ASTM D 4751	between 70 & 100 inclusive

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(a) **Seams:** The seams of the nonwoven filter fabric 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 filter fabric shall be attached at the factory or another approved location. Seams shall be tested in accordance with method ASTM D 1683, using 1 inch square jaws and 12 inches per minute constant rate of transverse. The strengths shall be not less than 90 percent of the required tensile strength (Table 1) of the unaged fabric in any principle direction.

(b) **Shipment and Storage:** During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees F, mud, dust and debris. To the extent possible, the filter fabric shall be maintained wrapped in a heavy duty protective covering. Each roll of filter fabric in the shipment shall be labeled with a number or symbol to identify the production run.

(c) **Submittals:** Manufacture's certificate shall be submitted to the Engineer for approval.

2. **Ground Fastening System:** Pins shall be either polyethylene or metal, and shall be a minimum of 3/16th of an inch in diameter and 12 inches in length. A flat washer shall be used with the pin, and shall be a minimum of 1 1/2 inches in diameter.

### C. INSTALLATION:

1. **General:** Installation shall be as per manufacturer's recommendation, and as follows. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

2. **Wrapped Wall Drains:** Where pervious is used adjacent to the slotted pipe screen wall drain, the slotted pipe screen shall be wrapped with filter fabric. The filter fabric shall be overlapped around the drain a minimum of 1.5 inches, and shall be fastened to the slotted pipe screen by the use of at least three equally spaced copper wire ties. Care shall be taken so that no openings or gaps occur in the wrapped filter fabric that would allow the migration of pervious through the slotted screen. A prefabricated "sock" meeting the above criteria is also acceptable.

3. **Optional Use:** If the Contractor elects to use coarse filter in lieu of pervious as wall

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backfill, filter fabric shall be used to separate the coarse filter from the existing excavated slope. The surface to receive fabric shall be prepared to a relatively smooth condition free of obstruction, depression, debris, and soft or low density pockets of material. The fabric shall be laid smooth and free of tension, stress, folds, wrinkles or creases. The strips shall be placed to provide a minimum width of 12 inches of overlap for each joint. Ground fastening pins with washers shall be inserted through both strips of overlapped fabric at not greater than 2 foot intervals along a line through the midpoint of the overlap. Additional pins, regardless of location, shall be installed as necessary to prevent slippage of the filter fabric. Each ground fastening pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation. The fabric shall be protected at all times during construction from contamination by surface runoff and any fabric so contaminated shall be removed and replaced with uncontaminated fabric. Any damage to the fabric during its installation or during coarse filter placement shall require replacement of the damaged fabric by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the fabric with stone is accomplished within 7 days after placement of fabric. Failure to comply shall require replacement of fabric. Before placement of coarse filter, the Contractor shall demonstrate that the placement technique will prevent damage to the fabric.

D. PAYMENT: No additional payment shall be made for Filter Fabric. It shall be considered incidental to other contract bid items.

02270            EROSION CONTROL

A.            General: The Contractor shall provide erosion control for all areas disturbed during construction. The City has prepared a set of guidelines and procedures for controlling erosion entitled “Erosion and Sediment Control Specification” official document number 940108 adopted March 18, 1994. This document is available for purchase at the permit counter on the 18th Floor of City Hall, for \$6.00 per copy. The Contractor is to assume that the work is to be done under the City’s General Permit. The Contractor does not need to make separate application with the Missouri Department of Natural Resources.

B.            Erosion Control Plan: The Contractor shall prepare an erosion control plan which shall be presented to the Contracting Officer, SD07-GA-RE. This plan shall, as a minimum, indicate the location and types of erosion control measures to be utilized throughout the project.

The prime Contractor is responsible and obligated for adding additional erosion control measures as needed if unforeseen erosion problems arise or if submitted plan does not function as intended. The requirements of the plan shall be the prime Contractor’s responsibility until the plan is properly completed, modified or voided.

The prime Contractor who is awarded the contract has the responsibility of adding additional erosion control measures as needed if unforeseen erosion problems arise or if the submitted plan does not function as intended. The requirements of the plan shall be the prime Contractor’s responsibility until the plan is properly completed, modified or voided.

C.            Direct payment for work covered by this section will not be made.

Graded Berms are to be considered subsidiary to other items in the Proposal, and they are only to be placed at the threat of forecasted or anticipated precipitation.

D.            See pages 00270-2 through 00270-4 of the project manual for details of the “Straw Bale Fence”, “Silt Fence”, and “Berm”.

02276    MODULAR BLOCK WALL

A. GENERAL

1. Scope: The work covered by this section consists of furnishing and installing a modular block retaining wall with a soil reinforcing system, and the construction of a leveling pad for the facing units. Included are the provision of modular units; soil reinforcement, specialty fill materials (as required); backfill to the lines and grades shown on the contract drawings; and all appurtenant items required for the construction of the retaining wall system.

(a) Contractor shall submit construction drawings and design calculations for the retaining wall system prepared and stamped by a professional Engineer in the state of Missouri. Design, techniques and material evaluations shall be in accordance with the NCMA design manual and other documents stated below, SD01-GA-EC, SD04-GA-EC.

(b) Work includes furnishing and installing modular block wall (MBW) units to the lines and grades designated on the construction drawings or as directed by the Contracting Officer.

(c) Work includes preparing foundation soil, furnishing and installing leveling pad, unit drainage fill and backfill to the lines and grades shown on the construction drawings or as directed by the Contracting Officer.

(d) Work includes furnishing and installing geogrid soil reinforcement. The type, size, location, and lengths shall be determined by the contractor and submitted with the construction drawings and design calculations for the retaining wall system. Geogrid soil reinforcement shall be used on any wall 3 feet or higher, at a minimum.

2. Related Sections

(a) Section 02246 - Geosynthetic Wall Reinforcement

(b) Section 02712 - Drainage Aggregate

3. Reference Standards

(a) American Society for Testing and Materials (ASTM)

1. ASTM C 33 - Concrete Aggregates
2. ASTM C 90 - Load Bearing Concrete Masonry Units
3. ASTM C 140 - Sampling and Testing Concrete Masonry Units

4. ASTM C 145 – Solid Load-Bearing Concrete Masonry Units
5. ASTM C 150 – Portland Cement

(b) National Concrete Masonry Association (NCMA)

1. NCMA TEK 50A - Specifications for Segmental Retaining Wall Units
2. NCMA SRWU 1 - Determination of Connection Strength between Segmental Concrete Units
3. NCMA SRWU-2- Determination of Shear Strength between Segmental Concrete Units
4. NCMA Design Manual for Segmental Retaining Walls

( c ) Geosynthetic Research Institute (GRI)

1. GRI-GG1 Geogrid Rib Tensile Strength
2. GRI-GG2 Geogrid Junction Strength
3. GRI-GG3 Tension Creep Testing of Geogrids
4. GRI-GG4 Determination of Long Tern Design Strength of Geogrids
5. GRI-GG5 Determination of Geogrid (soil) Pullout

(d) Where specifications and reference documents conflict, the Contracting Officer shall make the final determination of applicable document.

4. Certification: The Contractor shall submit a notarized manufacturer's certification prior to start of work stating that the MBW units meet the requirements of this specification, SD13-FIO-RE.

5. Quality Assurance

(a) Contractor shall check the materials upon delivery to assure that specified type, grade, color and texture of MBW unit has been received.

(b) Contractor shall prevent excessive mud, wet concrete, epoxies, and like materials which may affix themselves from coming in contact with the materials.

( c ) Contractor shall protect the materials from damage. Damaged material shall not be incorporated into the reinforced soil wall.

(d) Contractor shall submit a list of five (5) previously constructed projects of similar size and magnitude by the wall installer where the specific retaining wall system has been constructed successfully. Contact names and telephone numbers shall be listed for each project.

## 6. Submittals

(a) Experience : The work shall be accomplished by a Contractor experienced in, and employing, personnel experienced in this type of work. The Contractor completing the installation shall submit to the Contracting Officer for approval documentation substantiating a minimum of 3 years experience of similar construction. The Contractor shall furnish records of past successful experience in performing this type of work in similar type soil conditions, SD04-FIO-RE.

(b) Samples : the Contractor shall supply two samples of the modular concrete units proposed for this construction, and four 12" by 12" samples of the proposed soil reinforcement material for the review of the Contracting Officer (SD14-GA).

(c) Manufacturer's certification: certified manufacturer's test report shall be provided to verify that all materials and components of the wall system are in compliance with the applicable specification (SD13-GA).

## B. PRODUCTS

### 1. Modular Block Wall Units

(a) MBW units shall be machine formed concrete blocks specifically designed for retaining wall applications.

(b) MBW units shall meet the following architectural requirements:

1. Finish of units shall be split-faced.
2. Unit faces shall be of beveled geometry.
3. Units shall be erected with a running configuration.
4. All units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or significantly impair the strength or permanence of the construction. Cracking or excessive chipping can be grounds for rejection.
5. Color shall be concrete grey.

(c) MBW units shall meet the following structural requirements:

1. Concrete used to manufacture MBW units shall have a minimum 28 day compressive strength of 4000 psi in accordance with ASTM C 90. The concrete shall have adequate freeze/thaw protection with a maximum moisture absorption rate, by weight, of 7%.
2. Units shall be positively interlocked to provide a minimum shear capacity  $A_u$  2400 lb/ft and  $\lambda_u = 17.4$  as tested in accordance with NCMA SRWU-1.
3. Units shall provide a minimum connection strength between it and the geosynthetic reinforcement of  $a_{cs} = 720$  lb/ft and  $\lambda_{cs} = 39.6$  degrees as tested in accordance with NCMA SRWU-2, if required.

4. MBW units molded dimensions shall not differ more than  $\pm 1/16$  inch.

(d) MBW units shall meet the following constructability and geometric requirements:

1. Units shall be capable of attaining concave and convex curves.
2. Units shall be positively engaged to the unit below so as to provide a minimum of  $3/32$  inch horizontal setback per vertical foot of wall height.
3. Units shall be positively engaged to the unit below so as to provide a maximum of  $1/2$  inch horizontal setback per vertical foot of wall height.

(e) MBW units shall be one of the following approved manufacturers:

1. Keystone Retaining Wall Systems
2. Versa-Lok Retaining Wall Systems
3. Rockwood Retaining Wall Systems
4. Allan Block Retaining Wall Systems

## 2. Shear Connectors

(a) Shear connectors shall be  $1/2$  inch diameter thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods or equivalent to provide connection between vertically and horizontally adjacent units. Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to + 100 degrees F.

(b) Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.

## 3. Leveling Pad and Unit Fill Material

(a) Leveling Pad shall be constructed in accordance with SECTION: CAST-IN-PLACE CONCRETE and details shown on the contract drawings. The compressive strength of the concrete for the leveling pads shall be 4000 psi.

(b) Fill for units shall be free draining gravel or drainage fill.

(c) Do not run mechanical vibrating plate compactors on top of the units. Compact unit fill by running hand-operated compaction equipment just behind the unit. Compact to minimum 95% standard Proctor density (ASTM D 698)

## 4. Drainage Aggregate

(a) Drainage layer material shall be  $3/4$ " clean, angular crushed rock.

(b) Vertical drainage layer behind the wall face shall extend the entire geogrid length. In walls less than 3 feet in height where geogrid is not used, one cubic foot, minimum, of drainage fill shall be used for each square foot of wall face. Drainage fill shall be placed within cores of, between, and behind units to meet this requirement.

(c) Contractor shall submit reinforced fill sample and laboratory test results to the Contracting Officer for approval prior to the use of any proposed reinforced fill material.

#### 5. Infill Soil

(a) The infill soil and drainage aggregate are the same for this wall.

(b) The infill soil shall be free of debris and organic material and consist of ¾" crushed rock. The maximum particle size shall be 4 inches. There shall be less than 20% by weight of particles greater than 1 ½ inches maximum, 5% by weight passing the #200 sieve and PI < 20.

(c) The infill soil shall be compacted in a maximum of 8 inch lifts to the following minimum densities (percentage of the maximum standard Proctor) (ASTM D 698): i) fine grained (ML-CL, SC, SM) soils to a minimum of 95%; and ii) coarse grained (GP, GW, SW, SP) soils to a minimum of 98%.

#### 6. Geogrid Soil Reinforcement

(a) Geosynthetic reinforcement shall consist of geogrids manufactured specifically for soil reinforcement applications and shall be manufactured from high tenacity polyester yarn or high density polyethylene. Polyester geogrid shall be knitted from high tenacity polyester filament yarn with a molecular weight exceeding 25,000 Meg/m and a carboxyl end group values less than 30. Polyester geogrid shall be coated with an impregnated PVC coating that resists peeling, cracking, and stripping.

(b)  $T_a$ , Long Term Allowable Tensile Design Load, of the geogrid material shall be determined as follows:

$$T_a = T_{ult} / (RF_{cr} * RF_d * RF_{id} * FS)$$

$T_a$  shall be evaluated based on a 75 year design life.

##### 1. $T_{ult}$ , Short Term Ultimate Tensile Strength

$T_{ult}$  is based on the minimum average roll values (MARV)

##### 2. $RF_{cr}$ , Reduction Factor for Long Term Tension Creep

$RF_{cr}$  shall be determined from 10,000 hour creep testing performed in accordance with ASTM D5262. Reduction value = 1.60 minimum.

3. RFd, Reduction Factor for Durability

RFd shall be determined from polymer specific durability testing covering the range of expected soil environments. RFd = 1.10 minimum.

4. RFid, Reduction Factor for Installation Damage

RFid shall be determined from product specific construction damage testing performed in accordance with GRI-GG4. Test results shall be provided for each product to be used with project specific or more severe soil type. RFid = 1.10 minimum.

5. FS, Overall Design Factor of Safety

FS shall be 1.5 unless otherwise noted for the maximum allowable working stress calculation.

(c) The maximum design tensile load of the geogrid shall not exceed the laboratory tested ultimate strength of the geogrid/facing unit connection as limited by the "Hinge Height" divided by a factor of safety of 1.5. The connection strength testing and computation procedures shall be in accordance with NCMA SRWU-1 Test Method for Determining Connection Strength of SRW.

(d) Soil Interaction Coefficient, Ci

Ci values shall be determined per GRI:GG5 at a maximum 0.75 inch displacement.

(e) Manufacturing Quality Control

The geogrid manufacturer shall have a manufacturing quality control program that includes QC testing by an independent laboratory. The QC testing shall include:

Tensile Strength Testing

Melt Flow Index (HDPE)

Molecular Weight (Polyester)

(f) Soil reinforcement material shall be resistant to ultraviolet radiation, biological degradation, naturally encountered chemicals, alkalies, and acids. Soil reinforcement material shall meet the minimum material properties consistent with those required by modular wall supplier for reinforcement of the earth retained by the wall.

7. Common Backfill

(a) Soil placed behind the infill can be any inorganic soil with a liquid limit less than 50 and plasticity index less than 30, or existing soil on site.

(b) Backfill shall be compacted to a minimum 90% of maximum standard Proctor density (ASTM D 698).

## C. EXECUTION

### 1. Excavation

(a) Contractor shall excavate to the lines and grades shown on the project grading plans. Contractor shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted infill material, or as directed by the Contracting Officer, at the Contractor's expense.

(b) Contracting Officer will inspect the excavation and approve prior to placement of bearing pad material.

(c) Excavation of deleterious soils and replacement with compacted infill material, as directed by the Engineer, will be paid for at the contract unit prices.

(d) Over-excavated areas in front of wall face shall be filled with compacted existing soil at the Contractor's expense, or as directed by the Contracting Officer.

(e) Contractor shall verify location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

(f) Contractor shall notify Contracting Officer if existing wall is exposed for verification of assumed conditions.

### 2. Leveling Pad Construction

(a) Leveling pad shall be placed as shown on the construction drawings with a minimum thickness of 6 inches.

(b) Foundation soil shall be proof rolled and compacted to 95% of standard Proctor density and inspected by the Contracting Officer prior to placement of leveling pad materials.

(c) Leveling pad shall be prepared to insure intimate contact of retaining wall unit with pad.

### 3. Modular Block Unit Installation

(a) First course of MBW units shall be placed on the leveling pad. The units shall be checked for level and alignment. The first course is the most important to insure accurate and acceptable results.

(b) Insure that units are in full contact with base.

(c) Units are placed side by side for full length of straight wall alignment. Alignment may be done by means of a string line or offset from base line to a molded finished face of the MBW unit. Adjust unit spacing for curved sections according to manufacturer's recommendation.

(d) Install shear connectors (if applicable).

(e) Place unit fill (if applicable).

(f) Place and compact fill behind and within units.

(g) Place geogrid soil reinforcement (if applicable).

(h) Clean all excess debris from top of units and install next course. Ensure each course is completely filled prior to proceeding to next course.

(i) Lay each successive course ensuring that shear connectors are engaged.

(j) Repeat procedures to the extent of the wall height.

(k) Upper most row of MBW units or caps shall be glued to underlying units with an adhesive, as recommended by the manufacturer.

#### 4. Delivery, Storage and Handling:

(a) General : The Contractor shall check all materials upon delivery along with accompanying product certification before accepting delivery.

(b) Storage: All components shall be properly stored on wooden risers, or other approved methods to avoid contact with mud or deleterious materials which could damage the components.

(c) Soil Reinforcement Material: Soil reinforcement material shall be stored above -20 degrees F. Rolled Soil reinforcement material may be laid flat and stored outside for a maximum period of 30 days. For extended storage, soil reinforcement material shall be stored in an enclosure or covered with tarpaulin to prevent long-term exposure.

#### 5. Measurement And Payment

(a) deleted

(b) Payment for modular wall will be made at the contract lump sum amount for "modular wall", which price shall constitute full compensation for furnishing all plant, labor, materials and equipment required to construct the wall, complete, to the lines and grades shown on the contract

drawings. Included in the contract price shall be any required excavation, level pads, the wall units, reinforced geogrid, drainage pad, and incidentals.

( c ) deleted

6. Bidding Schedule Item applicable to the work covered in this section are as follows :

<u>Item</u>	<u>Unit</u>
“Modular Wall”	<u>lump sum</u>

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SECTION 02316A

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS  
06/03

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(1994; R 2001) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(2001) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2001) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 MEASUREMENT AND PAYMENT

Measurement and payment shall be based on completed work performed in accordance with the drawings and specifications. Refer to Bid schedule.

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 SUBMITTALS

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

SD-06 Test Reports

Field Density Tests; EC  
Testing of Backfill Materials; EC

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 shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, CH, MH.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, 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 of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials shall include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM shall be identified as cohesionless only when the fines are nonplastic.

2.1.4 Rock

Rock is defined in SECTION 02201 - EARTHWORK

2.1.5 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 6 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.6 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

2.1.7 Select Granular Material

Select granular material shall consist 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 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 1 inch inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.8 Initial Backfill Material

Initial Backfill Material shall consist of select granular material or satisfactory materials free from rocks 1 inch inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 1/2" inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

2.2 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

2.3 Detection Wire For Non-Metalic Piping

Detection wire shall be insulated single strand, solid copper with a minimum diameter of 12 AWG.

PART 3 EXECUTION

3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material defined as rock in paragraph MATERIALS . Common excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site or shall be disposed of by using in fill or burying under the ball field under 18 inches of clean fill or hauled off at contractor cost.. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

### 3.1.1 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than four feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

#### 3.1.1.1 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 one 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 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed six inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

#### 3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

#### 3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of the structure footings and foundations, as shown. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

### 3.1.1.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

### 3.1.2 Stockpiles

Stockpiles of Excavated and Backfill Materials 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 by rubber-tired equipment, 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. Locations of stockpiles of satisfactory materials shall be within the project limits and subject to prior approval of the Contracting Officer.

## 3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

### 3.2.1 Trench Backfill

Trenches shall be backfilled to the grade shown.

#### 3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

#### 3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

#### 3.2.1.3 Bedding and Initial Backfill

Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

#### 3.2.1.4 Final Backfill

The remainder of the trench, except for special materials for roadways, railroads and airfields, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

- a. Roadways, Railroads, and Airfields: Backfill shall be placed up to the elevation at which the requirements in Section 02201 "EARTHWORK" control. Water flooding or jetting methods of compaction will not be permitted.
- b. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. This requirement shall also apply to all other areas not specifically designated above.

#### 3.2.2 Backfill for Appurtenances

After the manhole, catch basin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for a minimum of 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.

### 3.3 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

#### 3.3.1 Gas Distribution

Trenches shall be excavated to a depth that will provide not less than 18 inches of cover in rock excavation and not less than 24 inches of cover in other excavation.

Relocation of Gas Distribution Lines are not required under this Contract

#### 3.3.2 Water Lines

Trenches shall be of a depth to provide a minimum cover of 3.5 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe. For fire protection yard mains or piping, an additional 12 inches of cover is required.

#### 3.3.3 Heat Distribution System

Initial backfill material shall be free of stones larger than 1/4 inch in any dimension.

#### 3.3.4 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 24 inches from the finished grade, unless otherwise indicated.

### 3.3.5 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 18 inches below finished grade unless otherwise shown.

### 3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

#### 3.4.1 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.

#### 3.4.2 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 1557. 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.

#### 3.4.3 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 per lift of backfill for every 100 feet of installation shall be performed. One moisture density relationship shall be determined for every 1000 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. 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.

#### 3.4.4 Displacement of Sewers

After other required tests have been performed and the trench backfill has been placed and compacted to two feet above the top of the pipe, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 36 inches shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the

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defects shall be remedied as directed at no additional cost to the Government.

-- End of Section --

2600

STORM SEWERS

- A. General: All storm sewer construction and materials shall conform to Section 2600 of the AWWA “Standard Specifications and Design Criteria”, and KCMO SUPPLEMENT except as otherwise specified herein and on the contract drawings. Note that all references to “Engineer” in the APWA guidance shall be interpreted as “Contracting Officer” for this contract.
  
- B. Payment: Lump sum payment shall be made for the alterations to the storm sewer system shown in the drawings, and in the specifications. Payment shall constitute full compensation for all labor, materials, and equipment necessary to complete the item. Payment shall include pipes, manholes, concrete cradles and all other subsidiary items.

02610 ADJUSTMENT OF MAN-HOLES

A. General: Adjustment of the height of existing manholes and other structures to match proposed grades and elevations shall be made as required. This item of work shall also include the penetration of existing manholes and other structures with new storm sewer pipe and the reshaping of manhole inverts.

B. Payment : Payment for adjustment of manholes shall be incidental to construction.

02715            ANCHORS AND DRAINS

A. GENERAL: This section pertains to:

1. Wall Anchors.
2. Channel Pavement Anchors
2. Anchored Wall Drains.
3. Retaining Wall Drains.
4. Slope Paving Drains.
5. Channel Pavement Drains.

B. REFERENCES:

1. ASTM A 706
2. ASTM D 4435-84

C. SUBMITTALS:

1. Shop Drawings: The Contractor shall submit shop drawings which include the following; reinforcement steel placement drawings; reinforcement steel schedules showing quantity, size, shape, dimensions, weight per foot, total weights and bending details; and details of bar supports showing types, sizes, spacing and sequence, SD04-GA-EC.
2. Test Reports: Certified tests reports of reinforcement steel showing that the steel complies with the applicable specifications shall be furnished for each anchor shipment and identified with specific lots prior to placement. Three copies of the heat analyses shall be provided for each lot of steel furnished and the Contractor shall certify that the steel conforms to the heat analyses, SD09-GA-EC.
3. Grout: The Contractor shall submit the grout manufacturer's certification that the internal grout during production was tested in accordance with ASTM C 845-96, SD13-FIO-RE. A report of the test results and grout mix properties shall be furnished at the time of shipment.

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Thirty days prior to installation of anchors, the Contactor shall submit the

external grout mixture proportions that will produce grout of the quality required. Applicable test reports shall be submitted to verify that the grout mixture proportions selected will produce grout of the quality specified. Lab test shall verify that all requirements of ASTM C-845 are met.

D. ANCHORS:

1. General:

(a) Anchors shall be groutable rebar type. The configuration and placement shall be as shown on the drawings and as described further in this section. All rust shall be removed. Splicing will not be permitted. Rotary percussion methods shall be used to drill all anchor holes. Anchor holes for #'s 5, 6, and 8 shall be 3" in diameter. Anchors shall not be located in trench fill material. All anchor holes shall be over drilled by 1-foot in length

2. Anchor Embedment:

(a) Wall Anchors:

Wall anchors shall meet the requirements of ASTM A 706, deformed, and be grade 60,000 psi and of the sizes and lengths shown on the drawings. All wall anchors regardless of diameter, shall be embedded into rock to a depth of ten (10) feet. Holes for wall anchors shall be drilled 20 degrees down from the horizontal and oriented normal to the walls in the vertical plane.

(b) Pavement Anchors:

Pavement anchors shall meet the requirements of section 03210. Embedment of pavement anchors shall be as follows, unless otherwise noted on the drawings:

a) #8 - 12'

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- b) #5 - 4'
- c) #5 - 10' (fountain Pedestal only)

3. Grout:

- (a) Grout for anchors in this specification shall be mixed as follows:

Parts by weight Portland type III cement/water	1:0.44
Expansion additive: Percent by weight of cement - (Intraplast N, SIKA Chemical Corp., or equivalent)	0.25
Accelerator: Ounces per cwt cement, - (Masterbuilders 555A, or equivalent)	20

- (b) Grout shall be mixed in a grout plant capable of mixing and pumping grout. Hand mixing will not be permitted. Mixing and placement shall be coordinated so that delays do not permit the mixture to set or change consistency. Grouts which set or change shall be discarded.

4. Installation:

- (a) Grout holes shall be cleaned of all drill cuttings, water, and any other material by the use of compressed air at 50 PSI from the bottom of the hole just prior to the placement of grout. Grout shall be placed in the hole from the bottom and shall completely fill the hole prior to emplacement of the anchor. Anchors shall be centered in the hole by use of copper wire of a gauge which will keep the anchor from coming into contact with the sides of the hole.

- (b) Anchors shall be emplaced a minimum of 48 hours prior to placing the concrete walls. Anchors, which are loose, shall be replaced at no extra cost.

5. Testing: Anchor pull tests shall be performed randomly on 2.5% of the anchored wall anchors installed. The testing apparatus shall be of the type described in ASTM D 4435-84. Anchor test load (in pounds) shall be as follows:

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	<u>Maximum</u>	<u>Minimum</u>
#6	24,600	23,600

Anchors which show a displacement of more than 0.1 inch shall be replaced as directed. Anchors designated for testing shall have been placed for a minimum of 72 hours before test loading. A record shall be maintained of anchors tested, including location, maximum test load, and displacement.

E. DRAINS:

1. Anchored Wall Drains: Anchored wall drains shall be placed midway between each vertical row of anchors, or between every other vertical row if anchor spacing is 5 feet or less. Drain spacing shall not exceed 10 feet. Drains shall be angled down 20 degrees from the horizontal and shall extend 10 feet into rock. Guide sleeves shall be incorporated into concrete forms at the proper angles to insure that drilling equipment does not cut reinforcing steel. Sleeves will be made of 4-inch schedule 80 PVC pipe and placed midway between the bottom of the wall and the top of the rock. The drains shall extend, by drilling, through the sleeve into the rock to the required depth. The Contractor may use rotary percussion or thin wall coring methods to extend the drains. The sleeves shall be cut and placed so that the end facing the channel is flush with the wall face. The extended drains shall be 3 inches in diameter. The Contractor shall insure that drilling operations does not destroy the sleeves. Drains will be located to avoid buried pipe and electrical conduits and trench fill material.

2. Channel Paving Drains: Channel paving drains shall be installed as shown in the drawings. Guide sleeves and drilling techniques shown in paragraph D.1 shall be used. Holes shall be drilled 30 degrees from the vertical in an upstream direction parallel to the stream centerline.

3. Retaining Wall and Slope Paving Drains. Drains in retaining walls other than anchored walls and in the slope paving shall be installed as shown on the drawings. The slotted pipe screens extending behind the walls and slope paving shall be PVC Schedule 80 configured with three rows of slots, spaced equally circumferentially (0.25 inch width, 1.75 inch slot length, and 0.25 inch spacing between slots). The 3-inch diameter screens shall expose slots in a 6-inch minimum length to provide a required 15 square inches of open area. An end cap shall be provided on the end of

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the screen. The total extension length of the slotted pipe screen shall be no more than 10 inches behind the retaining wall, but shall be as shown on the drawings for the slope paving. The Contractor shall ensure that the slotted screens are not damaged during construction.

F. PAYMENT: No additional payment shall be made for Anchors and Drains. It shall be considered incidental to other contract bid items.

SECTION 02770A

CONCRETE SIDEWALKS AND CURBS AND GUTTERS  
03/98

PART 1 GENERAL

This specification covers Portland Cement Concrete (PCC) for 6-inch and 9-inch concrete paving, and curbs and gutters. Kansas City Metropolitan Chapter of the AMERICAN PUBLIC WORKS ASSOCIATION (APWA) is referenced herein. Requirements for measurement and payment in the APWA shall not be used.

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/A 615M (1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C 31/C 31M (1996) Making and Curing Concrete Test Specimens in the Field

ASTM C 143 (1990a) Slump of Hydraulic Cement 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 (1997) Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C 309 (1997) Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C 920 (1995) Elastomeric Joint Sealants

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

Kansas City Metropolitan Chapter of the AMERICAN PUBLIC WORKS  
ASSOCIATION (APWA)

APWA 2200

(23 May 2001) PAVING

1.2 SUBMITTALS

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

SD-03 Product Data

Equipment;

Manufacturer's literature on the concrete plant; mixing equipment; hauling equipment; placing and finishing, and curing equipment; at least 14 days prior to start of placement.

Placing Schedule;

Concrete placing Schedules at least 14 days prior to start of placements.

Mixture Proportions; G, GD

The report of the Contractor's mixture proportioning studies showing the proportions of all ingredients and supporting information on aggregate and other materials that will be used in the manufacture of concrete, at least 30 days prior to commencing concrete placing operations.

Concrete;

Copies of certified delivery tickets for all concrete used in the construction.

SD-06 Test Reports

Field Quality Control; G, RE

Copies of all test reports within 24 hours of completion of the test.

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 materials shall conform to the requirements of the Kansas City Metro Chapter, APWA 2200 for paving, except as specified herein. In addition to meeting the APWA mix requirements, concrete aggregates shall conform to the requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. Maximum size of aggregate shall be 3/4 inches.

##### 2.1.1 Air Content

All concrete shall be air entrained. Mixtures shall meet the air content requirements of APWA. Where no other air content requirement is specified concrete shall have an air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

### 2.1.2 Reinforcement Steel

Reinforcement bars shall conform to ASTM A 615/A 615M. Wire mesh reinforcement shall conform to ASTM A 185. Use of rolled mesh is specifically prohibited. Wire mesh shall be supplied in flat sheets.

## 2.2 CONCRETE CURING MATERIALS

Curing materials shall conform to the Kansas City Metro Chapter, APWA 2200.

### 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.

### 2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C 309, Type 2.

## 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 AND SEALANTS

Joint fillers and sealant materials shall conform to the Kansas City Metro Chapter, APWA 2200, except as specified herein.

### 2.4.1 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D 1752, 3/8 inch thick, unless otherwise indicated. Joint materials shall be selected to match the color and types used in the existing adjacent sidewalks along the channel. Joint materials shall be selected to match the joint sizes and materials used in the existing adjacent sidewalks along the channel. The expansion joint filler material shall be certified by the manufacturer to be compatible with the joint sealants used in the work. Do not use bituminous joint filler if joint sealer is non-bituminous.

## 2.5 JOINT SEALANTS

### 2.5.1 Joint Sealant

Conform to the Kansas City Metro Chapter, APWA 2200.

## 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 and pavement 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 General

Construction of sidewalks, pavements, curbs and gutters shall conform to the Kansas City Metro Chapter, APWA 2200, except as otherwise specified or indicated.

#### 3.2 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 the Kansas City Metro Chapter, APWA 2200.

##### 3.2.1 Subgrade

The subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalks and pavements and supported between side forms.

##### 3.2.2 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.

### 3.2.3 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.

### 3.3 Base Course

Base course under sidewalks, pavements, curbs and gutters shall conform to the requirements of the Kansas City Metro Chapter, APWA 2200, except as otherwise indicated.

### 3.4 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.

#### 3.4.1 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 of 1/4 inch per foot with the low side adjacent to the roadway, except as otherwise indicated or directed. Side forms shall not be removed for 12 hours after finishing has been completed.

#### 3.4.2 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.

### 3.5 CONCRETE PLACEMENT AND FINISHING

#### 3.5.1 Formed Sidewalks and Pavements

Concrete shall be placed in the forms in one layer. When consolidated and finished, the sidewalks and pavements 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.

### 3.5.2 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.

### 3.5.3 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.

### 3.5.4 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.

## 3.6 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

### 3.6.1 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".

### 3.6.2 Curb and Gutter Finishing

Approved slipformed curb and gutter machines may be used in lieu of hand placement.

### 3.6.3 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.

### 3.6.4 Joint Finishing

Curb edges at formed joints shall be finished as indicated.

### 3.6.5 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.

### 3.7 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 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.

#### 3.7.1 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-fourth 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.

#### 3.7.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 1/2 inch joint filler strips. 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. 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.

#### 3.7.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

### 3.8 CURB AND GUTTER JOINTS

Curb and gutter joints shall be constructed at right angles to the line of curb and gutter.

### 3.8.1 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. Contraction joints shall be constructed by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing.

### 3.8.2 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. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement, 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 at intervals not exceeding 35 feet. Expansion joints should typically be aligned with joints in adjacent sidewalks, pavements, and structures. Expansion joints shall be located as indicated on the drawings or as directed. Expansion joints shall be provided in nonreinforced concrete gutter at locations indicated. Expansion joints shall be sealed immediately following curing of the concrete or as soon thereafter as weather conditions permit. Expansion joints and the top 1 inch depth of curb and gutter contraction-joints shall be sealed with joint sealant. 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.

## 3.9 CURING AND PROTECTION

### 3.9.1 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.

#### 3.9.1.1 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.

#### 3.9.1.2 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.

### 3.9.1.3 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.

### 3.9.2 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.

### 3.9.3 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.

#### 3.9.4 Protective Coating

Protective coating of linseed oil mixture shall be applied to the exposed-to-view concrete surface.

##### 3.9.4.1 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.

##### 3.9.4.2 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.

#### 3.10 FIELD QUALITY CONTROL

##### 3.10.1 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.

##### 3.10.2 Concrete Testing

###### 3.10.2.1 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 250 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/C 31M 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.

### 3.10.2.2 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.

### 3.10.2.3 Slump Test

Two slump tests shall be made on randomly selected batches of each class of concrete for every 250 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.

### 3.10.3 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.

### 3.10.4 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.

## 3.11 SURFACE DEFICIENCIES AND CORRECTIONS

### 3.11.1 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.

### 3.11.2 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.

Pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

3.11.3 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 --



4. After all stones have been placed, excess concrete or mortar shall be cleaned from the exposed surfaces to the satisfaction of the Contracting Officer.
  5. Construction joints shall be on center 6 feet typical transverse to the channel slopes. All stone faces shall be broken, no polished or cut stone; sandblast to clean stone after placing stone.
  6. This new work needs to match the appearance of adjacent slope paving.
- H. Payment and Coverage: Payment for this work including concrete and reinforcement shall be made at the lump sum contract price bid.

02820            TURF REINFORCEMENT MAT

A.     GENERAL:

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 OF TESTING AND MATERIALS (ASTM)

ASTM D 792-00	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D 1388-96	Standard Test Methods for Stiffness of Fabrics
ASTM D 1777-96	Standard Test Methods for Thickness of Textile Materials
ASTM D 4355-99	Standard Test Method for Deterioration of Geotextiles for Exposure to Ultraviolet Light and Water
ASTM D 5035-95	Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
ASTM D 5199-01	Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
TRM report	The Texas Department of Transportation Texas Transportation Institute Hydraulics and Erosion Control Laboratory <a href="http://www.dot.state.tx.us">www.dot.state.tx.us</a>

2.    Submittals: The following shall be submitted:

A.    Product Information Sheet(s) containing product description, dimensions,

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statement of intended or designed use of product, and product photographs, SD01-FIO-RE. The Contractor shall provide documentation from the manufacturer that each lot of turf reinforcement mat meets or exceeds the required specifications.

B. The Contractor shall submit samples of each type of fastener to be used with the turf reinforcement mat, SD14-FIO-RE.

3. Delivery, Storage, and Handling:

a. 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 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.

b. Handling: Materials shall be handled in a manner that ensures delivery to the location of installation in sound, undamaged condition.

B. MATERIALS:

1. Turf Reinforcement Mat: The Contractor shall provide turf reinforcement mat which meets the following requirements:

Shear value shall be 8 psf with an initial value of 2 psf.

The composite turf reinforcement mat shall be a machine-produced permanent three-dimensional netting structure.

The matrix shall be stitch bonded between a heavy duty UV stabilized bottom net with 0.50 x 0.50 inch openings, a heavy duty UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.50 x 0.50 inch openings (+/- 25%), and a super heavy duty UV stabilized top net with 0.50 x 0.50 inch openings (+/- 25%). The netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (+/- 25%) centers with UV stabilized polypropylene thread to form a permanent three-dimensional structure.

Installation staple patterns shall be clearly marked on the turf reinforcement mattings with environmentally safe paint.

The composite turf reinforcement mat shall be the North American Green C350 Three Phase, Synthetic Industries Landlok TRM 435, North American Green P350, Synthetic Industries Landlok TRM 450, Pyramat, or approved equal. Equal considerations shall

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include physical and sediment loss and final vegetative density. The permanent composite turf reinforcement mat shall have the following additional minimum physical properties:

**Material Content**

Nettings            8 OZ/SY  
                          Thread UV Stabilized Polypropylene

**Physical Specifications (per roll)**

Width                6.50 ft minimum

2. Staples/Fasteners: The Contractor shall provide staples, fasteners, pins, etc. per the manufacturer's recommendation.

**C: INSTALLATION:**

1. Turf Reinforcement Mat:

a. The Contractor shall install turf reinforcement mat as shown on the drawings. Turf reinforcement mat shall be installed in a directional manner as recommended by the manufacturer.

b. The Contractor shall assume a 20% scrap factor (overlap and burial loss) for turf reinforcement mat. Material will be trenched at the top of each bank, as shown on the Drawings, and shall be installed to match the final graded contour of the soil surface. The Contractor shall account for all scrap and trench-secured quantities in his/her quotation. Such quantities are considered incidental and non-payable for the project.

c. The Contractor shall fill turf reinforcement mat with topsoil even with the top of the turf reinforcement mat. Seeding shall be performed as specified in Section: SEEDING AND MULCHING.

2. Staples/Fasteners: Staples, fasteners, pins, and others shall be installed as per the recommendations of the manufacturer.

3. Field Quality Control: Notification: The Contractor shall notify the Contracting Officer 24 hours prior to installation of any portion of the work to allow the Contracting Officer sufficient time to inspect the work and shall obtain approval of all material prior to commencing construction. Any portion of the work installed without inspection may be removed to uncover sufficient portions of the work to allow inspection.

**D. PAYMENT AND COVERAGE:**

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1. Turf Reinforcement Mat: Payment will be by made at the lump sum contract price bid.

2. Blanket Fasteners and Staples: No additional payment shall be made for blanket fasteners, staples, or other connecting hardware. It shall be considered incidental to other contract bid items.

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SECTION 02921A

SEEDING AND MULCHING

PART 1 GENERAL

1.1 SCOPE

This section covers seeding and mulching, complete.

1.2 AREAS

All **overbank** areas along the existing channel where existing cover is removed or destroyed, the designated Fill Areas, as well as the slopes, crown, and work areas adjoining the channel, shall be seeded and mulched.

1.2.1 Environment Protection

Any area disturbed solely for the convenience of the Contractor, as determined by the Contracting Officer, shall be seeded and mulched and will be considered as protection of the environment.

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 DESCRIPTIONS:

**SD-13, Certificates**

Para. 2.6.3; GA-PM-PR Para. 2.6.4; FIO-RE

**SD-01, Data**

Para. 2.1; FIO-RE

**SD-14, Samples**

Para. 2.6.2; GA-RE

1.4 Review of Contractor Proposed Changes

Any Contractor-proposed changes to the seed mixes, mulch, fertilizer, seeding dates, seeding operations and other seeding operations or procedures shall be submitted in writing to the Contracting Officer for review and approval by KCD's Environmental Resources Section, Planning Branch, (CENWK-PM-PR), ATTN: Martin Schuettpelz, telephone no. 816-983-3134, FAX no. 816-426-2124.

PART 2 MATERIALS

2.1 FERTILIZER

Fertilizer, with the specified quantities/ratios of nitrogen, phosphoric acid, and potash, uniform in composition, free-flowing and suitable for

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application with approved equipment, shall be provided. The fertilizer shall be delivered to the site in bags or other convenient containers, fully labeled or otherwise designated in accordance with the applicable State fertilizer laws, and bearing the name, trade name or trademark, and warranty of the producer. Fertilizer may be supplied in bulk provided an analysis of samples tested in a laboratory is furnished for each shipment of fertilizer delivered to the project.

2.2 MULCH

Mulch materials shall be air dry, reasonably light in color, and shall not be musty, moldy, caked or of low quality. Mulch shall be grass hay or straw of cereal grain such as oats or wheat. Materials containing objectionable weed seeds or other species detrimental to the planting or the adjacent land uses will not be acceptable.

2.3 MULCH TACKIFIERS

2.3.1 Organic Mulch Tackifier

Organic mulch tackifier shall be a high viscosity guar gum that would granulate at 90 percent minimum through 100 ASTM mesh screen and at 40 percent maximum through 350 ASTM mesh screen. Organic mulch tackifier shall have a minimum cold water viscosity of 3000 Centipoise (cps) after hydrating for 15 minutes when mixed at 1 percent as measured by the Brookfield RVT instrument at 20 RPM. Product shall be readily dispersible in cold water and mix without producing lumps.

2.3.2 Asphalt adhesives shall not be used with any of the seeding or mulching.

2.4 SEED

Seed shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act. Seed shall be furnished in sealed, standard containers unless approved by the Contracting Officer. Seed that is wet or moldy or that has been otherwise damaged in transit or storage will not be acceptable. The seed mixtures and pounds of pure live seed to be used shall be those listed below.

2.4.1 Permanent Cover Seed Mixtures

Permanent seed mixture for all areas:

<u>Plant Species</u>	<u>Minimum Pure Live Seed (%)</u>	<u>Pounds of Pure Live Seed/Acre</u>
Alta fescue or Kentucky 31 fescue (Festuca elatior var. arundinacea)	75	25
Ryegrass (Lolium Perenne or L. multiflorum)	80	25

Kentucky bluegrass  
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(Poa pratensis)	75	20
Creeping red fescue (Festuca rubra)	85	10
		—
Total Pounds Pure Live Seed Per Acre		80

2.4.2 Temporary Cover Seed Mixture

<u>Plant Species</u>	<u>Pounds of Bulk Seed/Acre</u>
Oats (Avena sativa)	<u>60</u>
Total Pounds Bulk Seed/Acre	60

Temporary seed may be planted in the spring, summer, or fall, but planting shall be sequenced such that the permanent cover is applied within 6 months of the temporary mix application. Temporary seed mix shall be applied to all disturbed areas as soon as practicable when the final plan grade has been established outside the specified planting seasons. Temporary mix shall also be applied on all disturbed areas with slopes greater than 1 on 10 where construction is halted and will not resume within 21 days. If disturbed areas with slopes less than 1 on 10 (including Fill Areas) have been brought to final grade, no further construction activities will likely occur on the site, and the planting dates are appropriate, the appropriate permanent seed mixture shall be seeded as soon as possible.

2.4.3 Weed Seed

Weed seed shall not exceed 0.5 percent by weight of the total of pure live seed and other material in the mixture.

2.4.4 Pure Live Seed

The following formula shall be used to determine the amount of commercial seed required to provide in each kind of seed the specified quantities of pure live seed.

$$\frac{\text{Pure Live Seed} \times 100 \times 100}{\text{Purity} \times \text{Germination}} = \text{Pounds Commercial Seed Required}$$

2.5 WATER

Water used in seeding operations shall be free from oil, acid, alkali, salt, and other substances harmful to growth of grass, and shall be from a source approved prior to use.

2.5.1 Optional Watering of Seeded Areas

The Contractor shall water all areas seeded with a permanent seed mixture, both the "native" and "other" seed mixtures at the option and direction of the Contracting Officer. Seeded areas shall be considered watered when the

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top 1" of soil has been thoroughly moistened. Watering of seeded areas must not cause removal or rearrangement of the seed, soil bed, or mulch. The Contractor shall restore and reseed any seeded areas that are damaged due to the Contractor's watering operations in the opinion of the Contracting Officer. The Contractor shall restore any damaged sites using the designated seed mixture for the affected site.

## 2.6 QUALITY CONTROL

### 2.6.1 Fertilizer

The Contracting Officer shall be furnished duplicate copies of invoices showing quantities and grade of fertilizer. Upon completion of the project, a final check of total quantities of fertilizer used shall be made against total area treated. If minimum rates of application have not been met, additional quantities of material to make up minimum application specified shall be distributed as required.

### 2.6.2 Mulch

At least 30 days prior to commencing seeding operations, the Contracting Officer shall be notified of sources from which mulch materials are available and the quantities thereof, and representative samples of the materials proposed for use shall be submitted for approval. No mulch material may be applied without the Contracting Officer's specific prior approval.

### 2.6.3 Organic Mulch Tackifier

The Contracting Officer shall be furnished copies of manufacturer's specification for organic mulch tackifier and certification of conformance with the rigid requirements of the manufacturer with respect to moisture content, pH, dispersibility, granulation, viscosity, and mixing properties.

### 2.6.4 Seed

The Contracting Officer shall be furnished signed copies of statement from the suppliers, certifying that each container of seed delivered complies with specified requirements and is labeled in accordance with Federal Seed Act and is at least equal to the requirements previously specified. This certification shall be furnished on or with all copies of seed invoices. Each lot of seed will be tested by the Government in accordance with latest Rules and Regulations under the Federal Seed Act, at the discretion of the Contracting Officer.

## PART 3 EXECUTION

### 3.1 PREPARATION OF GROUND SURFACE

#### 3.1.1 General

Equipment, in good condition, shall be provided for the proper preparation of the ground and for handling and placing all materials. Equipment shall be approved before work is started.

### 3.1.2 Clearing

Prior to grading and tilling, vegetation that may interfere with operations shall be mowed, grubbed, and raked; the collected material shall be disposed of by the disposal methods specified in SECTION: **EARTHWORK**. The surface shall be cleared of stumps, roots, cable, wire, and other materials that might hinder the work.

### 3.1.3 Grading

Previously established grades shall be maintained on the areas to be seeded in a true and even condition; necessary repairs shall be made by adding soil as necessary to previously graded areas. Where grades have not been established, the areas shall be graded as shown, and all surfaces shall be left in an even and properly compacted condition to prevent formation of depressions.

### 3.1.4 Tillage

After the areas required to be treated have been brought to the grades shown, the soil shall be tilled to a depth of at least 3 inches by **disking**, harrowing, or other approved methods until the condition of the soil is acceptable. After tillage, all stones larger than 3 inches in diameter and other materials that might hinder the work or subsequent maintenance shall be cleared. The work shall be performed only during periods when, in the opinion of the Contracting Officer, beneficial results are likely to be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed.

### 3.1.6 Fertilizer

For all areas, seeded fertilizer with a 1:4:3 ratio (e.g., grade 6-24-18) of the active ingredients of nitrogen, phosphoric acid, and potash shall be distributed uniformly over areas to be seeded. Fertilizer shall be applied at a rate of 12, 48, and 36 pounds per acre of the respective active ingredients. Fertilizer shall be incorporated into the soil to a depth of at least 2 inches by **disking**, harrowing, or other acceptable methods. Regardless of the grade of bulk fertilizer provided, the application rate shall be varied to obtain the quantity of active ingredient of nitrogen, phosphoric acid, and potash specified. Incorporation of fertilizer may be part of the tilling operation. Use of equipment capable of sowing seed and distributing fertilizer at the same time will be acceptable, pending approval of the equipment by the Contracting officer and PM-PR (Schuettpelz).

### 3.1.7 Leveling

Surface irregularities resulting from tillage, fertilizing, or other operations before seeding shall be leveled prior to seeding.

## 3.2 PLANTING SEED

### 3.2.1 General

A satisfactory method of sowing at the specified rate shall be employed, using approved mechanical power-drawn drills or **seeders**, mechanical **hand-seeders** or other approved methods. When drills are used, markers or other means shall be provided to ensure that the successive seeded strips will overlap or be separated by a space no greater than the equipment's drill row spacing. When delays in operations extend the work beyond the most favorable planting season for species designated, or when conditions are such by reason of drought, high winds, excessive moisture, or other factors that satisfactory results are not likely to be obtained, work shall be halted as directed and resumed only when conditions are favorable or when approved alternate or corrective measures and procedures have been effected. If inspection during seeding operations, or after there is show of green, indicates that areas have been left **unplanted**, additional seed shall be sown as directed.

### 3.2.2 Seeding Dates

The native grass seeds in the Native Seed Mixture (Section 2.4.1) shall be sown between the dates of 20 March to 15 June, unless otherwise approved by the Contracting Officer and PM-PR (Mr. Schuettpelz).

The permanent mixture for "other areas" (Section 2.4.1) shall be sown between the dates of 15 March to 15 June for spring planting and 15 August to 1 October for fall planting, unless otherwise approved by the Contracting Officer.

Temporary cover seed mixture (Section 2.4.2) shall be seeded between the dates of 15 March to 1 November, unless otherwise approved by the Contracting Officer.

### 3.2.3 Drill Seeding (Native Seed Mixture)

The native seed mixture shall be seeded with a drill (Truax, Billion, or equivalent) equipped with double coulter furrow openers with depth bands and press wheels. Drill shall be equipped with at least two boxes—one capable of handling light, fluffy seeds and the other for handling the smaller heavier seeds. Native grass seed (excluding flowers) shall be drilled  $\frac{1}{4}$  to  $\frac{1}{2}$ -inch deep and then rolled with a weighted roller or cultipacker. Seeds of the four native wildflower species shall not be drilled deeper than  $\frac{1}{8}$ -inch and shall be applied separately if necessary, then rolled with a weighted roller or cultipacker.

### 3.2.4 Drill Seeding

Drill seeding of the "other areas" mixture and temporary cover seed may be accomplished with approved equipment with drills set not more than 8 inches apart. Seed shall be sown uniformly over designated areas to an average depth of  $\frac{1}{2}$  inch and at the specified rate. Half of seed shall be sown with seed drill moving in one direction, and the remainder with the drill moving at right angles to the first sowing. When slopes to be drill seeded exceed 1 on 5, the seeder shall be equipped with baffle plates spaced not more than 6 inches apart in the seed box.

### 3.2.5 Not Used

### 3.2.6 Broadcast Seeding (Not acceptable for Native Seed Mixture)

In areas inaccessible to drill seeding, seed shall be broadcast either by hand or with approved seeding equipment, as specified **hereinbefore**. Seed shall be distributed uniformly over designated areas. Half of seed shall be sown with sower moving in one direction, and the remainder with sower moving at right angles to first sowing. Seed shall be covered to an average depth of 1/4 inch by brush harrow, spike-tooth harrow, chain harrow, **cultipacker**, hand rake with wood tines, or other approved device. Seed shall not be broadcast during windy weather.

### 3.2.7 Preparation for Native Seed Planting

In areas where temporary seed has been planted, the Contractor shall initially spray the area with a herbicide (glyphosate) applied according to the manufacturer's recommendations. The temporary cover growth shall then be mowed to a height of 6 to 8 inches above the ground surface.

## 3.3 APPLYING AND ANCHORING MULCH

### 3.3.1 General

Mulch shall be spread uniformly in a continuous blanket over the seeded areas. Application rate of mulch shall be 2 ½ tons per acre for all seed mixtures. Mulching shall be started at the windward side of relatively flat areas, or at the upper part of a steep slope and continued uniformly until the area is covered. Mulch shall be spread by hand or any of the following.

#### 3.3.1.1 Blower Type Mulch Spreader

Blower type mulch spreader, which shall be trailer-mounted, equipped with a blower that is dynamically balanced for at least 2,000 revolutions per minute operation and that will discharge hay or straw mulch material through a discharge boom with spout at speeds up to 220 feet per second. The discharge spout shall be capable of **360-degree** horizontal rotation and minimum of **60degree** range of elevation and depression.

#### 3.3.2 Mechanical Anchoring

Immediately following spreading, the mulch shall be anchored to the soil by land packers or other suitable equipment. Land packers shall be of the scalloped-disk type, designed to force mulch into the soil surface. The number of passes needed, not to exceed three, will be determined by the Contracting Officer.

#### 3.3.3 Spray Anchoring with **Hydroseeder**

After applying mulch to slopes, the Contractor shall use a **hydroseeder** equipped with paddle mixer and pumping equipment to apply a mix of approved **tackifier** and fiber marker mulch to bind the mulch together with the soil. Water from an approved source shall be added to the tank to cover the agitator blades. **Tackifier** meeting the specifications of Section 2.3 shall be added to the tank and allowed to mix. **Tackifier** shall be used at the following rates based on the slope of the area treated.

<u>Slope:</u>	<u>Flat</u>	<u>4:1</u>	<u>3:1</u>	<u>2:1</u>	<u>1:1</u>
<u>Lb/Acre:</u>	40	45	50	60	70

After tackifier is thoroughly mixed, Contractor shall add 300 lbs. per acre of virgin wood fiber mulch manufactured by approved suppliers, such as SilvaFiber, Conwed 2000, Mat Fiber, Central Fiber, to aid in binding the mulch and providing a visual aid for determining coverage of the tackifier. The above quantities of tackifier and mulch marker are based on 1000 gallons of water per acre coverage.

Tackifier and wood fiber mulch shall be applied with fan nozzles thru hydroseeder mounted towers or hose where tower application cannot provide adequate coverage.

3.4 REPAIRING AND RESEEDING

The Contractor shall be fully responsible for any damage or lack of cover caused by elements under his control. The Contracting Officer may direct that areas that do not attain the required cover or areas that become damaged by repaired and reseeded to specification requirements. If such lack of cover is determined to be caused by no fault of the Contractor, equitable adjustment will be made in the contract price for the additional work directed and performed.

3.5 MOWING

Mowing prior to completion of the construction may be required and shall be performed at the option of the Contracting Officer. Vegetation shall be prevented from growing to heights exceeding one foot in order to permit native seed to germinate properly. Mowers shall be set to cut growth back to a height of 6 inches. Areas to be mowed shall be determined by the Contracting Officer and PM-PR.

3.6 MEASUREMENT AND COMPUTATION OF QUANTITIES

3.6.1 Measurement

The various areas that are satisfactorily seeded, or seeded and mulched, shall be measured along the slope to the nearest foot.

3.6.2 Computation of Quantities

Computation of quantities will be made in acres based on the measurements submitted. Each quantity will be computed to the nearest one-tenth acre based on the accumulative total.

3.7 BIDDING SCHEDULE ITEM

Bidding schedule item, applicable to the work covered by this section, is as follows:

<u>Item</u>	<u>Unit</u>
"Seeding and Mulching"	Lump Sum

-- End of Section --

02923            TOPSOIL MATERIAL AND APPLICATION

A. GENERAL: This section covers final grade topsoil for channel slopes and lawn areas.

B. MATERIALS:

1. Topsoil: On-site topsoil shall be used for left and right bank channel slopes. All topsoil shall be a friable, loamy mixture and of similar texture to the project site soil type to the satisfaction and approval of the Owner. It shall not have a mixture of subsoil and contain no slag, cinders, stones, lumps of soil, sticks, roots, trash or other extraneous materials larger than 1-1/2 inches in diameter. Topsoil must also be free of plants or plant parts of common bermuda-grass, johnsongrass, nutsedge, poison ivy and Canada thistle. All topsoil shall be tested by a reputable laboratory for pH and soluble salts. If needed, pH correction material shall be applied at a rate sufficient to correct the pH to a range of 6.0-7.0. Soluble salts shall not be higher than 500 parts per million. Topsoil shall meet the standards set forth in Section 11-1, paragraph B of the Midwest Turfgrass Growers Association standard specification.

a. No plant material shall be planted in soil that has been chemically treated until sufficient time has elapsed to permit dissipation of all toxic materials. The Contractor shall assume full responsibility for any loss or damage to the plants arising from improper use of chemicals or due to his failure to allow sufficient time to permit dissipation of toxic residues, whether or not such materials are specified herein.

2. Tests:

a. The contractor shall be responsible for providing physical and fertility analysis of topsoil.

b. Analyze topsoil to ascertain silt clay (Boyocas); percentage of nitrogen, phosphorus, potash, organic matter content, pH value and soluble salts.

c. Submit both the physical and fertility analysis for approval, SD09-GA-RE.

C. INSTALLATION:

1. General: Before all work in this Section, carefully inspect the installed work of all other

trades and verify that all such work is complete to the point this installation may properly commence.

- a. In case of discrepancy, immediately notify the Owner.
- b. Do not proceed with the installation in areas of discrepancy until all such discrepancies have been fully resolved.

Verify substrate base has been contoured and compacted.

2. Substrate Preparation :

a. Scarify subgrade to a minimum depth of 4-inches where topsoil is scheduled. Scarify in areas where equipment is used for hauling and spreading topsoil and has compacted subsoil

b. Remove stones, sticks, debris, roots, branches and other extraneous matter measuring over 1-1/2 inches in any dimension.

c. Eliminate uneven areas and low spots.

d. Limit preparation to areas that will be planted promptly after preparation.

3. Placing Topsoil:

a. Place topsoil in areas at the minimum thickness indicated in "7.Schedule" on Page 02923-3.

1. Spread topsoil to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Rake until smooth.

2. Place approximately 1/2 the total amount of topsoil required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil.

b. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading.

c. Fine grade topsoil eliminating rough or low areas. Maintain profile and contour of subgrade.

d. Remove roots, weeds, rocks and foreign material while spreading.

e. Compact placed topsoil to 85 percent standard proctor density in accordance with D 698.

f. Remove surplus subsoil from the site. Surplus topsoil shall be wasted on the site at a location designated.

g. Leave stockpile area and site clean and raked, ready to receive seeding.

Stockpile area shall be a location designated.

4. Grading:

a. Finish Grading. The finishing of side slopes, cuts and fills shall be to smooth uniform surfaces that will merge with the adjacent terrain without noticeable break. Finishing shall be done according to grades shown on the drawings and without variations that are readily discernible.

b. Finish grading shall be done to the lines and grades shown on the drawings. All areas disturbed by the Contractor during construction operations shall be bladed smooth, shaped and compacted as specified hereinbefore.

6. Protection:

a. Protect existing trees, structures, fences, sidewalks, utilities, paving and curbs. For protection of existing trees, see Specification Section 02924, Tree Preservation.

7. Schedule:

a. Compacted topsoil thickness at the following area:

1. ***This depth is contingent upon the quantity of stockpiled topsoil available on-site. If the amount of stockpiled topsoil is insufficient, the subgrade shall be raised to accommodate the deficiency.***

8. Clean Up: After the topsoil has been spread and the final grades approved, the site shall be cleared of all grade stakes, surface trash and other objects that would hinder installation and/or maintenance of bioengineer plantings. Paved areas over which hauling operations are conducted shall be kept clean, and any soil that may be brought upon the surfacing shall be promptly removed. The wheels of all vehicles shall be kept clean to avoid tracking soil on the surfacing of roads or other paved areas.

D. PAYMENT:

1. See Specification Section 02201, Earthwork.

02924            TREE PRESERVATION

A. GENERAL:

1. Selective Clearing is removal of undesirable trees and underbrush around specimen trees and brush as designated on the drawings and/or instructed by the Contracting Officer.

2. Specimen Trees as shown on the drawings and be approved by the Contracting Officer to save, shall be protected from damage incident to clearing, grubbing, and construction operations, by the erection of timber barriers or by such other means as the circumstances require. Such barriers must be placed and be approved by the Contracting Officer before construction operations can proceed.

3. Plant Preservation: All plant materials on the site to be saved and/or relocated shall be marked specifically by the Contracting Officer. No plant material may be removed from the site prior to the Contracting Officer's inspection. All plant material to be saved/or relocated will be protected from injury to the roots and to the branches, to a distance five feet beyond the drip-line. No grading, trenching, pruning, or storage of materials may go in this area, except as approved by the Contracting Officer.

a. Penalty: The contractor shall pay a penalty for any plant removed from the site which was not specified as such by the Contracting Officer. The CONTRACTOR shall pay for any such plant which dies due to damage during construction. The penalty is as follows:

Trunk Diameter at a point 4 feet above existing grade	Penalty
4" to 6"	\$200.00
6" to 8"	\$300.00
8" to 12"	\$1,000.00
12" to 20"	\$1,500.00
20" and larger	\$3,000.00

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b. Unaccountable: The contractor shall not be held accountable for damage to plants resulting from placement of fill or removal of soil where such action is required by the Contract Documents. Any plant, the trunk of which is within ten (10) feet from any structure, shall be exempt from these penalties as established below in the event that the contractor or any of his subcontractors cause the loss or removal of plants designated to be saved under the provisions of this specification.

c. Plants will be rated by the Contracting Officer as to variety, size, condition and site importance with the above figures acting as maximum penalties with the lowest assessment amount to no less than one-half of the above penalty figure.

d. Trees and plants to be relocated: Any tree or plants moved shall be done in a timely manner so as not to delay construction progress. The contractor shall take extra measures to protect the tree during the relocation by erecting barricades, staking, trimming, etc. as required. All trees to be relocated shall be performed by certified arborists. Tree relocation shall be performed between October 15th, and April 15th. Tree relocation shall be measured per each tree relocated, in place and accepted.

**PAYMENT:** No additional payment shall be made for Tree Preservation. It shall be considered incidental to other contract bid items, **SECTION: CLEARING, GRUBBING AND DEMOLITION.**

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SECTION 02930A

EXTERIOR PLANTING  
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

AMERICAN NURSERY AND LANDSCAPE ASSOCIATION (ANLA)

ANLA Z60.1 (1996) Nursery Stock

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602 (1995a) Agricultural Liming Materials

ASTM D 4972 (1995a) pH of Soils

ASTM D 5034 (1995) Breaking Strength and Elongation of Textile Fabrics (Grab Test)

ASTM D 5035 (1995) Breaking Force and Elongation of Textile Fabrics (Strip Method)

ASTM D 5268 (1992; R 1996) Topsoil Used for Landscaping Purposes

ASTM D 5883 (1996e1) Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes

1.2 SOURCE INSPECTIONS

The nursery or source of plant material and the source of delivered topsoil shall be subject to inspection.

1.3 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.3.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.3.1.1 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.

#### 1.3.1.2 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.

#### 1.3.1.3 Delivered Topsoil

Prior to the delivery of any topsoil, the availability of topsoil shall be verified in paragraph TOPSOIL. A soil test shall be provided for delivered topsoil.

#### 1.3.1.4 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.

#### 1.3.1.5 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.

#### 1.3.2 Inspection

Plant material shall be well shaped, vigorous and healthy with a healthy, well branched root system, free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement or abrasion. Plant material shall be checked for unauthorized substitution and to establish nursery grown status. Plant material showing desiccation, abrasion, sun-scald injury, disfigurement, or unauthorized substitution shall be rejected. 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. Plant material with broken or cracked balls; or broken containers shall be rejected. Bare-root plant material that is not dormant or is showing roots were pulled from the ground shall be rejected. Other materials shall be inspected for compliance with paragraph PRODUCTS. Open soil amendment containers or wet soil amendments shall be rejected. Topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material larger than 1-1/2 inch diameter shall be rejected. Topsoil that contains viable plant material and plant parts shall be rejected. Unacceptable material shall be removed from the job site.

#### 1.3.3 Storage

##### 1.3.3.1 Plant Material Storage

Plant material not installed on the day of arrival at the site shall be stored and protected in designated areas. Plant material shall not be stored longer than 30 days. Plant material shall be protected from direct

exposure to wind and sun. Bare-root plant material shall be heeled-in. All plant material shall be kept in a moist condition by watering with a fine mist spray until installed.

#### 1.3.3.2 Other Material Storage

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 planting operation material.

#### 1.3.4 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.

#### 1.3.5 Time Limitation

Except for container-grown plant material, the time limitation from digging to installing plant material shall be a maximum 90 days. The time limitation between installing the plant material and placing the mulch shall be a maximum 24 hours.

### 1.4 WARRANTY

Furnished plant material shall have a warranty for plant growth to be in a vigorous growing condition for a minimum 12 month period. A minimum 12 month calendar time period for the warranty of plant growth shall be provided regardless of the contract time period. When plant material is determined to be unhealthy in accordance with paragraph PLANT ESTABLISHMENT PERIOD, it shall be replaced once under this warranty.

## PART 2 PRODUCTS

### 2.1 PLANT MATERIAL

#### 2.1.1 Plant Material Classification

The plant material shall be nursery grown stock conforming to ANLA Z60.1 and shall be the species specified.

#### 2.1.2 Substitutions

Substitutions will not be permitted without written request and approval from the Contracting Officer.

#### 2.1.3 Quality

Well shaped, well grown, vigorous plant material having healthy and well branched root systems in accordance with ANLA 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, method of shipment, or shipment. Plant quality is determined by the growing conditions; method of shipment to maintain health of the root system; and growth of the trunk and crown as follows.

#### 2.1.4 Growing Conditions

Plant material shall be native to or well-suited to the growing conditions of the project site. Plant material shall be grown under climatic conditions similar to those at the project site.

#### 2.1.5 Method of Shipment to Maintain Health of Root System

##### 2.1.5.1 Balled and Burlapped (BB) Plant Material

Ball size and ratio shall be in accordance with ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding root system necessary for the full recovery of the plant. The plant stem or trunk shall be centered in the ball. All roots shall be clean cut at the ball surface. Roots shall not be pulled from the ground. Before shipment the root ball shall be dipped in gels containing mycorrhizal fungi inoculum. The root ball shall be completely wrapped with burlap or other suitable material and securely laced with biodegradable twine.

##### 2.1.5.2 Balled and Potted (Pot) Plant Material

Ball size and ratio shall be in accordance with ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding root system necessary for the full recovery of the plant. Removal shall be done by hand digging or mechanical devices. The plant stem or trunk shall be centered in the ball. All roots shall be clean cut at the ball surface. Roots shall not be pulled from the ground. Before shipment the root ball shall be dipped in gels containing mycorrhizal fungi inoculum. Container shall be used to retain the ball unbroken. Container shall be rigid to hold ball shape and protect root mass during shipping.

##### 2.1.5.3 Balled and Platform (BP) Plant Material

Ball size and ratio shall be in accordance with ANLA Z60.1. Plants shall be prepared as balled and burlapped plant material and securely fastened to wood platform for shipping.

##### 2.1.5.4 Bare-Root (BR) Plant Material

Minimum root spread shall be in accordance with ANLA Z60.1. A well branched root system characteristic of the species specified shall be provided. Roots shall not be pulled from the ground. Bare-root 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. Bare-root plant material shall be dormant. The root system shall be protected from drying out.

##### 2.1.5.5 Container-Grown (C) Plant Material

Container size shall be in accordance with ANLA 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.

2.1.6 Growth of Trunk and Crown

2.1.6.1 Deciduous Trees

A height to caliper relationship shall be provided in accordance with ANLA 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.
- c. Specimen: The tree provided 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 as indicated.

2.1.6.2 Palms

Palms shall have the specified height as measured from the base of the trunk to the base of the fronds or foliage in accordance with ANLA Z60.1. The palm shall have straight trunk and healthy fronds or foliage as typical for the variety grown in the region of the project. Palms trimmed or pruned for delivery shall retain a minimum of 6 inches of foliage at the crown as a means of determining plant health.

2.1.6.3 Deciduous Shrubs

Deciduous shrubs shall have the height and number of primary stems recommended by ANLA 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.

2.1.6.4 Coniferous Evergreen Plant Material

Coniferous Evergreen plant material shall have the height-to-spread ratio recommended by ANLA Z60.1. The coniferous evergreen trees shall not be "poled" or the leader removed. Acceptable plant material shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

2.1.6.5 Broadleaf Evergreen Plant Material

Broadleaf evergreen plant material shall have the height-to-spread ratio recommended by ANLA Z60.1. Acceptable plant material shall be well shaped and recognized by the trade as typical for the variety grown in the region of the project.

2.1.6.6 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 Z60.1. Plant material shall have heavy, well developed and balanced crown with vigorous, well developed root system and shall be furnished in containers.

### 2.1.7 Plant Material Size

Plant material shall be furnished in sizes indicated. Plant material larger in size than specified may be provided at no additional cost to the Government.

### 2.1.8 Plant Material Measurement

Plant material measurements shall be in accordance with ANLA Z60.1.

## 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 02201 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 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material and soil conditioners meeting the following requirements. Vermiculite is not recommended.

### 2.3.1 pH Adjuster

The pH adjuster shall be an agricultural liming material in accordance with ASTM C 602. These materials may be burnt lime, hydrated lime, ground limestone, or shells. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

#### 2.3.1.1 Limestone

Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.

#### 2.3.1.2 Hydrated Lime

Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. Gradation: A minimum 100 percent shall pass through a No. 8 sieve and a minimum 97 percent shall pass through a No. 60 sieve.

#### 2.3.1.3 Burnt Lime

Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 35 percent shall pass through a No. 60 sieve.

### 2.3.2 Fertilizer

Fertilizer shall be controlled release commercial grade; free flowing, pellet or tablet form; uniform in composition; and consist of a

nitrogen-phosphorus-potassium ratio. The fertilizer shall be derived from sulphur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients.

### 2.3.3 Organic Material

Organic material shall consist of either bonemeal, peat, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

#### 2.3.3.1 Bonemeal

Bonemeal shall be a finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

#### 2.3.3.2 Rotted Manure

Rotted manure shall be unleached horse, chicken, or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials. Manure shall contain no chemicals or ingredients harmful to plants. The manure shall be heat treated to kill weed seeds and shall be free of stones, sticks, and soil.

#### 2.3.3.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, or other wood waste material free of stones, sticks, and toxic substances harmful to plants, and stabilized with nitrogen.

#### 2.3.3.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. It shall be derived from food, agricultural, or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have a moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent or less by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length.

#### 2.3.3.5 Worm Castings

Worm castings shall be screened from worms and food source and shall be commercially packaged.

### 2.3.4 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for single use or in combination to meet topsoil requirements for the plant material specified.

#### 2.3.4.1 Sand

Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Greensand shall be balanced with the

inclusion of trace minerals and nutrients.

#### 2.3.4.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized according to manufacturer's recommendations. Polymers shall be added as a soil amendment and be cross-linked polyacrylamide with an absorption capacity of 250-400 times its weight.

#### 2.3.4.3 Calcined Clay

Granular particles shall be produced from montmorillonite clay calcined to minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent passing No. 8 sieve; a minimum 99 percent shall be retained on No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

#### 2.3.4.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

#### 2.3.4.5 Expanded Shale, Clay, or Slate (ESCS)

Rotary kiln produced ESCS material shall be in conformance with ASTM D 5883.

### 2.4 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Rotted manure is not recommended to be used as a mulch because it would encourage surface rooting of the plant material and weeds.

#### 2.4.1 Organic Mulch

Organic mulch materials shall be native to the project site and consist of recycled mulch, shredded bark, wood chips, or ground bark.

##### 2.4.1.1 Recycled Mulch

Recycled mulch may include compost, tree trimmings, or pine needles with a gradation that passes through a 2-1/2 x 2-1/2 inch screen. It shall be cleaned of all sticks a minimum 1 inch in diameter and plastic materials a minimum 3 inch length. The material shall be treated to retard the growth of mold and fungi. Other recycled mulch may include peanut shells, pecan shells or coco bean shells.

##### 2.4.1.2 Shredded Bark

Locally shredded material shall be treated to retard the growth of mold and fungi.

##### 2.4.1.3 Wood Chips and Ground Bark

Locally chipped or ground material shall be treated to retard the growth of mold and fungi. Gradation: A maximum 2 inch wide by 4 inch long.

## 2.5 GEOTEXTILE

Geotextile shall be woven or nonwoven; polypropylene, polyester, or fiberglass, mat in accordance with ASTM D 5034 or ASTM D 5035. It shall be made specifically for use as a fabric around plant material. Nominal weight shall be a minimum 4 ounces per square yard. Permeability rate shall be a minimum 0.04 inch per second.

## 2.6 WOOD STAKING MATERIAL

Wood stakes shall be hardwood or fir; rough sawn; free from knots, rot, cross grain, or other defects that would impair their strength.

### 2.6.1 Bracing Stake

Wood bracing stakes shall be a minimum 2 x 2 inch square and a minimum 8 feet long with a point at one end. Stake shall be set without damaging rootball.

### 2.6.2 Wood Ground Stakes

Wood ground stakes shall be a minimum of 2 x 2 inch square and a minimum 3 feet long with a point at one end.

### 2.6.3 Deadmen

Wood deadmen shall be a minimum 4 x 4 x 36 inches long.

## 2.7 METAL STAKING AND GUYING MATERIAL

Metal shall be aluminum or steel consisting of recycled content made for holding plant material in place.

### 2.7.1 Bracing Stakes

Metal bracing stakes shall be a minimum 1 inch diameter and a minimum 8 feet long. Stake shall be set without damaging rootball.

### 2.7.2 Metal Ground Stakes

Metal ground stakes shall be a minimum 1/2 inch diameter and a minimum 3 feet long.

### 2.7.3 Earth Anchor

Metal earth anchors shall be a minimum 1/2 inch diameter and a minimum 2 feet long.

### 2.7.4 Guying Material

Metal guying material shall be a minimum 12 gauge wire. Multi-strand cable shall be woven wire. Guying material tensile strength shall conform to the size of tree to be held firmly in place.

### 2.7.5 Turnbuckle

Metal turnbuckles shall be galvanized or cadmium-plated steel, and shall be a minimum 3 inches long with closed screw eyes on each end. Screw thread tensile strength shall conform to the size of tree to be held firmly in

place.

## 2.8 PLASTIC STAKING AND GUYING MATERIAL

Plastic shall consist of recycled plastic product made for holding plant material firmly in place. Plastic shall not be used for deadmen.

### 2.8.1 Plastic Bracing Stake

Plastic bracing stakes shall be a minimum 2 inch diameter and a minimum 8 feet long. Stake shall be set without damaging rootball.

### 2.8.2 Plastic Ground Stakes

Plastic ground stakes shall be a minimum 1 inch diameter and a minimum 3 feet long.

### 2.8.3 Plastic Guying Material

Plastic guying material shall be designed specifically for the purpose of firmly holding plant material in high wind velocities.

### 2.8.4 Chafing Guard

Plastic chafing guards shall be used to protect tree trunks and branches when metal is used as guying material. The material shall be the same color throughout the project site. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

## 2.9 RUBBER GUYING MATERIAL

Rubber chafing guards, consisting of recycled material, shall be used to protect tree trunks and branches when metal guying material is applied. The material shall be the same color throughout the project. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

## 2.10 FLAG

Plastic flag material shall be used on guying material. It shall be a minimum 6 inches long. Tape color shall be consistent and visually complimentary to the entire project area. The tape color shall meet pedestrian visual safety requirements for day and night.

## 2.11 TREE ROOT BARRIERS

Tree root barriers shall be metal or plastic consisting of recycled content. Barriers shall utilize vertical stabilizing members to encourage downward tree root growth. Barriers shall limit, by a minimum 90 percent, the occurrence of surface roots. Tree root barriers which are designed to be used as plant pit liners will be rejected.

## 2.12 MYCORRHIZAL FUNGI INOCULUM

Mycorrhizal fungi inoculum shall be composed of multiple-fungus inoculum as recommended by the manufacturer for the plant material specified.

## 2.13 WATER

Unless otherwise directed, water shall be the responsibility of the

Contractor. Water shall not contain elements toxic to plant life.

## 2.14 PESTICIDE

Pesticide shall be insecticide, herbicide, fungicide, nematocide, rodenticide or miticide. For the purpose of this specification a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved.

## PART 3 EXECUTION

### 3.1 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

#### 3.1.1 Deciduous Plant Material Time

Deciduous plant material shall be installed from 15 March to 1 June for spring-summer planting and from 1 October to 15 December for fall planting.

#### 3.1.2 Evergreen Plant Material Time

Evergreen plant material shall be installed from 15 March to 1 June for spring-summer planting and from 1 October to 15 December for fall planting.

#### 3.1.3 Plant Material Conditions

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. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted for approval.

#### 3.1.4 Tests

##### 3.1.4.1 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; when a negative percolation test occurs, a shop drawing shall be submitted indicating the corrective measures.

##### 3.1.4.2 Soil Test

Delivered topsoil, excavated plant pit soil, and stockpiled topsoil shall be tested in accordance with ASTM D 5268 and ASTM D 4972 for determining the particle size, pH, organic matter content, textural class, chemical analysis, soluble salts analysis, and mechanical analysis. Sample collection onsite shall be random over the entire site. Sample collection for stockpiled topsoil shall be at different levels in the stockpile. The soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test shall determine the quantities and type of soil amendments required to meet local growing conditions for the plant material specified.

### 3.2 SITE PREPARATION

#### 3.2.1 Finished Grade, Topsoil and Underground Utilities

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 02201 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.

### 3.2.2 Layout

Plant material locations and bed outlines shall be staked on the project site before any excavation is made. Plant material locations may be adjusted to meet field conditions.

### 3.2.3 Protecting Existing Vegetation

When there are established lawns in the planting area, the turf shall be covered and/or protected during planting operations. Existing trees, shrubs, and plant beds that are to be preserved shall be barricaded along the dripline to protect them during planting operations.

## 3.3 EXCAVATION

### 3.3.1 Obstructions Below Ground

When obstructions below ground affect the work, shop drawings showing proposed adjustments to plant material location, type of plant and planting method shall be submitted for approval.

### 3.3.2 Turf Removal

Where the planting operation occurs in an existing lawn area, the turf shall be removed from the excavation area to a depth that will ensure the removal of the entire root system.

### 3.3.3 Plant Pits

Plant pits for ball and burlapped or container plant material shall be dug to a depth equal to the height of the root ball as measured from the base of the ball to the base of the plant trunk. Plant pits for bare-root plant material shall be dug to a depth equal to the height of the root system. Plant pits shall be dug a minimum 50 percent wider than the ball or root system to allow for root expansion. The pit shall be constructed with sides sloping towards the base as a cone, to encourage well aerated soil to be available to the root system for favorable root growth. Cylindrical pits with vertical sides shall not be used.

## 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. In relation to the surrounding grade, the plant material shall be set even with the grade at which it was grown.

#### 3.4.1.1 Bare-Root Plant Material

Bare-root plant material shall be placed in water a minimum 30 minutes prior to setting.

#### 3.4.2 Tree Root Barrier

Tree root barriers shall be installed as recommended by the manufacturer. Tree root barriers shall be used for trees located up to a maximum 6 feet from paved surfaces or structures.

#### 3.4.3 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.

#### 3.4.4 Adding Mycorrhizal Fungi Inoculum

Mycorrhizal fungi inoculum shall be added as recommended by the manufacturer for the plant material specified.

#### 3.4.5 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. Additional requirements are as follows.

##### 3.4.5.1 Balled and Burlapped, and Balled and Platformed Plant Material

Biodegradable burlap and tying material shall be carefully opened and folded back from the top a minimum 1/3 depth from the top of the root ball. Backfill mixture shall be added to the plant pit in 6 inch layers with each layer tamped.

##### 3.4.5.2 Bare-Root Plant Material

The root system shall be spread out and arranged in its natural position. Damaged roots shall be removed with a clean cut. The backfill soil mixture shall be carefully worked in amongst the roots and watered to form a soupy mixture. Air pockets shall be removed from around the root system, and root to soil contact shall be provided.

##### 3.4.5.3 Container-Grown and Balled and Potted Plant Material

The plant material shall be carefully removed from containers that are not biodegradable. Prior to setting the plant in the pit, a maximum 1/4 depth of the root mass, measured from the bottom, shall be spread apart to promote new root growth. For plant material in biodegradable containers the container shall be split prior to setting the plant with container. Backfill mixture shall be added to the plant pit in 6 inch layers with each layer tamped.

##### 3.4.5.4 Earth Berm

An earth berm, consisting of backfill soil mixture, shall be formed with a minimum 4 inch height around the edge of the plant pit to aid in water retention and to provide soil for settling adjustments.

#### 3.4.6 Plant Bed

Plant material shall be set in plant beds according to the drawings.

Backfill soil mixture shall be placed on previously scarified subsoil to completely surround the root balls, and shall be brought to a smooth and even surface, blending to existing areas. Earth berms shall be provided. Polymers shall be spread uniformly over the plant bed and in the planting pit as recommended by the manufacturer and thoroughly incorporated into the soil to a maximum 4 inch depth.

#### 3.4.7 Watering

Plant pits and plant beds shall be watered immediately after backfilling, until completely saturated.

#### 3.4.8 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.

##### 3.4.8.1 One Bracing Stake

Trees 4 to 6 feet high shall be firmly anchored in place with one bracing stake. The bracing stake shall be placed on the side of the tree facing the prevailing wind. The bracing stake shall be driven vertically into firm ground and shall not injure the ball or root system. The tree shall be held firmly to the stake with a double strand of guying material. The guying material shall be firmly anchored at a minimum 1/2 tree height and shall prevent girdling. A chafing guard shall be used when metal is the guying material.

##### 3.4.8.2 Two Bracing Stakes

Trees from 6 to 8 feet height shall be firmly anchored in place with 2 bracing stakes placed on opposite sides. Bracing stakes shall be driven vertically into firm ground and shall not injure the ball or root system. The tree shall be held firmly between the stakes with a double strand of guying material. The guying material shall be firmly anchored at a minimum 1/2 tree height and shall prevent girdling. Chafing guards shall be used when metal is the guying material.

##### 3.4.8.3 Three Ground Stakes

Trees over a minimum 8 feet height and less than a maximum 6 inch caliper shall be held firmly in place with 3 bracing or ground stakes spaced equidistantly around the tree. Ground stakes shall be avoided in areas to be mowed. Stakes shall be driven into firm ground outside the earth berm. The guying material shall be firmly anchored at a minimum 1/2 tree height and shall prevent girdling. For trees over maximum 3 inch diameter at breast height, turnbuckles shall be used on the guying material for tree straightening purposes. One turnbuckle shall be centered on each guy line. Chafing guards shall be used when metal is the guying material.

#### 3.4.9 Deadmen or Earth Anchors

Trees over a minimum 6 inch caliper shall be held firmly in place with wood deadmen buried a minimum 3 feet in the ground or metal earth anchors. Multi-strand cable guying material shall be firmly anchored at a minimum 1/2 tree height and shall prevent girdling. Turnbuckles shall be used on the guying material for tree straightening purposes. One turnbuckle shall be centered on each guy line. Chafing guards shall be used.

#### 3.4.10 Flags

A flag shall be securely fastened to each guy line equidistant between the tree and the stake, deadmen, or earth anchor. The flag shall be visible to pedestrians.

### 3.5 FINISHING

#### 3.5.1 Plant Material

Prior to placing mulch, the installed area shall be uniformly edged to provide a clear division line between the planted area and the adjacent turf area, shaped as indicated. The installed area shall be raked and smoothed while maintaining the earth berms.

#### 3.5.2 Placing Geotextile

Prior to placing mulch, geotextile shall be placed as indicated in accordance with the manufacturer's recommendations.

#### 3.5.3 Placing Mulch

The placement of mulch shall occur a maximum 48 hours after planting. Mulch, used to reduce soil water loss, regulate soil temperature and prevent weed growth, shall be spread to cover the installed area with a minimum 4 inch uniform thickness. Mulch shall be kept out of the crowns of shrubs, ground cover, and vines and shall be kept off buildings, sidewalks and other facilities.

#### 3.5.4 Pruning

Pruning shall be accomplished by trained and experienced personnel. The pruning of trees and palms shall be in accordance with ANSI A300. Only dead or broken material shall be pruned from installed plants. 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".

### 3.6 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 APPLICATION OF PESTICIDE

When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted and coordinated with the installation pest management program.

#### 3.7.1 Technical Representative

The certified installation pest management coordinator shall be the

technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.

### 3.7.2 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately.

## 3.8 RESTORATION AND CLEAN UP

### 3.8.1 Restoration

Turf areas, pavements and facilities that have been damaged from the planting operation shall be restored to original condition at the Contractor's expense.

### 3.8.2 Clean Up

Excess and waste material shall be removed from the installed area and shall be disposed offsite. Adjacent paved areas shall be cleared.

## 3.9 PLANT ESTABLISHMENT PERIOD

### 3.9.1 Commencement

The plant establishment period for maintaining exterior plantings in a healthy growing condition shall commence on the first day of exterior planting work under this contract and shall continue through the remaining life of the contract and end 12 months after the last day of exterior planting required by this contract. 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 02921A SEEDING AND MULCHING. The plant establishment period shall be modified for inclement weather shut down periods, or for separate completion dates for areas.

### 3.9.2 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.

#### 3.9.2.1 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. An adequate supply of moisture is estimated to be the equivalent of 1 inch

absorbed water per week, delivered in the form of rain or augmented by watering. Run-off, puddling and wilting shall be prevented. Unless otherwise directed, watering trucks shall not be driven over turf areas. Watering of other adjacent areas or existing plant material shall be prevented.

#### 3.9.2.2 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.

#### 3.9.2.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

#### 3.9.2.4 Post-Fertilization

The plant material shall be topdressed at least once during the period of establishment with controlled release fertilizer, reference paragraph SOIL AMENDMENTS. Apply at the rate of 2 pounds per 100 square feet of plant pit or bed area. Dry fertilizer adhering to plants shall be flushed off. The application shall be timed prior to the advent of winter dormancy.

#### 3.9.2.5 Plant Pit Settling

When settling occurs to the backfill soil mixture, additional backfill soil shall be added to the plant pit or plant bed until the backfill level is equal to the surrounding grade. Serious settling that affects the setting of the plant in relation to the maximum depth at which it was grown requires replanting in accordance with paragraph INSTALLATION. The earth berm shall be maintained.

#### 3.9.2.6 Maintenance Record

A record shall be furnished describing the maintenance work performed, the quantity of plant losses, diagnosis of the plant loss, and the quantity of replacements made on each site visit.

#### 3.9.3 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.

#### 3.9.4 Replacement Plant Material

Unless otherwise directed, plant material shall be provided for replacement in accordance with paragraph PLANT MATERIAL. Replacement plant material shall be installed in accordance with paragraph INSTALLATION, and recommendations in paragraph PLANT ESTABLISHMENT PERIOD. Plant material shall be replaced in accordance with paragraph WARRANTY. An extended plant

establishment period shall not be required for replacement plant material.

3.9.5 Maintenance Instructions

Written instructions shall be furnished containing drawings and other necessary information for year-round care of the installed plant material; including, when and where maintenance should occur, and the procedures for plant material replacement.

3.10 Tree Planting Schedule

The Contractor shall furnish and install the Plantings listed in the TREE PLANTING SCHEDULE, at the locations indicated by the Contracting Officer's Representative.

BRUSH CREEK AT WOODLAND PARK IMPROVEMENTS TREE PLANTING SCHEDULE

Name	Common name	Size	Quantity
1 Cercis Canadensis	Redbud	- 1-1/2" cal.	20
2 Cercis Canadensis "Alba"	Whitebud	- 1-1/2" cal.	24
3 Acer Rubrum "Red Sunset"	Red Sunset Red Maple	- 2" cal.	14
4 Fraxinus Americana	White Ash	- 2" cal.	12
5 Malus Sargentii	Sargent Crabapple	- 2" cal.	27

-- End of Section --

Section No.      Title

**DIVISION 3 - CONCRETE**

03101A	Concrete Formwork
03150A	Expansion Joints and Waterstops
03200A	Reinforcement Steel
03301	Cast-In-Place Structural Concrete For Civil Works

SECTION 03101A

FORMWORK FOR CONCRETE  
09/01

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; R 1999) Guide to Formwork for Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31/C 31M (2000) Making and Curing Concrete Test Specimens in the Field

ASTM C 39/C 39M (1999) Compressive Strength of Cylindrical Concrete Specimens

ASTM C 1074 (1998) Estimating Concrete Strength by the Maturity Method

ASTM C 1077 (1998) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

U.S. DEPARTMENT OF COMMERCE (DOC)

PS1 (1996) Voluntary Product Standard - Construction and Industrial Plywood

1.2 DESIGN REQUIREMENTS

The design, engineering, and construction of the formwork shall be the responsibility of the Contractor. The formwork shall be designed for anticipated live and dead loads and shall comply with the tolerances specified in Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE, paragraph CONSTRUCTION TOLERANCES. However, for surfaces with an ACI Class A surface designation, the allowable deflection for facing material between studs, for studs between walers and walers between bracing shall be limited to 0.0025 times the span. The formwork shall be designed as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others. The adequacy of formwork design and construction shall be monitored prior to and during concrete placement as part of the Contractor's approved Quality Control Plan.

### 1.3 SUBMITTALS

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

#### SD-02 Shop Drawings

Shop Drawings; , RE

Drawings and design computations for all formwork required shall be submitted at least 30 days either before fabrication on site or before delivery of prefabricated forms. If reshoring is permitted, the method, including location, order, and time of erection and removal shall also be submitted for review.

#### SD-03 Product Data

Materials; , RE

Manufacturer's literature shall be submitted for plywood, concrete form hard board, form accessories, prefabricated forms, form coating, and form-lining materials.

#### SD-04 Samples

Sample Panels; G, RE

After shop drawings have been reviewed, sample panels for Class A finish with applied architectural treatment shall be built on the project site where directed.

#### SD-06 Test Reports

Inspection; , RE

The Contractor shall submit field inspection reports for concrete forms and embedded items.

Formwork Not Supporting Weight of Concrete; G, RE.

If forms are to be removed in less than 24 hours on formwork not supporting the weight of concrete, the evaluation and results of the control cylinder tests shall be submitted to and approved before the forms are removed.

### 1.4 SHOP DRAWINGS

The shop drawings and data submitted shall include the type, size, quantity, and strength of all materials of which the forms are made, the plan for jointing of facing panels, details affecting the appearance, and the assumed design values and loading conditions.

### 1.5 SAMPLE PANELS

Panels shall be provided for Class A and simulated pebble finish, and shall be of sufficient size to contain joints and shall be not less than 6 feet

long and 4 feet wide. The panels shall be of typical wall thickness and constructed containing the full allocation of reinforcing steel that will be used in the structure, with the forming system that duplicates in every detail the one that will be used in construction of the structure. The same concrete mixture proportion and materials, the same placement techniques and equipment, and the same finishing techniques and timing shall be used that are planned for the structure. Construction of Class A and simulated pebble finish will not be permitted until sample panels have been approved. Sample panels shall be protected from construction operations in a manner to protect approved finish, and are not to be removed until all Class A finish concrete has been accepted.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Forms and Form Liners

Forms and form liners shall be fabricated with facing materials that will produce a finish meeting the specified irregularities in formed surface requirements as defined in ACI 347R. Forms and form liners shall be fabricated with facing materials as specified below.

##### 2.1.1.1 Class "A" Finish

This class of finish shall apply to all exterior surfaces which will be exposed to view. The form facing material shall be composed of new, well-matched tongue-and-groove lumber or new plywood panels conforming to PS1, Grade B-B concrete form, Class I.

##### 2.1.1.2 Class "C" Finish

This class of finish shall apply to formed surfaces which will not be exposed to public view or day light. Such as interior surfaces of utility rooms, and interior surfaces of drains. The form facing may be either tongue-and-groove lumber, plywood, concrete form hard board or steel. Wood form facing for curved or warped surfaces shall be composed of splines of lumber which can be bent to the required shape without splitting or cracking.

##### 2.1.1.3 Class "D" Finish

This class of finish shall apply to formed surfaces which are required to be permanently covered by backfill. The form facing may be of wood or steel.

##### 2.1.1.4 Simulated Pebble Finish

This finish shall be produced by use of special form liners to produce a simulated river rounded gravel texture with an approximate 1-inch gravel size. Simulated pebble finish form liners such as Symons Corporation "Round Stone" or "Riverbed", or Greenstreak Inc "River Bed Aggregate", or approved equal. Samples of each of the above form liner shall be submitted for Contracting Officer selection and approval. A full size sample panel shall be produced using the selected form liner to demonstrate appearance, and compliance with all other specified requirements.

2.1.1.5 Curved Wall Forms

Forms for curved surfaces shall meet the following requirements in addition to the specified construction tolerance and surface requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE:

FORMS FOR CURVED WALLS

<u>Curve Radii</u> <u>(in feet)</u>	<u>Max. Allowable Chord Length</u> <u>(in feet)</u>
0-15	curved
>15-<25	1
>25-<50	2
>50-<100	3
>100-<350	4
>350	8

2.1.2 Form Coating

Form coating shall be commercial formulation that will not bond with, stain, cause deterioration, or any other damage to concrete surfaces. The coating 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. If special form liners are to be used, the Contractor shall follow the recommendation of the form liner manufacturer.

2.2 ACCESSORIES

Ties and other similar form accessories to be partially or wholly embedded in the concrete shall be of a commercially manufactured type. After the ends or end fasteners have been removed, the embedded portion of metal ties shall terminate not less than 2 inches from any concrete surface either exposed to view or exposed to water. Removable tie rods shall not be allowed in the channel or structures in the channel. Plastic snap ties may be used in locations where the surface will not be exposed to view. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Form Construction

Forms shall be constructed true to the structural design and required alignment. The form surface and joints shall be mortar tight and supported to achieve safe performance during construction, concrete placement, and form removal. The Contractor shall continuously monitor the alignment and stability of the forms during all phases to assure the finished product will meet the required surface class or classes specified in paragraph FORMS AND FORM LINERS and tolerances specified in paragraph DESIGN REQUIREMENTS. Failure of any supporting surface either due to surface texture, deflection or form collapse shall be the responsibility of the Contractor as will the replacement or correction of unsatisfactory surfaces. When forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface to

obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be re-used if there is any evidence of defects which would impair the quality of the resulting concrete surface. All surfaces of used forms shall be cleaned of mortar and any other foreign material before reuse.

### 3.1.2 Chamfering

All exposed joints, edges and external corners shall be chamfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. Chamfered joints shall not be permitted where earth or rockfill is placed in contact with concrete surfaces. Chamfered joints shall be terminated twelve inches outside the limit of the earth or rockfill so that the end of the chamfers will be clearly visible.

### 3.1.3 Construction Joints

Grade strips shall be used on all exposed horizontal construction joints so as to obtain a straight and neat horizontal joint. A strip of 1 inch square-edge lumber, bevelled and oiled to facilitate removal, shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 1 inch above the underside of the strip. The strip shall be removed 1 hour after the concrete has been placed, and any irregularities in the joint line shall be leveled off with a wood float, and all laitance shall be removed.

### 3.1.4 Coating

Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that, in cold weather when freezing temperatures are anticipated, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

## 3.2 FORM REMOVAL

Forms shall not be removed without approval. The minimal time required for concrete to reach a strength adequate for removal of formwork without risking the safety of workers or the quality of the concrete depends on a number of factors including, but not limited to, ambient temperature, concrete lift heights, type and amount of concrete admixture, and type and amount of cementitious material in the concrete. It is the responsibility of the Contractor to consider all applicable factors and leave the forms in place until it is safe to remove them. In any case forms shall not be removed unless the minimum time, minimum ambient temperature, and minimum compressive strength requirements below are met, except as otherwise directed or specifically authorized. When conditions are such as to justify the requirement, forms will be required to remain in place for a longer period. All removal shall be accomplished in a manner which will prevent damage to the concrete and ensure the complete safety of the structure. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements. Form removal shall be scheduled so that all necessary repairs can be performed in accordance with ACI 347R Guide for Formwork for Concrete. Evidence that concrete has gained sufficient strength to permit removal of

forms shall be determined by tests on control cylinders. All control cylinders shall be stored in the structure or as near the structure as possible so they receive the same curing conditions and protection methods as given those portions of the structure they represent. Control cylinders shall be removed from the molds at an age of no more than 24 hours. All control cylinders shall be prepared and tested in accordance with ASTM C 31/C 31M and ASTM C 39/C 39M at the expense of the Contractor by an independent laboratory that complies with ASTM C 1077 and shall be tested within 4 hours after removal from the site.

### 3.2.1 Formwork Not Supporting Weight of Concrete

Formwork for walls, columns, sides of beams, gravity structures, and other vertical type formwork not supporting the weight of concrete shall not be removed in less than 24 hours after concrete placement is completed. Form removal before 24 hours will be allowed for simple floor slab, sidewalks, and driveways provided the ambient temperature during this period has not fallen below 50 degrees F at any time since placement and evidence from compressive tests on field-cured concrete control cylinders indicates that the concrete has attained a compressive strength of at least 95 percent of design strength. Control cylinders shall be prepared for each set of forms to be removed before 24 hours. The stability of the concrete shall be evaluated by a structural engineer prior to removal of the forms.

### 3.2.2 Formwork Supporting Weight of Concrete

Formwork supporting weight of concrete and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported concrete may be subjected. As a minimum, forms shall be left in place until control concrete test cylinders indicate evidence the concrete has attained at least 95 percent of the design compressive strength required for the structure.

### 3.2.3 Tunnel Forms

Tunnel lining bulkhead forms shall not be removed in less than 12 hours and tunnel lining forms in not less than 16 hours.

## 3.3 INSPECTION

Forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

-- End of Section --

SECTION 03150A

EXPANSION JOINTS, AND CONSTRUCTION JOINTS  
05/98

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 1752	(1984; R 1996e1) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 2628	(1991; R 1998) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
ASTM D 2835	(1989; R 1998) Lubricant for Installation of Preformed Compression Seals in Concrete Pavements
ASTM D 5249	(1995) Backer Material for Use With Cold and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D 5329	(1996) Standard Test Method for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements

1.2 SUBMITTALS

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

SD-03 Product Data

Preformed Expansion Joint Filler; G, RE  
Sealant; G, RE

Manufacturer's literature, with mill test reports demonstrating compliance with specified requirements. Safety data sheets, for

preformed fillers and the lubricants used in their installation; field-molded sealants and primers (when required by sealant manufacturer); and preformed compression seals.

Manufacturer's recommended instructions for installing preformed fillers, field-molded sealants; and preformed compression seals.

#### SD-04 Samples

Lubricant for Preformed Compression Seals; G, RE

Specimens identified to indicate the manufacturer, type of material, size and quantity of material, and shipment or lot represented. Each sample shall be a piece not less than 9 ft of 1 inch nominal width or wider seal or a piece not less than 12 ft of compression seal less than 1 inch nominal width. One quart of lubricant shall be provided.

Field-Molded Type; G, RE

One gallon of field-molded sealant and one quart of primer (when primer is recommended by the sealant manufacturer) identified to indicate manufacturer, type of material, quantity, and shipment or lot represented.

#### SD-07 Certificates

Preformed Expansion Joint Filler; G, RE  
Sealant; G, RE

Certificates of compliance stating that the joint filler and sealant materials 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 sponge rubber filler strips shall be preformed material conforming to ASTM D 1752 Type I. 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. The expansion joint filler material shall be certified by the manufacturer to be compatible with the joint sealants used in the work.

### 2.2 SEALANT

Joint sealant shall conform to the following:

#### 2.2.1 Preformed Polychloroprene Elastomeric Type

ASTM D 2628.

### 2.2.2 Lubricant for Preformed Compression Seals

ASTM D 2835.

### 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. The sealant shall be selected to match the sealant used in existing adjacent portions of the channel.

## PART 3 EXECUTION

### 3.1 JOINTS

Joints shall be installed at locations indicated and as authorized. In no case shall any fixed metal be continuous through an expansion or monolith joint.

#### 3.1.1 Expansion Joints

Preformed expansion joint filler shall be used in expansion and isolation joints in slabs around columns and between slabs on grade and vertical surfaces where indicated. The filler shall extend the full slab depth, unless otherwise indicated. The edges of the joint shall be neatly finished with an edging tool of 1/8 inch radius, except where otherwise indicated or directed. Where the joint is to receive a sealant, the filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed and oiled wood strip temporarily secured to the top to form a recess to the size shown on the drawings. The wood strip shall not be removed until after the concrete curing period. Contractor may opt to use a removable expansion filler cap designed and fabricated for this purpose in lieu of the wood strip. The groove shall be thoroughly cleaned of laitance, curing compound, foreign materials, protrusions of hardened concrete, and any dust which shall be blown out of the groove with oil-free compressed air.

#### 3.1.2 Joint Sealant

All 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.

##### 3.1.2.1 Joints With Preformed Compression Seals

Compression seals shall be installed with equipment capable of installing joint seals to the prescribed depth without cutting, nicking, twisting, or otherwise distorting or damaging the seal or concrete and with no more than 5 percent stretching of the seal. The sides of the joint and, if necessary, the sides of the compression seal shall be covered with a coating of lubricant. Butt joints shall be coated with liberal applications of lubricant.

3.1.2.2 Joints With Field-Molded Sealant

Joints shall not be sealed when the sealant material, ambient air, or concrete temperature is less than 40 degrees F. Joints requiring a bond breaker shall be coated with curing compound or with bituminous paint. Bond breaker and back-up material shall be installed where required. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

3.2 CONSTRUCTION JOINTS

Construction joints are specified in Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS except that construction joints coinciding with expansion and contraction joints shall be treated as expansion or contraction joints as applicable.

-- End of Section --

SECTION 03200A  
CONCRETE REINFORCEMENT  
09/97

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   | (1995) Building Code Requirements for Structural Concrete and Commentary          |
| ACI 318M/318RM | (1999) Building Code Requirements for Structural Concrete and Commentary (Metric) |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- |                   |   |
|-------------------|---|
| ASTM A 53         | (1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless                |
| ASTM A 184/A 184M | (1996) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement                      |
| ASTM A 185        | (1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement                        |
| ASTM A 615/A 615M | (1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement                   |
| ASTM A 675/A 675M | (1990a; R 1995e1) Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties |
| ASTM A 775/A 775M | (1997e1) Epoxy-Coated Reinforcement Steel Bars  |
| ASTM A 884/A 884M | (1996ae1) Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement                |

AMERICAN WELDING SOCIETY (AWS)

- |          |  |
|----------|--|
| AWS D1.4 | (1998) Structural Welding Code - Reinforcing Steel |
|----------|--|

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

- |            |                                    |
|------------|------------------------------------|
| CRSI 1 MSP | (1996) Manual of Standard Practice |
|------------|------------------------------------|

## 1.2 SUBMITTALS

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

### SD-02 Shop Drawings

Reinforcement; G, RE

Complete shop drawings shall be submitted. The shop drawings shall be prepared under the direct supervision of a professional engineer licensed in the state of Missouri or Kansas. The shop drawings shall contain his seal and a statement certifying that they are in compliance with the specifications and contract drawings. The shop drawing shall include details of the bending and placing schedule of the steel reinforcement, together with bar schedules indicating the number, size, dimensions, and total length of various bars required. Bar lists and bending diagrams shall be checked for accuracy and completeness before the bars are fabricated. Details of typical supports for reinforcing steel shall be approved prior to placing any concrete. Shop drawings shall show all concrete dimensions, location of all reinforcement, elevations, reinforcing steel clearances, and the location of all construction joints shown on the drawings or proposed by the Contractor. The drawings shall show support details including types, sizes and spacing. Spacing between vertical reinforcing steel shall be shown on the elevations. The minimum scale used in the shop drawings shall be 3/8-inch to the foot. Reinforcement bending details shall conform to the requirements of ACI SP-66. Detail drawings showing reinforcing steel placement, schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing.

### SD-07 Certificates

Reinforcing Steel;

Certified copies of mill reports 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.

## 1.3 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 675/A 675M, Grade 80. 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 FABRICATED BAR MATS

Fabricated bar mats shall conform to ASTM A 184/A 184M.

## 2.3 REINFORCING STEEL

Reinforcing steel shall be deformed bars conforming to ASTM A 615/A 615M, grade 60. Epoxy coated reinforcing steel shall be deformed bars conforming to ASTM A 615/A 615M, grade 60. Epoxy coated reinforcement shall be used at locations shown on the drawings or when directed by the Contracting Officer. Epoxy coated reinforcing steel shall conform to ASTM A 775/A 775M.

## 2.4 WELDED WIRE FABRIC

Welded wire fabric shall conform to ASTM A 185. Use of rolled mesh is specifically prohibited. Wire mesh shall be supplied in flat sheets.

## 2.5 WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire. Tie wires and metal clips shall be plastic or epoxy coated when used with epoxy-coated reinforcement.

## 2.6 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI 1 MSP 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, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.

# 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. Epoxy-coated reinforcing steel shall be handled and stored by methods that will not damage the epoxy coating. All systems for handling epoxy-coated reinforcement bars shall have adequately padded contact areas wherever possible. All bundling bands shall be padded and all bundles shall be

lifted with a strong back, multiple supports, or platform bridges as to prevent bar-to bar abrasion from sags in the bar bundle. Bars or bundles shall not be dropped or dragged. Epoxy-coated reinforcing steel shall be transported and stored on wooden or padded supports. Reinforcement shall be placed in accordance with ACI 318/318R at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318/318R. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

### 3.1.2 Repair of Epoxy Coating

Each bar or piece of epoxy coated reinforcement shall be inspected prior to use in the work. Damage to epoxy coating of reinforcing steel shall be repaired. Should damage during shipment and installation exceed 2 percent of the surface area of an entire bar, that bar shall be removed and replaced with an acceptable bar. The sum of the areas covered with patching material applied during repairs at all stages of the work shall not exceed 5 percent of the total surface area of any bar. Patching of damaged areas shall be performed in accordance with the patching material manufacturer's recommendations.

### 3.1.3 Splicing

Splices of reinforcement shall conform to ACI 318/318R and shall be made only as required or indicated. Splicing shall be by lapping. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6 inches.

### 3.2 WELDED-WIRE FABRIC PLACEMENT

Welded-wire fabric shall be placed in slabs as indicated. Fabric placed in slabs on grade shall be continuous between expansion, construction, and contraction joints. Fabric placement at joints shall be as indicated. Lap splices shall be made in such a way that the overlapped area equals the distance between the outermost crosswires plus 2 inches. Laps shall be staggered to avoid continuous laps in either direction. Fabric shall be wired or clipped together at laps at intervals not to exceed 4 feet. Fabric shall be positioned by the use of supports.

### 3.3 DOWEL INSTALLATION

Dowels shall be installed in slabs on grade 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.

-- End of Section --

## SECTION 03301

## CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS

## 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 117/117R	(1990; Errata) Standard Tolerances for Concrete Construction and Materials
ACI 207	(1996) Mass Concrete
ACI 211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 214	(1977; R 1997) Recommended Practice for Evaluation of Strength Test Results of Concrete
ACI 229	(1994) Controlled Low Strength Materials (CLSM)
ACI 303R	(1991) Guide to Cast-in-Place Architectural Concrete Practice
ACI 304R	(1997) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305R	(1999) Hot Weather Concreting
ACI 318/318R	(1992; Rev 1992; Errata) Building Code Requirements for Reinforced Concrete
ACI 318M/318RM	(1995) Building Code Requirements for Structural Concrete and Commentary (Metric)

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31/C 31M	(2000) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1999 ael) Concrete Aggregates

ASTM C 39/C 39M	(1999) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 40	(1999) Organic Impurities in Fine Aggregates for Concrete
ASTM C 42/C 42M	(1999) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 87	(1983; R 1995e1) Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
ASTM C 94/C 94M	(2000) Ready-Mixed Concrete
ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 123	(1998) Lightweight Particles in Aggregate
ASTM C 127	(1988; R 1993e1) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	(1997) Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 142	(1978; R 1997) Clay Lumps and Friable Particles in Aggregates
ASTM C 143/C 143M	(2000) Slump of Hydraulic Cement Concrete
ASTM C 150	(1999a) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 192/C 192M	(2000) Making and Curing Concrete Test Specimens in the Laboratory

ASTM C 231	(1997e1) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2000) Air-Entraining Admixtures for Concrete
ASTM C 295	(1998) Petrographic Examination of Aggregates for Concrete
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 441	(1997e1) Effectiveness of Mineral Admixtures or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction
ASTM C 494/C 494M	(1999a) Chemical Admixtures for Concrete
ASTM C 535	(1996e1) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 595	(2000a) Blended Hydraulic Cements
ASTM C 597	(1983; R 1997) Pulse Velocity Through Concrete
ASTM C 618	(2000) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 666	(1997) Resistance of Concrete to Rapid Freezing and Thawing
ASTM C 803/C 803M	(1997e1) Penetration Resistance of Hardened Concrete
ASTM C 805	(1997) Rebound Number of Hardened Concrete
ASTM C 881	(1999) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 989	(1999) Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars

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ASTM C 1017/C 1017M	(1998) Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C 1059	(1999) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064/C 1064M	(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 C 1107	(1999) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C 1260	(1994) Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM E 1155	(1996) Determining Floor Flatness and Levelness Using the F-Number System
ASTM E 1155M	(1996) Determining Floor Flatness and Levelness Using the F-Number System (Metric)

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 94	(1995) Surface Retarders
COE CRD-C 100	(1975) Method of Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate
COE CRD-C 114	(1997) Test Method for Soundness of Aggregates by Freezing and Thawing of Concrete Specimens
COE CRD-C 130	(1989) Scratch Hardness of Coarse Aggregate Particles
COE CRD-C 143	(1962) Specifications for Meters for Automatic Indication of Moisture in Fine Aggregate

COE CRD-C 318 (1979) Cloth, Burlap, Jute (or Kenaf)  
COE CRD-C 400 (1963) Requirements for Water for Use  
in Mixing or Curing Concrete  
COE CRD-C 521 (1981) Standard Test Method for  
Frequency and Amplitude of Vibrators  
for Concrete

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION. MISSOURI  
STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, 1996 EDITION.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44 (1997) NIST Handbook 44:  
Specifications, Tolerances, and Other  
Technical Requirements for Weighing and  
Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100 (1996) Concrete Plant Standards

## 1.2 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for work covered under this Section and all costs shall be included in the contract unit or lump sum price for the item of work to which the materials and work is incidental.

## 1.3 SUBMITTALS

Item numbers within submittal packages shall be clearly identified. Information, including letters, test results, and certifications, shall be presented with headings relevant to this project.

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, SUBMITTAL PROCEDURES.

SD-08 Statements

Concrete Mixture Proportioning ; G, GD .

Requirements outlined in this paragraph shall be included in one transmittal. Concrete mixture proportions shall be determined by the Contractor, in accordance with the requirements in paragraphs, "MATERIALS" and "CONCRETE MIXTURE PROPORTIONING," and submitted for review. The concrete mixture quantities of all ingredients per cubic yard and nominal maximum coarse aggregate size that will be used

in the manufacture of each quality of concrete shall be stated. Statements regarding cementitious materials, aggregates, and chemical admixtures shall address all requirements specified. Proportions shall indicate the mass of cement, pozzolan and ground granulated blast-furnace (GGBF) slag, and water; the mass of fine and coarse aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

Non-Shrink Grout ; G, GD .

Mixture proportions with laboratory report demonstrating compliance with specified requirements.

Flowable Backfill; G, GD.

Mixture proportions with laboratory report demonstrating compliance with specified requirements.

Batch Plant ; G, GD .

The Contractor shall submit batch plant data, NRMCA Plant Certification with plant inspector's qualification letter, demonstrating compliance with specified requirements.

Concrete Mixers ; G, RE .  
Capacity ; G, RE.

The Contractor shall submit concrete mixer data, which includes the make, type, and capacity of concrete mixers proposed for mixing concrete in conformance with the paragraphs, "CAPACITY" and "CONCRETE MIXERS."

Conveying Equipment and Methods; .

The conveying equipment and methods for transporting, handling, and depositing the concrete shall be submitted for review by the Contracting Officer for conformance with paragraphs, "CAPACITY" and "CONVEYING EQUIPMENT."

Placing Equipment and Methods; .

All placing equipment and methods shall be submitted for review by the Contracting Officer for conformance with paragraph, "CAPACITY."

Testing Technicians ; .  
Concrete Transportation Construction Inspector (CTCI) ; .

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the requirements of paragraph, "TESTS AND INSPECTIONS."

Construction Joint Treatment ; G, RE .

The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review and approval for conformance with paragraph, "CONSTRUCTION JOINT TREATMENT."

Curing and Protection ; G, RE .

The curing medium and methods to be used shall be submitted for review and approval for conformance with paragraph, "CURING AND PROTECTION."

Cold-Weather Placing ; G, RE .

If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection meeting the requirements of paragraph, "COLD-WEATHER PLACING" shall be submitted for approval.

Hot-Weather Placing ; G, RE .

If concrete is to be placed under hot-weather conditions, the proposed materials and methods, meeting the requirements of paragraph, "HOT-WEATHER PLACING" and paragraph, "FINISHING," shall be submitted for review and approval.

**The previous four submittals (Construction Joint Treatment, Curing and Protection, Cold-Weather Placing, and Hot-Weather Placing) shall be submitted in a single packet.**

SD-09 Reports

Aggregate Quality ; G, GD .

Aggregate quality tests shall be submitted at least 30 days prior to start of concrete placement, in accordance with paragraph, "QUALITY OF AGGREGATES."

Uniformity of Concrete Mixing ; G, RE .

The results of the initial mixer uniformity tests as required in paragraph, "MIXER UNIFORMITY" shall be submitted at least 5 days prior to the initiation of placing.

Tests and Inspections ; G, RE .

Test results and inspection reports shall be submitted daily and weekly as required in paragraph, "REPORTS."

SD-13 Certificates

All certificates shall be submitted in a single packet.

Cementitious Materials ; G, GD

Cementitious Materials, including Cement and Pozzolan, and Ground Granulated Blast-Furnace Slag will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished. Certification and mill test reports shall be from samples taken from the particular lot furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious materials will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. Material not meeting specifications shall be promptly removed from the site of work.

Impervious-Sheet Curing Materials ; G, RE

Impervious-Sheet Curing Materials shall be certified for compliance with all specification requirements.

Air-Entraining Admixture ; G, GD

Air-Entraining Admixture shall be certified for compliance with all specification requirements.

Other Chemical Admixtures ; G, GD

Other Chemical Admixtures shall be certified for compliance with all specification requirements.

Membrane-Forming Curing Compound ; G, RE

Membrane-Forming Curing Compound shall be certified for compliance with all specification requirements.

Epoxy Resin ; G, RE

Epoxy Resin Bonding Compound shall be certified for compliance with all specification requirements.

Nonshrink Grout ; G, GD .

Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

## SD-14 Samples

Aggregates ; G, RE .

Samples of materials for government verification testing and approval shall be submitted as required.

## 1.4 GOVERNMENT VERIFICATION TESTING AND SAMPLING

The Government may sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172.

## 1.4.1 Government Verification Sampling and Testing

## 1.4.1.1 Aggregates

The aggregate sources listed at the end of this section for aggregates have been previously tested and at the time testing was performed were capable of producing materials of a quality required for this project provided suitable processing is performed. Coarse aggregates shall be produced from Burlington Limestone. The Government will inspect the Contractor's proposed aggregate sources, prior to determining requirement for initial Government Verification Sampling and Testing. Initial material acceptance will be based on the Government inspection and the results of material testing and evaluation specified in paragraph Tests and Inspections. Material sources shall be tested by an approved independent commercial testing laboratory, and certified copies of laboratory test reports and analysis shall be submitted in accordance with paragraph Tests and Inspections. The Contracting Officer will determine when Government Verification Sampling and Testing is required, to verify compliance with specified requirements. Samples for Government Verification Sampling and Testing, shall be obtained from the source of coarse aggregate and sources of fine aggregate selected by the Contractor, shall be taken under the supervision of the Contracting Officer in accordance with COE CRD-C 100 shall be delivered to the Corps of Engineer's Quality Control Laboratory for testing. Sampling and shipment of samples shall be at the Contractor's expense. Testing will be performed by and at the expense of the Government in accordance with the applicable COE CRD-C or ASTM test methods. If the Contractor selects more than one source for each aggregate size or selects a substitute source for any size aggregate after the original source was tested, the cost of that additional testing will be borne by the Contractor. Tests to which aggregate may be subjected are listed in paragraph QUALITY. The material from the proposed source shall meet the quality requirements of this paragraph. Testing of aggregates by the Government does not relieve the Contractor of the requirements outlined in paragraph TESTS AND INSPECTIONS.

## 1.4.2 Construction Testing by the Government

Government Verification testing will be performed by and at the expense of the Government except as otherwise specified. Samples for Government Verification Sampling and Testing shall be taken under the supervision of the Contracting Officer. Sampling and shipment of samples shall be at the Contractor's expense. Testing will be performed by and at the expense of the Government. The government may require duplicate samples for independent parallel quality assurance testing by the city. All testing and evaluations shall be coordinated with the contracting officer

1.4.2.1 Chemical Admixtures Storage

Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the Contractor when directed by the Contracting Officer and shall be rejected if test results are not satisfactory. Chemical admixtures will be accepted based on compliance with the requirements of paragraph, "CHEMICAL ADMIXTURES."

1.4.2.2 Concrete Strength

Compressive strength verification test specimens will be made by the Government and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

a. Investigation of Low-Strength Test Results - When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

b. Testing of Cores - When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented

by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

c. Load Tests - If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318/318R. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contracting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

## 1.5 DESIGN REQUIREMENTS

### 1.5.1 Concrete Strength

Specified compressive strength  $f'_c$  shall be as follows:

COMPRESSIVE STRENGTH (PSI) STRUCTURE	STRUCTURE OR PORTION OF STRUCTURE
4,000 @ 28 days	For all work, except sidewalks curbs and gutters.

Concrete compressive strength for sidewalks, curbs, and gutters shall conform to the requirements in Section: 02770, CONCRETE SIDEWALKS AND CURBS AND GUTTERS.

### 1.5.2 Maximum Water-Cement (W/C) Ratio

Maximum W/C shall be 0.45 by mass for all work. The W/C ratio may cause higher strengths than that required by paragraph "Concrete Strength" of this section.

## 1.6 CONSTRUCTION TOLERANCES

### 1.6.1 General

The definitions of the terms used in the following tables shall be as defined in ACI 117/117R. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal. Tolerances are not cumulative. The most restrictive tolerance controls. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment, and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A tolerance without

sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction. The application of the tolerances shall not be allowed to result in a reduction in the minimum required concrete clear cover over reinforcement or other metal embedment.

TOLERANCES FOR STRUCTURES (Includes Intakes)

(1) Vertical alignment

For heights 100 feet or less

Lines, surfaces, and arrises..... 1 in

Outside corner of exposed  
corner columns and control  
joint grooves in concrete  
exposed. to view ..... 1/2 in

Sealing surfaces ..... 1/16 in

(2) Lateral alignment

In slabs, centerline location of  
openings 12 inches or smaller  
and edge location of larger openings ..... 1/2 in

Sawcuts, joints, and weakened  
plane embedment in slabs ..... 3/4 in

Sealing surfaces ..... 1/16 in

(3) Level alignment

Top of slabs

Elevation of slabs-on-grade ..... 3/4 in

Lintels, parapets,  
horizontal grooves, and other  
lines exposed to view ..... 1/2 in

Sealing surfaces of sills and postwells.....1/16 in

(4) Cross-sectional dimensions

Members, such as abutments, postwells,  
pedestals, walls (thickness

only), and slabs (thickness only)

12-in. dimension or less .....	+3/8 in
.....	-1/4 in
More than 12 in. but not over 3 ft. dimension .....	+1/2 in
.....	-3/8 in
Over 3 ft. dimension .....	+1 in
.....	-3/4 in
Dimensions of unformed members cast against soil	
.....	+3 in
.....	-1/2 in

(5) Deviations from a planar surface measured with a 10-foot straight edge placed on high points:

General .....	3/8 in
Sealing surface .....	1/16 in

(6) The offset between adjacent pieces of formwork facing material shall not exceed:

Class A .....	1/8 in
Class B .....	1/4 in
Class C .....	1/2 in
Class D .....	1 in

**TOLERANCES FOR TUNNEL LININGS, CONDUITS, PRECAST CONCRETE PIPE, FILLING AND EMPTYING CULVERTS AND INLET AND OUTLET STRUCTURES**

(1) Lateral alignment

Centerline alignment

Water conveying, conduits, and culverts .....	1/2 in
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Others .....	1 in
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Inside dimensions ..... 0.005 times inside dimension

(2) Level alignment

Profile grade

Water conveying ,  
conduits, and culverts ..... 1/2in

Others ..... 1 in

Surface of invert ..... 1/4 in

Surface of side slope ..... 1/2 in

(3) Cross-sectional dimension

Thickness at any point

Conduits ..... +5 percent thickness but  
not less than 1/2 in.

..... -2.5 percent thickness but  
not less than 1/4 in.

1.6.2 Slabs on grade

Tolerances for finished surfaces of slabs on grade shall conform to the requirements specified herein. Measurements shall be accomplished along the alignment of each paving direction (slabs on grade) for sidewalks and pavements. The measurements in the transverse direction shall be accomplished at slab joints and at 5-foot intervals along the alignment. Measurements in the longitudinal direction shall be accomplished continuously along the alignment at the centerline and edges of each paving lane or row of slabs. Measurements shall be accomplished across joints in slabs on grade to determine gradual and abrupt variations in surface elevations across joints.

1.6.3 Appearance

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is approved by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS

### 2.1.1 Cementitious Materials

Cementitious materials shall be Portland cement, Portland-pozzolan cement, Portland cement in combination with pozzolan or GGBF slag and shall conform to appropriate specifications listed below. Use of cementitious materials in architectural concrete shall be restricted to one color, one source, and one type.

#### 2.1.1.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type I or II, except that the maximum amount of C3A in Type I cement shall be limited to a maximum of 15 percent, Type I and II shall meet the low alkali requirement. The same types and source of Portland cement shall be used throughout the entire project. White Portland cement shall meet the above requirements, and may only be used when specifically approved in writing.

#### 2.1.1.2 High-Early-Strength Portland Cement

ASTM C 150, Type III, with C3A limited to 8 percent, meeting the low alkali requirement. Type III may be used only when specifically approved in writing.

#### 2.1.1.3 Pozzolan, Other than Silica Fume

Pozzolan shall conform to ASTM C 618, Class C or F, Tables 1 and 3, including the Supplementary Optional Chemical Requirements in Table 2 for available alkalis, and the Supplementary Optional Physical Requirements in Table 4.

#### 2.1.1.4 Ground Granulated Blast-Furnace Slag

Ground Granulated Blast-Furnace Slag shall conform to ASTM C 989, Grade 100 or 120.

#### 2.1.1.5 Blended Hydraulic Cement

Portland Pozzolan cement shall conform to ASTM C 595, Type IP, meeting the mortar expansion requirement.

### 2.1.2 Aggregates

#### 2.1.2.1 General

Concrete aggregates may be furnished from any source capable of meeting the quality requirements as stated in paragraph QUALITY. Coarse aggregates shall be produced from Burlington limestone. The sources listed at the end of this section were previously evaluated and were found at that time capable of meeting the quality requirements when suitably processed. No guarantee is given or implied that any of the listed sources are currently capable of producing aggregates that meet the required quality stated in

paragraph QUALITY. The listed sources are provided for information only. The contractor shall sample and test all selected aggregates for compliance with specified requirements herein. All sampling and testing (except as otherwise specified) is the contractor's responsibility and shall be accomplished by an approved commercial testing laboratory. Material tests accomplished within 12 months shall be allowed for use in material compliance approvals. The nominal maximum size coarse aggregate for concrete shall be as listed in paragraph NOMINAL MAXIMUM-SIZE COARSE AGGREGATE. Fine and coarse aggregates shall conform to the grading requirements of ASTM C 33.

In addition to the grading limits in ASTM C 33, the fine aggregate, as delivered to the mixer shall have a fineness modulus of not less than 2.40 nor greater than 3.10. The grading of the fine aggregate shall also be controlled so that the fineness moduli of at least four of any five consecutive test samples of the fine aggregate as delivered to the mixer shall not vary more than 0.15 from the average fineness modulus of all samples taken during the first 30 days of concrete placement unless otherwise directed. The fineness modulus shall be determined by dividing by 100, the sum of the cumulative percentages retained on U.S. Standard Sieves Nos. 4, 8, 16, 30, 50, and 100. At the option of the Contractor, fine aggregate may be separated into two or more sizes or classifications, but the uniformity of grading of the separate sizes shall be controlled so that they may be combined throughout the job in fixed proportions established during the first 30 days of concrete placement.

#### 2.1.2.2 Concrete Aggregate Sources

After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish each aggregate for all concrete. If the Contractor proposes to furnish aggregates from a source or from sources not listed at the end of this section, he may designate only a single source or single combination of sources for each aggregate. The contractor shall be responsible for sampling and testing the aggregates. All aggregates shall be tested for compliance with the specified requirements, and certified copies of laboratory test reports submitted for approval prior to the use of the aggregates in the work. If a source for coarse or fine aggregates so designated by the Contractor does not meet the quality requirements stated in paragraph QUALITY, the Contractor shall replace the source. The contractor shall submit certified laboratory reports for the new source, showing compliance with the specified requirements prior to use in the work.

#### 2.1.2.3 Quality

Fine aggregates shall conform to the aggregate quality requirements of ASTM C 33, except as modified herein. Coarse aggregates shall conform to the aggregate quality requirements of ASTM C 33, Class 5S, except as modified herein. Aggregate particles shall be sound and durable and free from objectionable coatings. Coarse aggregate shall not contain more than 0.5 percent by weight of white tripolitic chert that has a specific gravity, saturated surface dry, of less than 2.40. Tripolitic chert is the white porous siliceous form of weathered chert

found in nodules and beds within some Burlington limestone sources. The total amount of all types of chert shall not exceed 3 percent by weight. To keep chert from exceeding these specified maximum limits, it may be necessary to employ selective quarrying to utilize the lesser cherty portions of the limestone deposit and to remove cherty particles by processing, loading, and handpicking from the quarried material before and during final processing into finished aggregate sizes.

All aggregates shall have a specific gravity, saturated surface dry of not less than 2.60, and an absorption of not more than 2.0 percent, as determined by ASTM C 127 and ASTM C 128. All aggregates shall be tested in accordance with ASTM C 1260 and shall have an expansion of less than 0.08 percent at 16 days.

In addition, aggregates delivered to the mixer shall meet the following requirements:

PROPERTY TEST	TEST LIMITS		
	FINE AGGREGATE	COARSE AGGREGATE	
Durability Factor using (Procedure A) 114	Greater than 50	Greater than 50	COE CRD-C ASTM C 666
Clay Lumps and Friable Particles	1	2	ASTM C 142
Material Finer than 75-m (No. 200) Sieve	3	1	ASTM C 33
Organic Impurities	Not darker than No. 3 Not less than 95 percent		ASTM C 40 ASTM C 87
Test Limits			
L.A. Abrasion		35	ASTM C 131 ASTM C 535
Total Lignite	0.1		ASTM C 123
Total Chert, than less 2.40 specific gravity		0.5	ASTM C 123
Coal and Lignite, less than 2.00 specific gravity	0.25	0.25	ASTM C 123
Petrographic Examination	Presence and types of Chert, Coal, Lignite, Shale and Alkali-Silica reactive aggregates		ASTM C 295

\*\* Footnote D to table 3 in ASTM C-33 (1993) remains applicable for the property test item - "Material Finer than 75-mm (No. 200) Sieve".  
\*\*

#### 2.1.2.4 Particle Shape

The shape of the particles in the fine aggregate and in the coarse aggregate shall be generally spherical or cubical. The quantity of flat and elongated particles in the separated size groups of coarse aggregate, as defined and determined by CE specification CRD-C 119 shall not exceed 25 percent in any size group.

#### 2.1.3 Chemical Admixtures

Chemical admixtures to be used, when required or permitted, shall conform to the appropriate specification listed.

##### 2.1.3.1 Air-Entraining Admixture

The air-entraining admixture shall conform to ASTM C 260 and shall consistently cause the concrete to have an air content in the specified ranges under field conditions.

##### 2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494/C 494M, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

##### 2.1.3.3 Water-Reducing or Retarding Admixture

a. Water-Reducing or Retarding Admixtures: ASTM C 494/C 494M, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

b. High-Range Water Reducing Admixture: ASTM C 494/C 494M, Type F or G except that the 6-month and 1-year strength requirements shall be waived. The admixture may be used only when approved by the Contracting Officer, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan.

#### 2.1.4 Curing Materials

##### 2.1.4.1 Impervious-Sheet Curing Materials

Impervious-sheet curing materials shall conform to ASTM C 171, type optional, except polyethylene film shall not be used.

##### 2.1.4.2 Membrane-Forming Curing Compound

The membrane-forming curing compound shall conform to ASTM C 309, Type 1-D or 2, except 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, coating, or flooring specified. Nonpigmented compound shall contain a fugitive dye and shall have the reflective requirements in ASTM C 309 waived.

2.1.4.3 Burlap

Burlap used for curing shall conform to COE CRD-C 318.

2.1.5 Water

Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, alkali, or organic compounds, except that nonpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.6 Nonshrink Grout

Nonshrink grout shall conform to ASTM C 1107 and shall be a commercial formulation suitable for the application proposed.

2.1.7 Flowable Backfill

Flowable backfill shall conform to State Specifications, Section 621 FLOWABLE BACKFILL, except the minimum compressive strength shall be 150 psi at 28 days age. All ingredients used in the flowable backfill shall conform to the requirements specified herein.

2.1.8 Epoxy Resin

Epoxy resin for use in repairs shall conform to ASTM C 881, Type III, Grade I or II.

2.2 CONCRETE MIXTURE PROPORTIONING

2.2.1 Quality of Mixture

For each portion of the structure, mixture proportions shall be selected so that the strength and W/C requirements listed in paragraph DESIGN REQUIREMENTS are met.

2.2.2 Cement Content

Cement Content shall be measured by weight. Cement content per cubic yard of concrete shall be 564 pounds, minimum, for all work.

2.2.3 Aggregate

The aggregate portion of the concrete mixtures shall contain at least 50 percent crushed Burlington limestone coarse aggregate

2.2.4 Nominal Maximum-Size Coarse Aggregate

Nominal maximum-size coarse aggregate for all concrete shall be 3/4 inch.

2.2.5 Air Content

Air content of all concrete as delivered to the forms and as determined by ASTM C 231 shall be between 4-1/2 and 7-1/2 percent.

2.2.6 Slump

The slump shall be determined in accordance with ASTM C 143/C 143M. All concrete shall have a slump within the range of 1 to 4 inch. Where placement by pump is approved, the slump shall not exceed 6 inches. The slump of pumped concrete shall be determined at the discharge side of the pump. Flowable backfill shall conform to State Specifications.

2.2.7 Concrete Proportioning

Trial batches and testing requirements for various qualities of concrete specified shall be the responsibility of the Contractor. Samples of aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios, which will produce a range of strength encompassing those required for the work. The maximum water-cement ratios required in paragraph MAXIMUM WATER-CEMENT RATIO will be converted to a weight ratio of water to cement plus pozzolan by mass, or GGBF slag by mass equivalency as described in ACI 211.1. In the case where GGBF slag is used, the weight of the slag shall be included in the equations for the term P, which is used to denote the mass of pozzolan. If pozzolan (Fly Ash) is used in the concrete mixture, the pozzolan content shall be 20 percent of the total cementitious material. Trial mixtures shall be proportioned for maximum permitted slump and air content with due consideration to the approved conveying and placement method. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192/C 192M. They shall be tested at 7 days and at the design age specified in paragraph DESIGN REQUIREMENTS in accordance with ASTM C 39/C 39M. From these test results, a curve will be plotted showing the relationship between water-cement ratio and strength. Flowable backfill shall conform to the requirements herein for concrete and to state specifications section 621.

2.2.8 Required Average Compressive Strength

In meeting the strength requirements specified in paragraph CONCRETE STRENGTH, the selected mixture proportion shall produce a required average compressive strength  $f'_{cr}$  exceeding the specified strength  $f'_c$  by the amount indicated below.

#### 2.2.8.1 Average Compressive Strength from Test Records

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected, shall represent concrete produced to meet a specified strength or strengths ( $f'_c$ ) within 1,000 psi of that specified for proposed work, and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another test age designated for determination of  $f'_c$ .

Required average compressive strength  $f'_{cr}$  used as the basis for selection of concrete proportions shall be the larger of the equations that follow using the standard deviation as determined above:

$$f'_{cr} = f'_c + 1.34S$$

$$f'_{cr} = f'_c + 2.33S - 500$$

Where  $S$  = standard deviation

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and a modification factor from the following table:

NUMBER OF TESTS* less than 15 STRENGTH	MODIFICATION FACTOR FOR STANDARD DEVIATION Use tabulation in paragraph DETERMINING REQUIRED AVERAGE
	15
20	1.08
25	1.03
30 or more	1.00

\*Interpolate for intermediate numbers of tests.

#### 2.2.8.2 Average Compressive Strength without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, the required average strength  $f_{cr}$  shall be determined as follows:

If the specified compressive strength  $f'_c$  is less than 3,000 psi,

$$f'_{cr} = f'_c + 1,000 \text{ psi}$$

If the specified compressive strength  $f'_c$  is 3,000 to 5,000 psi,

$$f'_{cr} = f'_c + 1,200 \text{ psi}$$

If the specified compressive strength  $f'_c$  is over 5,000 psi,

$$f'_{cr} = f'_c + 1,400 \text{ psi}$$

### PART 3 EXECUTION

#### 3.1 EQUIPMENT

##### 3.1.1 Capacity

The batching, mixing, conveying, and placing equipment shall have a capacity of at least 40 cubic yards per hour.

##### 3.1.2 Batch Plant

Batch plant shall conform to the requirements of NRMCA CPMB 100 and as specified. The contractor's plant submittal shall include a certified copy of the NRMCA QC Manual Section 3 Plant Certification Check List, with a letter stating the inspector's qualifications. However, rating plates attached to batch plant equipment are not required. The batch plant may be located on or off the project site.

##### 3.1.2.1 Batching Equipment

The batching controls shall be semiautomatic or automatic. The semiautomatic batching system shall be provided with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with an accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Separate bins or compartments shall be provided for each size group of aggregate and cement, pozzolan, and GGBF slag. Aggregates shall be weighed either in separate weigh batchers with individual scales or cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cement, pozzolan, or GGBF slag. If both cement and pozzolan or GGBF slag are used, they may be batched cumulatively provided that the Portland cement is batched first. If measured by mass, the mass of the water shall not be weighed cumulatively with another ingredient. Water batcher filling and discharging valves shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. An accurate mechanical device for measuring and dispensing each admixture shall be provided. Each dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and discharged automatically in a manner to obtain uniform distribution throughout the batch in the specified mixing period. Admixtures shall not be combined prior to introduction in water. The

plant shall be arranged so as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment. All filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

3.1.2.2 Scales

The equipment for batching by mass shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Tests shall be made at the frequency required in paragraph TESTS AND INSPECTIONS, and in the presence of a government inspector.

3.1.2.3 Batching Tolerances

a. Weighing Tolerances

REQUIRED	MATERIAL	PERCENT OF MASS
2	Cementitious materials Aggregate	0 to plus 2 plus or minus
1	Water	plus or minus
	Chemical admixture	0 to plus 6

b. Volumetric Tolerances - For volumetric batching equipment, the following tolerances shall apply to the required volume of material being batched:

- Water: ..... Plus or minus 1 percent.
- Chemical admixtures: ..... Zero to plus 6 percent.

3.1.2.4 Moisture Control

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched. An electric moisture meter complying with the provisions of COE CRD-C 143 shall be provided for measuring moisture in the fine aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the sand bin or in the sand batcher.

3.1.3 Concrete Mixers

The concrete mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the

drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

#### 3.1.3.1 Stationary Mixers

Concrete plant mixers shall be tilting, nontilting, horizontal-shaft, vertical-shaft, or pugmill and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixing time and uniformity shall conform to all the requirements in ASTM C 94/C 94M applicable to central-mixed concrete.

#### 3.1.3.2 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94/C 94M. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it will be possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

#### 3.1.4 Conveying Equipment

The conveying equipment shall conform to the following requirements.

##### 3.1.4.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least five times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 2 square feet. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 2 cubic yards shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

##### 3.1.4.2 Transfer Hoppers

Concrete may be charged into non-agitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and have conical-shaped discharge features. The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external vibration to effect complete discharge. Concrete shall not be held in non-agitating transfer hoppers more than 30 minutes.

#### 3.1.4.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94/C 94M. Non-agitating equipment may be used for transporting plant-mixed concrete over a smooth road when the hauling time is less than 15 minutes. Bodies of non-agitating equipment shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will permit positive control of the discharge of the concrete.

#### 3.1.4.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or non-agitating equipment, the chutes attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete.

#### 3.1.4.5 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 36 inches. The belt speed shall be a minimum of 300 feet per minute and a maximum of 750 feet per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant trunk that is long enough to extend through the reinforcing bars.

#### 3.1.4.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure. 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 4 inches. Aluminum pipe shall not be used.

#### 3.1.5 Vibrators

Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

APPLICATION	HEAD DIAMETER INCHES	FREQUENCY VPM	AMPLITUDE INCHES
Thin walls, beams, etc.	1-1/4 to 2-1/2	9,000 to 13,500	0.02 to 0.04

General construction                    2 to 3-1/2    8,000 to 12,000    0.025 to  
0.05

The frequency and amplitude shall be determined in accordance with COE CRD-C 521.

### 3.2 PREPARATION FOR PLACING

#### 3.2.1 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. Embedded items shall be 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. Welding, including tack welding, will not be permitted on embedded metals within 2 feet of the surface of the concrete.

#### 3.2.2 Concrete on Earth Foundations

Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with Section 02201 - EARTHWORK.

#### 3.2.3 Concrete on Rock Foundations

Rock surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semidetached, or unsound fragments. Joints in rock shall be cleaned to a satisfactory depth, as determined by the Contracting Officer, and to firm rock on the sides. Immediately before the concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of air-water jets or sandblasting as described in paragraph CONSTRUCTION JOINT TREATMENT. All rock surfaces shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. The mortar shall be covered with concrete before the time of initial setting of the mortar.

#### 3.2.4 Construction Joint Treatment

Construction joint treatment shall conform to the following requirements.

##### 3.2.4.1 Joint Preparation

Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by

cleaning with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean, well bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. The surface shall be washed clean again as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed.

#### 3.2.4.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 90 to 110 psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in applications. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

#### 3.2.4.3 High-Pressure Water Jet

A stream of water, under a pressure of not less than 3,000 psi, may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse-aggregate particles. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

#### 3.2.4.4 Wet Sandblasting

This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

#### 3.2.4.5 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

### 3.3 PLACING

### 3.3.1 Placing Procedures

The surfaces of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete. Surfaces may be dampened immediately before placement if necessary. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. Concrete shall be deposited as close as possible to its final position in the forms and, in so depositing, 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 may be effectively consolidated in horizontal layers 2.0 feet or less in thickness with a minimum of lateral movement. The amount deposited in each location shall be that which can be readily and thoroughly consolidated. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed. Concrete shall be placed 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 that is conical in shape. The concrete shall not be dropped vertically more than 5 feet, except where a properly designed and sized elephant truck with rigid drop chute bottom section is provided to prevent segregation and where specifically authorized. In no case will concrete be discharged to free-fall through reinforcing bars.

### 3.3.2 Placement by Pump

When concrete is to be placed by pump, the nominal maximum-size coarse aggregate shall 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. Grout used to lubricate the pumping equipment at the beginning of the placement will not be incorporated into the placement.

### 3.3.3 Time Interval Between Mixing and Placing

Concrete shall be placed within 30 minutes after discharge into non-agitating equipment. When concrete is truck-mixed or when a truck mixer or agitator is used for transporting concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours after introduction of the cement to the aggregates. When the length of haul makes it impossible to deliver truck-mixed concrete within these time limits, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site.

### 3.3.4 Cold-Weather Placing

When cold-weather placing of concrete is likely to be subjected to freezing temperatures before the expiration of the curing period, it shall be placed in accordance with procedures previously submitted in accordance with paragraph SUBMITTALS. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be above 32 degrees F. The placing temperature of the concrete having a minimum dimension less than 12 inches shall be between 55 and 75 degrees F when measured in accordance with ASTM C 1064/C 1064M. The placing temperature of the concrete having a minimum dimension greater than 12 inches shall be between 50 and 70 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

### 3.3.5 Hot-Weather Placing

Concrete shall be properly placed and finished with procedures previously submitted in accordance with paragraph SUBMITTALS. The concrete-placing temperature shall not exceed 85 degrees F when measured in accordance with ASTM C 1064/C 1064M. Cooling of the mixing water and aggregates, or both, may be required to obtain an adequate placing temperature. A retarder meeting the requirements of paragraph WATER-REDUCING OR RETARDING ADMIXTURES may be used to facilitate placing and finishing. Steel forms and reinforcement 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.

### 3.3.6 Consolidation

Immediately after placement, each layer of concrete, including Controlled Low Strength Material (CLSM) shall be consolidated by internal vibrating equipment. Vibrators shall not be used to transport concrete within the forms. Hand spading may be required, if necessary, with internal vibrating along formed surfaces permanently exposed to view. Form or surface vibrators shall not be used unless specifically approved. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding unhardened layer if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly.

### 3.3.7 Placing Concrete Underwater

Concrete placements required in water, shall be deposited in water by a tremie or concrete pump. Placement by pumps or tremies shall conform to ACI 304, and the requirements specified herein. The methods and equipment used shall be subject to approval. Concrete buckets will not be permitted for underwater placement of concrete except to deliver concrete to the tremie. The tremie shall be watertight and sufficiently large to permit a free flow of concrete. The discharge end of the pump line or tremie shaft shall be kept

continuously submerged in the concrete. The underwater seal shall be effected in a manner that will not produce undue turbulence in the water. The tremie shaft shall be kept full of concrete to a point well above the water surface. Placement shall proceed without interruption until the concrete has been brought to the required height. The tremie shall not be moved horizontally during a placing operation, and a sufficient number of tremies shall be provided so that the maximum horizontal flow will be limited to 15 feet.

### 3.4 FINISHING

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 40 degrees F. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour. Provisions 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. All unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish. Additional finishing shall be as specified below and shall be true to the elevation shown in the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

#### 3.4.1 Unformed Surfaces

##### 3.4.1.1 Float Finish

All unformed surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing operation. The concrete, while still green but sufficiently hardened to bear a man's weight without deep imprint, shall be floated to a true and even plane. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be made of magnesium or aluminum.

##### 3.4.1.2 Trowel Finish

A trowel finish shall be applied to unformed surfaces where specifically indicated on the drawings. Concrete surfaces shall be finished with a float finish, and after surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish free from blemishes including trowel marks.

##### 3.4.1.3 Broom Finish

A broom finish shall be applied as the final surface texturing for slabs on grade, which will be subject to vehicle or pedestrian

traffic. The concrete surface shall be given a float finish. The floated surface shall be broomed with a fiber-bristle brush in a direction transverse to that of the main traffic

#### 3.4.1.4 Wire-Comb Texturing

This surface texturing shall only be used where specifically indicated on the drawings. Surface texture transverse to the pavement centerline shall be applied using a mechanical wire comb drag. The comb shall be capable of traversing the full width of the pavement in a single pass at a uniform speed and with a uniform pressure. Successive passes of the comb shall be overlapped the minimum necessary to obtain a continuous and uniformly textured surface. The scores shall be 1/8 to 3/16 inch deep, 1/16 to 1/8 inch wide, and spaced 1/2 inch apart

#### 3.4.2 Formed Surfaces

Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired as described in paragraph FORMED SURFACE REPAIR. Unless painting of surfaces is required, uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement, with joints between panels planned in approved relation to openings, building corners, and other architectural features. The finished surface of textured, tooled, and other architectural finishes shall duplicate the pre-approved sample panel. The sample panel shall be prepared in accordance with Section 03101 FORMWORK FOR CONCRETE. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

##### 3.4.2.1 Textured Finish

Textured finish shall be applied where specified or indicated, unless otherwise directed. This type of finish shall be applied where specified to conform to details shown in the drawings by use of approved textured form liners. Liner panels shall be secured in the forms by methods recommended by the manufacturer but not by methods that will permit impressions of nail heads, screw heads, washers, or the like to be imparted to the surface of the concrete. Edges of textured panels shall be sealed to each other to prevent grout leakage. The sealant used shall be non-staining to the surface. The finish shall be similar to and shall closely match the finish on the sample panel.

##### 3.4.2.2 Tooled Finish

Tooled finish shall be applied where specified or indicated, unless otherwise directed. The thoroughly cured concrete shall be dressed with electric, air, or hand tools to a uniform texture and shall be given a hand-tooled surface texture. The finish shall be similar to and shall closely match the finish on the sample panel.

### 3.4.3 Formed Surface Repair

After removal of forms, all ridges, lips, and bulges on surfaces permanently exposed shall be removed. All repairs shall be completed within 48 hours after form removal.

#### 3.4.3.1 Class A Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have a class A finish and simulated pebble finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs smaller than 16 square inches in area and less than 1/2 inch deep and bug holes exceeding 1/2 inch in diameter shall be chipped and filled with dry-packed mortar. Holes left by removal of tie rods shall be reamed and filled with dry-packed mortar as specified in paragraph MATERIAL AND PROCEDURE FOR REPAIRS. Defective and unsound concrete areas larger than described shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern with lines parallel to the formwork, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

#### 3.4.3.2 Class C and Class D Finishes

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown shall have defects repaired as follows: defective areas, voids, and honeycombs smaller than 24 square inches and less than 2 inches deep; bug holes exceeding 1-1/2 inches in diameter shall be chipped and filled with dry-packed mortar; and holes left by removal of the tie rods shall be chipped and filled with dry-packed mortar. Defective and unsound concrete areas larger than 24 square inches and deeper than 1-1/2 inches shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

#### 3.4.3.3 Material and Procedure for Repairs

The cement used in the dry-packed mortar or replacement concrete shall be a blend of the cement used for production of project concrete and white Portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be used to determine the proportions required to match colors. Dry-packed mortar shall consist of one part cement to two and one-half parts fine aggregate. The fine aggregate shall be that used for production of project concrete. The mortar shall be remixed over a period of at least 30 minutes without addition of water until it obtains the stiffest consistency that will permit placing. Mortar

shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. and struck off to match adjacent concrete. Replacement concrete shall be produced using project materials and shall be proportioned by the Contracting Officer. It shall be thoroughly compacted into the prepared void by internal vibration, tamping, rodding, ramming, etc. and shall be struck off and finished to match adjacent concrete. Forms shall be used to confine the concrete. If an expanding agent is used in the repair concrete, the repair shall be thoroughly confined on all sides including the top surface. Metal tools shall not be used to finish permanently exposed surfaces. The repaired areas shall be cured for 7 days. The temperature of the in situ concrete, adjacent air, and replacement mortar or concrete shall be above 40 degrees F during placement, finishing, and curing. Other methods and materials for repair may be used only when approved in writing by the Contracting Officer. Repairs of the so called "plaster-type" will not be permitted.

### 3.5 CURING AND PROTECTION

#### 3.5.1 Duration

All concrete shall be cured by an approved method. Curing effectiveness and methods shall be continuously maintained to ensure that concrete curing is uninterrupted for the entire curing period.

Concrete produced with Type I or III Portland cement shall be cured for at least 7 days.

Concrete containing Type II Portland cement, or fly ash shall be cured for at least 14 days.

Concrete containing GGBF slag shall be cured for at least 21 days.

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, and mechanical damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours and from flowing water for 14 days. No fire or excessive heat including welding shall be permitted near or in direct contact with concrete or concrete embedments at any time. Concrete placements shall be protected from damaging thermal gradients and temperature conditions as recommended in ACI 207, except as otherwise specified or directed.

#### 3.5.2 Moist Curing

Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required in paragraph APPEARANCE. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel

forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of 2 inches of continuously saturated sand, or by covering with saturated non-staining burlap or cotton mats. Horizontal construction joints may be allowed to dry for 12 hours immediately prior to the placing of the following lift.

### 3.5.3 Membrane-Forming Curing Compound

Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface to which a grout-cleaned finish is to be applied or other concrete is to be bonded, on any surface containing protruding steel reinforcement, on an abrasive aggregate finish, or any surface maintained at curing temperature by use of free steam. A styrene acrylate or chlorinated rubber compound may be used for surfaces that are to be painted or are to receive bituminous roofing or waterproofing, or for 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.

#### 3.5.3.1 Pigmented Curing Compound

A pigmented curing compound meeting the requirements of the above paragraph MEMBRANE-FORMING CURING COMPOUND may be used on surfaces that will not be exposed to view when the project is completed.

#### 3.5.3.2 Nonpigmented Curing Compound

A nonpigmented curing compound containing a fugitive dye may be used on surfaces that will be exposed to view when the project is completed. Concrete cured with nonpigmented curing compound must be shaded from the sun for the first 3 days when the ambient temperature is 90 degrees F or higher.

#### 3.5.3.3 Application

The 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. The surfaces shall be thoroughly moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as free water has disappeared and bleeding has stopped. 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. Concrete surfaces that 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. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

#### 3.5.4 Evaporation Retardant

Sheet curing shall not be used on vertical or near-vertical surfaces. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper or polyethylene-coated burlap having the burlap thoroughly water-saturated before placing. 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. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

#### 3.5.5 Cold-Weather Curing and Protection

When the daily outdoor low temperature is less than 32 degrees F, the temperature of the concrete shall be maintained above 40 degrees F for the first 7 days after placing. During the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that the concrete will not be subjected to damaging temperature differential and thermal gradients as determined in accordance with ACI 207. The concrete temperature conditions shall be monitored by use of suitable temperature measuring devices furnished by the Contractor and installed adjacent to the concrete surface and near the bottom of the placement or lift.

#### 3.5.6 Hot Weather Curing and Protection

WHEN THE RATE OF EVAPORATION OF SURFACE MOISTURE, AS DETERMINED BY USE OF FIG. 2.1.5 OF ACI 305, MAY REASONABLY BE EXPECTED TO EXCEED 0.2 POUNDS PER SQUARE FOOT PER HOUR, PROVISIONS 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.

### 3.6 SETTING OF BASE PLATES AND BEARING PLATES

#### 3.6.1 Setting of Plates

After being plumbed and properly positioned, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be provided with full bearing with nonshrink grout. The space between the top of concrete or masonry-bearing surface and the bottom of the plate shall be approximately 1/24 of the width of the plate, but not less than 1/2 inch for plates less than 12 inches wide. Concrete surfaces shall be rough, clean, and free of oil, grease, and laitance, and they shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

### 3.6.2 Nonshrink Grout Application

Nonshrink grout shall conform to the requirements of paragraph NONSHRINK GROUT. Water content shall be the minimum that will provide a flowable mixture and fill the space to be grouted without segregation, bleeding, or reduction of strength.

#### 3.6.2.1 Mixing and Placing of Nonshrink Grout

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be of size to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry-bearing surface and the plate shall be filled solid with the grout. Forms shall be of wood or other equally suitable material for retaining the grout and shall be removed after the grout has set. If grade "A" grout as specified in ASTM C 1107 is used, all surfaces shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be under pressure with a grout pump.

Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 65 to 85 degrees F until after setting.

#### 3.6.2.2 Treatment of Exposed Surfaces

After the grout has set, those types containing metallic aggregate shall have the exposed surfaces cut back 1 inch and immediately covered with a parge coat of mortar proportioned by mass of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

#### 3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph CURING AND PROTECTION.

### 3.7 TESTS AND INSPECTIONS

Tests and inspections shall conform to the following requirements.

#### 3.7.1 General

The Contractor shall perform the inspections and tests described below, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall conform with ASTM C 1077. The laboratory shall be located onsite. (An offsite laboratory may be used, subject to the approval of the Contracting Officer.) The individuals who sample and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Transportation Construction Inspector (CTCI). The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077.

#### 3.7.2 Testing and Inspection Requirements

##### 3.7.2.1 Fine Aggregate

a. Grading - At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and COE CRD-C 104 for the fine aggregate or for each size range of fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits.

b. Corrective Action for Fine Aggregate Grading - When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer.

c. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing

foreman. When the electric moisture meter is operating satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.

d. Moisture Content Corrective Action - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device) if necessary to maintain the specified slump.

#### 3.7.2.2 Coarse Aggregate

a. Grading - At least once during each consecutive 8 hours of operations 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. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for graduation control which are coarser than the specification limits for samples taken at locations other than as delivered to the mixer to allow for degradation during handling.

b. Corrective Action for Grading - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of five tests are outside specification limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

c. Coarse Aggregate Moisture Content - A test for moisture content of each size group of coarse aggregate shall be made at least twice per week. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified above for fine aggregate, until the difference falls below 1.0 percent.

d. Coarse Aggregate Moisture Corrective Action - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted if necessary to maintain the specified slump.

## 3.7.2.3 Quality of Aggregates

a. Frequency of Quality Tests - Thirty days prior to the start of concrete placement the Contractor shall perform all tests for aggregate quality listed below. In addition, after the start of concrete placement, the Contractor shall perform tests for aggregate quality in accordance with the frequency schedule shown below. Samples tested after the start of concrete placement shall be taken immediately prior to entering the concrete mixer.

PROPERTY	FINE AGGREGATE	FREQUENCY COARSE AGGREGATE	TEST
Specific Gravity 127	Every 3 months	Every 3 months	ASTM C
128			ASTM C
Absorption 127	Every 3 months	Every 3 months	ASTM C
128			ASTM C
Durability Factor Using, 114 (Procedure A) 666	Every 12 months	Every 12 months	COE CRD-C ASTM C
Alkali Reactivity 1260	Every 3 months	Every 3 months	ASTM C
Clay Lumps and Friable Particles 142	Every 3 months	Every 3 months	ASTM C
Material Finer than the 75-m (No. 200) Sieve 117	Not applicable	Every 3 months	ASTM C
Impurities	Every 3 months	Not applicable	ASTM C 40 ASTM C 87
L.A. Abrasion 131	Not applicable	Every 6 months	ASTM C
535			ASTM C
Petrographic Examination 295	Every 6 months	Every 6 months	ASTM C

Total Chert,  
than less 2.40  
specific gravity    Every 6 months    Every 4 hours    ASTM C  
123

Coal and  
Lignite, less  
than 2.00  
gravity    Every 6 months    Every 6 months    ASTM C  
123

b. Corrective Action for Aggregate Quality - If the result of a quality test fails to meet the requirements for quality immediately prior to start of concrete placement, production procedures or materials shall be changed and additional tests shall be performed until the material meets the quality requirements prior to proceeding with either mixture proportioning studies or starting concrete placement. After concrete placement commences, whenever the result of a test for quality fails the requirements, the test shall be rerun immediately. If the second test fails the quality requirement, the fact shall be reported to the Contracting Officer and immediate steps taken to rectify the situation.

3.7.2.4 Scales

a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every 3 months for conformance with the applicable requirements of paragraph BATCHING EQUIPMENT. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors.

b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph BATCH PLANT for checking the accuracy of dispensed admixtures are operating properly.

c. Scales Corrective Action - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.7.2.5 Batch-Plant Control

The measurement of all constituent materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be

adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during plant operation.

#### 3.7.2.6 Concrete Mixture

a. Air Content Testing - Air content tests shall be made when test specimens are fabricated. In addition, at least two tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government quality assurance representative. Tests shall be made in accordance with ASTM C 231. Test results shall be plotted on control charts, which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single test result reaches either the upper or lower action limit a second test shall immediately be made. The results of the two tests shall be averaged and this average used as the air content of the batch to plot on both the control chart for air content and the control chart for range, and for determining the need for any remedial action. The result of each test, or average as noted in the previous sentence, shall be plotted on a separate chart for each mixture on which an "average line" is set at the midpoint of the specified air content range from paragraph AIR CONTENT. An upper warning limit and a lower warning limit line shall be set 1.0 percentage point above and below the average line. An upper action limit and a lower action limit line shall be set 1.5 percentage points above and below the average line, respectively. The range between each two consecutive tests shall be plotted on a control chart for range where an upper warning limit is set at 2.0 percentage points and up upper action limit is set at 3.0 percentage points. Samples for air content may be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated air content. If the Contractor's materials or transportation methods cause air content loss between the mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the air content at the mixer controlled as directed.

b. Air Content Corrective Action - Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as is practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the control chart range reaches the warning limit, the admixture dispenser shall be

recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted. All this shall be at no extra cost to the Government.

c. Slump Testing - In addition to slump tests which shall be made when test specimens are fabricated, at least four slump tests shall be made on randomly selected batches in accordance with ASTM C 143/C 143M for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government's quality assurance representative. Test results shall be plotted on control charts, which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, a second test shall immediately be made on the same batch of concrete. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control chart for percent air and the chart for range, and for determining the need for any remedial action. An upper warning limit shall be set at 1/2 inch below the maximum allowable slump on separate control charts for percent air used for each type of mixture as specified in paragraph SLUMP, and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at 2 inches. Samples for slump shall be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the slump at the mixer controlled as directed.

d. Slump Corrective Action - Whenever points on the control chart for slump reach the upper warning limit, an adjustment shall be immediately made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum W/C specified, based upon aggregates which are in a saturated surface-dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting

operation shall immediately be halted and the Contractor shall take appropriate steps to bring the slump under control. Also, additional slump tests shall be made as directed. All this shall be at no additional cost to the Government.

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/C 1064M. The temperature shall be reported along with the compressive strength data. During hot weather conditions, mass or large placements with a least dimension of 2.5 feet shall have a temperature measurement made for each batch or delivery at the placement location, prior to placement.

f. Compressive-Strength Specimens - At least one set of test specimens shall be made each day on each different concrete mixture placed during the day. Additional sets of test cylinders shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A random sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased manner. A set of test specimens for concrete with a 28-day specified strength per paragraph DESIGN REQUIREMENTS shall consist of four cylinders, two to be tested at 7 days and two at 28 days. A set of test specimens for concrete with a 7-day strength per specified paragraph DESIGN REQUIREMENTS shall consist of six cylinders, two tested at 3 days, two at 7 days, and two at 28 days. Test specimens shall be molded and cured in accordance with ASTM C 31/C 31M and tested in accordance with ASTM C 39/C 39M. All compressive-strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength tests, moving average for strength, and moving average for range for each mixture. The charts shall be similar to those found in ACI 214.

#### 3.7.2.7 Inspection Before Placing

Foundation or construction joints, forms, and embedded items shall be inspected for quality by the Contractor in sufficient time prior to each concrete placement to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

#### 3.7.2.8 Placing

a. Placing Inspection - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement.

b. Placing Corrective Action - The placing foreman shall not permit batching and placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

#### 3.7.2.9 Vibrators

a. Vibrator Testing and Use - The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521 prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined at the same time the vibrator is operating in concrete with the tachometer held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing.

b. Vibrator Corrective Action - Any vibrator not meeting the requirements of paragraph VIBRATORS shall be immediately removed from service and repaired or replaced.

#### 3.7.2.10 Curing

a. Moist-Curing Inspections - At least once each shift, and once per day on nonwork days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist-Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

c. Membrane-Curing Inspection - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square feet per gallon. He shall note whether or not coverage is uniform.

d. Membrane-Curing Corrective Action - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. Sheet-Curing Inspection - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. Sheet-Curing Corrective Action - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

#### 3.7.2.11 Cold-Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on nonwork days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

#### 3.7.2.12 Cold-Weather Protection Corrective Action

When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended 1 day.

#### 3.7.2.13 Mixer Uniformity

a. Stationary Mixers - Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 75,000 cubic yards of concrete placed, whichever results in the longest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94/C 94M.

b. Truck Mixers - Prior to the start of concrete placing and at least once every 6 months when concrete is being placed, uniformity of concrete shall be determined in accordance with ASTM C 94/C 94M. The truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer, the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory.

#### 3.7.2.14 Mixer Uniformity Corrective Action

When a mixer fails to meet mixer uniformity requirements, either the mixer shall be removed from service on the work, the mixing time shall

be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

3.7.3 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all test and inspection records.

LIST OF COARSE AGGREGATE SOURCES

<u>QUARRIES UNIT</u>	<u>COUNTY</u>	<u>STATE</u>	<u>GEOLOGICAL</u>
LaFarge (Menefee) - Dresden Quarry LS Sec. 23, T.46N, R22W Sedalia, MO 816-826-0328	Pettis	MO	Burlington
Fischer Quarries LS Sec 17, T46, R21 Hughesville, MO 660-829-5555, 800-352-1517	Pettis	MO	Burlington
Hilty Quarries - Snyder Quarry LS Sec. 16, T39N, R25W Clinton, MO 816-855-8135	St. Clair	MO	Burlington
Hilty Quarries - Tightwad Quarry Burlington LS Sec. 3 & 34, T41N, R24W Clinton, MO 816-855-8135	Benton	MO	
Hilty Quarries - Warsaw North Quarry Burlington LS	Benton	MO	

Sec. 15, T41N, R23W  
 Clinton, MO  
 816-855-8135

Hilty Quarries  
 - Warsaw South Quarry      Benton                              MO  
 Burlington LS  
 Sec. 4 T39N, R22W  
 Clinton, MO  
 816-855-8135

Ash Grove Aggregates  
 - Wheatland QRY                      Hickory                              MO  
 Burlington LS  
 Sec. 2, T37N, R23W  
 Butler, MO  
 816-679-4128

LIST OF FINE AGGREGATE SOURCES

<u>SOURCE</u>	<u>LOCATIONS</u>	<u>GEOLOGICAL UNIT</u>
Commercial Producers Sand	Kansas & Missouri Rivers	Natural Alluvial

Sec 5, T52N, R21W

Listing of a source is not to be construed as approval of all material from the 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. A winter quarrying prohibition is in effect for this Contract.

Materials may be furnished from any of the above listed sources or, at the option of the Contractor, may be furnished from any other source designated by the Contractor and approved by the Contracting Officer.

-- End Of Section --

Section No.    Title

**DIVISION 4 - MASONRY**

(NOT USED)

Section No.    Title

**DIVISION 5 - METALS**

05300	Intake Drainage System
05500	Miscellaneous Metals

05300            INTAKE DRAINAGE SYSTEM

A. 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 126            (1995; R 2001) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
- ASTM A 193            (1989) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
- ASTM A 276            (2000a) Standard Specification for Stainless Steel Bars and Shapes

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- ASME B16.21            (1978) Nonmetallic Flat Gaskets for Pipe Flanges

AMERICAN WELDING SOCIETY (AWS)

- AWS D1.1            (1998) Structural Welding Code - Steel

B. GENERAL REQUIREMENTS:

1. Definitions. The Dam Intake Drainage System shall be defined as the system/structure which provides for dissipation of the confined waters behind each dam structure. The basics of the system are indicated on the plans and consist of an intake, conduit, control valve, trash/intake protection structure, and valve access. The preceding is not, nor is it intended to be, a comprehensive definition and this specification pertains only to the valve and its control for the drainage system around the dam structure.
2. Standard Products. Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products specified. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

3. Verification of Dimensions. The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

4. Welding. Materials shall be welded in accordance with qualified procedures using performance-qualified welders and welding operators. Procedures and welders shall be qualified in accordance with AWS D1.1. Structural members shall be welded in accordance with **Specification Section: MISCELLANEOUS METAL**.

C. SUBMITTALS:

1. Welding. The following shall be submitted for Government review/approval:

A copy of qualified procedures and a list of names and identification symbols of qualified welders and welding operators.

(a) Drawings: Dam Intake Drainage System; Submit for Government approval.

Detail drawings consisting of illustrations, schedules, performance charts, instructions, brochures, diagrams, and other information to illustrate the requirements and operations of each product or item. Detail drawings for the complete dam intake drain system shall include piping/drainage layouts and locations of connections; dimensions for roughing-in, foundation, and support points; and schematic diagrams. Detail drawings shall indicate clearances required for maintenance and operation. Where piping and equipment are to be supported other than as indicated, details shall include loadings and proposed support methods.

(b) Instructions: Dam Intake Drainage System; Submit for Government review.

Diagrams, instructions, and other sheets proposed for posting.

(c) Certificates: Materials and Equipment; Submit for Government review.

Where materials or equipment are specified to comply with requirements of ASME or other standards, proof of such compliance shall be submitted. The label or listing of the specified agency will be acceptable evidence. In lieu of the label or listing, a written certificate may be submitted from an approved, nationally recognized testing organization equipped to perform such services, stating that the items have been

tested and conform to the requirements and testing methods of the specified agency.

Where equipment is specified to conform to requirements of the ASME Boiler and Pressure Vessel Code, the design, fabrication, and installation shall conform to the code.

2. Bolts. The following shall be submitted for Government review:

Written certification that the bolts furnished comply with the requirements of this specification, provided by the bolt manufacturer. The certification shall include illustrations of product-required markings, the date of manufacture, and the number of each type of bolt to be furnished based on this certification.

3. Operation and Maintenance Manuals: Dam Intake Drainage System. The following shall be submitted for Government review:

Six copies of the operation manual outlining the step-by-step procedures required for drainage system startup, operation and shutdown. The manual shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Six copies of the maintenance manual listing routine maintenance procedures, possible breakdowns and repairs. The manual shall include piping and equipment layout of the system as installed.

D. MATERIALS: Materials for various services shall be in accordance with this specification in addition to other referenced specifications. All fittings shall be compatible with the applicable materials specified.

1. Gate. Gate shall be provided and installed on the dam intake structure drainage location where indicated. Gate shall be self-contained with yoke, operator and rising stem extensions.

(a) Gate Frame. The gate frame shall be a rigid, welded unit, composed of guide rails, head bar and headrails with sufficient clear opening. The frame and cover shall be cast iron with machined seating faces. The frame shall be flatback or spigotback mounting. Grooves shall be cast on the vertical sides of the cover to match the guide angles. The cover shall be of domed design to withstand a maximum seating head of 20 feet and an unseating head of 10 feet. The guide rails and head rails shall be a minimum of 1/4 inch thick stainless steel, designed and built to withstand

the total thrust of the gate slide due to water pressure and wedge action. There shall be one adjustable cast iron wedge per side, located on the horizontal centerline of the gate. A heavy cast iron arch shall be provided and bolted to the gate. The ends of the arch shall contain integrally cast wedges, which shall wedge in beneath the other half of the wedge system and attached to the guide rails. The wedges shall have smooth bearing surfaces and shall be adjustable to insure effective contact between gate seating surfaces.

(b) Stem. The gate stem shall be as required for the intended service, of suitable length and ample strength for the conditions involved. The stem diameter shall be capable of withstanding twice the rated output of the operator at 40 pound pull, and shall be supported such that the L/r (length/radius) for the unsupported part of the stem shall not exceed 200. When rising stem extension is used, the stem extension shall be supported with clamp type stem guides such that a rigid installation shall be provided. Bronze collars shall be attached to the stem to reduce clearance between ID and stem, and shall be so spaced so that L/r ratio of stem does not exceed 200.

(c) Operator. The manually operated lifting mechanism shall be as indicated. Handwheel type lift shall be without gear reduction. The lift nut shall be flanged and supported on non-metallic thrust washers or bearings to take the thrust developed during opening and closing of the gate. The operating wheel shall be capable of removal by simple means to prevent vandalism of the gate/drainage structure and/or theft of the wheel. An arrow shall be cast on the handwheel to indicate the direction of rotation to open the gate. A maximum effort of 40 pounds shall be required to operate the gate after it is unseated, based on the maximum specified operating head (20 feet).

(d) Materials and Painting. Frames and cover (slide/gate) shall be fabricated from cast iron ASTM A126, Class B. Rails and yoke shall be fabricated from ASTM A276, A304 or A316 type stainless steel. Fasteners and anchor bolts shall be ASTM A276, A304 or A316 type stainless steel. Operating stem shall be ASTM A276, A304 or A316 type stainless steel. All materials, with the exception of stainless steel and rubber, shall be painted with an immersion approved coating consisting of a coal tar epoxy or a two-part epoxy and white metal blast surface preparation. All components shall be shop painted. No painting will be permitted in the field other than touch-up. Galvanizing is not acceptable.

#### E. INSTALLATION:

1. All products shall be installed as indicated and in accordance with this specification and the manufacturer's requirements. Products shall be stored in protected areas free from corrosive and damaging conditions (i.e. atmosphere, weather, humidity, construction traffic, etc.) until ready for installation. Care shall be taken during installation to prevent any and all damage to the paint coatings, seal surfaces, valve operation, stems, etc.

2. Piping/Conduit Structure. All piping to construct the drainage portion of the intake structure shall be standard Reinforced Concrete Pipe unless indicated otherwise on contract drawings. Reinforced Concrete Pipe shall be in accordance with SECTION 02600 STORM SEWER.

3. Operational Test. Upon completion of and prior to acceptance of the installation, the Contractor shall subject the system to operating tests to demonstrate satisfactory functional performance and operational efficiency. Such operating tests shall cover a period of not less than 2 hours and shall include the following information in a report with conclusion as to the adequacy of the system:

- (a) Time, date, and duration of test.
- (b) Water height at the intake structure.
- (c) Operation of gate through full cycle.
- (d) Discharge characteristics at 1/4, 1/2, 3/4 and full open.
- (e) Complete operation of each system.

F. PAYMENT: Payment for this work shall be made at the contract price bid per lump sum of "Dam Intake Drain Structure" as listed in the Itemized Proposal. The RCP associated with the Dam Intake Structure shall be considered part of the lump sum.

05500      MISCELLANEOUS METAL

A. 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 6	(1993b) General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
ASTM A 36	(1993a) Structural Steel
ASTM A 47	(1989) Ferritic Malleable Iron Castings
ASTM A 48	(1990) Gray Iron Castings
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 193	(1990) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
ASTM A 240	(1990) Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
ASTM A 276	(1990) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 283	(1993) Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 307	(1993a) Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength

ASTM A 325	(1993) Structural Bolts, Steel, Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 446	(1993) Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
ASTM A 475	(1989) Zinc-Coated Steel Wire Strand
ASTM A 490	(1993) Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
ASTM A 525	(1993) General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
ASTM A 514	(1993a; Errata) High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
ASTM A 563	(1993) Carbon and Alloy Steel Nuts
ASTM F 436	(1993) Hardened Steel Washers
ASTM F 594	(1990) Stainless Steel Nuts
ASTM F 844	(1990) Washers, Steel, Plain (Flat), Unhardened for General Use

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B18.2.2	(1987) Square and Hex Nuts (Inch Series)
ASME B18.21.1	(1990) Lock Washers (Inch Series)

ASME B46.1 (1985) Surface Texture (Surface Roughness, Waviness and Lay)

AMERICAN WELDING SOCIETY (AWS)

AWS A2.4 (1993) Standard Symbols for Welding, Brazing and Nondestructive Examination

AWS D1.1 (1994) Structural Welding Code - Steel

FEDERAL SPECIFICATIONS (FS)

FS RR-C-271 (Rev D) Chains and Attachments, Welded and Weldless

FS RR-G-1602 (Rev C) Grating, Metal, Other Than Bar Type (Floor, Except for Naval Vessels)

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM-01 (1988) Metal Finishes Manual for Architectural and Metal Products

B. SUBMITTALS:

1. Drawings. The following shall be submitted for Government approval.

(a) Miscellaneous Metal Items.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for all items covered by this specification.

2. List of Materials. The following shall be submitted to the Government for information only:

(a) Miscellaneous Metal Items.

The Contractor shall furnish copies of all purchase and mill orders, shop orders and work orders. The Contractor shall furnish a list designating the material to be used for each item at the time of submittal of shop drawings.

### C. REQUIREMENTS:

1. General. The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, ASTM A 446, or ASTM A 525, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

2. Dissimilar Materials. Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

3. Workmanship. Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and

elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

4. Anchorage. Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

5. Welding. This section specifies the welding procedures for miscellaneous structural steel using pre-qualified welds. The requirements of this section do not replace the welding requirements prescribed in other sections of the specification and on contract drawings. Welding of steel shall conform to the provisions of AWS D1.1, Sections 1 through 8, 10 and 11 unless otherwise specified. Welders and welding operators for steel shall pass the qualifications tests prescribed by AWS D1.1, Section 5. The welders and welding operators so qualified shall be certified by name. The date qualified and the code under which qualified shall be on the certificate. Prior qualification will be acceptable only when the Contractor certifies that the welder has performed satisfactory work using the process in all positions for which qualified within the preceding three months. The Contractor shall require welders and welding operators to repeat the qualifying tests when in the opinion of the Contracting Officer their work indicates a reasonable doubt of proficiency. Those passing the requalifying tests shall be recertified. Those not passing shall be disqualified until passing. All expenses in connection with qualification and requalification shall be borne by the Contractor.

#### D. MATERIALS:

1. Structural Steel. Carbon grade steel shall conform to ASTM A 36.
2. Carbon Steel Bolts. Carbon steel bolts shall conform to ASTM A 307, Grade A with carbon steel nuts conforming to ASTM A 563, Grade A.
3. Nuts Dimensional Style. Carbon steel nuts shall be Heavy Hex Style when used with ASTM A 307 bolts.
4. Washers. Plain washers shall conform to ASTM F 844. Other types, when required, shall conform to ASME B18.21.1.

5. Expansion Anchors. Anchor bolts shall be externally threaded wedge expansion bolt anchors, stainless steel, Hilti Kwik Bolt II or approved equal. Anchor bolt studs shall be stainless steel and conform to ASTM A 276 with chemical composition of either Type 304 or 316 stainless steel. Anchor bolt wedge shall be manufactured from either Type 304 or 316 stainless steel to conform with stud material. Nut shall be stainless steel conforming to ASTM F 594 with chemical composition of either Type 304 or 316 stainless steel and meeting dimensional requirements of ASME B18.2.2 to conform with stud material. Washer shall be Type 304 or 316 stainless steel conforming to ASTM A 240 to conform with stud material.
6. Shop Painting. Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.
7. Manhole Cast Iron Frames and Covers. Cast Iron Frames and Covers shall meet the requirements of ASTM A 47 and ASTM A 48.
8. Pumpwell Pit and Channel Grate and Frame. Pumpwell pit and channel grate and grate frame shall be castings conforming to ASTM A 48, Class 35B, Gray Iron, NEENAH R-4999-HX with cover grate type A or an approved equal. The grate shall be bolted to the frame. The frame shall be securely attached to the concrete.
9. Weir Grate and Frame. The weir gate and the gate frame shall conform to ASTM A 36.
10. Grating and Frame above Intake Gate. Steel grating shall be designed in accordance with NAAMM-01 for bar type floor gratings to support minimum concentrated load of 5000 pounds at grate mid span. Edges shall be banded with bars 1/4 inch less in height than bearing bars for grating sizes above 3/4 inch. Banding bars shall be flush with the top of bearing grating. Frames shall be of welded steel construction finished to match the grating. Floor grating and frame shall be galvanized after fabrication. Grating shall be securely fastened using anchorage devices to grating frame. The frame shall be securely attached to the concrete.
11. Miscellaneous. Miscellaneous plates and shapes for items that do not form a part of

the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

E. EXECUTION:

1. General. All items shall be installed at the locations shown and according to the manufacturer's recommendations. Products shall be stored in protected areas free from corrosive and damaging conditions (i.e. atmosphere, weather, humidity, construction traffic, etc.) until ready for installation. All items to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit, and other foreign matter shall be removed. Items listed below require additional procedures as specified.

2. Trashracks for Intake. The trashracks shall be as shown on the contract drawings and shall be furnished and installed complete with all fittings, fasteners, anchors, and other appurtenances as shown and as required for proper installation. The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the contracting officer of any discrepancy before performing any work.

(a) Materials. The structural steel members used to construct the trashracks shall be as specified in section C.1. The anchor bolts used to fasten the trashrack to the head wall of the intake structure shall be as specified in section C.5. Welding filler material shall be as specified on the contract drawings or in accordance with AWS D1.1.

(b) Fabrication. The intake structure trashracks shall be fabricated of welding quality structural shapes and plates in accordance with the details shown in the contract drawings. Suitable welding jigs shall be used in fabrication to rigidly hold the various members in proper relationship with each other until sufficient welding has been done to assure that, when completed, the trashracks will meet the dimensional requirements shown on the drawings. Materials shall be welded in accordance with qualified procedures using performance-qualified welders and welding operators. Procedures and welders shall be qualified welders and welding operators. Procedures and welders shall be qualified in accordance with AWS D1.1. Structural members shall be welded in accordance with AWS D1.1. Trashrack shall be hot-dip galvanized after fabrication.

(c) Installation. The trashrack shall be installed as specified and shown on the drawings. The trashrack structure shall be rigidly secured to concrete with expansion anchors. Care shall be taken during installation to prevent damage to the concrete surfaces, etc.

3. Manhole Frames and Covers for Intake Drainage Structure. The frames and covers shall be as indicated in the drawings and shall be furnished and installed with all flanges, fittings, fasteners, etc. and other appurtenances as shown and as required for proper installation. The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the contracting officer of any discrepancy before performing any work.

(a) Materials. The frame and cover shall meet the specifications for grey iron castings, ASTM A 48, class 35B as a minimum requirement. The cover shall be a bolt down cover with a minimum of four stainless steel bolts. Bolts shall be a high strength or intermediate strength with material conforming to ASTM A 193.

(b) Fabrication. Manhole frame and cover castings for the intake shall be for heavy-duty loading. Manhole frames and covers shall be uniform quality, free from blowholes, shrinkage, distortion or other defects and they shall be smooth and well cleaned by shotblasting. The castings shall be manufactured true to pattern; component parts shall fit together in a satisfactory manner. Round frames and covers shall have continuously machined bearing surfaces to prevent rocking and rattling. Cast dimensions may vary one-half the maximum shrinkage possessed by the metal or +/- 1/16 inch per foot.

(c) Installation. The manhole frame and cover shall be installed as specified and shown on the drawings. The manhole frame and cover shall be rigidly secured to the concrete. Care shall be taken during installation to prevent damage to the concrete surfaces etc.

4. Weir Frame and Gate. The trashracks shall be as shown on the contract drawings and shall be furnished and installed complete with all fittings, fasteners, anchors, and other appurtenances as shown and as required for proper installation. The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the contracting officer of any discrepancy before performing any work.

(a) Materials. The structural steel members used to construct the trashracks shall be as specified in section C.1. The anchor bolts used to fasten the trashrack to the head wall of the intake structure shall be as specified in section C.5. Welding filler material shall be as specified on the contract drawings or in accordance with AWS D1.1.

(b) Fabrication. The intake structure trashracks shall be fabricated of welding quality structural shapes and plates in accordance with the details shown in the contract drawings. Suitable welding jigs shall be used in fabrication to rigidly hold the various members in proper relationship with each other until sufficient welding has been done to assure that, when completed, the trashracks will meet the dimensional requirements shown on the drawings. Materials shall be welded in accordance with qualified procedures using performance-qualified welders and welding operators. Procedures and welders shall be qualified welders and welding operators. Procedures and welders shall be qualified in accordance with AWS D1.1. Structural members shall be welded in accordance with AWS D1.1. Trashrack shall be hot-dip galvanized after fabrication.

(c) Installation. The trashrack shall be installed as specified and shown on the drawings. The trashrack structure shall be rigidly secured to concrete with expansion anchors. Care shall be taken during installation to prevent damage to the concrete surfaces, etc.

#### F. PAYMENT:

No additional payment shall be made for Miscellaneous Metals. Payment for this work shall be considered incidental to contract bid item "Intake and Drain" as listed in the itemized proposal.

Section No.    Title

**DIVISION 6 – WOODS AND PLASTICS**

THRU

**DIVISION 10 - SPECIALTIES**

(NOT USED)

Section No.    Title

**DIVISION 11 - EQUIPMENT**

11310A        Re-circulation Pump

SECTION 11310A  
RECIRCULATION PUMP  
11/90

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 BEARING MANUFACTURERS ASSOCIATION (ABMA)

ABMA 9 (1990; R 2000) Load Ratings and Fatigue Life for Ball Bearings

ABMA 11 (1990; R 1999) Load Ratings and Fatigue Life for Roller Bearings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 153/A 153M (1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASME INTERNATIONAL (ASME)

ASME B40.1 (1991) Gauges - Pressure Indicating Dial Type - Elastic Element

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1 (1993) Industrial Controls and Systems

NEMA MG 1 (1993; Rev 1; Rev 2; Rev 3; Rev 4) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

1.2 SUBMITTALS

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

SD-02 Shop Drawings

Equipment Installation; G, EC

Drawings containing complete wiring and schematic diagrams and any other details required to demonstrate that the system has been

coordinated and will properly function as a unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

SD-03 Product Data

Sewage and Sludge Pump System; G, EC

Pump characteristic curves showing capacity in gpm, net positive suction head (NPSH), head, efficiency, and pumping horsepower from 0 gpm to 110 percent (100 percent for positive displacement pumps) of design capacity. A complete list of equipment and material, including manufacturer's descriptive data and technical literature, performance charts and curves, catalog cuts, and installation instructions.

Spare Parts; G, EC

Spare parts data for each different item of material and equipment specified, after approval of the related submittals, and not later than one month prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

Sewage and Sludge Pump System; G, EC

Diagrams, instructions, and other sheets proposed for posting.

SD-06 Test Reports

Field Testing and Adjusting Equipment; G, EC

Performance test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall indicate the final position of controls.

SD-10 Operation and Maintenance Data

Sewage and Sludge Pump System; G, EC

Six copies of operation and six copies of maintenance manuals for the equipment furnished. One complete set prior to performance testing and the remainder upon acceptance. Operation manuals shall detail the step-by-step procedures required for system startup, operation, and shutdown. Operation manuals shall include the manufacturer's name, model number, parts list, and brief description of all equipment and their basic operating features. Maintenance manuals shall list routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. Maintenance manuals shall include piping and equipment layout and simplified wiring and control diagrams of the system as installed. Manuals shall be approved prior to the field training course.

### 1.3 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be stored with protection from the weather, excessive humidity and excessive temperature variation; and dirt, dust, or other contaminants.

### 1.4 FIELD MEASUREMENTS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

## PART 2 PRODUCTS

### 2.1 GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS

Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Pump casings shall be constructed of cast iron of uniform quality and free from blow holes, porosity, hard spots, shrinkage defects, cracks, and other injurious defects. Impellers shall be cast iron.

#### 2.1.1 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

#### 2.1.2 Equipment Guards

Belts, pulleys, chains, gears, projecting setscrews, keys, and other rotating parts so located that any person may come in close proximity thereto shall be enclosed or guarded.

#### 2.1.3 Special Tools

One set of special tools, calibration devices, and instruments required for operation, calibration, and maintenance of the equipment shall be provided.

#### 2.1.4 Electric Motors

Motors shall conform to NEMA MG 1.

#### 2.1.5 Motor Controls

Controls shall conform to NEMA ICS 1.

#### 2.1.6 Bolts, Nuts, Anchors, and Washers

Bolts, nuts, anchors, and washers shall be steel; galvanized in accordance with ASTM A 153/A 153M.

### 2.1.7 Pressure Gauges

Compound gauges shall be provided on the suction side of pumps and standard pressure gauges on the discharge side of pumps. Gauges shall comply with ASME B40.1. Gauge ranges shall be as appropriate for the particular installation.

## 2.2 SUBMERSIBLE CENTRIFUGAL PUMPS

Submersible centrifugal pumps shall be centrifugal type pumps designed to pump solids up to 3 inches in diameter and shall be capable of withstanding submergence as required for the particular installation.

### 2.2.1 Pump Characteristics

Pump number one located in the wetwell shall have the following operating characteristics:

- a. Pump Service: Creek/River/Lake/Rain Water and Raw Sewage.
- b. Design Operating Point: 5000 gpm flow, 48 feet head, 75 percent efficiency.
- c. Maximum Operating Point: 3800 gpm flow, 58 feet head, 75 percent efficiency.
- e. Impeller Type: balanced, enclosed, 2-vane, non-clogging.
- f. Operating Speed: 1150 rpm.
- g. Depth of Submergence: as indicated on drawings.
- h. Motor Type: NEMA B with Class F insulation.
- i. Electrical Characteristics: 480 volts ac, 3 phase, 60 Hz, 75 hp.
- j. Size: Within rated load driving pump at specified rpm.
- k. Pump Control: Mercury level and H-O-A switch.

### 2.2.2 Pump Casing

The casing shall be capable of withstanding operating pressures 50 percent greater than the maximum operating pressures. The volute shall have smooth passages which provide unobstructed flow through the pump.

### 2.2.3 Mating Surfaces

Mating surfaces where watertight seal is required, including seal between discharge connection elbow and pump, shall be machined and fitted with nitrile rubber O-rings. Fitting shall be such that sealing is accomplished by metal-to-metal contact between mating surfaces, resulting in proper compression of the O-rings without the requirement of specific torque limits.

### 2.2.4 Coatings

Exterior surfaces of the casing in contact with sewage shall be protected by a sewage resistant coal tar epoxy coating. All exposed nuts and bolts

shall be stainless steel.

#### 2.2.5 Impeller

The impeller shall be of the single shrouded non-clogging design to minimize clogging of solids, fibrous materials, heavy sludge, or other materials found in sewage. The impeller shall be statically, dynamically, and hydraulically balanced within the operating range and to the first critical speed at 150 percent of the maximum operating speed. The impeller shall be securely keyed to the shaft with a locking arrangement whereby the impeller cannot be loosened by torque from either forward or reverse direction.

#### 2.2.6 Wearing Rings

Wearing rings, when required, shall be renewable type and shall be provided on the impeller and casing and shall have wearing surfaces normal to the axis of rotation. Material for wear rings shall be standard of pump manufacturer. Wearing rings shall be designed for ease of maintenance and shall be adequately secured to prevent rotation.

#### 2.2.7 Pump Shaft

The pump shaft shall be of high grade alloy steel and shall be of adequate size and strength to transmit the full driver horsepower with a liberal safety factor.

#### 2.2.8 Seals

A tandem mechanical shaft seal system running in an oil bath shall be provided. Seals shall be of tungsten carbide with each interface held in contact by its own spring system. Conventional mechanical seals which require a constant pressure differential to effect sealing will not be allowed.

#### 2.2.9 Bearings

Pump bearings shall be ball or roller type designed to handle all thrust loads in either direction. Pumps depending only on hydraulic balance end thrust will not be acceptable. Bearings shall have an ABEMA L-10 life of 50,000 hours minimum, as specified in ABMA 9 or ABMA 11.

#### 2.2.10 Motor

The pump motor shall have Class F insulation, NEMA B design, in accordance with NEMA MG 1, and shall be watertight. The motor shall be either oil filled, air filled with a water jacket, or air filled with cooling fins which encircles the stator housing.

#### 2.2.11 Power Cable

The power cable shall comply with NFPA 70, Type SO, and shall be of standard construction for submersible pump applications. The power cable shall enter the pump through a heavy duty entry assembly provided with an internal grommet assembly to prevent leakage. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems are not acceptable. Provide approximately 80 feet

of cable. Actual cable length to be field verified.

## 2.2.12 Installation Systems

### 2.2.12.1 Rail Mounted Systems

Rail mounted installation systems shall consist of guide rails, a sliding bracket, and a discharge connection elbow. Guide rails shall be of the size and type standard with the manufacturer and shall not support any portion of the weight of the pump. The sliding guide bracket shall be an integral part of the pump unit. The discharge connection elbow shall be permanently installed in the wet well along with the discharge piping. The pump shall be automatically connected to the discharge connection elbow when lowered into place and shall be easily removed for inspection and service without entering the pump well.

### 2.2.12.2 Bolt Down Systems

The pump mount system shall include a base designed to support the weight of the pump. The base shall be capable of withstanding all stresses imposed upon it by vibration, shock, and direct and eccentric loads.

### 2.2.12.3 Lifting Chain

Lifting chain to raise and lower the pump through the limits indicated shall be provided. The chain shall be galvanized and shall be capable of supporting the pump.

### 2.2.12.4 Recirculation Pump Sequence of Operation:

(a) There shall be three water level and thereby three floats associated with the pump operation. The first water level shall be bottom of the channel level (referred to as the middle water level). The pump shall operate with the HOA switch in the auto position and the water is at the channel level to produce the desired water flow in the channel. The second water level shall be the high water level. This level is approximately 6"-8" above the bottom of the channel level (referred to as the highest water level). Upon reaching this level and on activation of the float switch the controls shall stop pump operation. The pump controls shall remain in the off position and would require a manual restart to operate. This high water level represents a rain situation in which the water flow in the channel occurs as a result of rain and therefore pump operation is not required. The third and final water level is approximately 18" below the bottom of the channel level (referred to as the lowest water level). Upon reaching this level and on activation of the float switch the controls shall stop pump operation to prevent cavitation. The pump shall resume operation when the desired water level is reached. Refer to paragraph 3 (a) for mercury float switches to be used in this sequence of operation.

(b) In other words to clarify the above control requirements, three mercury switches will automatically start and stop (cycle) the pump except for the high water level switch which would require a manual reset to start the operation. With HOA switch in auto mode (cycling mode). Water level below the lowest level mercury switch will stop the pump to prevent cavitation. Water level above the highest level mercury switch, will stop the pump and the pump will remain in stopped position (will not cycle) and would require a manual restart/reset. If the highest level is not reached

the pump will cycle between the set points of the mercury switches when on auto mode.

### 2.3 ELECTRICAL WORK

Electrical motor driven equipment specified shall be provided complete with motors, motor starters, and controls. Electric equipment and wiring shall be in accordance with Section 16375 ELECTRICAL DISTRIBUTION SYSTEM. Electrical characteristics shall be as specified or indicated. Motor starters shall be provided complete with thermal overload protection and other appurtenances necessary for the motor control specified. Manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices but not shown, shall be provided.

### 2.4 Electrical Work

#### 2.4.1 Motor

Electrical motor driven equipment specified shall be provided complete with motors, motor starters, and controls. Electric equipment and wiring shall be in accordance with the electrical specifications. Electrical characteristics shall be as specified or indicated. Motor starters shall be provided complete with thermal overload protection and other appurtenances necessary for the motor control specified. Manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices but not shown, shall be provided.

#### 2.4.2 Controls

Contractor shall provide all labor, materials, equipment, etc. required for a simplex motor control panel and float switches as specified. The motor control panel shall be shop assembled and tested meeting UL Standard 508 for industrial controls. The motor and control panel shall be provided by the pump manufacturer to insure single source responsibility for the equipment and to provide a cohesive installation.

##### 2.4.2.1 Mercury Float Switches

Controls shall be provided for pump unit operation. Sealed steel tube mercury float switches shall be provided for turn off level and turn on control. The switches shall be protected by a solid polyurethane float that is leakproof, shockproof and corrosion resistant to sewage. All support brackets, electrical contacts, etc. shall be provided for a complete, reliable and permanent installation. Refer to paragraph 2 (d) above for pump sequence of operation.

#### 2.4.2.2 Control Panel

The controls shall be contained in an painted stainless steel lockable enclosure complying with NEMA 6P requirements and a hinged door with neoprene gasketing. Padlocking of the enclosure shall be provided along with nameplate information regarding the pump and electrical installation. Appropriate safety signs shall also be included warning of electrical hazards. A red amber run light and H-O-A switch shall be provided. Incoming power shall be 480 volt, 3 phase, 60 Hz and shall be sized appropriately for the pump installed. Control voltage shall be 120 volt by means of an internal transformer. All terminal blocks for float switches, controls, lights, magnetic motor starter with overload relays, breakers, etc. shall be provided for a complete, reliable and permanent installation.

An elapsed time meter, cycle counter and a 24-hour time clock (adjustable to 15 minute intervals to control pump operations) shall also be provided. The elapsed time meter shall be such that it will protect the motor from cycling which would cause damage.

### PART 3 EXECUTION

#### 3.1 EQUIPMENT INSTALLATION

##### 3.1.1 Pump Installation

Pumping equipment and appurtenances shall be installed in the position indicated and in accordance with the manufacturer's written instructions. All appurtenances required for a complete and operating pumping system shall be provided, including such items as piping, conduit, valves, wall sleeves, wall pipes, concrete foundations, anchors, grouting, pumps, drivers, power supply, seal water units, and controls.

##### 3.1.2 Concrete

Concrete shall conform to Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

##### 3.1.3 Grouting Screw Pump Flow Channel

After installation and adjustment of the screw pump, place grout in the flow channel to the configuration and dimensions indicated and as required to insure a proper fit between the screw pump and flow channel. A radius screed provided by the pump manufacturer shall be temporarily attached to provide proper clearance between the screw and the flow channel. The flow channel shall be grouted in strict accordance with the manufacturer's instructions.

#### 3.2 PAINTING

Pumps and motors shall be thoroughly cleaned, primed, and given two finish coats of paint at the factory in accordance with the recommendations of the manufacturer.

### 3.3 FIELD TESTING AND ADJUSTING EQUIPMENT

#### 3.3.1 Operational Test

Prior to acceptance, an operational test of all pumps, drivers, and control systems shall be performed to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that the equipment is not electrically, mechanically, structurally, or otherwise defective; is in safe and satisfactory operating condition; and conforms with the specified operating characteristics. Prior to applying electrical power to any motor driven equipment, the drive train shall be rotated by hand to demonstrate free operation of all mechanical parts. Tests shall include checks for excessive vibration, leaks in all piping and seals, correct operation of control systems and equipment, proper alignment, excessive noise levels, and power consumption.

#### 3.3.2 Retesting

If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests shall be reconducted.

### 3.4 MANUFACTURER'S SERVICES

Services of a manufacturer's representative who is experienced in the installation, adjustment, and operation of the equipment specified shall be provided. The representative shall supervise the installation, adjustment, and testing of the equipment.

### 3.5 POSTING FRAMED INSTRUCTIONS

Framed instructions containing wiring and control diagrams under glass or in laminated plastic shall be posted where directed. Condensed operating instructions, prepared in typed form, shall be framed as specified above and posted beside the diagrams. The framed instructions shall be posted before acceptance testing of the system.

### 3.6 FIELD TRAINING

A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a total period of 4 hours of normal working time and shall start after the system is functionally complete but prior to final acceptance tests. Field training shall cover all of the items contained in the operating and maintenance manuals.

-- End of Section --

Section No.    Title

**DIVISION 12 - FURNISHINGS**

(NOT USED)

Section No.      Title

**DIVISION 13 - SPECIAL CONSTRUCTION**

13110A              Cathodic Protection System (Sacrificial Anode)

SECTION 13110A

CATHODIC PROTECTION SYSTEM (SACRIFICIAL ANODE)  
11/98

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 418  | (1995a) Cast and Wrought Galvanic Zinc Anodes                 |
| ASTM B 843  | (1993; R 1998) Magnesium Alloy Anodes for Cathodic Protection |
| ASTM D 1248 | (1998) Polyethylene Plastics Molding and Extrusion Materials  |

NACE INTERNATIONAL (NACE)

- |             |  |
|-------------|--|
| NACE RP0169 | (1996) Control of External Corrosion on Underground or Submerged Metallic Piping Systems   |
| NACE RP0177 | (1995) Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control Systems                    |
| NACE RP0188 | (1999) Discontinuity (Holiday) Testing of Protective Coatings  |
| NACE RP0190 | (1995) External Protective Coatings for Joints, Fittings, and Valves on Metallic Underground or Submerged Pipelines and Piping Systems |

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- |           |   |
|-----------|---|
| NEMA TC 2 | (1998) Electrical Polyvinyl Chloride (PVC) Tubing (EPT) and Conduit (EPC-40 and EPC-80)                               |
| NEMA WC 5 | (1992; Rev 2, 1996) Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy |

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- |         |                                 |
|---------|---------------------------------|
| NFPA 70 | (1999) National Electrical Code |
|---------|---------------------------------|

UNDERWRITERS LABORATORIES (UL)

- UL 6 (1997) Rigid Metal Conduit
- UL 510 (1994; Rev thru Apr 1998) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
- UL 514A (1996; Rev Dec 1999) Metallic Outlet Boxes

1.2 SUBMITTALS

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

SD-02 Shop Drawings

Drawings; G, \_\_EC\_\_

Six copies of detail drawings consisting of a complete list of equipment and material including manufacturer's descriptive and technical literature, catalog cuts, results of system design calculations including soil-resistivity, installation instructions and certified test data stating the maximum recommended anode current output density and the rate of gaseous production if any at that current density. Detail drawings shall contain complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will function properly as a unit.

Contractor's Modifications; G, \_\_EC\_\_

Six copies of detail drawings showing proposed changes in location, scope of performance indicating any variations from, additions to, or clarifications of contract drawings. The drawings shall show proposed changes in anode arrangement, anode size and number, anode materials and layout details, conduit size, wire size, mounting details, wiring diagram, method for electrically-isolating each pipe, and any other pertinent information to proper installation and performance of the system.

SD-03 Product Data

Equipment; G, \_\_EC\_\_

Within 30 days after receipt of notice to proceed, an itemized list of equipment and materials including item number, quantity, and manufacturer of each item. The list shall be accompanied by a description of procedures for each type of testing and adjustments, including testing of coating for thickness and holidays. Installation of materials and equipment shall not commence until this submittal is approved.

Spare Parts; \_\_G\_\_, \_\_RE\_\_

Spare parts data for each different item of material and equipment specified, after approval of detail drawings and not later than six (6) months prior to the date of beneficial occupancy. The data shall include a complete list of parts, special tools, and supplies, with current unit prices and source of supply. One (1) spare anode of each type shall be furnished.

SD-06 Test Reports

Tests and Measurements; G,   RE  

Test reports in booklet form tabulating all field tests and measurements performed, upon completion and testing of the installed system and including close interval potential survey, casing and interference tests, final system test verifying protection, insulated joint and bond tests, and holiday coating test. A certified test report showing that the connecting method has passed a 120-day laboratory test without failure at the place of connection, wherein the anode is subjected to maximum recommended current output while immersed in a three percent sodium chloride solution.

Contractor's Modifications; G,   RE  

Final report regarding Contractor's modifications. The report shall include pipe-to-soil measurements throughout the affected area, indicating that the modifications improved the overall conditions, and current measurements for anodes. The following special materials and information are required: taping materials and conductors; zinc grounding cell, installation and testing procedures, and equipment; coating material; system design calculations for anode number, life, and parameters to achieve protective potential; backfill shield material and installation details showing waterproofing; bonding and waterproofing details; insulated resistance wire; exothermic weld equipment and material.

SD-07 Certificates

Cathodic Protection System;   G  ,   RE  

Proof that the materials and equipment furnished under this section conform to the specified requirements contained in the referenced standards or publications. The label or listing by the specified agency will be acceptable evidence of such compliance.

Services of "Corrosion Expert"; G,   RE  

Evidence of qualifications of the "corrosion expert."

a. The "corrosion expert's" name and qualifications shall be certified in writing to the Contracting Officer prior to the start of construction.

b. Certification shall be submitted giving the name of the firm, the number of years of experience, and a list of not less than five (5) of the firm's installations three (3) or more years old that have been tested and found satisfactory.

SD-10 Operation and Maintenance Data

Cathodic Protection System; \_\_G\_\_, \_\_RE\_\_

Before final acceptance of the cathodic protection system, six copies of operating manuals outlining the step-by-step procedures required for system startup, operation, adjustment of current flow, and shutdown. The manuals shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Six copies of maintenance manual, listing routine maintenance procedures, recommendation for maintenance testing, possible breakdowns and repairs, and troubleshooting guides. The manuals shall include single-line diagrams for the system as installed; instructions in making pipe-to-reference cell and tank-to-reference cell potential measurements and frequency of monitoring; instructions for dielectric connections, interference and sacrificial anode bonds; instructions shall include precautions to ensure safe conditions during repair of pipe or other metallic systems. The instructions shall be neatly bound between permanent covers and titled "Operating and Maintenance Instructions." These instructions shall be submitted for the Contracting Officer's approval. The instructions shall include the following:

a. As-built drawings, to scale of the entire system, showing the locations of the piping, location of all anodes and test stations, locations of all insulating joints, and structure-to-reference cell potentials as measured during the tests required by Paragraph: TESTS AND MEASUREMENTS, of this section.

b. Recommendations for maintenance testing, including instructions in making pipe-to-reference cell potential measurements and frequency of testing.

c. All maintenance and operating instructions and nameplate data shall be in English.

d. Instructions shall include precautions to insure safe conditions during repair of pipe system.

Training Course; \_\_G\_\_, \_\_RE\_\_

The proposed Training Course Curriculum (including topics and dates of discussion) indicating that all of the items contained in the operating and maintenance instructions, as well as demonstrations of routine maintenance operations, including testing procedures included in the maintenance instructions, are to be covered.

### 1.3 GENERAL REQUIREMENTS

The Contractor shall furnish and install a complete, operating, sacrificial anode cathodic protection system in complete compliance with NFPA 70, with all applicable Federal, State, and local regulations and with minimum requirements of this contract. In addition to the minimum requirements of these specifications, The services required include planning, installation, adjusting and testing of a cathodic protection system, using sacrificial anodes for cathodic protection of the Water lines, their

connectors and lines under the slab or floor foundation. The cathodic protection system shall include anodes, cables, connectors, corrosion protection test stations, and any other equipment required for a complete operating system providing the NACE criteria of protection as specified. Insulators are required whenever needed to insulate the pipes from any other structure. Any pipe crossing the another water pipe pipe shall have a test station. The cathodic protection shall be provided on Water pipes.

#### 1.3.1 Services of "Corrosion Expert"

The Contractor shall obtain the services of a "corrosion expert" to supervise, inspect, and test the installation and performance of the cathodic protection system. "Corrosion expert" refers to a person, who by thorough knowledge of the physical sciences and the principles of engineering and mathematics, acquired by professional education and related practical experience, is qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. Such a person must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection (CP) Specialist or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control of buried or submerged metallic piping and tank systems, if such certification or licensing includes 5 years experience in corrosion control on underground metallic surfaces of the type under this contract. The "corrosion expert" shall make at least 3 visits to the project site. The first of these visits shall include obtaining soil resistivity data, acknowledging the type of pipeline coatings to be used and reporting to the Contractor the type of cathodic protection required. Once the submittals are approved and the materials delivered, the "corrosion expert" shall revisit the site the ensure the Contractor understands installation practices and laying out the components. The third visit shall involve testing the installed cathodic protection systems and training applicable personnel on proper maintenance techniques. The "corrosion expert" shall supervise installation and testing of all cathodic protection.

#### 1.3.2 Contractor's Modifications

The specified system is based on a complete system with magnesium sacrificial anodes. The Contractor may modify the cathodic protection system after review of the project, site verification, and analysis, if the proposed modifications include the anodes specified and will provide better overall system performance. The modifications shall be fully described, shall be approved by the Contracting Officer's representative, and shall meet the following criteria. The proposed system shall achieve a minimum pipe-to-soil "instant off" potential of minus 850 millivolts with reference to a saturated copper-copper sulfate reference cell on the underground components of the piping or other metallic surface. The Contractor shall take resistivity measurements of the soil in the vicinity of the pipes and ground bed sites. Based upon the measurements taken, the current and voltage shall be required to produce a minimum of minus 850 millivolts "instant off" potential between the structure being tested and the reference cell. This potential shall be obtained over 95 percent of the metallic area. The anode system shall be designed for a life of twenty-five (25) years of continuous operation.

#### 1.3.3 Isolators

Isolators are required to insulate the indicated pipes from any other

structure. Isolators shall be provided with lightning protection and a test station as shown.

#### 1.3.4 Anode and Bond Wires

Magnesium anodes with an unpackaged weight of 17 pounds shall be provided uniform distances along the metallic pipe lines. Test stations shall be provided for these anodes. These anodes shall be in addition to anodes for the pipe under concrete slab and casing requirements. For each cathodic system, the metallic components and structures to be protected shall be made electrically continuous. This shall be accomplished by installing bond wires between the various structures. Bonding of existing buried structures may also be required to preclude detrimental stray current effects and safety hazards. Provisions shall be included to return stray current to its source without damaging structures intercepting the stray current. The electrical isolation of underground facilities in accordance with acceptable industry practice shall be included under this section. All tests shall be witnessed by the Contracting Officer.

#### 1.3.5 Surge Protection

Approved zinc grounding cells or sealed weatherproof lightning arrestor devices shall be installed across insulated flanges or fittings installed in underground piping as indicated on the drawings. The arrestor shall be gapless, self-healing, solid state type. Zinc anode composition shall conform to ASTM B 418, Type II. Lead wires shall be number 6 AWG copper with high molecular weight polyethylene (HMWPE) insulation. The zinc grounding cells shall not be prepackaged in backfill but shall be installed as detailed on the drawings. Lightning arrestors or zinc grounding cells are not required for insulated flanges on metallic components used on nonmetallic piping systems.

#### 1.3.6 Summary of Services Required

The scope of services shall include, but shall not be limited to, the following:

- a. Close-interval potential surveys.
- b. Cathodic Protection Systems.
- c. System testing.
- d. Casing corrosion control.
- e. Interference testing.
- f. Training.
- g. Operating and maintenance manual.
- h. Insulator testing and bonding testing.
- i. Coating and holiday testing shall be submitted within 45 days of notice to proceed.

#### 1.3.7 Nonmetallic Pipe System

In the event pipe other than metallic pipe is approved and used in lieu of

metallic pipe, all metallic components of this pipe system shall be protected with cathodic protection. Detailed drawings of cathodic protection for each component shall be submitted to the Contracting Officer for approval within 45 days after date of receipt of notice to proceed, and before commencement of any work.

#### 1.3.7.1 Coatings

Coatings for metallic components shall be as required for metallic fittings. Protective covering (coating and taping) shall be completed and tested on each metallic component (such as valves, hydrants and fillings). This covering shall be as required for underground metallic pipe. Each test shall be witnessed by the Contracting Officer. Coatings shall be selected, applied, and inspected in accordance with NACE RP0190 and as specified in these specifications. The use of nonmetallic pipe does not change other requirements of the specifications. Any deviations due to the use of nonmetallic pipe shall be submitted for approval.

#### 1.3.7.2 Tracer Wire

When a nonmetallic pipe line is used to extend or add to an existing metallic line, an insulated No. 8 AWG copper wire shall be thermit-welded to the existing metallic line and run the length of the new nonmetallic line. This wire shall be used as a locator tracer wire and to maintain continuity to any future extensions of the pipe line.

#### 1.3.8 Tests of Components

A minimum of four (4) tests shall be made at each metallic component in the piping system. Two (2) measurements shall be made directly over the anodes and the other two (2) tests shall be over the outer edge of the component, but at the farthest point from the anodes. Structure and pipes shall be shown with the cathodic protection equipment. All components of the cathodic protection system shall be shown on drawings, showing their relationship to the protected structure or component. A narrative shall describe how the cathodic protection system will work and provide testing at each component. Components requiring cathodic protection shall include but not be limited to the following:

- a. Pipes under the floor slab or foundations.
- b. PIV.
- c. Shutoff valves.
- d. Metallic pipe extended from aboveground locations.
- e. Each connector or change-of-direction device.
- f. Any metallic pipe component or section.
- g. Backflow preventor.
- h. Culvert.

#### 1.3.9 Drawings

Detailed drawings shall be provided showing location of anodes, insulated fittings, test stations, permanent reference cells, and bonding. Locations

shall be referenced to two (2) permanent facilities or mark points.

#### 1.3.10 Electrical Potential Measurements

All potential tests shall be made at a minimum of 10 foot intervals witnessed by the Contracting Officer. Submittals shall identify test locations on separate drawing, showing all metal to be protected and all cathodic protection equipment. Test points equipment and protected metal shall be easily distinguished and identified.

#### 1.3.11 Achievement of Criteria for Protection

All conductors, unless otherwise shown, shall be routed to or through the test stations. Each system provided shall achieve a minimum pipe-to-soil "instant off" potential of minus 850 millivolt potentials with reference to a saturated copper-copper-sulfate reference cell on all underground components of the piping. Based upon the measurements taken, the current and voltage of the anodes should be adjusted as required to produce a minimum of minus 850 millivolts "instant off" potential between the structure being tested and the reference cell. This potential should be obtained over 95 percent of the metallic area. This must be achieved without the "instant off" potential exceeding 1150 millivolts. Testing will be witnessed by the Contracting Officer. Additional anodes shall be provided by the Contractor if required to achieve the minus 850 millivolts "instant off". Although acceptance criteria of the cathodic protection systems are defined in NACE RP0169, for this project the "instant off" potential of minus 850 millivolts is the only acceptable criteria.

#### 1.3.12 Metallic Components and Typicals

a. Metallic components: As a minimum, each metallic component shall be protected with two (2) magnesium anodes. This number of anodes is required to achieve minus 850 millivolts "instant off" potential on the metallic area and at the same time not provide overvoltage above 1150 millivolts "instant off." As a minimum, the magnesium anode unpackaged weight shall be 17 pounds. The magnesium anodes shall be located on each side of the metallic component and routed through a test station.

b. Fire Hydrants: Fire hydrant pipe components shall have a minimum of two (2) anodes. These magnesium anodes shall have an unpackaged weight of 17 pounds.

c. Pipe Under Concrete Slab: Pipe under concrete slab shall have a minimum of 2 magnesium anodes. These magnesium anodes shall have an unpackaged weight of 17 pounds. Pipe under concrete slab shall have 2 permanent reference electrodes located under the slab. One (1) permanent reference electrode shall be located where the pipe enters the concrete slab. All conductors shall be routed to a test station.

d. Valves: Each valve shall be protected with 2 magnesium anodes. The magnesium anode shall have an unpackaged weight of 17 pounds.

e. Metallic Pipe Component or Section: Each section of metallic pipe shall be protected with 2 magnesium anodes. The magnesium anodes shall have an unpackaged weight of 17 pounds.

f. Connectors or Change-of-Direction Devices: Each change-of-direction device shall be protected with 2 magnesium anodes. The magnesium anode shall have an unpackaged weight of 17 pounds.

1.3.13 Metallic Component Coating

Coatings for metallic components shall be as required for metallic fittings as indicated. This will include fire hydrants, T's, elbows, valves, etc. Coatings shall be selected, applied, and inspected in accordance with NACE RP0190 and as specified in these specifications.

PART 2 PRODUCTS

2.1 MAGNESIUM ANODES

2.1.1 Anode Composition

Anodes shall be of high-potential magnesium alloy, made of primary magnesium obtained from sea water or brine, and not made from scrap metal. Magnesium anodes shall conform to ASTM B 843 and to the following analysis (in percents) otherwise indicated:

Aluminum, max.	0.010
Manganese, max.	0.50 to 1.30
Zinc	0.05
Silicon, max.	0.05
Copper, max.	0.02
Nickel, max.	0.001
Iron, Max.	0.03
Other impurities, max.	0.05 each or 0.3 max. total
Magnesium	Remainder

The Contractor shall furnish spectrographic analysis on samples from each heat or batch of anodes used on this project.

2.1.2 Dimensions and Weights

Dimensions and weights of anodes shall be approximately as follows:

TYPICAL MAGNESIUM ANODE SIZE

(Cross sections may be round, square, or D shaped)

NOMINAL WT. LBS.	APPROX. SIZE (IN)	NOMINAL GROSS WT lb PACKAGED IN BACKFILL	NOMINAL PACKAGE DIMENSIONS (IN)
3	3 X 3 X 5	8	5-1/4 X 5-1/4 X 8
5	3 X 3 X 8	13	5-1/4 X 5-1/4 X 11-1/4
9	3 X 3 X 14	27	5-1/4 X 20
12	4 X 4 X 12	32	7-1/2 X 18
17	4 X 4 X 17	45	7-1/2 X 24
32	5 X 5 X 20-1/2	68	8-1/2 X 28
50	7 X 7 X 16	100	10 X 24

2.1.3 Packaged Anodes

Anodes shall be provided in packaged form with the anode surrounded by specially-prepared quick-wetting backfill and contained in a water

permeable cloth or paper sack. Anodes shall be centered by means of spacers in the backfill material. The backfill material shall have the following composition, unless otherwise indicated:

Material	Approximate Percent by Weight
Gypsum	75
Bentonite	20
Sodium Sulphate	5
Total	100

2.1.4 Wire

2.1.4.1 Wire Requirements

Wire shall be No. AWG solid copper wire, not less than 10 feet long, unspliced, complying with NFPA 70, Type RHH insulation. Connecting wires for magnesium anodes shall be factory installed with the place or emergence from the anode in a cavity sealed flush with a dielectric sealing compound.

2.1.4.2 Anode Header Cable

Cable for anode header and distribution shall be No. 4 AWG stranded copper wire with type CP high molecular weight polyethylene, 7/64 inch thick insulation, 600-volt rating, in accordance with NEMA WC 5.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Electrical Wire

Wire shall be No. 12 AWG stranded copper wire with NFPA 70, Type RHW-USE insulation. Polyethylene insulation shall comply with the requirements of ASTM D 1248 and shall be of the following types, classes, and grades:

High-molecular weight polyethylene shall be Type I, Class C, Grade E5.

High-density polyethylene shall be Type III, Class C, Grade E3.

2.2.1.1 Wire Splicing

Connecting wire splicing shall be made with copper compression connectors or exothermic welds, following instructions of the manufacturer. Single split-bolt connections shall not be used. Sheaths for encapsulating electrical wire splices to be buried underground shall fit the insulated wires entering the spliced joints and epoxy potting compound shall be as specified below.

2.2.1.2 Test Wires

Test wires shall be AWG No. 12 stranded copper wire with NFPA 70, Type TW or RHW or polyethylene insulation.

2.2.1.3 Resistance Wire

Resistance wire shall be AWG No. 16 or No. 22 nickel-chromium wire.

#### 2.2.2 Conduit

Rigid galvanized steel conduit and accessories shall conform to UL 6. Non metallic conduit shall conform to NEMA TC 2.

#### 2.2.3 Test Boxes and Junctions Boxes

Boxes shall be outdoor type conforming to UL 514A.

#### 2.2.4 Joint, Patch, Seal, and Repair Coating

Sealing and dielectric compound shall be a black, rubber based compound that is soft, permanently pliable, tacky, moldable, and unbacked. Compound shall be applied as recommended by the manufacturer, but not less than 1/2-inch thick. Coating compound shall be cold-applied coal-tar base mastic . Pressure-sensitive vinyl plastic electrical tape shall conform to UL 510.

#### 2.2.5 Backfill Shields

Shields shall consist of approved pipeline wrapping or fiberglass-reinforced, coal-tar impregnated tape, or plastic weld caps, specifically made for the purpose and installed in accordance with the manufacturer's recommendations. When joint bonds are required, due to the use of mechanical joints, the entire joint shall be protected by the use of a kraft paper joint cover. The joint cover shall be filled with poured-in, hot coat-tar enamel.

#### 2.2.6 Epoxy Potting Compound

Compound for encapsulating electrical wire splices to be buried underground shall be a two package system made for the purpose.

#### 2.2.7 Test Stations

Stations shall be of the flush-curb-box type and shall be the standard product of a recognized manufacturer. Test stations shall be complete with an insulated terminal block having the required number of terminals. The test station shall be provided with a lockable over and shall have an embossed legend, "C.P. Test." Test stations may be constructed of nonmetallic materials. However, if nonmetallic materials are utilized, as a minimum, the materials shall be resistant to damage from ultraviolet radiation, contain good color retention qualities, contain high strength qualities, and be resistant to accidental or vandalistic impacts that might be normally encountered in the environment for which they are to be installed. The test stations shall be listed for the particular application for which they are to be utilized.

#### 2.2.8 Resistance Bonds

Resistance bonds should be adjusted as outlined in this specification. Alternate methods may be used if they are approved by the Contracting Officer.

#### 2.2.9 Stray Current Measurements

Stray current measurements should be performed at each test station. Stray currents resulting from lightning or overhead alternating current (AC) power transmission systems shall be mitigated in accordance with NACE RP0177.

#### 2.2.10 Resistance Wire

Wire shall be No. 16 or No. 22 nickel-chromium wire with TW insulation.

#### 2.2.11 Electrical Connections

Electrical connections shall be done as follows:

a. Exothermic welds shall be "Cadweld", or an approved equal. Use of this material shall be in strict accordance with the manufacturer's recommendations.

b. Electrical-shielded arc welds shall be approved for use on steel pipe by shop drawing submittal action.

c. Brazing shall be as specified in Paragraph: Lead Wire Connections.

#### 2.2.12 Electrical Tape

Pressure-sensitive vinyl plastic electrical tape shall conform to UL 510.

### PART 3 EXECUTION

#### 3.1 CRITERIA OF PROTECTION

Acceptance criteria for determining the adequacy of protection on a buried underground metallic component shall be in accordance with NACE RP0169 and as specified below.

##### 3.1.1 Iron and Steel

The following method (a) shall be used for testing cathodic protection voltages. If more than one method is required, method (b) shall be used.

a. A negative voltage of at least minus 850 millivolts as measured between the underground component and a saturated copper-copper sulphate reference electrode connecting the earth (electrolyte) directly over the underground component. Determination of this voltage shall be made with the cathodic protection system in operation. Voltage drops shall be considered for valid interpretation of this voltage measurement. A minimum of minus 850 millivolts "instant off" potential between the underground component being tested and the reference cell shall be achieved over 95 percent of the area of the structure. Adequate number of measurements shall be obtained over the entire structure, pipe, tank, or other metallic component to verify and record achievement of minus 850 millivolts "instant off." This potential shall be obtained over 95 percent of the total metallic area without the "instant off" potential exceeding 1200 millivolts.

b. A minimum polarization voltage shift of 100 millivolts as measured between the underground component and a saturated copper-copper sulphate reference electrode contacting the earth directly over the underground component. This polarization voltage shift shall be determined by interrupting the protective current and measuring the polarization decay. When the protective current is interrupted, an immediate voltage shift will occur. The voltage reading, after the immediate shift, shall be used as the base reading from which to measure polarization decay. Measurements achieving 100 millivolts decay shall be made over 95 percent

of the metallic surface being protected.

c. For any metallic component, a minimum of four (4) measurements shall be made using subparagraph (a), above, and achieving the "instant off" potential of minus 850 millivolts. Two (2) measurements shall be made over the anodes and two (2) measurements shall be made at different locations near the component and farthest away from the anode.

### 3.1.2 Aluminum

Aluminum underground component shall not be protected to a potential more negative than minus 1200 millivolts, measured between the underground component and a saturated copper-copper sulphate reference electrode contacting the earth, directly over the metallic component. Resistance, if required, shall be inserted in the anode circuit within the test station to reduce the potential of the aluminum to a value which will not exceed a potential more negative than minus 1200 millivolts. Voltage shift criterion shall be a minimum negative polarization shift of 100 millivolts measured between the metallic component and a saturated copper-copper sulphate reference electrode contacting the earth, directly over the metallic component. The polarization voltage shift shall be determined as outlined for iron and steel.

### 3.1.3 Copper Piping

For copper piping, the following criteria shall apply: A minimum of 100 millivolts of cathodic polarization between the structure surface and a stable reference electrode contacting the electrolyte. The polarization voltage shift shall be determined as outlined for iron and steel.

## 3.2 ANODE STORAGE AND INSTALLATION

### 3.2.1 Anode Storage

Storage area for magnesium anodes will be designated by the Contracting Officer. If anodes are not stored in a building, tarps or similar protection should be used to protect anodes from inclement weather. Packaged anodes, damaged as a result of improper handling or being exposed to rain, shall be resacked by the Contractor and the required backfill added.

### 3.2.2 Anode Installation

Unless otherwise authorized, installation shall not proceed without the presence of the Contracting Officer. Anodes of the size specified shall be installed to the depth indicated and at the locations shown. Locations may be changed to clear obstructions with the approval of the Contracting Officer. Anodes shall be installed in sufficient number and of the required type, size, and spacing to obtain a uniform current distribution over the surface of the structure. The anode system shall be designed for a life of 25 years of continuous operation. Anodes shall be installed as indicated in a dry condition after any plastic or waterproof protective covering has been completely removed from the water permeable, permanent container housing the anode metal. The anode connecting wire shall not be used for lowering the anode into the hole. The annular space around the anode shall be backfilled with fine earth in 6 inch layers and each layer shall be hand tamped. Care must be exercised not to strike the anode or connecting wire with the tamper. Approximately 5 gallons of water shall be applied to each filled hole after anode backfilling and tamping has been

completed to a point about 6 inches above the anode. After the water has been absorbed by the earth, backfilling shall be completed to the ground surface level.

#### 3.2.2.1 Groups of Anodes

Groups of anodes, in quantity and location shown, shall be connected to an anode header cable. The anode header cable shall make contact with the structure to be protected only through a test station. Anode lead connection to the anode header cable shall be made by an approved crimp connector or exothermic weld and splice mold kit with appropriate potting compound.

#### 3.2.2.2 Welding Methods

Connections to metallic devices shall be made by exothermic weld methods manufactured for the type of equipment supplied. Electric arc welded connections and other types of welded connections to ferrous pipe and structures shall be approved before use.

#### 3.2.3 Anode Placement - General

Packaged anodes shall be installed completely dry, and shall be lowered into holes by rope sling or by grasping the cloth gather. The anode lead wire shall not be used in lowering the anodes. The hole shall be backfilled with fine soil in 6 inch layers and each layer shall be hand-tamped around the anode. Care must be exercised not to strike the anode or lead wire with the tamper. If immediate testing is to be performed, water shall be added only after backfilling and tamping has been completed to a point 6 inches above the anode. Approximately 2 gallons of water may be poured into the hole. After the water has been absorbed by the soil, backfilling and tamping may be completed to the top of the hole. Anodes shall be installed as specified or shown. In the event a rock strata is encountered prior to achieving specified augered-hole depth, anodes may be installed horizontally to a depth at least as deep as the bottom of the pipe, with the approval of the Contracting Officer.

#### 3.2.4 Underground Pipeline

Anodes shall be installed at a minimum of 8 feet and a maximum of 10 feet from the line to be protected.

#### 3.2.5 Installation Details

Details shall conform to the requirements of this specification. Details shown on the drawings are indicative of the general type of material required, and are not intended to restrict selection to material of any particular manufacturer.

#### 3.2.6 Lead Wire Connections

##### 3.2.6.1 Underground Pipeline (Metallic)

To facilitate periodic electrical measurements during the life of the sacrificial anode system and to reduce the output current of the anodes, if required, all anode lead wires shall be connected to a test station and buried a minimum of 24 inches in depth. The cable shall be No. 10 AWG, stranded copper, polyethylene or RHW-USE insulated cable. The cable shall

make contact with the structure only through a test station. Resistance wire shall be installed between the cable and the pipe cable, in the test station, to reduce the current output, if required. Anode connections, except in the test station, shall be made with exothermic welding process, and shall be insulated by means of at least three (3) layers of electrical tape; and all lead wire connections shall be installed in a moistureproof splice mold kit and filled with epoxy resin. Lead wire-to-structure connections shall be accomplished by an exothermic welding process. All welds shall be in accordance with the manufacturer's recommendations. A backfill shield filled with a pipeline mastic sealant or material compatible with the coating shall be placed over the weld connection and shall be of such diameter as to cover the exposed metal adequately.

#### 3.2.6.2 Resistance Wire Splices

Resistance wire connections shall be accomplished with silver solder and the solder joints wrapped with a minimum of three (3) layers of pressure-sensitive tape. Lead wire connections shall be installed in a moistureproof splice mold kit and filled with epoxy resin.

#### 3.2.7 Location of Test Stations

Test stations shall be of the type and location shown and shall be curb box mounted. Buried insulating joints shall be provided with test wire connections brought to a test station. Unless otherwise shown, other test stations shall be located as follows:

- a. At 1,000-foot intervals or less.
- b. Where the pipe or conduit crosses any other metal pipe.
- c. At both ends of casings under roadways and railways.
- d. Where both sides of an insulating joint are not accessible above ground for testing purposes.

#### 3.2.8 Underground Pipe Joint Bonds

Underground pipe having other than welded or threaded coupling joints shall be made electrically continuous by means of a bonding connection installed across the joint.

### 3.3 ELECTRICAL ISOLATION OF STRUCTURES

#### 3.3.1 Isolation Joints and Fittings

Isolating fittings, including main line isolating flanges and couplings, shall be installed aboveground, or within manholes, wherever possible. Where isolating joints must be covered with soil, they shall be fitted with a paper joint cover specifically manufactured for covering the particular joint, and the space within the cover filled with hot coal-tar enamel. Isolating fittings in lines entering buildings shall be located at least 12 inches above grade of floor level, when possible. Isolating joints shall be provided with grounding cells to protect against over-voltage surges or approved surge protection devices. The cells shall provide a low resistance across isolating joint without excessive loss of cathodic current.

### 3.4 TRENCHING AND BACKFILLING

Trenching and backfilling shall be in accordance with Section 02316a EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS.

### 3.5 TESTS AND MEASUREMENTS

#### 3.5.1 Baseline Potentials

Each test and measurement will be witnessed by the Contracting Officer. The Contractor shall notify the Contracting Officer a minimum of five (5) working days prior to each test. After backfill of the pipe, the static potential-to-soil of the metallic components shall be measured. The locations of these measurements shall be identical to the locations specified for metallic components to-reference electrode potential measurements. The initial measurements shall be recorded.

#### 3.5.2 Isolation Testing

Before the anode system is connected to the metallic component, an isolation test shall be made at each isolating joint or fitting. This test shall demonstrate that no metallic contact, or short circuit exists between the two isolated sections. Any isolating fittings installed and found to be defective shall be reported to the Contracting Officer.

##### 3.5.2.1 Insulation Checker

A Model 601 insulation checker, as manufactured by "Gas Electronics", or an approved equal, using the continuity check circuit, shall be used for isolating joint (flange) electrical testing. Testing shall conform to the manufacturer's operating instructions. Test shall be witnessed by the Contracting Officer. An isolating joint that is good will read full scale on the meter. If an isolating joint is shorted, the meter pointer will be deflected or near zero on the meter scale. Location of the fault shall be determined from the instructions, and the joint shall be repaired. If an isolating joint is located inside a vault, the pipe shall be sleeved with insulator when entering and leaving the vault.

##### 3.5.2.2 Cathodic Protection Meter

A Model B3A2 cathodic protection meter, as manufactured by "M.C. Miller", or an approved equal, using the continuity check circuit, shall be used for isolating joint (flange) electrical testing. This test shall be performed in addition to the Model 601 insulation checker. Continuity is checked across the isolation joint after the test lead wire is shorted together and the meter adjusted to scale. A full-scale deflection indicates the system is shorted at some location. The Model 601 verifies that the particular insulation under test is good and the Model B3A2 verifies that the system is isolated. If the system is shorted, further testing shall be performed to isolate the location of the short.

#### 3.5.3 Anode Output

As the anodes or groups of anodes are connected, current output shall be measured with an approved clamp-on milliammeter, calibrated shunt with a suitable millivoltmeter or multimeter, or a low resistance ammeter. (Of the three methods, the low-resistance ammeter is the least desirable and most inaccurate. The clamp-on milliammeter is the most accurate.) The valves obtained and the date, time, and location shall be recorded.

### 3.5.4 Reference Electrode Potential Measurements

Upon completion of the installation and with the entire cathodic protection system in operation, electrode potential measurements shall be made using a copper-copper sulphate reference electrode and a potentiometer-voltmeter, or a direct-current voltmeter having an internal resistance (sensitivity) of not less than 10 megohms per volt and a full scale of 10 volts. The locations of these measurements shall be identical to the locations used for baseline potentials. The values obtained and the date, time, and locations of measurements shall be recorded. No less than eight (8) measurements shall be made over any length of line or component. Additional measurements shall be made at each distribution service riser, with the reference electrode placed directly over the service line.

### 3.5.5 Location of Measurements

#### 3.5.5.1 Piping or Conduit

For coated piping or conduit, measurements shall be taken from the reference electrode located in contact with the earth, directly over the pipe. Connection to the pipe shall be made at service risers, valves, test leads, or by other means suitable for test purposes. Pipe-to-soil potential measurements shall be made at intervals not exceeding 10 feet. The Contractor may use a continuous pipe-to-soil potential profile in lieu of 5 foot interval pipe-to-soil potential measurements. Additional measurements shall be made at each distribution service riser, with the reference electrode placed directly over the service line adjacent to the riser. Potentials shall be plotted versus distance to an approved scale. Locations where potentials do not meet or exceed the criteria shall be identified and reported to the Contracting Officer's representative.

#### 3.5.5.2 Holiday Test

Any damage to the protective covering during transit and handling shall be repaired before installation. After field-coating and wrapping has been applied, the entire pipe shall be inspected by an electric holiday detector with impressed current in accordance with NACE RP0188 using a full-ring, spring-type coil electrode. The holiday detector shall be equipped with a bell, buzzer, or other type of audible signal which sounds when a holiday is detected. Holidays in the protective covering shall be repaired upon detection. Occasional checks of holiday detector potential will be made by the Contracting Officer to determine suitability of the detector. Labor, materials, and equipment necessary for conducting the inspection shall be furnished by the Contractor. The coating system shall be inspected for holes, voids, cracks, and other damage during installation.

### 3.6 TRAINING COURSE

The Contractor shall conduct a training course for the operating staff as designated by the Contracting Officer. The training period shall consist of a total of 4 hours of normal working time and shall start after the system is functionally completed but prior to final acceptance tests. The field instructions shall cover all of the items contained in the operating and maintenance instructions, as well as demonstrations of routine maintenance operations, including testing procedures included in the maintenance instructions. At least 14 days prior to date of proposed conduction of the training course, the training course curriculum shall be submitted for approval, along with the proposed training date. Training

shall consist of demonstration of test equipment, providing forms for test data and the tolerances which indicate that the system works.

### 3.7 CLEANUP

The Contractor shall be responsible for cleanup of the construction site. All paper bags, wire clippings, etc., shall be disposed of as directed. Paper bags, wire clippings and other waste shall not be put in bell holes or anodes excavation.

### 3.8 MISCELLANEOUS INSTALLATION AND TESTING

#### 3.8.1 Coatings

All aboveground pipeline shall be coated as indicated or as approved. The coating shall have a minimum thickness of 7 mil. The pipeline coating shall be in accordance with all applicable Federal, State, and local regulations.

#### 3.8.2 Excavation

In the event rock is encountered in providing the required depth for anodes, the Contractor shall determine an alternate approved location and, if the depth is still not provided, an alternate plan shall be submitted to the Contracting Officer. Alternate techniques and depths must be approved prior to implementation.

### 3.9 SPARE PARTS

After approval of shop drawings, and not later than three (3) months prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for each different item of material and equipment specified. The data shall include a complete list of parts, special tools, and supplies, with current unit prices and source of supply. In addition, the Contractor shall supply information for material and equipment replacement for all other components of the complete system, including anodes, cables, splice kits and connectors, corrosion test stations, and any other components not listed above.

### 3.10 SEEDING

Seeding shall be done by the Contractor, as directed, in all unsurfaced locations disturbed by this construction. In areas where grass cover exists, it is possible that sod can be carefully removed, watered, and stored during construction operations, and replaced after the operations are completed since it is estimated that no section of pipeline should remain uncovered for more than two (2) days. The use of sod in lieu of seeding shall require approval by the Contracting Officer.

### 3.11 SYSTEM TESTING

The Contractor shall submit a report including potential measurements taken at adequately-close intervals to establish that minus 850 millivolts potential, "instant-off" potential, is provided, and that the cathodic protection is not providing interference to other foreign pipes causing damage to paint or pipes. The report shall provide a narrative describing how the criteria of protection is achieved without damaging other pipe or structures in the area.

3.12 CLEARING OF TREES AND UNDERBRUSH

In the areas of the anode beds, all trees and underbrush shall be cleared and grubbed to the limits shown or indicated.

-- End of Section --

Section No.    Title

**DIVISION 14 - CONVEYING SYSTEMS**

(NOT USED)

Section No.      Title

**DIVISION 15 - MECHANICAL**

15200A            Re-circulation Piping

-

SECTION 15200A

RECIRCULATION PIPING

03/02

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 1784	(1999a) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 1785	(1999) Poly(Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2000	(1999) Rubber Products in Automotive Applications
ASTM D 2104	(1999e1) Polyethylene (PE) Plastic Pipe, Schedule 40
ASTM D 2235	(1996a) Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
ASTM D 2239	(1999) Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
ASTM D 2241	(2000) Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D 2447	(1999) Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter
ASTM D 2464	(1999) Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2466	(1999) Poly(Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 40
ASTM D 2467	(1999) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2672	Joints for IPS PVC Pipe Using Solvent Cement
ASTM D 2855	Making Solvent-Cemented Joints with

Poly(Vinyl Chloride) (PVC) Pipe and Fittings

ASTM D 3139	Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3212	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F 477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.20.1	Pipe Threads, General Purpose (Inch)
ASME B16.5	Pipe Flanges and Flanged Fittings
ASME B16.21	Nonmetallic Flat Gaskets for Pipe Flanges

AMERICAN WATER WORKS ASSOCIATION(AWWA)

AWWA C110	(1998) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(2000) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115	(1999) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C150	(1996) Thickness Design of Ductile-Iron Pipe
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C153	(2000) 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-Seated Gate Valves for Water Supply Service
AWWA C504	(1994) Rubber-Seated Butterfly Valves
AWWA C508	(1993; C508a) Swing-Check Valves for Waterworks Service, 2 In. (50 mm) Through 24 In. (600 mm) NPS
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in. for

Water Distribution

AWWA C905 Standard for Polyvinyl Chloride (PVC)  
Water Transmission Pipe, Nominal Diameters  
14 in. through 36 in.

DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA)

DIPRA TRD (1997) Thrust Restraint Design for Ductile  
Iron Pipe

NACE INTERNATIONAL (NACE)

NACE RP0185 (1996) Extruded, Polyolefin Resin Coating  
Systems with Soft Adhesives for  
Underground or Submerged Pipe

PLASTICS PIPE INSTITUTE (PPI)

PPI TR21 (2001) Thermal Expansion and Contraction  
of Plastic Pipe

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910 Occupational Safety and Health Standards

FEDERAL SPECIFICATIONS (FS)

FS QQ-C-40 (Basic; Am 2) Caulking: Lead Wool and  
Lead Pig

MILITARY SPECIFICATIONS (MS)

MS MIL-T-27730 (Rev A) Tape, Antiseize,  
Polytetrafluoroethylene, With Dispenser

NATIONAL SANITATION FOUNDATION (NSF)

NSF Std 14 Plastic Piping Components and Related  
Materials

1.2 UNIT PRICES

Measurement and payment will be based on completed work performed in accordance with the drawings, specifications and the contract payment schedules. No payment will be made under this section for excavation, trenching, or backfilling.

1.2.1 Measurement

The length of pipelines, for which payment will be made, shall be determined by measuring along the centerlines of the various piping systems and sizes as furnished and installed. Pipe shall be measured from the center of fitting to center of fitting and from center of main header to end of pipe. No deduction shall be made for the space occupied by valves or fittings.

1.2.2 Payment

Payment will be made at the price per linear foot listed in the bid form for the various types and sizes of piping, and will be full compensation for all pipes, joints, fittings and specialties, complete in place. Payment for valves and other appurtenances will be made at the respective contract unit price for each item complete in place. Payment will include the furnishing of all testing, plant, labor, and material and incidentals necessary to complete the work, as specified and as shown in contract documents.

1.2.2.1 Connections to Existing Piping

Connections to existing piping systems where new fittings in the existing line are required will be paid for according to the contract prices for such connection. The price will be considered as full compensation for material and labor required for the removal and replacement of the existing pipe as necessary.

1.2.2.2 Connections to Existing Equipment

1.3 SYSTEM DESCRIPTION

This specification covers the requirements for above and below grade liquid process pipe, pipe supports, fittings, equipment and accessories located both inside and outside of treatment plants.

1.3.1 Design Requirements

Support systems shall be selected and designed in accordance with MSS SP-58, MSS SP-69, and MSS SP-89 within the specified spans and component requirements. The absence of pipe supports and details on the contract drawings does not relieve the Contractor of responsibility for sizing and providing supports.

1.3.2 Performance Requirements

The pressure ratings and materials specified represent minimum acceptable standards for piping systems. The piping systems shall be suitable for the services specified and intended. Each piping system shall be coordinated to function as a unit. Flanges, valves, fittings and appurtenances shall have a pressure rating no less than that required for the system in which they are installed.

1.3.2.1 Buried Piping Systems

Piping systems shall be suitable for design conditions, considering the piping both with and without internal pressure. Consideration shall be given to all operating and service conditions both internal and external to the piping systems. Buried ferrous piping shall have cathodic protection

in accordance with Section 13110A CATHODIC PROTECTION SYSTEM IMPRESSED CURRENT

1.3.2.2 Above Grade Piping Systems

Piping systems shall be suitable for design conditions, considering the piping both with and without internal pressure, and installation factors such as insulation, support spans, and ambient temperatures. Consideration shall be given to all operating and service conditions both internal and external to the piping systems.

1.4 SUBMITTALS

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

SD-02 Shop Drawings

Pipe and Equipment; G, EC

Equipment shop drawings and support system detail drawings showing piping systems and appurtenances, such as mechanical joints, valves, local indicators and hangers, including a complete list of equipment and materials. As-built drawings showing pipe anchors and guides, and layout of piping systems relative to other parts of the work including clearances for maintenance and operation. As-built piping and instrumentation diagrams (P&IDs) identifying and labeling equipment, instrumentation, valves, vents, drains, and all other inline devices; if the contract drawings contained P&IDs, the P&IDs found in the contract drawings shall be revised to reflect the constructed process system, as directed by the Contracting Officer.

SD-03 Product Data

Qualifications; G, EC

A statement certifying that the Contractor has the specified experience.

Welders; G, EC

The names of all qualified welders, their identifying symbols, and the qualifying procedures for each welder including support data such as test procedures used, standards tested to, etc.

Waste Water Disposal; G, EC

The method proposed for disposal of waste water from hydrostatic tests and disinfection, and all required permits, prior to performing hydrostatic tests.

Assistance and Training; G, EC

A signed statement certifying 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.

Delivery, Storage and Handling; G, EC

Material safety data sheets.

Materials and Equipment; G, EC

Manufacturer's descriptive and technical literature for each piping system, including design recommendations; pressure and temperature ratings; dimensions, type, grade and strength of pipe and fittings; thermal characteristics (coefficient of expansion and thermal conductivity); and chemical resistance to each chemical and chemical mixture in the liquid stream.

Installation; G, EC

The manufacturer's installation recommendations or instructions for each material or procedure to be utilized, including materials preparation.

Pipe Schedule; G, EC

A list of piping systems, pressure ratings and source of supply for each piping system broken out by material, size and application as indicated on the contract drawings. A list of any special tools necessary for each piping system and appurtenances furnished for adjustment, operation, maintenance and disassembly of the system.

Valve Schedule; G, EC

Operator Schedule; G, EC

A list of valve materials, pressure ratings, valve operator's materials, air supply pressure, electrical service, location, source of supply, and reference identification as indicated in the contract drawings. A list of any special tools necessary for each valve type and appurtenances furnished for adjustment, operation, maintenance and disassembly.

#### SD-06 Test Reports

Pipe Leakage Tests; G, EC

Hydrostatic Tests; G, EC

Valve Testing; G, EC

Copies of all field test reports within 24 hours of the completion of the test.

#### SD-07 Certificates

Plastic Piping System; G, EC

Documentation certifying that the manufacturer of each thermoplastic piping system is listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements of the resin manufacturer for the resin used to manufacture each of the respective thermoplastic pipe systems.

Contractor's Installation; G, EC

A statement signed by the plastic pipe manufacturer's representative certifying that the Contractor's personnel are capable of properly installing the piping system on the project.

SD-10 Operation and Maintenance Data

Piping and Appurtenances; G, EC

Six copies each of operation and maintenance manuals in indexed booklet form. Operation manuals shall detail the step-by-step procedures required for specialized startup, operation and shutdown of piping systems, and shall include the manufacturer's name, model number, parts list and brief description of piping equipment such as valves and other appurtenances and their basic operating features. Maintenance manuals shall list routine maintenance procedures and troubleshooting guides for the equipment, and shall include piping layout and valve locations.

1.5 QUALIFICATIONS

1.5.1 Contractor

Contractor shall have successfully completed at least 3 projects of the same scope and size or larger within the last 6 years. Contractor shall demonstrate specific experience in regard to the system installation to be performed.

1.5.2 Welders

The welding of pressure piping systems shall be in accordance with qualifying procedures using performance qualified welders and operators.

1.6 GENERAL JOB REQUIREMENTS

Piping materials and appurtenances shall be as specified and as shown on the drawings, and shall be suitable for the service intended. Piping materials, appurtenances and equipment supplied as part of this contract shall be new and unused except for testing equipment. Components that serve the same function and are the same size shall be identical products of the same manufacturer.

1.6.1 Components

Piping equipment and appurtenances shall be new products of equal material and ratings as the connecting pipe.

1.6.2 Standard Products

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacturing of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Nominal sizes for standardized products shall be used. Pipe, valves, fittings and appurtenances shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

### 1.6.3 Identification and Tagging

Each piece of pipe shall bear the ASTM designation and all other markings required for that designation. Valves shall be marked in accordance with MSS SP-25 and shall bear an identification tag securely attached using stainless steel wire straps designed for that purpose. Identification tags shall be 1.375 inch minimum diameter, made of stamped stainless steel. Identifications shall be black for reading clarity. The service, valve identification number shown on the contract drawings, the manufacturer's name, and the valve model number shall be displayed.

### 1.7 DELIVERY, STORAGE AND HANDLING

Materials delivered and placed in storage shall be stored with protection from the weather, excessive humidity variation, excessive temperature variation, dirt, dust and/or other contaminants. Proper protection and care of material before, during and after installation is the Contractor's responsibility. Any material found to be damaged shall be replaced at the Contractor's expense. During installation, piping shall be capped to keep out dirt and other foreign matter. A material safety data sheet in conformance with 29 CFR 1910 Section 1200(g) shall accompany each chemical delivered for use in pipe installation. At a minimum, this includes all solvents, solvent cements, glues and other materials that may contain hazardous compounds. Handling shall be in accordance with ASTM F 402. Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325-1. Materials shall be stored with protection from puncture, dirt, grease, moisture, mechanical abrasions, excessive heat, ultraviolet (UV) radiation damage, or other damage. Pipe and fittings shall be handled and stored in accordance with the manufacturer's recommendation. Plastic pipe shall be packed, packaged and marked in accordance with ASTM D 3892.

### 1.8 PROJECT/SITE CONDITIONS

#### 1.8.1 Environmental Requirements

#### 1.8.2 Existing Conditions

The Contractor shall be responsible for the verification of existing piping and penetrations. Prior to ordering materials, the Contractor shall expose all existing pipes which are to be connected to new pipelines. The Contractor shall verify the size, material, joint types, elevation, horizontal location, and pipe service of existing pipes, and inspect size and location of structure penetrations to verify adequacy of wall sleeves, and other openings before installing connecting pipes.

#### 1.8.3 Verification of Dimensions

After becoming familiar with all details of the work, the Contractor shall verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

### 1.9 SEQUENCING AND SCHEDULING

For slab, floor, wall, and roof penetrations, the Contractor shall have on site pertinent wall pipes and sleeves before they are required for placement in concrete forms. The Contractor shall verify and coordinate the size and location of building and structure pipe penetrations before

forming and placing concrete.

1.10 MAINTENANCE

1.10.1 Service

1.10.2 Extra Materials

Concurrent with delivery and installation of the specified piping systems and appurtenances, spare parts for each different item of material and equipment specified that is recommended by the manufacturer to be replaced any time up to 3 years of service shall be furnished. For each type and size of valve, the following extra materials shall be provided: lubricator, lubricant with appropriate temperature rating, lubricator/isolating valve; galvanized operating wrench, 4.1 feet long, for T-handled operators; galvanized operating key for cross handled valves;. Extra materials shall include 2 of the following spare parts for each type and size of valve: gaskets; O-ring seals; diaphragms (molded); all elastomer parts; stem packing; seat rings and seat ring pulling tool.

PART 2 PRODUCTS

2.1 MATERIALS (GENERAL)

Materials for various services shall be in accordance with TABLE I. Pipe fittings shall be compatible with the applicable pipe materials.

2.2 DUCTILE IRON PIPING SYSTEM

2.2.1 Ductile Iron Pipe

Ductile iron pipe for pressure service shall have a design and wall thickness conforming to AWWA C150. Ductile iron pipe shall have a standard lining.

2.2.2 Ductile Iron Joints

Joints shall have a working pressure rating for liquids equal to the pressure rating of the connected pipe. Dielectric fittings or isolation joints shall be provided between all dissimilar metals.

2.2.2.1 Mechanical Joints

Mechanical joints shall conform to AWWA C110 and AWWA C111. Gaskets, glands, bolts and nuts shall be furnished in sufficient quantity for the complete assembly of each mechanical joint. Glands shall be ductile or gray iron with an asphaltic coating. Gaskets shall be vulcanized synthetic rubber, reclaimed rubber is not acceptable. For grooved shoulder piping, self-centering gasketed couplings designed to mechanically engage piping and lock in a positive watertight couple shall be used. Housings shall be composed of malleable iron, ASTM A 47/A 47M or ductile iron, ASTM A 536 and gaskets of molded synthetic rubber, halogenated isobutylene isoprene shall be used. Bolts and nuts shall be heat treated carbon steel, ASTM A 183, minimum tensile. Mechanical joints shall have bolt holes oriented straddling the vertical centerline of the valves and fittings.

#### 2.2.2.2 Push-on Joints

Push-on type joints shall conform to AWWA C111. Each push-on joint shall be supplied complete with gasket and lubricant. Gaskets shall be compatible with joint design and comprised of vulcanized synthetic rubber, reclaimed rubber is not acceptable. Lubricant shall be specifically formulated for use with push-on joints and shall be non-toxic, odorless, tasteless and shall not support bacteria growth.

#### 2.2.2.3 Restrained Joints

Restrained joints shall conform to the requirements of AWWA C111, and be designed for a working pressure equal to connected pipe rating. When using ductile iron pipe with restrained joints, field cuts shall be supplied with a lock ring complete with retainer, retainer lock and roll-pin, as required by manufacturer's recommendations, procedures and/or installation instructions.

#### 2.2.2.4 Flanged Joints

Flanged joints shall conform to AWWA C110. Gaskets, bolts and nuts shall be provided with flanged joints in sufficient quantity for the complete assembly of each joint. Gaskets shall be vulcanized synthetic rubber, reclaimed rubber is not acceptable.

#### 2.2.3 Ductile Iron Fittings

Fittings shall be ductile iron AWWA C110. Flanges and flanged fittings shall conform to ASME B16.1 and shall be rated for 150 psig service. Materials shall be ductile iron. Bolts and nuts shall be carbon steel conforming to ASTM A 307, Grade B. Bolts shall be provided with washers of the same material as the bolts. Gaskets shall be rubber ringfull face, maximum 0.125 in thick.

### 2.3 POLYVINYL CHLORIDE (PVC)

#### 2.3.1 PVC Pipe

PVC, ASTM D 1784, minimum cell classification 12545-C, pipe shall be Schedule 40 conforming to ASTM D 1785 manufactured to an SDR rating in accordance with ASTM D 2241, so that the pressure rating of the pipe is consistent for all pipe sizes. The pipe shall be SDR 25 with a pressure rating of 150 psig

#### 2.3.2 PVC Tubing

Tubing shall be flexible and clear with nominal size and wall thickness and reinforcement.

#### 2.3.3 PVC Joints

The piping system shall be joined by flanged or mechanical connections except where connecting to unions, valves, and equipment with threaded connections that may require future disassembly. Connections at those points shall be threaded and back-welded. Tubing connections shall use compression fittings.

#### 2.3.4 PVC Fittings

The schedule rating for the fittings shall not be less than that for the associated pipe. Fittings shall be ASTM D 1784, minimum cell classification 12545-C, PVC conforming to the requirements of ASTM D 2464, threaded in accordance with ASME B1.20.1.

##### 2.3.4.1 Push-on Joints

Push-on type joints shall be sealed with ethylene propylene rubber (EPR) gaskets in accordance with ASTM F 477.

##### 2.3.4.2 Flanged Fittings

Flanges and flanged fittings shall be Class 125, one piece, molded hub type, flat faced, and shall conform to ASME B16.1 ASME B16.5 ASTM A 240/A 240M, TP304 stainless steel backing flanges with ASME B16.1 ASME B16.5 drilling. Flanges shall be complete with one-piece, molded PVC stub ends. Flanged connections shall have the same pressure rating as the pipe or greater. Bolting shall be stainless steel, ASTM A 193/A 193M, Grade B8 hex head bolts and ASTM A 194/A 194M, Grade 8 hex head nuts. Bolts shall be provided with washers of the same material as the bolts. Gaskets shall be full-faced, maximum 1/8 inch thick, fabricated from ethylene propylene rubber (EPR) in accordance with ASME B16.21. When the mating flange has a raised face, a flat ring gasket shall be used and a filler gasket shall be provided between outer diameter of the raised face and the flange outer diameter to protect the PVC flange from bolting moment.

##### 2.3.4.3 Tubing Fittings

Fittings shall be compression type comprised of nuts and bodies, with elastomeric O-ring seals, rated to a minimum 150 psig with straight threads conforming to ISO 228-1 ASME B1.1.

##### 2.3.5 PVC Solvent Cement

Socket connections shall be joined with PVC solvent cement conforming to ASTM D 2564. Manufacture and viscosity shall be as recommended by the pipe and fitting manufacturer to assure compatibility. Joints shall be prepared with primers conforming to ASTM F 656 prior to cementing and assembly.

#### 2.4 ISOLATION JOINTS AND COUPLINGS

##### 2.4.1 Dielectric Fittings

Dielectric fittings shall be provided between threaded ferrous and nonferrous metallic pipe, fittings and valves. Dielectric fittings shall prevent metal-to-metal contact of dissimilar metallic piping elements and shall be suitable for the required working pressure, temperature and corrosive application.

##### 2.4.2 Isolation Joints

Isolation joints shall be provided between nonthreaded ferrous and nonferrous metallic pipe fittings and valves. Isolation joints shall consist of an isolation gasket of the dielectric type, isolation washers and isolation sleeves for flange bolts. Isolation gaskets shall be full faced with an outside diameter equal to the flange outside diameter. Bolt isolation sleeves shall be full length. Units shall be of a shape to

prevent metal-to-metal contact of dissimilar metallic piping elements.

### 2.4.3 Metallic Piping Couplings

Thrust ties shall be provided where shown on the contract drawings and where required to restrain the force developed by 1.5 times the maximum allowable operating pressures specified. For metallic pipe other than ductile iron, thrust ties shall be attached with fabricated lugs. For ductile iron pipe, thrust ties shall be attached with socket clamps against a grooved joint coupling or flange. For exposed installations, zinc-plated nuts and bolts shall be used. However, high-strength, low-alloy steel, in accordance with AWWA C111, may be substituted for use on cast iron and ductile iron couplings. For buried and submerged installations, TP304 stainless steel bolts and nuts shall be provided.

#### 2.4.3.1 Sleeve-Type Couplings

Sleeve-type couplings shall be used for joining plain end pipe sections in a flexible manner with a diameter to properly fit the pipe. A coupling shall consist of two elastomeric wedge section gaskets and elliptic-neck, track-head steel bolts designed to properly compress the gaskets. For pipe sizes 2 inches and larger, the followers shall be ASTM A 395/A 395M, and the middle ring shall be ASTM A 513 ASTM A 395/A 395M with AWWA C111 bolting. Gaskets shall be ethylene propylene diene monomer (EPDM). Split sleeve-type couplings may be used in aboveground installations under special situations and when approved in advance by the Contracting Officer.

#### 2.4.3.2 Transition Couplings

Transitional couplings may be used to connect two pipes of the same material that have small differences in outside diameter. A fully assembled transitional coupling shall be sized to properly fit pipe diameters. The coupling shall consist of two elastomeric wedge section gaskets and elliptic-neck, track-head steel bolts designed to properly compress the gaskets. The coupling shall use ethylene propylene diene monomer (EPDM), wedge gaskets. The coupling shall be sized to match the associated piping.

#### 2.4.3.3 Flanged Coupling Adapters

Flanged coupling adapters shall be fully assembled units manufactured to meet ASTM A 126 Class B, cast iron. The flanges shall mate with ASME B16.1 Class B flanges of the same nominal size. A factory applied corrosion resistant coating shall be applied. The coupling shall use ethylene propylene diene monomer (EPDM) gaskets. Where pipe movement out of the adaptor may occur, proper anchorage of the pipe shall be provided and couplings shall be furnished with lock pins. The coupling shall be sized to match the associated piping.

### 2.4.4 Couplings for Nonmetallic Piping

#### 2.4.4.1 Bellows Coupling

#### 2.4.4.2 Compression Coupling

A compression coupling shall consist of two elastomeric gaskets and two machined steel lock rings. The coupling shall use ethylene propylene diene monomer (EPDM) gaskets. The maximum allowable working pressure shall be 150 psig 120 degrees F. The coupling shall be sized to match the associated

pipng.

## 2.5 VALVE BOXES and VALVE MANHOLES

The box length shall adapt to the length required for the depth of the line without full extension. Boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subjected to vehicular traffic. The boxes shall have housings of sufficient size to completely cover the valve or service stop and shall be complete with covers.

### 2.5.1 Valve Boxes

### 2.5.2 Service Boxes

Service boxes shall be extension service boxes with either screw or slide-type adjustment.

### 2.5.3 Valve Manholes

Valve manholes for automatic valves and meters installed below grade shall be constructed in accordance with the following paragraphs.

## 2.6 VALVES

### 2.6.1 General Requirements For Valves

Valves shall include operator, actuator, handwheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and all other accessories required for a complete operation. The valves shall be suitable for the intended service. Renewable parts are not to be of a lower quality than those specified. Valves shall be the same size as adjoining pipe. Valve ends shall be compatible with adjacent piping system. An operator shall be sized to operate the associated valve for the full range of pressures and velocities. Valves will open by turning counterclockwise. Operators, actuators, and accessories shall be factory mounted.

### 2.6.2 Valve Schedule

### 2.6.3 Factory Finishing

Valves shall have an epoxy coating in accordance with AWWA C550 unless otherwise specified. The epoxy shall be either a two-part liquid material or a heat-activated fusion material except that only a heat-activated material shall apply if a valve coating is specified as "fusion" or "fusion bonded" epoxy. The epoxy coating shall have a minimum 7.0 mils dry film thickness except where it is limited by valve operating tolerances. Safety isolation valves and lockout valves with handles, handwheels, or chain wheels shall be painted "safety yellow."

### 2.6.4 Check Valves

#### 2.6.4.1 Swing Check Valves

Swing check valves shall conform to the following:

- c. Swing check valves, 2 inches through 36 inches, shall conform to

AWWA C508, and have ASME B16.1 flanged, mechanical joint or grooved end connections. Valves shall have a bronze body, bronze -mounted disc, solid bronze hinges, and a stainless steel hinge shaft. Valves 2 inches through 12 inches shall be rated for 175 psig service and valves 14 inches through 36 inches shall be rated for 150 psig service at 140 degrees F. Valves shall be fitted with an adjustable outside lever and weight. An increasing-pattern body valve may be used where increased outlet piping size is shown.

2.6.4.2 Thermoplastic Check Valve

2.6.4.3 Double Disc Swing Check Valve

2.6.4.4 Slanting Disc Check Valve

2.6.4.5 Silent Check Valve

Silent check valves shall conform to the following:

2.6.4.6 Ball Check Valve

2.6.5 Ball Valves

2.6.5.1 General Purpose Ball Valves

General purpose ball valves shall conform to the following:

- a. Ball valves, 2 inches and smaller, shall be end entry type with bronze bodies and threaded, in accordance with ASME B1.20.1, full bore ports. Valves shall have polytetrafluoroethylene (PTFE) seats and packing, brass balls and hand wheel operators. Valves shall be rated for 400 psig service at 150 degrees F and shall conform to ASME B16.34. A union shall be installed adjacent to the valves to provide access to the seat.
- b. Ball valves, 2.5 inches and larger, shall be end entry type with bronze bodies and ASME B16.1 flanged ends. Valves shall have polytetrafluoroethylene (PTFE) packing and seats, a brass ball, regular, and hand wheel operators. Valves shall be rated for 400 psig service at 150 degrees F and shall conform to ASME B16.34.

2.6.5.2 Multiple Piece Body Ball Valves

2.6.5.3 Thermoplastic Ball Valve

2.6.6 Gate Valves

2.6.6.1 General Service Gate Valves

General service gate valves shall conform to the following:

- b. Gate valves, 2.5 inches and larger, shall have cast-iron bodies with bronze trim. Valves shall meet the requirements of AWWA C500 AWWA C509 and have Class 125 flanged in accordance with ASME B1.20.1, mechanical joint or push-on end connections. Bonnet shall be a OS&Y Bolted type. Discs shall be double type of bronze construction, and have nonrising stems with backseats. Each gate valve, 16 inches and larger, shall include a by-pass of the same materials as the gate valve. The bypass shall meet the

requirements of AWWA C500. Valves shall be rated for 150 psig service. Valves shall be equipped with handwheel operators.

2.6.6.2 Thermoplastic Gate Valve

2.6.7 Globe Valves

2.6.7.1 General Requirements For Globe Valves

Globe valves, 3 inches and smaller, shall be globe style valve and shall have bronze bodies, with bronze trim, and bronze bonnets. Valves shall conform to ASME B16.34 Class 125, and shall have flanged ASME B16.1 end connections. Valves shall include union bonnets, inside screws, rising stems, conventional discs constructed of bronze rings. Valves shall be rated for 150 psig service. Valves shall be equipped with handwheel operators.

2.6.7.2 Needle Valve

2.6.7.3 Hose Valve

2.6.8 Plug Valves

2.6.8.1 Eccentric Valve

2.6.8.2 Lined Eccentric Valve

2.6.9 Butterfly Valves

2.6.9.1 Standard Service Butterfly Valve

Butterfly valves, 2 inches and larger, shall have stainless steel bodies, ASME B16.1 flanged or AWWA C111 mechanical joint end connections. Valves shall conform to AWWA C504 Class 125. Discs shall be contoured bronze. The valve shafts shall be stainless steel with self-lubricating, corrosion-resistant sleeve type bearings. Valve seats for 24 inch and smaller valves shall be attached to either the valve body or the disc and shall be constructed of chloroprene.

2.6.9.2 Thermoplastic Butterfly Valves

2.6.10 Pinch Valves

2.6.11 Diaphragm Valves

2.6.11.1 Standard Service Diaphragm Valve

2.6.11.2 Thermoplastic Diaphragm Valve

2.6.12 Self-Contained Automatic Valves

2.6.12.1 Pressure-Reducing Valve

2.6.12.2 Pump Control Valve

Pump control valve shall be diaphragm actuated, pilot controlled globe

valve with ductile iron bodies, ASME B16.1 Class 200 flanged end connections, bronze trim, stainless steel stems, and externally mounted strainers with cocks. Valves shall be designed to eliminate pipeline surge caused by pump startup and shutdown, and shall include automatic check features.

#### 2.6.13 Operators

##### 2.6.13.1 Operator Schedule

Requirements relative to this paragraph are shown on in the contract drawings.

##### 2.6.13.2 Manual Operator

The force in a manual operator shall not exceed 39.3 pounds under any operating condition, including initial breakaway. The operator shall be equipped with gear reduction when force exceeds 39.3 pounds. The manual operator shall be a self-locking type or shall be equipped with a self-locking device. A position indicator shall be supplied on quarter-turn valves. Worm and gear operators shall be a one-piece design with worm-gears of gear bronze material. Worm shall be hardened alloy steel with the thread ground and polished. Traveling nut type operators shall have threader steel reach rods with an internally threaded bronze or ductile iron nut.

- a. Exposed Operators. Exposed operators shall have galvanized and painted handwheels. Lever operators are allowed on quarter-turn valves 8 inches and smaller. Cranks shall be supplied on gear type operators. If located off of the operator floor, chain wheel operator with tiebacks, extension stem, floor stands, and other accessories shall be provided to permit operation from normal operation level. Valve handles shall be capable of padlocking, and wheels shall be lockable with a chain and padlock.
- b. Underground Operators. Buried service operators on valves larger than 2.5 inches shall have a 2 inch operating nut. Buried operators on valves. The moving parts of valve and operator shall be enclosed in housing to prevent contact with the soil. Buried service operators for quarter-turn valves shall be designed to withstand an input torque of 450 foot-pound of input torque at the fully open or fully closed positions, and shall be grease packed and gasketed to withstand a submersion in water to 10.2 psig. Buried valves shall have extension stems, bonnets, and valve boxes.

2.6.13.3 Pneumatic Operator

2.6.13.4 Electric Operator

2.6.14 Valve Accessories

2.6.14.1 Extension Bonnet for Valve Operator

2.6.14.2 Floor Stand and Extension Stem

2.6.14.3 Floor Box and Stem

2.6.14.4 Chain Wheel and Guide

2.7 DRAINS

Valved drains may not be shown on the detailed drawings for individual pipelines; their absence will not relieve the Contractor of the responsibility for providing and installing them as indicated in the piping and instrumentation diagrams to complete the piping system for the use intended.

2.7.1 Locations

All pipeline low points shall be drained.

2.7.2 Sizes

For pipelines 2.5 inches and larger, drains shall be 0.75 inch and equipped with ball valves. For pipelines.

2.8 SAMPLE PORTS

Sample ports, shown on the flow diagrams and piping and instrument diagrams of the contract drawings, may not be shown on the detailed drawings of the individual pipelines; their absence shall not relieve the Contractor of the responsibility for providing them. Sample ports shall be provided as indicated in the piping and instrument diagrams to complete the piping systems for the use intended. The sample ports shall be located in easily accessible locations, and shall avoid potential stagnant points and/or areas where material could collect. A plug-type sampling valve with a stainless steel piston that extends beyond the inner surface of the pipe when closed shall be provided at all the sampling ports. The piston shall be sealed by two compressible replaceable polytetrafluoroethylene (PTFE) rings, one above the discharge port, the other below the discharge port. The valve body shall be stainless steel Class 150 with a male ASME B1.20.1 pipe threads inlet connection and female ASME B1.20.1 pipe threads outlet connection. Sampling ports shall be comprised of pipe fittings, pipe, and ball valves which comply with material, temperature, and pressure requirements of the associated piping system as specified elsewhere in this Section. A double block and bleed configuration shall be provided.

2.9 MISCELLANEOUS PIPING COMPONENTS

2.9.1 Air Release and Vacuum Breakers

Air release vents shall be located, and vented, such that a hazardous atmosphere will not be created upon operation.

2.9.1.1 Locations

All pipeline high points shall have air release vents and vacuum breakers.

2.9.1.2 Vacuum Breakers

Vacuum breakers 2 inches and smaller shall be an angle type with all bronze bodies and bonnets, and shall be installed at least 6 inches above the flood line of associated equipment and shall conform to ASSE 1001 for pipe applied units.

2.9.1.3 Air and Vacuum Valve Suitable for Corrosive Service

2.9.1.4 Air Release Valve Suitable for Corrosive Service

2.9.1.5 Combination Air Valve Suitable for Corrosive Service

2.9.2 Backflow Preventer

2.9.2.1 Double Check Valve Assembly

2.9.2.2 Reduced Pressure Backflow Preventer

2.9.2.3 Backflow Preventer with Intermediate Vent

2.9.3 Strainers

2.9.4 Indicating Devices

2.9.4.1 Pressure and Vacuum Gauges

Pressure gauges shall be stem mounted, with aluminum cases equipped with safety pressure blowout backs and dry filled dials. The gauge sensors shall be diaphragm actuated and constructed of phosphor bronze. The gauges shall be equipped with brass 0.25 inch male connections. The dials of the gauges shall be 6 inches in diameter with scale readings in psig and inches of mercury ranging from zero to approximately twice the anticipated process operating or equipment pressure. A slotted adjustable pointer shall be provided with accuracy to conform to ASME B40.1, Grade A. A lever handled gauge cock and filter type snubber shall be provided. A snubber shall be installed between the pipeline and the gauge. The gauges shall be isolated from the process fluids using remote corrosion resistant diaphragm seals. The housing of the corrosion resistant seals shall be constructed of polypropylene (PP). Seals shall be composed of stainless steel

2.9.4.2 Thermometers

Thermometers shall be bi-metal actuated, with 5 inches dished anti-parallax dials that have external calibration adjustment and stainless steel cases. Mercury shall not be used in thermometers. The thermometers shall have stainless steel stems, adjustable angle type for the correct viewing angle. The union connections with associated thermowells shall be included. Scale shall be 25 to 125 degrees F with accuracy within one scale division.

2.9.4.3 Thermowells

Thermowells shall be brass. The length shall be as required with the

associated temperature element. Process connections shall be constructed of stainless steel and shall have flanges, faced and drilled to ASME B16.5 Class 150.

#### 2.9.5 Static Mixer

#### 2.9.6 Expansion Joints

The Contractor shall provide all structural work and equipment required to control expansion and contraction of piping. The Contractor shall verify that the anchors, guides, and expansion joints provided, adequately protect the piping systems.

##### 2.9.6.1 Expansion Joint for Metallic Pipe

The expansion joint shall be a double slip ball type with stainless steel wetted materials of construction. The expansion joint shall be sized to match the associated piping. The maximum allowable working pressure shall be 150 psig at 120 degrees F. The expansion joint shall be sized for a maximum axial compressing or expanding deflection, lateral movement, and angular rotation as recommended by manufacturer. End connections shall be Class 150 flanged ASME B16.11. Required accessories for a complete assembly shall be provided including: swivel joints, limit stops, internal guides, anti-torque device, internal flow liners, control rods, and control cables as required by manufacturer.

##### 2.9.6.2 Expansion Joint for Nonmetallic Piping

A bellows expansion joint shall have the minimum number of convolutions as required by manufacturer to accommodate the required axial deflection, lateral movement and an angular rotation as required by manufacturer with ductile iron flanged, faced and drilled to ASME B16.1 Class 150 end connections, and metal reinforcing bands. The maximum allowable working pressure shall be 140 psig at 120 degrees F. Bolting shall be limited to restrain the force developed by 1.5 times the specified maximum allowable operating pressure. The expansion joint shall be sized to match the associated piping.

#### 2.9.7 Pressure Relief Devices

##### 2.9.7.1 Pressure-Relief Valve

Pressure-relief valves shall conform to the following:

##### 2.9.7.2 Rupture Discs

#### 2.10 PIPE SUPPORTS AND PENETRATIONS

##### 2.10.1 Pipe Supports

Pipe supports shall conform to the requirements of MSS SP-58, MSS SP-69, and MSS SP-89. Where pipe supports contact bare piping or in-line devices, provide supports of compatible material so that neither shall have a deteriorating action on the other.

#### 2.10.1.1 Beam Clamps

For upper attachments on structural steel, the Contractor shall provide beam clamps of ASTM A 36/A 36M carbon steel and MSS SP-58 Types 19 through 23, 25 or 27 through 30. Holes drilled in structural steel for hanger support rods will not be permitted. Clamps shall be provided with hardened steel cup-point set screws and lock-nuts for anchoring in place. Clamp size selection shall only be based on the support of the required load.

#### 2.10.1.2 Riser Clamps

Vertical runs of piping shall be supported at each floor, or closer where required, with ASTM A 36/A 36M carbon steel clamps bolted around pipes and attached to the building construction. Copper plated clamps shall be provided for copper tubing support. Two bolt-type clamps designed for installation under insulation shall be used on insulated pipe runs.

#### 2.10.1.3 Brackets

Where piping is run adjacent to walls or steel columns, the Contractor shall provide welded ASTM A 36/A 36M steel brackets, pre-punched with a minimum of two fastener holes.

#### 2.10.1.4 Offset Pipe Clamp

Where pipes are indicated as offset from wall surfaces, a double-leg design two-piece pipe clamp shall be supplied by the Contractor.

#### 2.10.1.5 Racks

Multiple pipe racks or trapeze hangers shall be fabricated from ASTM A 36/A 36M steel, and designed to suit the conditions at the points of installation. Pipes shall be kept in their relative positions to each other by the use of clamps or clips. Pipelines subject to thermal expansion must be free to slide or roll.

#### 2.10.1.6 Hangers

Hangers shall be fabricated of ASTM A 36/A 36M carbon steel. All hangers shall be of a uniform type and material for a given pipe run and application. Coated or plated hangers shall be used to isolate steel hangers from dissimilar metal tube or pipe. Hangers for pipe sizes 2.5 inches or larger shall incorporate a means of vertical adjustment after erection while supporting the load. For piping systems with liquid temperatures up to 122 degrees F the following shall be used: MSS SP-58 Types 1,3 through 12, Types 24 and 26 with overhead support, or Types 35 through 38 with support from below.

#### 2.10.1.7 Hanger Rods

Hanger rods shall be carbon steel conforming to ASTM A 576. The diameter of the rods for piping system support shall conform to manufacturers recommendations. ASME B31.1.

2.10.2 Pipe Guides

2.10.2.1 Intermediate Guides

2.10.2.2 Alignment Guides

For piping, 10 inch and larger, alignment guides shall be galvanized steel roller type guides.

2.10.3 Flashing Sleeves

Galvanized steel flashing sleeves shall be installed wherever piping passes through concrete roof structures. Flashing shall turn down inside the pipe for 4 inches and larger pipes.

2.10.4 Wall Penetrations

2.10.4.1 Above Grade Wall Penetrations

2.10.4.2 Below Grade Wall Penetrations

Below-grade wall penetrations shall be provided with hydrostatic seals designed to seal opening between pipe or conduit and a through-structure opening. The seals shall be modular mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening polysiloxane (also known as silicone) based, nonslumping, vibration and water resistant sealant with intumescent properties.

2.10.4.3 Galvanizing

2.11 MISCELLANEOUS MATERIALS

2.11.1 Pipe Insulation Material

2.11.2 Heat Trace

2.11.2.1 Electrical Heat Trace Construction

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

Pipe and equipment openings shall be closed with caps or plugs during installation. Equipment shall be protected from dirt, water, and chemical or mechanical damage.

3.1.2 System Preparation

3.1.2.1 Pipe and Fittings

Pipe and fittings shall be inspected before exposed piping is installed or buried piping is lowered into the trench. The Contractor shall clean the ends of pipes thoroughly, remove foreign matter and dirt from inside of pipes, and keep piping clean during and after laying.

### 3.1.2.2 Damaged Coatings

The Contractor shall repair damaged coating areas in the field with material equal to the original coating, except for damaged glass-lined pipe which shall be promptly removed from the site. The Contractor shall not install damaged piping materials. Field repair of damaged and uncoated areas of galvanized piping shall conform to ASTM A 780.

### 3.1.2.3 Field Fabrication

The Contractor shall notify the Contracting Officer at least 2 weeks prior to the field fabrication of pipe or fittings and at least 3 days prior to the start of any surface preparation or coating application work. Field welding shall be performed in accordance with the requirements of this section. Welding electrodes shall be provided in accordance with Table 4.1 of AWS D1.1/D1.1M as required for the applicable base metals and welding process. Fabrication of fittings shall be performed in accordance with the manufacturer's instructions.

## 3.2 EXPOSED PIPING INSTALLATION

### 3.2.1 Anchors and Fasteners

#### 3.2.1.1 Drilled-In Expansion Anchors and Fasteners

#### 3.2.1.2 Drilled-In Adhesive Anchors

### 3.2.2 Piping Expansion and Contraction Provisions

### 3.2.3 Piping Flexibility Provisions

### 3.2.4 Couplings, Adapters and Service Saddles

Pipes shall be thoroughly cleaned of oil, scale, rust, and dirt in order to provide a clean seat for gaskets. Gaskets shall be wiped clean prior to installation. Flexible couplings and flanged coupling adapter gaskets shall be lubricated with the manufacturer's standard lubricant before installation on the pipe ends. Couplings, service saddles, and anchor studs shall be installed in accordance with manufacturer's instructions. Bolts shall be tightened progressively, drawing up bolts on opposite sides a little at a time until all bolts have a uniform tightness. Torque-limiting wrenches shall be used to tighten bolts.

### 3.2.5 Piping Equipment/Component Installation

Piping components and indicators shall be installed in accordance with manufacturer's instructions. Required upstream and downstream clearances, isolation valves, and miscellaneous devices shall be provided for an operable installation. The upstream and downstream lengths of undisturbed piping shall be in accordance with flow indicator manufacturer's recommendations.

3.2.5.1 Backflow Preventers

3.2.5.2 Local Indicators

3.2.6 Pipe Flanges

Pipe flanges shall be set level, plumb, and aligned. Flanged fittings shall be installed true and perpendicular to the axis of the pipe. The bolt holes shall be concentric to the centerline of the pipe.

3.2.7 Valve Locations

Valves shall be located in accordance with the contract drawings where actuators are shown. Where actuators are not shown, valves shall be located and oriented to permit easy access to the valve operator, and to avoid interferences.

3.2.8 Pipe Tap Connections

Taps to pipe barrels are unacceptable. Taps to ductile iron piping shall be made only with a service saddle or at a tapping boss of a fitting, valve body, or equipment casting. Taps to steel piping shall be made only with a welded threadolet connection.

3.2.9 Plastic Pipe Installation

All plastic pipe shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations. Heat joining shall be performed in accordance with ASTM D 2657. Electrofusion joining shall be performed in accordance with ASTM F 1290. Schedule 40 pipe shall not be threaded. Schedule 80 threaded nipples shall be used where necessary to connect to threaded valves or fittings. Strap wrenches shall be used for tightening threaded plastic joints, and care shall be taken not to over tighten these fittings. Pipe shall not be laid when the temperature is below 40.1 degrees F, nor above 90 degrees F when exposed to direct sunlight. Any plastic pipe installed above grade and outdoors shall be ultraviolet (UV) protected or UV resistant. The pipe ends that are to be joined shall be shielded from direct sunlight prior to and during the laying operation. Adequate ventilation shall be provided when working with pipe joint solvent cement and the handling of solvent cements, primers and cleaners shall be in accordance with ASTM F 402. The Contractor shall provide and install supports and hangers in accordance with the manufacturer's recommendations. Where plastic pipe is subjected to severe temperature fluctuations, provisions for expansion and contraction must be provided. This shall be accomplished with the use of expansion joints and offset piping arrangements. All lines shall be hydrostatically tested at the maximum operating pressures.

3.2.9.1 PVC Piping

Solvent-cemented joints shall be constructed in accordance with ASTM D 2855.

3.2.9.2 FRP Piping

Pipe, duct, and fittings shall be cut, fabricated, and installed in strict accordance with the pipe manufacturer's written recommendations and as shown on the contract drawings. All FRP pipe and fittings shall have interior surfaces which are highly polished, with no exposed fibers. Field

joints shall be cured as recommended by the manufacturer. Where it is absolutely necessary to make a field weld on pipe specified to be field flanged only, the weld shall be made only under direct supervision of the pipe manufacturer's field representative, who shall be experienced in FRP pipe lay-up techniques.

### 3.2.10 Double Containment Piping Installation

Factory trained field representatives of the piping supplier shall provide technical field support during critical periods of piping and leak detection system installation including final check out of the leak detection/location system, and end user training.

### 3.2.11 Insulation

## 3.3 BURIED PIPE PLACEMENT

### 3.3.1 Excavation and Backfilling

Earthwork shall be performed as specified in Section 02316a EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer. The Contractor shall exercise care when lowering pipe into the trench to prevent damage or twisting of the pipe.

### 3.3.2 Fittings

At valves and connections, the trench bottom shall be dug out with sufficient length, width, and depth to ensure clearance between the undisturbed trench bottom and the valves and such connections.

### 3.3.3 Thrust Restraint

Thrust restraint devices are generally not shown in the contract drawings; their absence will not relieve Contractor of the responsibility for providing them as required to provide complete systems for the use intended. The Contractor shall provide thrust blocks and ties where required, whether or not shown on the contract drawings. At a minimum, thrust restraint shall be provided at pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist.

#### 3.3.3.1 Thrust Blocks

Thrust blocking shall be concrete of a mix not leaner than 1 cement, 2.5 sand and 5 gravel, and have 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 the thrust blocks shall be poured against undisturbed earth. The sides of thrust blocks not subject to thrusts may be poured against forms. The area of bearing shall be as shown or directed. Blocking shall be placed so that fitting joints shall be accessible for repair. Steel rods and clamps, protected by galvanizing or a coating of bituminous paint shall be used to anchor vertical down bends into gravity thrust blocks.

#### 3.3.3.2 Restrained Joints

The restrained pipe length shall be as required by TM 5-813-5. For ductile iron pipe, restrained joints shall be designed by the Contractor or the

pipe manufacturer in accordance with DIPRA TRD.

#### 3.3.4 Marking Tape

Pipe marking tape shall be provided and installed in accordance with the requirements of Section 02316a EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

#### 3.3.5 Plastic Pipe Installation

Plastic pipe shall be cut, fabricated, and installed in strict conformance with the pipe manufacturer's recommendations. Offset loops from the trench centerline shall be as recommended by the manufacturer for the maximum temperature variation between the pipe temperature at the time of solvent welding and operating temperature. Design for installation of plastic pipe exposed to ambient conditions or in which the temperature variation of the contents is substantial shall have provisions for movement due to thermal expansion and contraction documented to be in accordance with PPI TR21. Flexible plastic pipe connected to heavy fittings, manholes, and rigid structures shall be supported in such a manner that no subsequent relative movement between the plastic pipe at the flanged joint and the rigid structures is possible. Thrust blocking shall not be used for flexible plastic piping. The piping shall be designed and installed to withstand the compression and expansion forces imposed by the trench conditions.

#### 3.4 CONNECTING DISSIMILAR PIPE

Flexible transition couplings, dielectric fittings and isolation joints shall be installed in accordance with the manufacturer's instructions.

#### 3.5 EXTERNAL CORROSION PROTECTION

Protect all pipe and piping accessories from corrosion and adverse environmental conditions.

##### 3.5.1 Underground Metallic Piping

Buried metallic piping shall be protected from corrosion using protective coatings and cathodic protection. Where dissimilar metals are joined underground, gas-tight isolation joints shall be used. Insulating joint material shall be provided where required to control galvanic or electrical action.

##### 3.5.2 Above Grade Metallic Piping

Nonferrous and stainless steel piping shall not be painted except for aluminum alloy piping. Where dissimilar metals are joined, isolation joints shall be used.

###### 3.5.2.1 Ferrous Piping

Shop primed surfaces shall be touched up with ferrous metal primer. Surfaces that have not been shop primed shall be solvent cleaned. Surfaces that contain loose rust, mill scale or other foreign substances shall be mechanically cleaned by commercial sand blasting conforming to SSPC SP 6 and primed with a ferrous metal primer. Primed surfaces shall be finished with two coats of exterior oil paint..

### 3.5.2.2 Aluminum Alloy Piping

## 3.6 DOUBLE CONTAINMENT PIPING LEAK DETECTION SYSTEM

### 3.6.1 Assistance and Training

The Contractor shall provide manufacturer's technical assistance for Contractor training, installation inspection, start up, and owner operating and maintenance training. The Contractor shall follow manufacturer's instructions for installation.

### 3.6.2 Field Test of System

## 3.7 FLEXIBLE JOINTS AT CONCRETE STRUCTURES

Flexible joints shall be provided at the face of all structures, whether or not shown on the contract drawings. Rubber ring joints, mechanical joints, flexible couplings, and proprietary restrained ductile iron pipe joints shall be considered flexible joints; welded pipe joints shall not. Joints may be flush with the structure face or may be located up to 1 pipe diameter away from face, but not further than 17.7 inches away from face. For pipelines larger than 18 inches in diameter the first joint shall be within 1 pipe diameter.

## 3.8 CLOSURES

Closure pieces shall be installed as necessary to end pipe runs and shall conform to ASME B16.9 or ASME B16.11. Elastomer sleeves bonded to pipe ends are not acceptable. Pressure piping shall have closures of plain end pieces, with thickness matching the nominal wall thickness of the associated pipe, mounted on double flexible couplings, unless otherwise shown on contract drawings or approved by the Contracting Officer. Pipes with restrained joints shall have pipe closures installed with thrust tie-rod assemblies.

## 3.9 PENETRATIONS

Steel pipe sleeves shall be hot-dipped galvanized after fabrication for above grade applications in nonsubmerged areas. For below grade, or in submerged and damp environments, steel pipe sleeves shall be lined and coated. Embedded metallic piping shall be isolated from concrete reinforcement using coated pipe penetrations. Wall pipes shall be securely supported by form work to prevent contact with reinforcing steel and tie-wires. Joints shall be caulked with rubber sealant. For existing concrete walls, rotary drilled holes may be provided in lieu of sleeves.

## 3.10 VALVE INSTALLATION

Flanged valve bolt holes shall be installed so as to straddle the vertical centerline of pipe. Flanged faces shall be cleaned prior to inserting the gasket and bolts, and then the nuts shall be tightened progressively and uniformly. Threaded ends shall have the threads cleaned by wire brushing or swabbing prior to installation.

### 3.10.1 Valve Orientation

The operating stem of a manual valve shall be installed in a vertical position when the valve is installed in horizontal runs of pipe having centerline elevations 4.5 feet or less above finished grade level, unless

otherwise shown on contract drawings. The operating stem of a manual valve shall be installed in a horizontal position in horizontal runs of pipe having centerline elevations between 4.5 feet and 6.75 feet above finish floor, unless otherwise shown on contract drawings. Automatic valves shall be installed in accordance with the manufacturer's instructions and approved drawings.

#### 3.10.1.1 Butterfly Valves

Orientation of butterfly valves shall take into account changes in pipe direction. Valve shafts shall be oriented so that unbalanced flows caused by pipe direction changes or other disturbances are equally divided to each half of the disc.

#### 3.10.1.2 Plug Valves

If a plug valve seat position is not shown in the contract drawings, locate the seat position as follows: for horizontal flow, the flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve; and for vertical flow, the seat shall be installed in the highest portion of the valve.

#### 3.10.2 Line Size Ball Valves

A line size ball valve and union shall be installed upstream of each solenoid valve, in-line flow switch, or other in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.

#### 3.10.3 Isolation Valve

Safety isolation valves shall be installed on compressed air supplies. The valve shall be located to provide accessibility for control and maintenance. If necessary, access doors shall be installed in finished walls and plaster ceilings for valve access.

#### 3.10.4 Operator Extension Stems

Where the depth of the valve is such that its centerline is more than 3 feet below grade, an operator extension stem shall be furnished with a 2 inch operating nut to bring the operating nut to a point 5.9 inches below the surface of the ground and/or box cover. The operating nut shall be located in a floor box.

#### 3.10.5 Torque Tube

Where the operator for quarter-turn valve is located on a floor stand, an extension stem torque tube shall be furnished, properly sized for the maximum torque capacity of the valve.

#### 3.10.6 Chain Wheel and Guide

Chain wheel and guide assemblies or chain lever assemblies shall be installed on manually operated valves located over 6.73 feet above finished floor elevation. Where chains hang in normally traveled areas, appropriate "L" type tie-back anchors shall be used.

#### 3.11 AIR RELEASE, DRAINS AND SAMPLE PORTS

Sample ports shall be provided where indicated on the contract drawings.

The Contractor shall install specified vents at piping high points for entrapped air release and install drains in the low points of pipelines regardless of whether shown on contract drawings.

### 3.12 PIPING SUPPORT SYSTEMS INSTALLATION

The absence of pipe supports and details on the contract drawings shall not relieve the Contractor of responsibility for sizing and providing supports throughout plant.

#### 3.12.1 General Support Requirements

Pipe support systems shall meet the requirements of MSS SP-58. Contractor-designed and selected support systems shall be installed in accordance with MSS SP-69, and as specified herein. Piping connections to equipment shall be supported by pipe supports and not off the equipment. Large or heavy valves, fittings, and/or equipment shall be supported independently of associated piping. Pipes shall not be supported off other pipes. Supports shall be provided at piping changes in direction or in elevation, adjacent to flexible joints and couplings, and where otherwise shown on the contract drawings. Pipe supports and hangers shall not be installed in equipment access areas or bridge crane runs. Hanging pipes shall be braced against horizontal movement by both longitudinal and lateral sway bracing. At each channel type support, every pipe shall be provided with an intermediate pipe guide, except where pipe anchors are required. Existing support systems may be used to support additional new piping only if the Contractor can demonstrate that the existing support systems are adequate for the additional loads, or if the existing systems are strengthened to support the additional loads. Pedestal type pipe supports shall be provided under base flanges adjacent to rotating equipment and where required to isolate vibration. Piping 2.5 inches in diameter and larger shall be braced for seismic forces. Lateral supports for seismic loads shall be installed at all changes in direction.

#### 3.12.2 Support of Insulated Piping

The Contractor shall install oversized supports to fit the insulation inserts. Supports shall be provided with galvanized or stainless steel protection shields and oversized rollers.

#### 3.12.3 Dielectric Barriers

Dielectric barriers shall be installed between supports and copper or stainless steel piping, and between stainless steel supports and non-stainless steel ferrous piping.

3.12.4 Support Spacing

3.12.4.1 Acceptable Limits for Metallic Piping

3.12.4.2 Acceptable Limits for Thermoplastic Piping

3.12.4.3 Acceptable Limits for Rubber/Elastomer Piping

3.12.5 Support Methods

3.12.6 Supports and Hangers for Stainless Steel Piping

3.13 PIPE IDENTIFICATION, PAINTING AND COLOR CODING

Except where piping is required to be completely painted in its code color, piping or its insulation covering may be banded either with plastic adhesive tapes or painted stripes around pipe designating piping contents in accordance with following options and requirements. A single individual band, of plastic adhesive tape or paint, designating pipe contents shall be provided with sufficient length to permit the stenciling of pipe contents in letters. Identification shall be provided at branch connections, inlets and outlets of equipment, every 19.7 feet of straight run, upstream of valves, and within 3.3 feet of entrance to or exit from wall curtains, or other similar type barrier.

3.14 FIELD QUALITY CONTROL

3.14.1 Hydrostatic Tests

Where any section of a pipeline is provided with concrete thrust blocking for fitting, the hydrostatic tests shall not be made until at least 5 days after the installation of the concrete thrust blocking, unless otherwise approved by the Contracting Officer.

3.14.1.1 Buried Piping

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 test pressure of 50 psig. 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 as necessary. Defective pipe, joints, fittings, and valves found during the pressure test shall be removed and replaced with new material, and the test 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 are encountered: (1) wet or unstable soil conditions in the trench; (2) 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; or (3) maintaining the trench in an open condition would delay completion of the Contract. 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 hydrostatic tests. Backfill placed prior to the tests shall be placed in accordance with the requirements of Section 02316a EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.14.1.2 Exposed Piping

Hydrostatic testing shall be conducted in accordance with ASME B31.3. Piping systems shall be tested under normal service conditions (as indicated in the Pipe Schedule in the contract drawings) to demonstrate compliance. The test pressure shall not be less than 1.5 times the design pressure. Water shall be used as the hydrostatic test fluid. The Contractor shall provide clean test water of such quality to prevent corrosion of the piping system materials. Air release vents shall be opened at all high points of the piping system in order to purge air pockets while the piping system is filling.

- a. For rigid piping hydrostatic testing, the maximum test pressure shall be calculated according to ASME B31.3, but shall not exceed the yield strength of the piping system. The maximum velocity during filling shall be 0.25 fps applied over full area of pipe in accordance with the manufacturer's instructions. Venting during filling may also be provided by loosening flanges with a minimum of four bolts or by the use of equipment vents. The Contractor shall test all parts of the piping system. The hydrostatic test pressure shall be maintained continuously for 30 minutes minimum and for such additional time as necessary to conduct examinations for leakage. All joints and connections shall be examined by the Contractor for leakage. The piping system, exclusive of possible localized instances at pump or valve packing, shall show no visual evidence of leaking. The Contractor shall correct visible leakage and retest. Unless otherwise directed by the Contracting Officer, the piping system shall be left full of water after leaks are repaired.
- b. For non-rigid, non-metallic piping and metallic piping with a non-metallic liner hydrostatic testing, the maximum test pressure shall be calculated according to ASME B31.3, but shall not exceed 1.5 times the maximum pressure rating of the lowest rated component in the piping system. The maximum velocity during filling shall be 0.25 fps applied over full area of pipe in accordance with the manufacturer's instructions. The system shall be initially pressurized to 50 percent of the normal service conditions and inspected. Any leaks shall be repaired by the Contractor. The system shall then be pressurized to the test pressure. Small amounts of water shall be added as required on a hourly basis for a maximum of 3 hours in order to maintain the test pressure. After 4 hours, the test pressure shall be lowered by 10.2 psi. If the hydrostatic pressure remains steady for 1 hour, then no leakage is indicated. The Contractor shall inspect for leaks, repair and retest if necessary. The piping system shall be allowed to relax for 8 hours before retesting.

3.14.1.3 Double Containment Primary Piping

3.14.1.4 Time for Making Test

Except for joint material setting or where concrete thrust blocks necessitate a delay, underground piping 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. Tests for above ground pressure piping shall be conducted after the piping has been completely installed, including all supports, hangers, and anchors, and inspected for proper installation but

prior to installation of insulation.

### 3.14.2 Pneumatic Tests

Pneumatic testing shall be prepared for and conducted in accordance with the requirements of ASME B31.3. Care must be taken to minimize the chance of a brittle fracture or failure during a pneumatic leak test. Only non-toxic, nonflammable, inert gases or air shall be used.

#### 3.14.2.1 Pressure Relief Device

During pneumatic testing, a pressure relief device shall be provided for each piping section being tested. The device shall have a set pressure not higher than the test pressure plus the lesser of 10 percent of the test pressure or 50.8 psi.

#### 3.14.2.2 Pneumatic Testing Procedures

The test fluid shall be air and the test pressure shall be 110 percent of the design pressure. The test pressure shall be incrementally increased until the gage pressure reaches the lesser of 50 percent of the test pressure or 25 psig. The Contractor shall examine piping joints for leakage. If no leakage is occurring, the Contractor shall continue to increase the pressure incrementally, while maintaining each incremental increase long enough to equalize pipe strains, until the test pressure is reached. The test pressure shall then be reduced to the design pressure and maintained for 10 minutes without additional energy expenditure. If the pneumatic pressure remains steady, then no leakage is indicated. The Contractor shall inspect for and repair leaks, and retest if necessary.

#### 3.14.2.3 Double Containment Secondary Piping

### 3.14.3 Pipe Leakage Tests

Unless approved by the Contracting Officer, leakage testing 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 piping shall be subjected to not less than 200 psig. Leakage is defined as the quantity of the test liquid, water, that is supplied to the piping system, or any valved or approved section thereof, in order to maintain pressure within 5 psi of the specified leakage test pressure after the piping has been filled with the test liquid and all air is expelled. No piping installation will be accepted if leakage exceeds the allowable leakage determined by the following formula:

$$L = C_f \times N \times D \times P^{0.5}$$

$C_f$  = conversion factor = 0.0001351  
 $L$  = allowable leakage, gallons per hour  
 $N$  = number of joints in the length of piping tested  
 $D$  = nominal pipe diameter, inches  
 $P$  = average test pressure during the test, psig.

Should any test disclose leakage greater than that allowed, the leaks shall be located and repaired until the leakage is within the specified allowance, without additional cost.

#### 3.14.4 Testing New to Existing Connections

New piping connected to existing pipe, existing equipment, existing

treatment systems, or tanks and treatment systems furnished under other Sections shall be tested. The Contractor shall isolate the new piping with pipe caps, spectacle blinds, or blind flanges. The joint between new piping and existing piping shall be tested by methods that do not place the entire existing system under the test load. The Contractor shall then proceed with the testing of new piping systems as specified herein.

#### 3.14.5 Valve Testing

Valves may either be tested while testing pipelines, or as a separate step.

It shall be demonstrated that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, and in both directions for two-way valve applications. The Contractor shall count and record the number of turns required to open and close each valve, and account for any discrepancies with manufacturer's data. Air and vacuum relief valves shall be examined as the associated pipe is being filled to verify venting and seating is fully functional. The Contractor shall set, verify, and record set pressures for all relief and regulating valves. Self-contained automatic valves shall be tested at both maximum and minimum operating ranges, and reset upon completion of test to the design value. Automatic valves that are not self-contained shall be tested in conjunction with control system testing.

#### 3.15 FINAL CLEANING

##### 3.15.1 Interim Cleaning

The Contractor shall prevent the accumulation of weld rod, weld spatter, pipe cuttings and filings, gravel, cleaning rags, and other foreign material within piping sections during fabrication. The piping shall be examined to assure removal of these and other foreign objects prior to assembly and installation.

##### 3.15.2 Flushing

Following assembly and testing, and prior to final acceptance, piping systems shall be flushed with water to remove accumulated construction debris and other foreign matter. The piping shall be flushed until all foreign matter is removed from the pipeline. The Contractor shall provide all hoses, temporary pipes, ditches, and other items as required to properly dispose of flushing water without damage to adjacent properties. The minimum flushing velocity shall be 2.5 fps. For large diameter pipe where it is impractical to flush the pipe at the minimum flushing velocity, the pipeline shall be cleaned in-place from the inside by brushing and sweeping, then flushing the pipeline at a lower velocity. Cone strainers shall be installed in the flushing connections of attached equipment and left in place until cleaning is completed. Accumulated debris shall be removed through drains, or by removing spools or valves.

##### 3.15.3 Disinfection

#### 3.16 WASTE WATER DISPOSAL

The water used for testing, cleaning, flushing and/or disinfection shall be disposed of in accordance with all applicable regulations. Disposal is solely the responsibility of the Contractor. The method proposed for disposal of waste water shall be provided to, and approved by, the Contracting Officer prior to performing any testing, cleaning, flushing and

disinfection activities.

3.17 TABLES

TABLE I  
PIPE AND FITTING MATERIALS FOR COMMON PIPING SYSTEMS

Item No.	Pipe Material	A	B1	B2	C	D1	D2	SERVICE
2.2	DI Pipe	x	x	x	x			
2.9	PVC Pipe	x	x					
2.13	PE Pipe	x	x				x	

LEGEND:

- A - Underground
- B1 - Aboveground: with ambient temperature exposure -13 degrees F to 113 degrees F and ultraviolet light exposure
- B2 - Aboveground: with heat trace and insulated jacket
- C - Temperature, Greater than 176 degrees F
- D1 - Solvents: non-polar
- D2 - Solvents: polar

-- End of Section --

Section No.    Title

**DIVISION 16 - ELECTRICAL**

16375            Electrical Distribution System, Underground

SECTION 16375

ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND  
11/92

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 C80.1 (1995) Rigid Steel Conduit - Zinc Coated

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123/A 123M (1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 153/A 153M (1995) Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM B 8 (1993) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

ASTM B 117 (1997) Operating Salt Spray (Fog) Apparatus

ASTM D 1654 (1992) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2 (1997) National Electrical Safety Code

IEEE Std 81 (1983) Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System (Part 1)

IEEE Std 100 (1996) IEEE Standard Dictionary of Electrical and Electronics Terms

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA AB 1 (1993) Molded Case Circuit Breakers and Molded Case Switches

NEMA FB 1 (1993) Fittings, Cast Metal Boxes and Conduit Bodies for Conduit and Cable

Assemblies

NEMA FU 1	(1986) Low Voltage Cartridge Fuses
NEMA PB 1	(1990) Panelboards
NEMA TC 6	(1990) PVC and ABS Plastic Utilities Duct for Underground Installation
NEMA FU 1	(1986) Low Voltage Cartridge Fuses
NEMA ICS 2	(1993) Industrial Controls and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC
NEMA RN 1	(1998) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2002) National Electrical Code
NFPA 101	(2000) Life Safety Code

UNDERWRITERS LABORATORIES (UL)

UL 6	(1997) Rigid Metal Conduit
UL 198C	(1986; Rev thru Feb 1998) High-Interrupting-Capacity Fuses, Current-Limiting Types
UL 198D	(1995) Class K Fuses
UL 198E	(1988; Rev Jul 1988) Class R Fuses
UL 198H	(1988; Rev thru Nov 1993) Class T Fuses
UL 467	(1993; Rev thru Aug 1996) Grounding and Bonding Equipment
UL 486A	(1997) Wire Connectors and Soldering Lugs for Use with Copper Conductors
UL 489	(1996; Rev thru Nov 1997) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
UL 510	(1994; Rev thru Apr 1998) Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
UL 514A	(1996; Rev Jul 1999) Metallic Outlet Boxes
UL 651	(1995; Rev thru Oct 1998) Schedule 40 and

80 Rigid PVC Conduit

UL 854 (1996; Rev Apr 1998) Service-Entrance Cables

UL 1242 (1996; Rev Apr 1997) Intermediate Metal Conduit

## 1.2 GENERAL REQUIREMENTS

### 1.2.1 Terminology

Terminology used in this specification is as defined in IEEE Std 100.

### 1.2.2 Rules

The installation shall conform to the requirements of NFPA 70 unless more stringent requirements are indicated or shown.

### 1.2.3 Coordination

The drawings indicate the extent and the general location and arrangement of equipment, conduit, and wiring. The Contractor shall become familiar with all details of the work and verify all dimensions in the field so that the equipment shall be properly located and readily accessible. If any conflicts occur necessitating departures from the drawings, details of and reasons for departures shall be submitted and approved prior to implementing any change. The Contractor shall coordinate the electrical requirements of the mechanical work and provide all power related circuits, wiring, hardware and structural support, even if not shown on the drawings.

### 1.2.4 Special Environments

#### 1.2.4.1 Weatherproof Locations

Wiring, and equipment in outdoor locations shall conform to NFPA 70 requirements for installation in damp or wet locations.

## 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 Catalog Data; G, RE

Catalog cuts, brochures, circulars, specifications, product data, and printed information in sufficient detail and scope to verify compliance

with the requirements of the contract documents.

Material, Equipment, Lists; G, RE

A complete itemized listing of equipment and materials proposed for incorporation into the work. Each entry shall include an item number, the quantity of items proposed, and the name of the manufacturer of each such item.

Installation Procedures; G, RE

Procedures shall include diagrams, instructions, and precautions required to install, adjust, calibrate, and test the devices and equipment.

SD-04 Drawings

Electrical Distribution System; G, RE

Detail drawings consisting of equipment drawings, illustrations, schedules, instructions, diagrams manufacturers standard installation drawings and other information necessary to define the installation and enable the Government to check conformity with the requirements of the contract drawings.

If departures from the contract drawings are deemed necessary by the Contractor, complete details of such departures shall be included with the detail drawings. Approved departures shall be made at no additional cost to the Government.

Detail drawings shall show how components are assembled, function together and how they will be installed on the project. Data and drawings for component parts of an item or system shall be coordinated and submitted as a unit. Data and drawings shall be coordinated and included in a single submission. Multiple submissions for the same equipment or system are not acceptable except where prior approval has been obtained from the Contracting Officer. In such cases, a list of data to be submitted later shall be included with the first submission. Detail drawings shall consist of the following:

a. Detail drawings showing physical arrangement, construction details, connections, finishes, materials used in fabrication, provisions for conduit or busway entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and equipment weight. Drawings shall be drawn to scale and/or dimensioned. All optional items shall be clearly identified as included or excluded.

b. Internal wiring diagrams of equipment showing wiring as actually provided for this project. External wiring connections shall be clearly identified.

As-Built Drawings; G, RE

The as-built drawings shall be a record of the construction as installed. The drawings shall include the information shown on the contract drawings as well as deviations, modifications, and changes from the contract drawings, however minor. The as-built drawings shall be a full sized set of prints marked to reflect deviations, modifications, and changes. The

as-built drawings shall be complete and show the location, size, dimensions, part identification, and other information. Additional sheets may be added. The as-built drawings shall be jointly inspected for accuracy and completeness by the Contractor's quality control representative and by the Contracting Officer prior to the submission of each monthly pay estimate. Upon completion of the work, the Contractor shall provide three full sized sets of the marked prints to the Contracting Officer for approval. If upon review, the as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for correction. The Contractor shall correct and return the as-built drawings to the Contracting Officer for approval within 10 calendar days from the time the drawings are returned to the Contractor.

#### SD-09 Reports

##### Factory Test; G, RE

Certified factory test reports shall be submitted when the manufacturer performs routine factory tests, including tests required by standards listed in paragraph REFERENCES. Results of factory tests performed shall be certified by the manufacturer, or an approved testing laboratory, and submitted within 7 days following successful completion of the tests. The manufacturer's pass-fail criteria for tests specified in paragraph FIELD TESTING shall be included.

##### Field Testing; G, RE

A proposed field test plan, 30days prior to testing the installed system. No field test shall be performed until the test plan is approved. The test plan shall consist of complete field test procedures including tests to be performed, test equipment required, and tolerance limits.

##### Test Reports; G, RE

Six copies of the information described below in 8-1/2 by 11 inch binders having a minimum of three rings, including a separate section for each test. Sections shall be separated by heavy plastic dividers with tabs.

- a. A list of equipment used, with calibration certifications.
- b. A copy of measurements taken.
- c. The dates of testing.
- d. The equipment and values to be verified.
- e. The condition specified for the test.
- f. The test results, signed and dated.
- g. A description of adjustments made.

#### SD-13 Certificates

##### Materials and Equipment; G, RE

Where materials or equipment are specified to conform to the standards of the Underwriters Laboratories (UL) or to be constructed or tested, or both, in accordance with the standards of the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers (IEEE), or the National Electrical Manufacturers Association (NEMA), the Contractor shall submit proof that the items provided conform to such requirements. The label of, or listing by, UL will be acceptable as evidence that the items conform. Either a certification or a published catalog specification data statement, to the effect that the item is in accordance with the referenced ANSI or IEEE standard, will be acceptable as evidence that the item conforms. A similar certification or published catalog specification data statement to the effect that the item is in accordance with the referenced NEMA standard, by a company listed as a member company of NEMA, will be acceptable as evidence that the item conforms. In lieu of such certification or published data, the Contractor may submit a certificate from a recognized testing agency equipped and competent to perform such services, stating that the items have been tested and that they conform to the requirements listed, including methods of testing of the specified agencies. Compliance with above-named requirements does not relieve the Contractor from compliance with any other requirements of the specifications.

Cable Installer Qualifications; G, RE

The Contractor shall provide at least one onsite person in a supervisory position with a documentable level of competency and experience to supervise all cable pulling operations. A resume shall be provided showing the cable installers' experience in the last three years, including a list of references complete with points of contact, addresses and telephone numbers.

SD-19 OPERATION AND MAINTENANCE MANUALS

Electrical Distribution System; G, RE

Six copies of operation and maintenance manuals, within 7 calendar days following the completion of tests and including assembly, installation, operation and maintenance instructions, spare parts data which provides supplier name, current cost, catalog order number, and a recommended list of spare parts to be stocked. Manuals shall also include data outlining detailed procedures for system startup and operation, and a troubleshooting guide which lists possible operational problems and corrective action to be taken. A brief description of all equipment, basic operating features, and routine maintenance requirements shall also be included. Documents shall be bound in a binder marked or identified on the spine and front cover. A table of contents page shall be included and marked with pertinent contract information and contents of the manual. Tabs shall be provided to separate different types of documents, such as catalog ordering information, drawings, instructions, and spare parts data. Index sheets shall be provided for each section of the manual when warranted by the quantity of documents included under separate tabs or dividers.

Three additional copies of the instructions manual shall be provided within 30 calendar days following the manuals.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

Devices and equipment shall be visually inspected by the Contractor when received and prior to acceptance from conveyance. Stored items shall be protected from the environment in accordance with the manufacturer's published instructions. Damaged items shall be replaced. Oil filled transformers and switches shall be stored in accordance with the manufacturer's requirements. Wood poles held in storage for more than 2 weeks shall be stored in accordance with ANSI O5.1. Handling of wood poles shall be in accordance with ANSI O5.1, except that pointed tools capable of producing indentations more than 1 inch in depth shall not be used. Metal poles shall be handled and stored in accordance with the manufacturer's instructions.

#### 1.5 EXTRA MATERIALS

Two complete sets of all special tools required for maintenance shall be provided, complete with a suitable tool box. Special tools are those that only the manufacturer provides, for special purposes (to access compartments, or operate, adjust, or maintain special parts).

#### 1.6 WORKMANSHIP

Materials and equipment shall be installed in accordance with NFPA 70, recommendations of the manufacturer, and as shown.

### PART 2 PRODUCTS

#### 2.1 STANDARD PRODUCT

Material and equipment shall be the standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Items of the same classification shall be identical including equipment, assemblies, parts, and components.

#### 2.2 NAMEPLATES

##### 2.2.1 General

Each major component of this specification shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a nameplate securely attached to the equipment. Nameplates shall be made of noncorrosive metal. Equipment containing liquid dielectrics shall have the type of dielectric on the nameplate. Sectionalizer switch nameplates shall have a schematic with all switch positions shown and labeled. As a minimum, nameplates shall be provided for panelboard, lighting cabinet, controllers and devices.

#### 2.3 CORROSION PROTECTION

##### 2.3.1 Aluminum Materials

Aluminum shall not be used.

## 2.3.2 Ferrous Metal Materials

### 2.3.2.1 Hardware

Ferrous metal hardware shall be hot-dip galvanized in accordance with ASTM A 153/A 153M and ASTM A 123/A 123M.

### 2.3.2.2 Equipment

Equipment and component items, shall be provided with corrosion-resistant finishes which shall withstand 120 hours of exposure to the salt spray test specified in ASTM B 117 without loss of paint or release of adhesion of the paint primer coat to the metal surface in excess of 1/16 inch from the test mark. The scribed test mark and test evaluation shall be in accordance with ASTM D 1654 with a rating of not less than 7 in accordance with TABLE 1, (procedure A). Cut edges or otherwise damaged surfaces of hot-dip galvanized sheet steel or mill galvanized sheet steel shall be coated with a zinc rich paint conforming to the manufacturer's standard.

## 2.4 CABLES

Cables shall be single conductor type unless otherwise indicated. Sizes are based on copper conductors and the insulation types indicated. Sizes shall be not less than indicated. Branch-circuit conductors shall be not smaller than No. 12 AWG.

## 2.5 CONDUIT AND DUCTS

Ducts shall be single, round-bore type, with wall thickness and fittings suitable for the application. Duct lines shall be concrete-encased, thin-wall type. Duct lines shall be nonencased direct-burial, thick-wall type.

### 2.5.1 Metallic Conduit

Intermediate metal conduit shall comply with UL 1242. Rigid galvanized steel conduit shall comply with UL 6 and ANSI C80.1. Metallic conduit fittings and outlets shall comply with UL 514A and NEMA FB 1.

### 2.5.2 Nonmetallic Ducts

#### 2.6.2.2 Concrete Encased Ducts

UL 651 Schedule 40 or NEMA TC 6 Type EB.

### 2.5.3 Direct Burial

UL 651 Schedule 80 or NEMA TC 6 Type DB.

#### 2.5.4 Conduit Sealing Compound

Compounds for sealing ducts and conduit shall have a putty-like consistency workable with the hands at temperatures as low as 35 degrees F, shall neither slump at a temperature of 300 degrees F, nor harden materially when exposed to the air. Compounds shall adhere to clean surfaces of fiber or plastic ducts; metallic conduits or conduit coatings; concrete, masonry, or lead; any cable sheaths, jackets, covers, or insulation materials; and the common metals. Compounds shall form a seal without dissolving, noticeably changing characteristics, or removing any of the ingredients. Compounds shall have no injurious effect upon the hands of workmen or upon materials.

#### 2.6 HANDHOLES, AND PULLBOXES

Handholes for low voltage cables installed in parking lots, sidewalks, and turfed areas shall be fabricated from an aggregate consisting of sand and with continuous woven glass strands having an overall compressive strength of at least and a flexural strength of at least Pullbox and handhole covers in sidewalks, and turfed areas shall be of the same material as the box. Concrete pullboxes shall consist of precast reinforced concrete boxes, extensions, bases, and covers.

#### 2.7 SERVICE EQUIPMENT

Service-disconnecting means shall be of the enclosed molded-case circuit breaker type with an external handle for manual operation. When service disconnecting means is a part of an assembly, the assembly shall be listed as suitable for service entrance equipment. Enclosures shall be sheet metal with hinged cover for surface mounting unless otherwise indicated.

#### 2.8 PANELBOARDS AND LOADCENTERS

Circuit breakers and switches used as a motor disconnecting means shall be capable of being locked in the open position. Door locks shall be keyed alike. Nameplates shall be as approved. Directories shall be typed to indicate loads served by each circuit and mounted in a holder behind a clear protective covering. Busses shall be copper.

##### 2.8.1 Loadcenters

Loadcenters are not acceptable.

##### 2.8.2 Panelboards

Panelboards shall be circuit breaker type as indicated on the drawings. Switches serving as motor disconnect means shall be horsepower rated in conformance with UL 98.

## 2.9 CIRCUIT BREAKERS

### 2.9.1 MOLDED-CASE CIRCUIT BREAKERS

Molded-case circuit breakers shall conform to NEMA AB 1 and UL 489. Circuit breakers may be installed in panelboards & enclosures.

#### 2.9.1.1 Construction

Circuit breakers shall be suitable for mounting and operating in any position. Lug shall be listed for copper conductors only or copper and aluminum conductors in accordance with UL 486E. Single-pole circuit breakers shall be full module size with not more than one pole per module. Multi-pole circuit breakers shall be of the common-trip type having a single operating handle such that an overload or short circuit on any one pole will result in all poles opening simultaneously. Sizes of 100 amperes or less may consist of single-pole breakers permanently factory assembled into a multi-pole unit having an internal, mechanical, nontamperable common-trip mechanism and external handle ties. All circuit breakers shall have a quick-make, quick-break overcenter toggle-type mechanism, and the handle mechanism shall be trip-free to prevent holding the contacts closed against a short-circuit or sustained overload. All circuit breaker handles shall assume a position between "ON" and "OFF" when tripped automatically. All ratings shall be clearly visible.

#### 2.9.1.2 Ratings

Voltage ratings shall be not less than the applicable circuit voltage. The interrupting rating of the circuit breakers shall be at least equal to the available short-circuit current at the line terminals of the circuit breaker and correspond to the UL listed integrated short-circuit current rating specified for the panelboards and switchboards. Molded-case circuit breakers shall have nominal voltage ratings, maximum continuous-current ratings, and maximum short-circuit interrupting ratings in accordance with NEMA AB 1. Ratings shall be coordinated with system X/R ratio.

#### 2.9.1.3 Thermal-Magnetic Trip Elements

Thermal magnetic circuit breakers shall be provided as shown. Automatic operation shall be obtained by means of thermal-magnetic tripping devices located in each pole providing inverse time delay and instantaneous circuit protection. The instantaneous magnetic trip shall be adjustable and accessible from the front of all circuit breakers on frame sizes above 150 amperes.

### 2.9.2 SWD Circuit Breakers

Circuit breakers rated 15 amperes and intended to switch 277 volts or less fluorescent lighting loads shall be marked "SWD."

2.10 CONDUITS

2.10.1 Intermediate Metal Conduit

UL 1242.

2.10.2 PVC Coated Rigid Steel Conduit

NEMA RN 1.

2.10.3 Rigid Metal Conduit

UL 6.

2.11 CONDUIT AND DEVICE BOXES AND FITTINGS

2.11.1 Fittings for Conduit and Outlet Boxes

UL 514B.

2.11.2 Fittings For Use in Hazardous (Classified) Locations

UL 886.

2.11.3 Fittings, PVC, for Use with Rigid PVC Conduit and Tubing

UL 514B.

2.12 CONNECTORS, WIRE PRESSURE

Use With Copper Conductors

UL 486A.

2.13 ENCLOSURES

2.13.1 Cabinets and Boxes

Cabinets and boxes with volume greater than 100 cubic inches shall be in accordance with UL 50, hot-dip, zinc-coated, if sheet steel. The enclosures shall be NEMA 250, Type 3R for main panel enclosures . Provide interior metal panel for mounting electrical components and' power panel. The enclosure door frame shall be double flanged out on all four sides. All exterior seams shall be continuously welded weather tight. The door for the

NEMA 3R enclosures shall have a heavy gauge continuous hinge with stainless steel hinge pin and held closed by flush latch operable by key. All enclosures shall be opened with the same key. The enclosure finish by federal standard #201478, forest green. All enclosures shall be factory painted.

#### 2.13.2 Circuit Breaker Enclosures

UL 489.

#### 2.14 PANELBOARDS

Dead-front construction, NEMA PB 1 and UL 67.

#### 2.15 Service Entrance Equipment

UL 869A.

#### 2.16 TAPES

##### 2.16.1 Plastic Tape

UL 510.

##### 2.25.2 Rubber Tape

UL 510.

#### 2.17 LOW-VOLTAGE FUSES AND FUSEHOLDERS

##### 2.17.1 Fuses, Low Voltage Cartridge Type

NEMA FU 1.

##### 2.17.2 Fuses, High-Interrupting-Capacity, Current-Limiting Type

Fuses, Class G, J, L and CC shall be in accordance with UL 198C.

##### 2.17.3 Fuses, Class K, High-Interrupting-Capacity Type

UL 198D.

##### 2.17.4 Fuses, Class H

UL 198B.

##### 2.17.5 Fuses, Class R

UL 198E.

2.15.6 Fuses, Class T

UL 198H.

2.18 Watthour Meters socket

Watthour meters socket shall conform to KCPL requirements.

2.19 WATER LEVEL PROBE

The system shall be a electrode-activated floatless liquid level control system which consists of a control relay and a holder designed to support three electrodes. The system shall be installed as shown on drawings. After installation, the system must be tested to insure the system work as described on drawings.

2.19.1 Induction Type Control Relay

The control relay shall have a 120 volt, 60Hz line voltage and 220 volt A.C. secondary coil voltage. (The secondary voltage is based on the conductivity of ordinary potable water). There shall be at least one normally closed contact for the lighting circuit and one normally open contact for the immersion heater. The contact shall be rated for 25 amp resistive at 120 volts. The control relay shall be installed in a NEMA 1 enclosure and located in each main panel cabinet.

2.19.2 Electrode Holder Assembly

The assembly shall consist of a cast iron flanged electrode holder threaded onto a 3 inch UV protected sch. 80 pvc pipe.

2.19.3 Electrodes

The electrodes shall be wire suspended or solid rod. Wire suspension electrodes shall be 303 stainless steel and assembled in a molded plastic insulating shield. The suspension wire shall be a single conductor 18 gauge, 41 strand copper with a min. 4/64-inch vinyl insulation. Solid rod electrodes shall 316 stainless steel.

2.19.4 Probe Assembly Box

The box shall be 3/16-inch gauge stainless steel and sized to house probe assembly as detail on drawings. The box shall be mounted recessed in concrete wall. The front of the box shall have a 3/16-inch gauge stainless steel cover plate and 1/4-inch stainless steel grill cover below to allow water to reach to probe. The front cover shall be attached with min. 1/4-inch stainless bolts. The box shall be located as indicated on drawings.

2.19.5 Contacts

Contacts in miscellaneous control devices such and auxiliary relays shall have current and voltage ratings in accordance with NEMA ICS 2 for rating

designation B300.

## 2.20 GROUNDING AND BONDING

### 2.20.1 Driven Ground Rods

Ground rods shall be copper-clad steel conforming to UL 467 not less than in diameter by in length. Sectional type rods may be used.

### 2.20.2 Grounding Conductors

Insulated conductors shall be of the same material as phase conductors and green color-coded, except that conductors shall be rated no more than 600 volts. Bare conductors shall be ASTM B 8 soft-drawn unless otherwise indicated. Aluminum is not acceptable.

## 2.21 CONCRETE AND REINFORCEMENT

Concrete work shall have minimum 3000 psi compressive strength.

## PART 3 EXECUTION

### 3.1 GENERAL INSTALLATION REQUIREMENTS

Equipment and devices shall be installed and energized in accordance with the manufacturer's published instructions. Steel conduits installed underground shall be installed and protected from corrosion. Except as covered herein, excavation, trenching, and backfilling shall conform to the requirements of Section 02316a EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Concrete work shall have minimum 3000 psi compressive strength.

#### 3.1.1 Conformance to Codes

The installation shall comply with the requirements and recommendations of NFPA 70 and IEEE C2 as applicable.

#### 3.1.2 Verification of Dimensions

The Contractor shall become familiar with details of the work, shall verify dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

### 3.2 Conductor Identification and Tagging

Power, control, and signal circuit conductor identification shall be provided within each enclosure where a tap, splice, or termination is made. Where several feeders pass through a common pull box, the feeders shall be tagged to indicate clearly the electrical characteristics, circuit number, and panel designation. Phase conductors of low voltage power circuits shall be identified by color coding. Phase identification by a particular color shall be maintained continuously for the length of a circuit, including junctions.

- a. Color coding shall be provided for service, feeder, branch, and ground conductors. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in the same raceway or box, other neutral shall be white with colored (not green) stripe. The color coding for 3-phase and single-phase low voltage systems shall be as follows:  
  
120/208-volt, 3-phase: Black(A), red(B).  
277/480-volt, 3-phase: Brown(A), orange(B), and yellow(C).
- b. Conductor phase and voltage identification shall be made by color-coded insulation for all conductors smaller than No. 6 AWG. For conductors No. 6 AWG and larger, identification shall be made by color-coded insulation, or conductors with black insulation may be furnished and identified by the use of half-lapped bands of colored electrical tape wrapped around the insulation for a minimum of 3 inches of length near the end, or other method as submitted by the Contractor and approved by the Contracting Officer.
- c. Control and signal circuit conductor identification shall be made by color-coded insulated conductors, plastic-coated self-sticking printed markers, permanently attached stamped metal foil markers, or equivalent means as approved. Control circuit terminals of equipment shall be properly identified. Terminal and conductor identification shall match that shown on approved detail drawings. Hand lettering or marking is not acceptable.

### 3.3 CABLE INSTALLATION

The Contractor shall obtain from the manufacturer an installation manual or set of instructions which addresses such aspects as cable construction, insulation type, cable diameter, bending radius, cable temperature, lubricants, coefficient of friction, conduit cleaning, and storage procedures.

#### 3.3.1 Cable Installation Plan and Procedure

Cable shall be installed strictly in accordance with the cable manufacturer's recommendations. Each circuit shall be identified by means of a fiber, laminated plastic, or non-ferrous metal tags, or approved equal, in each pullbox, junction box, and each terminal. Each tag shall contain the following information; , circuit number, circuit voltage, and cable destination.

#### 3.3.2 Duct Cleaning

Duct shall be cleaned with an assembly that consists of a flexible mandrel (manufacturers standard product in lengths recommended for the specific size and type of duct) that is 1/4 inch less than inside diameter of duct, 2 wire brushes, and a rag. The cleaning assembly shall be pulled through conduit a minimum of 2 times or until less than a volume of 8 cubic inches of debris is expelled from the duct.

### 3.3.3 Duct Lubrication

The cable lubricant shall be compatible with the cable jacket for cable that is being installed. Application of lubricant shall be in accordance with lubricant manufacturer's recommendations.

### 3.3.4 Cable Installation

The Contractor shall provide a cable feeding truck and a cable pulling winch as required. The Contractor shall provide a pulling grip or pulling eye in accordance with cable manufacturer's recommendations. The pulling grip or pulling eye apparatus shall be attached to polypropylene or manilla rope followed by lubricant front end packs and then by power cables. A dynamometer shall be used to monitor pulling tension. Pulling tension shall not exceed cable manufacturer's recommendations. The Contractor shall not allow cables to cross over while cables are being fed into duct. For cable installation in cold weather, cables shall be kept at 50 degrees F temperature for at least 24 hours before installation.

### 3.3.5 Cable Installation Plan

The Contractor shall submit a cable installation plan for all cable pulls in accordance with the detail drawings portion of paragraph SUBMITTALS. Cable installation plan shall include:

- a. Site layout drawing with cable pulls identified in numeric order of expected pulling sequence and direction of cable pull.
- b. List of cable installation equipment.
- c. Lubricant manufacturer's application instructions.
- d. Procedure for resealing cable ends to prevent moisture from entering cable.
- e. Cable pulling tension calculations of all cable pulls.
- f. Cable percentage conduit fill.
- g. Cable sidewall thrust pressure.
- h. Cable minimum bend radius and minimum diameter of pulling wheels used.
- i. Cable jam ratio.
- j. Maximum allowable pulling tension on each different type and size of conductor.
- k. Maximum allowable pulling tension on pulling device.

### 3.3.6 Duct Line

shall be installed in duct lines as indicated.

## 3.4 DUCT LINES

### 3.4.1 Requirements

Numbers and sizes of ducts shall be as indicated. Duct lines shall be laid with a minimum slope of 4 inches per 100 feet. Depending on the contour of the finished grade, the high-point may be at a terminal , or a pullbox or between pullboxes. Short-radius manufactured 90-degree duct bends may be used only for pole or equipment risers, unless specifically indicated as acceptable. The minimum manufactured bend radius shall be 18 inches for ducts of less than 3 inch diameter, and 36 inches for ducts 3 inches or greater in diameter. Otherwise, long sweep bends having a minimum radius of 25 feet shall be used for a change of direction of more than 5 degrees, either horizontally or vertically. Both curved and straight sections may be used to form long sweep bends, but the maximum curve used shall be 30 degrees and manufactured bends shall be used. Ducts shall be provided with end bells whenever duct lines terminate in manholes or handholes.

### 3.4.2 Treatment

Ducts shall be kept clean of concrete, dirt, or foreign substances during construction. Field cuts requiring tapers shall be made with proper tools and match factory tapers. A coupling recommended by the duct manufacturer shall be used whenever an existing duct is connected to a duct of different material or shape. Ducts shall be stored to avoid warping and deterioration with ends sufficiently plugged to prevent entry of any water or solid substances. Ducts shall be thoroughly cleaned before being laid. Plastic ducts shall be stored on a flat surface and protected from the direct rays of the sun.

### 3.4.3 Concrete Encasement

Ducts requiring concrete encasements shall comply with NFPA 70, & as indicated except that electrical duct bank configurations for ducts 6 inches in diameter shall be determined by calculation and as shown on the drawings. The separation between adjacent electric power and communication ducts shall conform to IEEE C2. Duct line encasements shall be monolithic construction. Where a connection is made to a previously poured encasement, the new encasement shall be well bonded or doweled to the existing encasement. The Contractor shall submit proposed bonding method for approval in accordance with the detail drawing portion of paragraph SUBMITTALS. At any point, except railroad and airfield crossings, tops of concrete encasements shall be not less than the cover requirements listed in NFPA 70. Where ducts are jacked under existing pavement, rigid steel conduit will be installed because of its strength. To protect the corrosion-resistant conduit coating, predrilling or installing conduit inside a larger iron pipe sleeve (jack-and-sleeve) is required. Separators or spacing blocks shall be made of steel, concrete, plastic, or a combination of these materials placed not farther apart than 4 feet on centers. Ducts shall be securely anchored to prevent movement during the placement of concrete and joints shall be staggered at least 6 inches vertically.

#### 3.4.4 Nonencased Direct-Burial

Top of duct lines shall be below the frost line depth but not less than 30 inches below finished grade and shall be installed with a minimum of (3 inches\_) of earth around each duct, except that between adjacent electric power and communication ducts, 12 inches of earth is required. Bottoms of trenches shall be graded toward manholes or handholes and shall be smooth and free of stones, soft spots, and sharp objects. Where bottoms of trenches comprise materials other than sand, a 3 inch layer of sand shall be laid first and compacted to approximate densities of surrounding firm soil before installing ducts. Joints in adjacent tiers of duct shall be vertically staggered at least 6 inches. The first 6 inch layer of backfill cover shall be sand compacted as previously specified. The rest of the excavation shall be backfilled and compacted in 3 to 6 inch layers. Duct banks may be held in alignment with earth. However, high-tiered banks shall use a wooden frame or equivalent form to hold ducts in alignment prior to backfilling.

#### 3.4.5 Installation of Couplings

Joints in each type of duct shall be made up in accordance with the manufacturer's recommendations for the particular type of duct and coupling selected and as approved.

##### 3.4.5.1 Plastic Duct

Duct joints shall be made by brushing a plastic solvent cement on insides of plastic coupling fittings and on outsides of duct ends. Each duct and fitting shall then be slipped together with a quick 1/4-turn twist to set the joint tightly.

#### 3.4.6 Duct Line Markers

Duct line markers shall be provided at the ends of long duct line stubouts or for other ducts whose locations are indeterminate because of duct curvature or terminations at completely below-grade structures. In addition to markers, a brightly colored plastic tape, not less than in width and suitably inscribed at not more than on centers with a continuous metallic backing and a corrosion-resistant metallic foil core to permit easy location of the duct line, shall be placed approximately (12 inches) below finished grade levels of such lines.

### 3.5 PULLBOXES

#### 3.5.1 Pullboxes

Pullbox tops shall be flush with sidewalks or curbs or placed 1/2 inch above surrounding grades when remote from curbed roadways or sidewalks. Covers shall be marked "Low-Voltage" and provided with 2 lifting eyes and 2 hold-down bolts. Each box shall have a suitable opening for a ground rod. Conduit, cable, ground rod entrances, and unused openings shall be sealed with mortar.

### 3.6 ILLUMINATION

#### 3.6.1 Fountain Light Luminaires

Luminaires, ballasts, lamps, and control devices required for Fountain lighting shall be in accordance with the drawings and as described herein. Heads shall be internally wired and rated 600 volts.

#### 3.6.2 Control

Connect luminaires as indicated on plans.

#### 3.6.3 LIGHTING CONTACTOR

NEMA ICS 2, mechanically held contactor in accordance with NEMA ICS 2. Contacts shall be rated 300 volts, 30 amperes, and 10 poles. Coils shall be rated 120 volts. Contactor shall have silver alloy double-break contacts and coil clearing contacts for mechanically held contactor and shall require no arcing contacts. Provide contactor with hand-off-automatic selector switch. Contactor shall be mounted in the lighting cabinet.

#### 3.6.4 TIME SWITCH

Astronomic dial type or electronic type, arranged to turn "ON" at sunset, and turn "OFF" at predetermined time between 8:30 p.m. and 2:30 a.m. or sunrise, automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise. Provide switch rated 120 volts, having automatically wound spring mechanism or capacitor, to maintain accurate time for a minimum of 7 hours following power failure. Provide time switch with a manual on-off bypass switch. Time switch shall be mounted in the lighting cabinet.

#### 3.6.5 PHOTOCCELL SWITCH

UL 773 or UL 773A, hermetically sealed cadmium-sulfide or silicon diode type cell rated 277 volts ac, 60 Hz with single-throw contacts or single pole double-throw (spdt) contacts for mechanically held contactors rated 1000 watts designed to fail to the ON position. Switch shall turn on at or below 3 footcandles and off at 2 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources. Provide a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition only for the switch mounted on the lighting cabinet. Provide

a cast weatherproof

aluminum housing with adjustable window slide, rated 1800 VA, minimum. for switch mounted on the lighting cabinet. For fixtures provide integral to the fixture rated 1800VA, minimum.

### 3.7 PAD-MOUNTED EQUIPMENT INSTALLATION

Pad-mounted equipment , shall be furnished & installed on concrete pads by KCPL

#### 3.7.1 Concrete Pads

##### 3.7.1.1 Construction

Concrete pads for pad-mounted electrical equipment shall be poured-in-place.

Pads shall be constructed as indicated. Tops of concrete pads shall be level and shall project 4 inches above finished paving or grade and sloped to drain. Edges of concrete pads shall have 3/4 inch chamfer. Conduits for primary, secondary, and grounding conductors shall be set in place prior to placement of concrete pads. Where grounding electrode conductors are installed through concrete pads, PVC conduit sleeves shall be installed through the concrete to provide physical protection.

##### 3.7.1.2 Concrete and Reinforcement

Concrete work shall have minimum 3000 psi compressive strength. Concrete pads shall be constructed as indicated. Tops of concrete pads shall be level and shall project 4 inches above finished paving or grade and sloped to drain. Conduits for secondary and grounding conductors shall be set in place prior to pouring of concrete pads.

##### 3.7.1.3 Sealing

When the installation is complete, the Contractor shall seal all conduit and other entries into the equipment enclosure with an approved sealing compound. Seals shall be of sufficient strength and durability to protect all energized live parts of the equipment from rodents, insects, or other foreign matter.

#### 3.7.2 Padlocks

Padlocks shall be provided for pad-mounted equipment. Padlocks shall be keyed as directed by the Contracting Officer.

### 3.8 CONNECTIONS BETWEEN AERIAL AND UNDERGROUND SYSTEMS

Connections between aerial and underground systems shall be made as shown.

### 3.9 GROUNDING

#### 3.9.1 Grounding Electrodes

Grounding electrodes shall be installed as shown on the drawings and as follows:

- a. Driven rod electrodes - Unless otherwise indicated, ground rods shall be driven into the earth until the tops of the rods are approximately 1 foot below finished grade.
- c. Ground Ring - A ground ring shall be installed as shown.

- d. Additional electrodes - When the required ground resistance is not met, additional electrodes shall be provided interconnected with grounding conductors to achieve the specified ground resistance. The additional electrodes will be up to three, rods spaced a minimum of 10 feet apart . In high ground resistance, UL listed chemically charged ground rods may be used. If the resultant resistance exceeds 25 ohms measured not less than 48 hours after rainfall, the Contracting Officer shall be notified immediately.

### 3.9.2 Grounding and Bonding Connections

Connections above grade shall be made by the fusion-welding process or with bolted solderless connectors, in compliance with UL 467, and those below grade shall be made by a fusion-welding process. Where grounding conductors are connected to aluminum-composition conductors, specially treated or lined copper-to-aluminum connectors suitable for this purpose shall be used.

### 3.9.3 Grounding and Bonding Conductors

Grounding and bonding conductors include conductors used to bond transformer enclosures and equipment frames to the grounding electrode system. Grounding and bonding conductors shall be sized as shown, and located to provide maximum physical protection. Bends greater than 45 degrees in ground conductors are not permitted. Routing of ground conductors through concrete shall be avoided. When concrete penetration is necessary, nonmetallic conduit shall be cast flush with the points of concrete entrance and exit so as to provide an opening for the ground conductor, and the opening shall be sealed with a suitable compound after installation.

### 3.10 Pull Wires

A pull wire shall be inserted in each empty raceway. The pull wire shall be of No. 14 AWG zinc-coated steel, or of plastic having not less than 200 pounds per square inch tensile strength. Not less than 10 inches of slack shall be left at each end of the pull wire.

### 3.11 FIELD TESTING

#### 3.11.1 General

Field testing shall be performed in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer 30 days prior to conducting tests. The Contractor shall furnish all materials, labor, and equipment necessary to conduct field tests. The Contractor shall perform all tests and inspections recommended by the manufacturer unless specifically waived by the Contracting Officer. The Contractor shall maintain a written record of all tests which includes date, test performed, personnel involved, devices tested, serial number and name of test equipment, and test results. Field test reports shall be signed and dated by the Contractor.

#### 3.11.2 Safety

The Contractor shall provide and use safety devices such as rubber gloves,

protective barriers, and danger signs to protect and warn personnel in the test vicinity. The Contractor shall replace any devices or equipment which are damaged due to improper test procedures or handling.

### 3.11.3 Ground-Resistance Tests

The resistance of each grounding electrode system shall be measured using the fall-of-potential method defined in IEEE Std 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

- a. Single rod electrode - 25 ohms.
- b. Multiple rod electrodes - ohms.
- c. Ground ring - ohms.
- d. Ground ring - 25 ohms.

### 3.11.4 Circuit Breaker Tests

The following field tests shall be performed on circuit breakers. Pass-fail criteria shall be in accordance with the circuit breaker manufacturer's specifications.

- a. Insulation resistance test phase-to-phase.
- b. Insulation resistance test phase-to-ground.
- c. Closed breaker contact resistance test.
- d. Power factor test.
- e. High-potential test.
- f. Manual operation of the breaker.

### 3.11.5 Pre-Energization

Calibration, testing, adjustment, and placing into service of the installation shall be accomplished for the equipment listed below. The equipment shall be inspected to ensure that installation is in compliance with the recommendations of the manufacturer and as shown on the detail drawings. Terminations of conductors at major equipment shall be inspected to ensure the adequacy of connections. Bare and insulated conductors between such terminations shall be inspected to detect possible damage during installation. Components shall be inspected for damage caused during installation or shipment to ensure packaging materials have been removed. Components capable of being both manually and electrically operated shall be operated manually prior to the first electrical operation. Components capable of being calibrated, adjusted, and tested shall be calibrated, adjusted, and tested in accordance with the

instructions of the equipment manufacturer.

- a. Panelboard HA, LA
- b. Lighting Cabinet LC

#### 3.11.6 Operating Tests

After the installation is completed, and at such times as the Contracting Officer may direct, the Contractor shall conduct operating tests for approval. The equipment shall be demonstrated to operate in accordance with the requirements herein. An operating test report shall be submitted in accordance with paragraph SUBMITTALS.

#### 3.12 ONSITE TRAINING

The Contractor shall conduct a training course for the operating staff as designated by the Contracting Officer. The training period shall consist of a total of 4 hours of normal working time and shall start after the system is functionally completed but prior to final acceptance tests. The course instruction shall cover pertinent points involved in operating, starting, stopping, and servicing the equipment, as well as all major elements of the operation and maintenance manuals. Additionally, the course instructions shall demonstrate all routine maintenance operations.

#### 3.13 ACCEPTANCE

Final acceptance of the facility will not be given until the Contractor has successfully completed all tests and after all defects in installation, material or operation have been corrected.

-- End of Section --