AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT	1. CONTRACT ID CODE	PAGE OF PAGES 1 13

2. AMENDMENT / MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION / PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
1	16-Aug-2002		

6. ISSUED BY CODE

US Army Corps of Engineers, Kansas City District
760 Federal Building, 601 East 12th Street
Kansas City, Missouri 64106-2896

7. ADMINISTERED BY (If other than item 6) CODE

8. NAME AND ADDRESS OF CONTRACTOR (No.,street, county, State and ZIP Code)

CODE FACILITY CODE

(x) X

9a. AMENDMENT OF SOLICITATION NO.
DACA41-02-R-0010

9B. DATED (SEE ITEM 11)
7/26/2002

10A. MODIFICATION OF CONTRACT / ORDER NO.

10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above number solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [ ] is extended, [X] is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitaiton or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning_____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegraph which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS / ORDERS,
IT MODIFIES THE CONTRACT / ORDER NO. AS DESCRIBED IN ITEM 14.

(x) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBER CONTRACT / ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF:

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return copies to the issuing office.

14. DESCRIPTION OF AMENDMENT / MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Project: Improve Military Family Housing, Phase 3
Location: Whiteman Air Force Base, Missouri

1. This Amendment is amended in accordance with the attached pages.
2. Receipt of Offers, 2:00 pm, 27 Aug. 2002, in 757 Federal Bldg, Kansas City, Mo. 64106-2896

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR / OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED

1. SOLICITATION NO. DACA41-02-R-0010 is amended as follows:

a. SPECIFICATIONS:

(1) Revised Pages: The following pages are deleted and replaced with revised pages of the same number. A copy of each revised page accompanies this amendment.

TC-2	SF1442-1
TC-4	3 of 28

(2) Reissued Pages: Page SF1442-2 is reissued without change. A copy of the reissued page accompanies this amendment.

(3) New Section: The following sections are new sections which are added. A copy of each new section accompanies this amendment.

Section No.	Section Title
01100	General
02531	Cured-In-Place Pipe (CIPP)
02532	Pipe Bursting
02882	Recreation Facility Playgrounds
02921	Seeding
02922	Sodding
02930	Exterior Planting
13280	Asbestos Abatement
13281	Lead Hazard Control Activities

(4) Revised Section: Section 01100 – GENERAL is deleted and replaced by a revised section of the same number. A copy of the revised section accompanies this amendment.

(5) Submittal Registers: The Submittal Registers (pages 1 thru 12), located at the end of Section 01330 – Submittal Procedures, are deleted and replaced by revised Submittals Registers (pages 1 thru 15). A copy of the revised Submittal Registers accompanies this amendment.

(6) Narrative Changes:

(a) GENERAL: All References to “PURCHASE REQUEST NUMBER W58XUW-2155-2127” are deleted.

(b) SECTION 00010 - SOLICITATION CONTRACT FORM

NOTES: The following note has been added.

"(20) The following clauses apply only to design-build portion of the contract (CLINs 0005 – 0007): Section 00800 – SCR-DB-005, 006, 008, 009, 010, 012, 014, 016, 019, and 020 and Section 01012."

(c) SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following have been deleted:

52.232-28	Invitation to Propose Performance-Based Payments	MAR 2000
	BID BOND REQUIREMENTS	JUL 2002

(d) SECTION 00110 - SUBMISSION REQUIREMENTS AND INSTRUCTION

1. The page limitation is modified from 150 to 75 pages for Volume I.

2. References to Volume 3 anywhere in this section are corrected to Volume 2.

(e) SECTION 00120 - PROPOSAL EVALUATION AND CONTRACT AWARD

Paragraph 4 is modified as follows:

"4. RELATIVE WEIGHT OF TECHNICAL EVALUATION CRITERIA

Factor 1 is the most important technical factor. Within Factor 1, subfactor a is the most important; subfactor b is slightly less important than subfactor a; subfactor c is slightly less important than subfactor b; and subfactor d is slightly less important than subfactor c.

Factor 2 is slightly less important than Factor 1. Within Factor 2, subfactors a, b and c are equal, subfactor d is slightly less important than subfactor c, and subfactor e is less important than subfactor d.

Factor 3 is less important than Factor 2 and is approximately equal to combined weight of Factor 2, subfactors a, b and c. Within Factor 3, subfactor a is significantly more important than subfactor b.

Factor 4 is significantly less important than the combined weight of Factors 1, 2 and 3."

(g) SECTION 00700 - CONTRACT CLAUSES

The following have been added by full text:

1. “52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:
Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.
If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.
(3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.
(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).
(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

(End of Clause)”

2. “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 index of drawings.

(End of clause)"

(g) SECTION 00800 - SPECIAL CONTRACT REQUIREMENTS

The following have been modified:

1. "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 fifteen percent (15%) 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 Summary of Changes) "

2. "252.211-12 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 following amounts for each calendar day of delay until the work is completed or accepted.

$38.67/unit/day for all units on a street until all units on a street are accepted.
$1,100.00 /day past the total completion of work for each phase.

(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)"

3. "52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract with then (10) calendar days after the date the Contractor received the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 620* calendar days after the date of receipt by him of notice to proceed as set forth in the schedule below except as specified in the various landscaping sections. The time stated for completion shall include final cleanup of the premises.

*This is an estimate only. The final number will be determined by the successful offeror's proposal.

SCHEDULE:

Item of Work	Commencement Time	Duration
Phase 1: Improvements in the Midland neighborhood, including all sitework	Upon Contractor's acknowledgement of Receipt of Notice to Proceed	_____** Calendar Days
Phase 2: Base Bid and Sets 2, 3, and 4 improvements in the Woodview neighborhood, including all sitework	Upon Contractor's acknowledgement of Receipt of Notice to Proceed for Phase 2	_____** Calendar Days
Phase 3: Improvements for the remaining sets of units, including all design and sitework	Upon Contractor's acknowledgement of Receipt of Notice to Proceed for Phase 3	_____** Calendar Days
Total Construction Period including demolition	Upon Contractor's acknowledgement of original Receipt of Notice to Proceed	_____** Calendar Days

**Phasing Schedule to be determined by successful offeror's proposal.

NOTES:

1. Government will accept structures under a single roof back by complete streets (both sides, intersection to intersection) rather than by complete phase. The contractor must complete all trails, playgrounds, roadwork, and signage that are adjacent to houses being accepted The Contractor must provide accessibility for all residents of the street and for fire-fighting equipment. Liquidated Damages will be $38.67/unit/day for ALL units on a street until ALL units on a street are accepted by the Contracting Officer.

2. The completion times, by street, will be determined by the phasing plans in the Contractor's proposal.

3. Once the Government has accepted 50% of a phase, the Contractor will be given another phase to start within 30 calendar days. A maximum of two phases maybe under construction at one time with at least 50% of earlier phase accepted.

4. Commencement of design for the fifth, sixth, and seventh sets of units will begin upon inclusion of these units by the Government, either as part of the original award or by exercise of option after award. Prior to the start of any construction activities for

these units, the Contracting Officer shall approve the 100% design.

(End of clause)"

(h) SECTION 00810 WAGE RATES:

General Decision No. MO020001 is deleted in its entirety.

(i) Section 02050 - DEMOLITION : The following paragraph is added:

"3.3.3 SALVAGEABLE LANDSCAPING ROCK
The Contractor can assume that existing landscaping rock adjacent to housing units (lava rock / river rock) is not contaminated with chlordane and can therefore be considered reusable salvage."

(j) Section 02315 - EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS:

1. Paragraph 2.1.4 is deleted and replace with the following paragraph:

"2.1.4 Expansive Soils - Expansive soils are defined as soils that have a plasticity index equal to or greater than 12 when tested in accordance with ASTM D 4318."

2. Paragraph 3.13 & 3.14 are deleted and replace with the following paragraphs:

"3.13 SUBGRADE PREPARATION - Building footings, foundations and garage slabs shall bear on a minimum of 24 inches of compacted fill material, consisting of non-expansive "cohesive material" or the subgrade shall be prepared with lime-treatment or fly ash stabilization per the Geotechnical Engineering Services Report. The subgrade under exterior slabs (driveways, sidewalks) will not be required to be removed and replaced with non-expansive or treated soil. In no case shall a sector of a building foundation bear partially on compacted subgrade. Excavations and surfaces supporting concrete shall be clean and thoroughly "crumbed out", being free of clumps of loose earth and unsatisfactory material. If in the opinion of the Contracting Officer a surface supporting concrete has been "softened" due to ponding of water, freezing, or remolding due to traffic or improper excavation techniques, the material in question shall be replaced with neat concrete. Material removed beneath slabs-on-grade shall be replaced with satisfactory material, compacted to the required density. Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill

material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. The moisture content of expansive cohesive soils shall be adjusted to within 3 to 8 percent of optimum moisture content prior to compaction. The moisture content of non-expansive cohesive soils shall be adjusted to within -1 to +3 percent of optimum moisture content prior to compaction. Minimum subgrade density shall be as specified in paragraph FILLING AND BACKFILLING."

"3.14 FILLING AND BACKFILLING - Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Satisfactory materials shall be placed in horizontal layers not exceeding 8 inches in loose thickness, or 6 inches when hand-operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as specified. Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and 1 foot above other utility lines shall be free from stones larger than 1 inch in any dimension. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes or concrete to avoid damage to coatings or wrappings. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall. Each layer of fill and backfill shall be compacted to not less than the percentage of maximum density specified below:

Percent Laboratory maximum density	
Cohesive material	Cohesionless material

Under structures, building slabs, steps, paved areas, around footings, and in trenches	90	95
Under sidewalks and grassed areas	85	90
Expansive materials	Compacted to not less than eighty-five (85) percent nor more than ninety (90) percent	
Nonfrost susceptible materials	95	

Subgrade

Under building slabs, steps, and paved areas, top 12 inches	90	95
Lime or flyash treated subgrade	90	
Under sidewalks, top 6 inches	85	90

Approved compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified herein before to the required density prior to further construction thereon. Recompaction over underground utilities and heating lines shall be by hand tamping."

3. The following paragraph is added:

"3.20 RE-USE OF EXISTING FOUNDATION BACKFILL MATERIAL
The Contractor shall assume that the soil out 6 inches from existing building foundations may contain chlordane in amounts above the Missouri Department of Natural Resources' target concentration levels for residential areas. The backfill at most existing foundations will not be disturbed as a part of this project. Where any such existing foundation backfill is disturbed however, the Contractor shall remove it and re-use it on this project as new backfill material, either at the same address or at another address within the project area. No such material shall be removed from the project area. Wherever such potentially contaminated backfill is re-used however, such backfill shall be topped off with a layer of uncontaminated soil, minimum thickness of 3 inches."

(k) Specification 02830 SEGMENTAL CONCRETE BLOCK RETAINING WALL:

The following information is added to the beginning of paragraph 1.4 SEGMENTAL RETAINING WALL DESIGN:

"All walls under 48" high shall be constructed per the manufacturers printed instructions. All walls over 48" high shall be designed per the following requirements." Specification 02870 SITE FURNISHINGS – Delete paragraph 2.1.1.1. "Pre-cast Concrete."

(l) Specification 02870 SITE FURNISHINGS:

1. Paragraph 2.1.1.2. – Change the specification section referenced from Section 03330 to Section 03300.

(m) Specification 02870 SITE FURNISHINGS – Delete paragraph 2.5.5. "Ash Receptacles."

(n) Specification Section 02921 SEEDING: Paragraph 1.1: Add the following note: "Sod shall be placed at all inlets (15 ft. x 15 ft. min.) and on all slopes exceeding 3:1 slope. Seed shall be placed on all other disturbed areas unless plant beds are specified."

(o) Specification Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE: paragraph 1.4.2.1 Strength Requirements: The first 3 sentences are deleted and are replaced by the following:

"All concrete shall have a 28-day compressive strength of 4,000 psi. Compressive strength shall be determined in accordance with ASTM C 39/C 39M."

b. DRAWINGS: IMPROVE FAMILY HOUSING FY 2003: Narrative Changes:

(1) Sheet 4 – In the Design-Build Housing Unit Schedule ADD Unit address 706 Titan Loop to the "Unit Type C7" category. Plan drawing is shown on Sheet A1.12.

(2) Sheet CO.1: UTILITY PLAN GENERAL NOTES:

(a) Note 1: The following information is added to Note 1:
" At locations where water lines cross streets, the Contractor shall bore under the street to install the new water lines. Pipe Sleeves are not required on the service lines. The Contractor is not required to replace the existing valves and valve boxes."

(b) Note 2 is deleted and replaced by the following note:

"2. The Contractor shall replace all existing Sanitary Sewer Lines from the Main to the

Living Units. At the Contractor's option, Pipe Bursting or Pipe Lining may be used at street crossings. (Refer to Specification Section 02532 - Pipe Bursting and Section 02531 – Cured-In-Place Concrete for Pipe Lining.) Duplex Unit are served by 6-inch lines and Single Units are served by 4-inch lines."

(3) Sheets C2.5 through C2.16 – Add General Note: "Playground, trails, benches, and bollards shown for reference only. Refer to sheets C2.17 through C2.20 and sheets C3.25 through C3.27 for these site improvements."

(4) Sheet C6.1: DETAIL 6 – DETAIL AT DRIVEWAY:

(a) The "12-inch dimension" of the Tapered Section of the Concrete Drive is deleted.

(b) The following note is added: "Note - Thicken driveway approach apron to 6 inch thickness from street curb back to first CJ (6 feet). "

(5) Sheet C6.2:

(a) Detail 5 – Add note "Compact subgrade. Modify top 6" of grade with lime and compact per paving specifications."

(b) Detail 7 – Change "Re:C6.2/5" to "Re: C6.2/8."

(c) Detail 8 – Add note: "Pipe thickness shall be 0237" min. (Schedule 40)."

(d) Detail 15 – Add note: "Match existing crosswalks for dimensions of lines."

(6) Sheet C6.3:

(a) Details 1 through 6 – Provide 20' x 20' reinforced concrete slab with 4" wwm for all shelters. Base material to be compacted gravel on compacted sub-base.

(b) Shelter Details 5 and 6 – Type of footing (spread column footing shown in detail 6 or round column footing shown in detail 5) is contractor's option. All concrete is provided by contractor, and shall be 4000 psi. Anchor bolts ¾" x 12" with 10" embedment. Provide a full depth expansion joint between concrete slabs on grade and vertical structure surfaces such as foundations.

(c) General Note: The following notes are added:

1. "Provide control joints for concrete slabs at 10' o.c. each way per detail 2, drawing C6.1, unless indicated otherwise in the drawing."

2. "Provide three moveable picnic tables (as specified in Section 02870 Site Furnishings) for each shelter on the plans, details 1 and 2, drawing C6.2."

(7) Sheets L1.1 through L1.3 :

(a) Note #12 as is deleted and is replaced by the following note:

"12. The base bid requires sod for turf establishment around all inlet areas (15' x 15' min.), for all slopes exceeding 3:1, and in drainage swale locations."

(b) In the PLANT SCHEDULE, all references to "MS" are changed to "PTL" and all references to "Maiden Grass" is changed to "Miscanthus Grass".

(8) Sheets A1.11 through A1.15 : The following note is added to the C4, C7 & C8 Unit Plan General Notes:

"All "C" type units have existing full basements."

2. Offerors are required to acknowledge receipt of this amendment on the Proposal Form, in the space provided, or by separate letter or telegram prior to receipt of offers. Failure to acknowledge all amendments may cause rejection of the offer.

3. Offers will be received until 2:00 p.m. local time at place of receipt of offers, 27 August 2002 in Room 757, Federal Building, 601 E. 12th Street, Kansas City, Missouri 64106-2896.

Encls
Spec pages as listed

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

SPECIFICATIONS FOR CONSTRUCTION OF
IMPROVE MILITARY FAMILY
HOUSING, PHASE 3
WHITEMAN AIR FORCE BASE, MISSOURI

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SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACA41-02-R-0010	[ ] SEALED BID *(IFB)* [X] NEGOTIATED *(RFP)*	7/26/2002	1

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

4.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.
		47501 & 53439

7. ISSUED BY CODE	8. ADDRESS OFFER TO
U.S. Army Engineer District, Kansas City 760 Federal Building, 601 E. 12th Street Kansas City, Missouri 64106-2896 Tel: (816) 983-3802 Fax: (816) 426-5169	See Item 7

9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. *(Include area code)*	
	Pamela Wellons	816-983-3802 Ext.	(NO COLLECT CALLS)

SOLICITATION

NOTE: In sealed bid solicitation "offer" and "offeror" mean "bid" and "Bidder".

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

IMPROVE MILITARY FAMILY HOUSING, PHASE 3
WHITEMAN AIR FORCE BASE, MISSOURI

11. The Contractor shall begin performance within 10 calendar days and complete it within ** calendar days after receiving [ ] award [X] notice to proceed. This performance period is [ ] mandatory, [X] negotiable. ** See 00800)

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

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and *** copies to perform the work required are due at the place specified in Item 8 by 2:00 p.m. local time 8/27/2002 *(date).* If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelolpes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.
*** See 00110

B. An offer guarantee [X] is, [ ] is not required. NOT TO EXCEED 20% OF TOTAL BID AMOUNT

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.

00010-1

OFFER *(Must be fully completed by offeror)*

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*

DUNS NO:

CODE FACILITY CODE

15. TELEPHONE NO. *(Include area code)*

(FAX #)

16. REMITTANCE ADDRESS (Include only if different from Item 14)

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 requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.*

AMOUNTS: See attached Proposal Schedule.

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

19. ACKNOWLEDGEMENT OF AMENDMENTS

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

AMENDMENT NO.								
DATE								

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

AWARD *(To be completed by Government)*

21. ITEMS ACCEPTED

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN ITEM *(4 copies unless otherwise specified)*

26. ADMINISTERED BY CODE

25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO

☐ 10 U.S.C. 2304(c) ( ) ☐ 41 U.S.C. 253(c) ( )

27. PAYMENT WILL BE MADE BY

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

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

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

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type of print)*

31A. NAME OF CONTRATING OFFICER *(Type or print)*

30B. SIGNATURE	31b. UNITED STATED OF AMERICA	31C. AWARD DATE

SECTION 01100

GENERAL

PART 1 GENERAL

1.1 INQUIRIES

Pursuant to SECTION 00100 paragraph titled "Instructions to Offerors--Competitive Acquisition", 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: Mr. Richard Whitesell. Inquiries for which oral explanation or advice on the plans and specifications will suffice may be referred to Mr. Whitsell by calling Area Code 816-983-3465. 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 SUPERINTENDENCE OF SUBCONTRACTORS

(a) The Contractor shall be required to furnish the following:

(1) If more than 50% and less than 70% of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(2) If 70% or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(b) If the Contracting Officer, at any time after 50% of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirement for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.3 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.

1.4 WORK DELAYS

The Contractor may anticipate a work delay of up to 10 working days during the contract period due to Whiteman AFB operations. This time is included in the overall contract completion time and iwll be included in the Contractor's proposal price. During this work delay, no site access to any of the work areas will be allowed. The Contracting Officer will provide 48 hours notice to the Contractor prior to the work delay.

1.5 EMERGENCY OUTAGES

The Contractor shall notify the Contracting Officer immediately when an emergency outage of a utility occurs due to Contractor cutting or damaging the utility. No outage shall exceed four (4) hours in duration. The Contractor shall bear the cost for all repairs. The following list of contacts shall also be informed when an outage occurs.

SECURITY SENSORS	509 SFS/SPOSS 2154 CS/SCLGC
PHONE LINES COMMERCIAL	509 CS
SECURITY	509 CS/SCLGC
FIRE ALARMS	509 CES/DEF
POWER LINES COMMERCIAL	509 CS
SECURITY	509 SFS/SPOS
FIRE ALARMS	509 CES/DEF

1.6 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 offeror 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 Decisions of the Secretary of Labor, attached to and a part of this contract, all work required within 5 feet outside building lines shall be considered Residential Construction. All other construction not defined herein as Residential Construction shall be considered Heavy Construction.

1.7 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.

1.8 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.)

1.9 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.

1.10 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)

1.11 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.

1.12 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)

1.13 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.

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)	(5)	(5)	(5)	(5)	(5)	(4)	(4)	(4)	(4)	(3)	(6)

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

work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE titled "Default (Fixed Price Construction)." (ER 415-1-15)

1.14 WORKING HOURS

Working hours for this project will be limited to Monday through Friday, 7:30 a.m. to 4:30 p.m., except as follows: Work will not be permitted on weekends and Federal holidays. In unusual circumstances, such as when utility turn-off is required for an extended period of time, authorization for weekend or holiday work may be requested from the Contracting Officer; these instances must be coordinated well in advance, in writing. Likewise, utility turn-off of short duration or work which will disrupt normal operations or traffic flow must be scheduled at least 3 working days in advance and may require schedule changes to ensure that safety is maintained.

1.15 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 State Statute	coverage complying with applicable
Employers' Liability	minimum amount of $100,000.00
General Liability on Comprehensive Form of Policy which includes, but is not limited to, insurance for all work required herein	minimum limits of $500,000 per occurrence for bodily injury
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)

1.16 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.

1.17 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 DATE OF SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1)

(a) The date of the U.S. Army Corps of Engineers Safety and Health Requirements Manual in effect on the date of this solicitation is 3 September 1996. See Section 00700, Contract Clause titled "Accident Prevention."

(b) Section 06.I of EM 385-1-1 is deleted. Job hazard analysis for confined space entry procedures is still required, as per 01.A.09 of EM 385-1-1. OSHA Standards 29 CFR 1910.146 or 29 CFR 1926 shall apply.

(c) 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 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)

(g) Color Boards:

1. The Contractor shall submit a minimum of three (3) complete sets of color boards within 120 calendar days of receipt of Notice to Proceed. Construction color boards shall be submitted in a 3-ring notebook binder with all materials securely mounted on rigid 8-1/2 by 11-inch presentation (mat) board, with a maximum spread of 25-1/2 by 33 inches for foldouts, clearly coded regarding location of materials in the facility.

2. An index shall be provided listing pertinent contract specifications and drawings for each sample and any proposed substitutions or variances shall be so designated. The Contractor shall also certify, in writing, that all submittal items technically comply with the project specifications.

3. Color boards shall reflect all actual finish textures, patterns, and

colors required for this contract as specified on the Interior Room Finish Schedule, the Exterior Finish Schedule and Interior Finish Materials Legend located in the Contract Drawings, and the sample requirements of the submittal registers. All materials must be labeled with the manufacturer's name, pattern and color reference. Patterned material samples (i.e., carpet) must be of sufficient size to enable evaluation of the pattern. Samples shall be keyed or coded to match any key or code system in the Contract Drawings.

4. The Contractor shall express mail a minimum of three (3) copies of the color boards to the Contracting Officer. The Contracting Officer will forward one copy of the colorboards to CENWK-EC-D for review and concurrence. Concurrence or comments will be provided not later than 45 calendar days after receipt of the submittal. This paragraph does not cover the quality of finishing materials. The quality, physical requirements, and method of installation shall be submitted with the appropriate shop drawings. The Contractor shall not submit any of the above requirements with the color boards. Specific locations where the various materials are required are shown on the drawings.

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 DAMAGE TO WORK (1966 MAR OCE)

The responsibility for damage to any part of the permanent work shall be as set forth in the CONTRACT CLAUSE titled "Permits and Responsibilities." However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs as 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 work an equitable adjustment pursuant to CONTRACT CLAUSE titled, "Changes," of the contract, will be made as full compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

1.26 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.

1.27 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."

1.28 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.

1.29 UPKEEP OF ROADWAY AREAS WITHIN A MILITARY INSTALLATION WHICH THE CONTRACTOR USES

In addition to the requirements in CONTRACT CLAUSE titled "Operations and Storage Areas," the Contractor shall comply with the following requirements: Where the construction work is on or adjacent to, or involves hauling over public roads, streets, or highways located on a military installation, 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. The Contractor shall keep the roads including adjacent construction site free of debris including litter, waste construction material, mud etc., that might be caused to accumulate thereon by his operations, and upon completion of the work, shall clean up the said roads and construction site and repair any damage occasioned with his operations under this contract to the satisfaction of the Contracting Officer. The drainage from the roads shall not be obstructed by the construction work.

1.30 PROTECTION OF UTILITY LINES

(a) 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.

(b) All requests for access and/or locations must be made through the Contracting Officer's Representative (COR) or Resident Engineer. The Director of Public Works will work directly with the Resident Engineer to provide timely information to the Contractor.

1.31 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)

1.32 SECURITY MEASURES FOR STORAGE OF EXPLOSIVES ONSITE

When explosives are stored on the project site the following security measures shall be followed which are in accordance with the requirements contained in the Corps of Engineers Manual, EM 385-1-1, dated April 1981, as amended, Part II of the Federal Safety and Health Regulations; Metal and Nonmetallic Mine Safety, Title 30, Code of Federal Regulations, and Commerce in Explosives, Title 26, Code of Federal Regulations.

(a) The explosive storage area shall be provided with perimeter fence, chain link or other approved type, not less than 6 feet in height plus extension arms with three strands of barbed wire. The storage area shall be provided with a gate which shall be secured with a chain and padlock. The gate shall be locked at all times except when explosives are being removed or placed in the area.

(b) Minimum distance between a storage magazine and the perimeter fence shall be 25 feet.

(c) The area outside the perimeter fence for a minimum distance of 10 feet and the area inside the perimeter fence shall be kept clear of vegetation and all combustible matter.

(d) The storage area shall be well lighted during the hours of darkness. (MRD Ltr, 16 May 73, HST - 11, 30, 31 23 Apr 75)

1.33 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."

1.34 UNEXPECTED DISCOVERY OF ASBESTOS ON CONSTRUCTION (RENOVATION AND DEMOLITION)

The buildings and areas to be renovated or demolished have been surveyed for the presence of asbestos-containing materials. This survey is not a warranty that asbestos-containing materials are either not present or limited to the amounts found in the survey. Should suspected asbestos-containing material be encountered, the Contractor shall promptly, and before the conditions or the substance encountered is disturbed, give a written notice to the Contracting Officer of the suspected asbestos-containing material conditions encountered. As directed by tee Contracting Officer, the Contractor shall remove and dispose of any and all asbestos-containing material as necessary to accomplish the required work which shall be performed in accordance with all pertinent local, state, and federal laws. An equitable adjustment will be made to the Contractor in accordance with the CONTRACT CLAUSE entitled "Changes", for the additional work directed by the Contracting Officer.

1.35 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.

1.36 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."

1.37 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.

1.38 ENCOUNTERING EXISTING UNDERGROUMD UTILITIES

During any excavation activity, existing underground utilities encountered shall be immediately reported to the Contracting Officer.

Within 48 hours of encountering underground utilities, the Contractor shall submit to Contracting Officer a marked-up copy of contract drawing that best represents the location, general description and approximate depth of the utilities below finished grade.

Also, the Contractor shall incorporate the above information in required

marked-up full scale contract drawing indicating as-built conditions in accordance with all contract provisions pertaining to "As-Built Drawings."

1.39 DAILY WORK SCHEDULES

In order to closely coordinate work under this contract, the Contractor shall prepare for and attend a weekly coordination meeting with the Contracting Officer and Using Service at which time the Contractor shall submit for coordination and approval, his proposed daily work schedule for the next 2-week period. Required temporary utility services, time and duration of interruptions, road cuts, and repairs requiring traffic control, and protection of adjoining areas shall be included with the Contractor's proposed 2-week work schedule. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings.

1.40 SITE FENCING AND MOWING

The Contractor shall provide orange snow fencing around the entire work site; all site storage areas are considered a part of the work site. When grass/weeds exceed six inches in height, all areas contained by orange snow fencing shall be mowed. Snow fencing on pavement shall be supported by weighted orange barrels.

1.41 deleted

1.42 CLEANLINESS OF PAVED SURFACES

When paved surfaces are jointly used by the Air Force and Contractor, the Contractor shall keep all paved surfaces, such as runways, taxiways, and hardstands, clean at all times and, specifically, free from small stones which might damage aircraft propellers or jet aircraft.

1.43 WORK ON WEEKENDS OR HOLIDAYS

If the Contractor intends to work on weekends or holidays that will require the use of the south gate, the Contractor shall notify the Security Police and the Resident Office by noon the Thursday prior to the weekend or 48 hours prior to a holiday.

1.44 UTILITY MARKING

The Contractor shall be required at the request of other contractors working in the area to flag the utilities being installed on this contract within 14 days of the request by the other contractor working in the area.

1.45 SPECIAL SAFETY REQUIREMENTS

The Contractor shall comply with Air Force and local fire regulations and NFPA 241-1986 "Safeguarding Building Construction and Demolition Operations." Fire extinguishers rated and approved by the National Fire Protection Association, of sufficient size, type, and quantity to cope with all known hazards, shall be provided by the Contractor at the construction

site during the execution of this contract; the extinguishers shall be removed upon acceptance of the project.

1.46 BASE POLICY FOR THE OPERATION OF ALL HYDRANTS AND VALVES ON THE BASE WATER DISTRIBUTION SYSTEM

The following is the base policy for the operation of all hydrants and valves on the base water distribution system:

a. The fire alarm communication center will be immediately notified at 4507 or 4508, of out-of-service hydrants, sprinkler system, stand pipes, etc. The alarm room will also be notified when hydrants are returned to service.

b. Civil Engineering personnel are responsible for operation of all valves and are the only one to open or close these valves. In an emergency (water main break) a Contractor may close a valve and notify the Fire Department at 4507 or 4508 and Mains Maintenance at 6357 immediately.

c. When fire hydrants are out-of-service the Fire Department will immediately place a metal placard 12 inches in diameter with waterproof white letters on a red background reading "OUT-OF-SERVICE". The placards will be placed in a way that identifies hydrants from approaching direction.

d. When fire hydrants are placed back in service, the Fire Department will immediately remove placards.

e. Every effort will be made to return hydrants to service as soon as possible. Hydrants awaiting parts will be assigned an emergency work order. When hydrants are shut down due to construction, call the Fire Department as listed above.

f. The use of fire hydrants by other than fire protection personnel will be coordinated and approved by the Base Fire Chief. Such use will not render the hydrant inoperative for fire protection operations.

1.47 POLICY FOR STORAGE OF HAZARDOUS MATERIALS ON CONSTRUCTION SITES

The following is the policy for storage of hazardous materials on construction sites located at Whiteman AFB MO.

a. Definition of hazardous materials is any substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, and is likely to cause death injury.

b. Hazardous material will not be stored in Government facilities, without special authorization from base. Contact point will be the Fire Department at extension 6080.

c. Each construction site shall have a hazardous material storage area. This area will be the only location that hazardous material shall be stored on a construction site. Exceptions must have prior written approval from the base. Contact point will be the Fire Department at extension 6080.

d. Number every trailer, building and shed with a number at least 6 inches by 4 inches; this number will correspond with the numbers listed below in item e.1.

e. The Contractor will provide an emergency folder that will be kept on-site and up-to-date at all times (on the injury board). This folder shall contain:

(1) Construction site map identifying every road, building, trailer, and shed on site by number, as well as hazardous material storage location.

(2) A copy of every MSDS (material safety data sheet) with amount and location of all hazardous material on site.

f. The Contractor will also provide a copy of each map and MSDS to the Base Fire Department, Building 34 (Dispatch Office) immediately upon delivery of all hazardous material to construction site.

1.48 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)

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 --

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		02220	SD-03 Product Data, Work Plan	1.3													
		02241	SD-03 Product Data, Work Plant, Equipment,														
			Machine and Tools	1.4													
			SD-06 Test Reports, Sampling & Testing,														
			Field Density	1.4													
			SD-09 Manufacturer's Field Reports, Waybills &														
			Delivery Tickets, Coarse Aggregate	1.4													
		02300	SD-03 Product Data, Earthwork	1.3													
			SD-07 Certificates, Testing	1.3													
		02315	SD-06 Test Reports, Testing	1.3													
		02316	SD-06 Test Reports, Field Density Tests,														
			Testing of Backfill Materials	1.3													
		02361	SD-04 Samples, Pesticides	1.2													
			SD-07 Certificates, Qualifications of pesticide														
			applicators	1.2													
			SD-08 Manufacturer's Instructions, Pesticides	1.2													
			SD-11 Closeout Submittals, Warranty	1.2													
			SD-11 Closeout Submittals, Application report	1.2													
		02531	SD-02 Shop Dwgs, Liner,Curing Detls,Serv.Cor	1.3													

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			SD-02 Shop Dwgs, Design Calcs for CIPP	1.3													
			SD-03 Product Data, Data Sheets, Lining Mat'ls	1.3													
			SD-03 Product Data, Data Sheets, Resins	1.3													
			SD-03 Product Data, Data Sheets, Stor.Proced.	1.3													
			SD-03 Product Data, Temp.Control	1.3													
			SD-03 Product Data, Curing	1.3													
			SD-03 Product Data, Serv.Conn.Methods	1.3													
			SD-03 Product Data, Trimming & Finishing	1.3													
		02532	SD-02 Shop Drawings, Method of Constr&Rest	1.3													
			SD-03 Product Data, Data Sheets, New Pipe	1.3													
			SD-03 Product Data, Data Sheets, Couplings	1.3													
			SD-03 Product Data, Data Sheets, Bursting Sys	1.3													
			SD-07 Certificates, Workmen Training	1.3													
		02630	SD-02 Shop Drawings, Precast Concrete Struct	1.2													
			SD-02 Shop Drawings, Metal Items	1.2													
			SD-03 Product Data, Cast-iron Soil Piping	1.2													
			SD-03 Product Data, Clay Piping	1.2													
			SD-03 Product Data, Concrete Piping	1.2													
			SD-03 Product Data, Corrug.Alum.Piping	1.2													
			SD-03 Product Data, Corrug.Steel Piping	1.2													
			SD-03 Product Data, Comp.Plast.Piping	1.2													
			SD-03 Product Data, Polyvinyl Chloride Piping	1.2													
			SD-03 Product Data, Corr.Plastic Piping	1.2													

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			SD-03 Product Data, Subsur.Drainage Piping	1.2													
			SD-04 Samples, Pipeline Materials	1.2													
			SD-07 Certificates, Pipeline & Fittings	1.2													
			SD-07 Certificates, CI Frames,Covers&Gratings	1.2													
			SD-07 Certificates, Precast Conc.Structures	1.2													
		02713	SD-03 Product Data,Job-Mix Formula Mix Desig	1.2													
			SD-03 Prod.Data,Job-Mix Formula Waybills&De	1.2													
			SD-06 Test Reports, Sampling&Testing	1.2													
		02744A	SD-03 Product Data, Job Mix Certification	1.2													
			SD-03 Product Data, Waybills&Delivery Tickets	1.2													
			SD-03 Product Data, Waybills&Deli.Tick.dur.job	1.2													
			SD-06 Test Reports, Sampling&Testing	1.2													
		02744N	SD-06 Test Reports, Emulsified Asphalt	1.2													
		02770	SD-03 Product Data, Concrete	1.2													
			SD-06 Test Reports, Field Quality Control	1.2													
		02832	SD-02 Shop Drawings, Retaining Wall Design	1.3													
			SD-03 Product Data, Manufacturer's Data	1.3													
			SD-03 Product Data, Qualifications	1.3													
			SD-03 Product Data, Soil Testing	1.3													
			SD-03 Product Data, Reinforcement Testing	1.3													

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			SD-03 Product Data, Calculations	1.3													
			SD-04 Samples, Segmental Concrete Units	1.3													
			SD-04 Samples, Reinforcement	1.3													
			SD-07 Certificates, Reinforcement	1.3													
		02870	SD-02 Shop Drawings, Site Furnishing Stds	1.3													
			SD-03 Product Data, Site Furnishings	1.3													
			SD-03 Product Data, Installation	1.3													
			SD-03 Product Data, Materials	1.3													
			SD-04 Samples, Finish	1.3													
			SD-06 Test Reports, Recycled Material	1.3													
			SD-06 Test Reports, Post-installation	1.3													
		02882	SD-02 Shop Drawings	1.04													
			SD-03 Product Data	1.04													
			SD-04 Samples	1.04													
			SD-07 Certificates, Warranty	1.04													
		02921A	SD-03 Product Data, Equipment	1.2													
			SD-03 Product Data, Surface Erosion Ctrl Mat'l	1.2													
			SD-03 Product Data, Chemical Treatment Mat'l	1.2													
			SD-03 Product Data, Delivery	1.2													
			SD-03 Product Data, Finished Grade Status	1.2													
			SD-03 Product Data, Topsoil	1.2													
			SD-03 Product Data, Quantity Check	1.2													

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			SD-03 Product Data, Seed Est. Period	1.2													
			SD-03 Product Data, Maintenance Record	1.2													
			SD-03 Product Data, Application of Pesticide	1.2													
			SD-04 Samples, Delivered Topsoil	1.2													
			SD-04 Samples, Soil Amendments	1.2													
			SD-04 Samples, Mulch	1.2													
			SD-06 Test Reports, Equipment Calibration	1.2													
			SD-06 Test Reports, Soil Test	1.2													
			SD-07 Certificates, Seed	1.2													
			SD-07 Certificates, Topsoil	1.2													
			SD-07 Certificates, pH Adjuster	1.2													
			SD-07 Certificates, Fertilizer	1.2													
			SD-07 Certificates, Organic Material	1.2													
			SD-07 Certificates, Soil Conditioner	1.2													
			SD-07 Certificates, Mulch	1.2													
			SD-07 Certificates, Asphalt Adhesive	1.2													
			SD-07 Certificates, Pesticide	1.2													
		02922A	SD-03 Product Data, Equipment	1.2													
			SD-03 Product Data, Chemical Treatment Mat'l	1.2													
			SD-03 Product Data, Delivery Schedule	1.2													
			SD-07 Product Data, Finished Grade & Topsoil	1.2													
			SD-07 Product Data, Topsoil	1.2													
			SD-07 Product Data, Quantity Check	1.2													
			SD-07 Product Data, Sod Establishment Period	1.2													

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			SD-07 Product Data, Maintenance Record	1.2													
			SD-07 Product Data, Application of Pesticide	1.2													
			SD-04 Samples, Delivered Topsoil	1.2													
			SD-04 Samples, Soil Amendments	1.2													
			SD-04 Samples, Temporary Seeding	1.2													
			SD-06 Test Reports, Equipment Calibration	1.2													
			SD-06 Test Reports, Soil Test	1.2													
			SD-07 Certificates, Sod	1.2													
			SD-07 Certificates, Topsoil	1.2													
			SD-07 Certificates, pH Adjuster	1.2													
			SD-07 Certificates, Fertilizer	1.2													
			SD-07 Certificates, Organic Material	1.2													
			SD-07 Certificates, Soil Conditioner	1.2													
			SD-07 Certificates, Pesticide	1.2													
		02930A	SD-02 Shop Drawings, Landscape Plan	1.2													
			SD-02 Shop Drawings, Fin.Gr.Topsoil & Un.Util	1.2													
			SD-03 Product Data, Geotextile	1.2													
			SD-03 Product Data, Chemical Treatment Mat'l	1.2													
			SD-03 Product Data, Equipment	1.2													
			SD-03 Product Data, Delivery	1.2													
			SD-03 Product Data, Plant Est. Period	1.2													
			SD-03 Product Data, Maintenance Record	1.2													
			SD-03 Product Data, Application of Pesticide	1.2													
			SD-04 Samples, Delivered Topsoil	1.2													

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			SD-04 Samples, Soil Amendments	1.2													
			SD-04 Samples, Mulch	1.2													
			SD-04 Samples, Geotextile	1.2													
			SD-06 Test Reports, Soil Test	1.2													
			SD-06 Test Reports, Percolation Test	1.2													
			SD-07 Certificates, Plant Material	1.2													
			SD-07 Certificates, Topsoil	1.2													
			SD-07 Certificates, pH Adjuster	1.2													
			SD-07 Certificates, Fertilizer	1.2													
			SD-07 Certificates, Organic Material	1.2													
			SD-07 Certificates, Soil Conditioner	1.2													
			SD-07 Certificates, Organic Mulch	1.2													
			SD-07 Certificates, Mycorrhizal Fungi Inoculum	1.2													
			SD-07 Certificates, Pesticide	1.2													
			SD-10 O&M Data, Maintenance Instructions	1.2													
		03100	SD-03 Product Data, Form Materials	1.2													
			SD-03 Product Data, Form Releasing Agents	1.2													
		03200	SD-02 Shop Drawings, Conc.Reinf.System	1.2													
			SD-07 Certificates, Reinforcing Steel	1.2													
		03300	SD-03 Product Data, Mixture Proportions	1.2													
			SD-06 Test Reports, Testing&Insp. For CQC	1.2													
			SD-07 Certificates, Qualifications	1.2													

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			SD-07 Certificates, Materials Certification	1.2													
		04200	SD-03 Product Data, Clay or Shale Brick	1.2													
			SD-03 Product Data, Conc. Masonry Units	1.2													
			SD-04 Samples, Clay or Shale Brick	1.2													
			SD-04 Samples, Portable Panel	1.2													
			SD-06 Test Reports, Efflorescence Test, Field														
			Testing of Mortar	1.2													
			SD-06 Test Reports, Field Testing of Grout	1.2													
			SD-06 Test Reports, Prism Tests, Masonry	1.2													
			SD-06 Test Reports, Special Inspection	1.2													
			SD-06 Test Reports, Masonry Inspector Rpts	1.2													
			SD-07 Certificates, Clay or Shale Brick	1.2													
			SD-07 Certificates, Concrete Masonry Units	1.2													
			SD-07 Certificates, Anchors,Ties,Exp.Jt Matls	1.2													
			SD-07 Certificates, Joint Reinforcement	1.2													
			SD-07 Certificates, Reinf.Steel Bars & Rods	1.2													
			SD-07 Certificates, Masonry Cement	1.2													
			SD-07 Certificates, Mortar Coloring	1.2													
			SD-07 Certificates, Mortar Admixtures	1.2													
			SD-07 Certificates, Grout Admixtures	1.2													
			SD-08 Manu.Instr., Cold Weather Installation	1.2													
		05120	SD-02 Shop Drawings, Erection Plan	1.3													
			SD-07 Certificates, Mill Test Reports	1.3													

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		05500	SD-02 Shop Drawings, Misc. Metal Items	1.1													
		06100	SD-02 Shop Drawings, Trussed Rafters	1.2													
			SD-05 Design Data, Trussed Rafters	1.2													
			SD-06 Test Reports, Preserv.-trtd Lumber&Plyw	1.2													
		06200	SD-02 Shop Drawings, Prefab. Millwork	1.2													
			SD-07 Certificates, Certificates of Grade	1.2													
			SD-07 Certificates, Certificates of Compliance	1.2													
		07311	SD-03 Product Data, Roofing System	1.2													
			SD-04 Samples, Finishes	1.2													
		07413	SD-02 Shop Drawings, Metal Siding	1.3													
			SD-04 Samples, Accessories	1.3													
			SD-04 Samples, Gutters & Downspouts	1.3													
			SD-08 Manuf.Instr., Gutters & Downspouts	1.3													
			SD-08 Manuf.Instr., Wall Panels	1.3													
		07920	SD-03 Product Data, Sealant	1.2													
			SD-07 Certificates, Sealant	1.2													
		08210	SD-02 Shop Drawings, Doors	1.2													
			SD-03 Product Data, Doors	1.2													

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			SD-03 Product Data, Accessories	1.2													
			SD-03 Product Data, Sample warranty	1.2													
			SD-03 Product Data, Fire Resistance Rating	1.2													
		08361	SD-02 Shop Drawings, Doors	1.2													
			SD-03 Product Data, Doors	1.2													
			SD-08 Manuf.Instr., Doors	1.2													
			SD-10 Operation & Maintenance Data, Doors	1.2													
		08610	SD-02 Shop Drawings, Windows	1.3													
			SD-02 Shop Drawings, Doors	1.3													
			SD-03 Product Data, Windows	1.3													
			SD-03 Product Data, Doors	1.3													
			SD-03 Product Data, Insect Screens	1.3													
			SD-04 Samples, Finish	1.3													
			SD-07 Certificates, Windows	1.3													
			SD-07 Certificates, Doors	1.3													
			SD-08 Manuf.Instr., Installation	1.3													
		08710	SD-02 Shop Drawings, Hardware Schedule	1.2													
			SD-02 Shop Drawings, Keying System	1.2													
			SD-03 Product Data, Hardware Items	1.2													
			SD-08 Manuf.Instr., Installation	1.2													
			SD-10 Oper.&Maint.Data, Hdwe Schedule Items	1.2													
			SD-11 Closeout Submittals, Key Bitting	1.2													

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		09250	SD-04 Samples, Knock Down Texture Coating	1.3													
			SD-07 Certificates, Gypsum Wallboard	1.3													
			SD-07 Certificates, Water-Resist. Gypsum Bd	1.3													
		09310	SD-03 Product Data, Tile	1.2													
			SD-03 Product Data, Mortar, Grout & Adhesive	1.2													
			SD-04 Samples, Tile	1.2													
			SD-07 Certificates, Tile	1.2													
			SD-07 Certificates, Mortar, Grout & Adhesive	1.2													
			SD-08 Manuf.Instr., Tile	1.2													
			SD-08 Manuf.Instr., Mortar & Grout	1.2													
		09650	SD-03 Product Data, Resilient Flooring & Acces	1.2													
			SD-04 Samples, Resilient Flooring & Acces.	1.2													
		09680	SD-03 Product Data, Carpet & Accessories	1.2													
			SD-04 Samples, Carpet & Accessories	1.2													
		09900	SD-03 Product Data, Paint	1.2													
			SD-07 Certificates, Lead	1.2													
			SD-07 Certificates, Mildewcide & Insecticide	1.2													
			SD-07 Certificates,Volatile Org.Compnd Cont.	1.2													
			SD-08 Manuf.Instr., Mixing & Thinning	1.2													
			SD-08 Manuf.Instr., Application	1.2													

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		09915	SD-04 Samples, Color board	1.3													
		10800	SD-03 Product Data, Finishes	1.2													
			SD-03 Product Data, Accessory Items	1.2													
		10900	SD-04 Samples, Color	1.2													
			SD-07 Certificates, List of Materials	1.2													
			SD-08 Manuf. Instr.	1.2													
		12390	SD-02 Shop Drawings, Cabinets & Countertops	1.10													
			SD-03 Product Data, Cabinets & Countertops	1.10													
			SD-04 Samples, Cabinets & Countertops	1.10													
			SD-07 Certificates, Compliance of Cabinets	1.10													
		13280A	SD-03 Product Data, Resp.Prot.Program	1.4													
			SD-03 Product Data, Cleanup & Disposal	1.4													
			SD-03 Product Data, Detailed Drawings	1.4													
			SD-03 Product Data - Materials & Equipment:	1.4													
			a. High Efficiency Filtered Air HEPA Equip	1.4													
			b. Vacuum cleaning equipment	1.4													
			c. Pressure differential monitor for HEPA Eq.	1.4													
			d. Air monitoring equipment	1.4													
			e. Respirators	1.4													
			f. Personal Prot. Clothing & Equipment:	1.4													

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			(1) Coveralls	1.4													
			(2) Underclothing	1.4													
			(3) Other work clothing	1.4													
			(4) Foot coverings	1.4													
			(5) Hard hats	1.4													
			(6) Eye protection	1.4													
			(7) Other items req.&appr. By Contrs Desig	1.4													
			g. Glovebag	1.4													
			h. Duct Tape	1.4													
			I. Disposal Containers:	1.4													
			(1) Disposal bags	1.4													
			(2) Fireboard drums	1.4													
			(3) Paperboard boxes	1.4													
			j. Sheet Plastic:	1.4													
			(1) Polyethylene Sheet-General	1.4													
			(2) Polyethylene Sheet - Flame Resistant	1.4													
			(3) Polyethylene Sheet-Reinforced	1.4													
			k. Wetting Agent:	1.4													
			(1) Amended Water	1.4													
			(2) Removal encapsulant	1.4													
			l. Strippable Coating	1.4													
			m. Prefabricated Decontamination Unit	1.4													
			n. Other items	1.4													
			o. Chemical encapsulant	1.4													
			p. Chemical encasement materials	1.4													
			q. Material Safety Data Sheets (all chemicals)	1.4													

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			SD-03 Product Data - Qualifications	1.4													
			Training Program	1.4													
			Medical Requirements	1.4													
			Encapsulants	1.4													
			SD-06 Test Reports	1.4													
			Exposure Assessment & Air Monitoring	1.4													
			Local Exhaust Ventilation	1.4													
			Licenses, Permits & Notifications	1.4													
			SD-07 Certificates	1.4													
			a. Vacuums	1.4													
			b. Water filtration equipment	1.4													
			c. Ventilation equipment	1.4													
			d. Other equipment req. to contain asbestos	1.4													
		13281A	SD-03 Product Data, Materials & Equipment	1.4													
			SD-03 Product Data, Expendable Supplies	1.4													
			SD-03 Product Data, Qualifications	1.4													
			SD-06 Test Reports, Pressure Differential Log	1.4													
			SD-06 Test Reports,Licenses,Permits & Notifica	1.4													
			SD-06 Test Reports, Accident Prevention Plan	1.4													
			SD-06 Test Reports, Sampling & Analysis	1.4													
			SD-06 Test Reports, Clearance Report	1.4													
		15190	SD-02 Shop Drawings, Gas Piping System	1.3													
			SD-06 Test Reports, Pressure Tests	1.3													
			SD-06 Test Reports, Tests with Gas	1.3													

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		15250	SD-04 Samples, Thermal Insulation Materials	1.3													
		15400	SD-03 Product Data, Plumbing Fixture Schedul	1.3													
		15566	SD-02 Shop Drawings, Heating Equipment	1.3													
			SD-02 Shop Drawings, Installation	1.3													
			SD-03 Product Data, Heating Equipment	1.3													
			SD-10 Oper.& Maint.Data, Heating Equipment	1.3													
		15730	SD-02 Shop Dwgs, Field-Assbld Refrig.Piping	1.2													
			SD-02 Shop Dwgs, Control Sys. Wiring Diagran	1.2													
			SD-03 Product Data, Air Conditioners	1.2													
			SD-03 Product Data, Filters	1.2													
			SD-03 Product Data, Thermostats	1.2													
			SD-03 Product Data, Refrig. Piping & Access.	1.2													
			SD-06 Test Reports, Salt-spray Tests	1.2													
			SD-06 Test Reports, Start-up & Initial Oper.Tes	1.2													
			SD-07 Certificates, Year 2000 Compliance War	1.2													
			SD-08 Manuf.Instr., Air Conditioners	1.2													
			SD-08 Manuf.Instr., Filters	1.2													
			SD-08 Manuf.Instr., Thermostats	1.2													
			SD-08 Manuf.Instr., Refrig. Piping & Access.	1.2													
			SD-10 Oper.&Maint.Data, Air Conditioners	1.2													
			SD-10 Oper.&Maint.Data, Filters	1.2													
			SD-10 Oper.&Maint.Data, Thermostats	1.2													

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		15895	SD-03 Product Data, Components	1.2													
		16415	SD-03 Product Data, Manufacturer's Catalog	1.3													
			SD-03 Product Data, Matl, Equip.& Fixture Lists	1.3													
			SD-07 Certificates, Materials & Equipment	1.3													
		16528	SD-03 Product Data, Equipment & Materials	1.2													

DIVISION 2 – SITE WORK

02050	Demolition
02110	Clearing and Grubbing
02241	Aggregate Base Course
02300	Earthwork
02315	Excavation, Filling and Backfilling for Structures
02316	Excavation, Filling and Backfilling for Utilities Systems
02361	Soil Treatment for Subterranean Termite Control
02531	Cured-In-Place Pipe (CIPP)
02532	Pipe Bursting
02630	Storm Drainage
02713	Bituminous Base Course
02730	Sanitary Sewers
02744A	Bituminous Road-Mix Surface Course
02744N	Bituminous Tack Coats
02763	Pavement Marking
02770	Concrete Sidewalks and Curbs and Gutters
02832	Segmental Concrete Block Retaining Wall
02870	Site Furnishings
02882	Recreation Facility Playgrounds
02921	Seeding
02922	Sodding
02930	Exterior Planting
02964	Cold Milling of Bituminous Pavements

SECTION 02531
CURED-IN-PLACE PIPE (CIPP)

1 GENERAL

1.1 SCOPE

This Specification covers the work necessary to furnish and install complete, the cured-in-place pipe (CIPP). The Contractor shall provide all materials, labor, equipment, and services necessary for bypass pumping and/or diversion of sewage flows, cleaning and television inspection of sewer to be lined, finer installation, reconnection of service connections, and final television inspection and testing of lined pipe system.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

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

ASTM D543	Standard Test Methods for Resistance of Plastics to Chemical Reagents
ASTM D790	Standard Test Methods for Unreinforced and Reinforced Insulating Materials Flexural Properties of Plastics and Electrical
ASTM F1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin-impregnated Tube

1.3 SUBMITTALS

Government approval is required for all submittals. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Construction details control, handling and inserting the liner, curing details, service connection methods, and trimming and finishing. The Contractor shall also provide manufacturers' certification, field measurements, and pipe sizing calculations, which demonstrate that the liner has been properly undersized to avoid the creation of wrinkles or folds.

The CIPP shall be designed to a minimum wall thickness based on the individual project parameters and the condition of the existing conduit. Prior to installation of the liner, design calculations shall be submitted to determine the minimum thickness of the liner to be installed. The pipe design shall have sufficient strength to support all dead loads, live loads and groundwater loads imposed.

SD-03 Product Data

Data Sheets

Lining materials, resins, storage procedures, temperature control, curing, service connection methods, trimming and finishing

SD-07 Certificates

Liner materials are in compliance with the specifications, codes, and standards.

1.4 QUALITY ASSURANCE

1.4.1 The finished liner shall be continuous over the entire length of an insertion run between two (2) manholes or access points and shall be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination.

1.4.2 Wrinkles in the finished liner pipe that reduce the hydraulic capacity of the pipe are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense. Methods of repair shall be proposed by the Contractor and submitted to the Contracting Officer or his/her designated representative for review.

1.4.3 When cured the CIPP shall form a mechanical bond with the existing pipe.

1.4.4 The finished pipe must be such that when the thermosetting resin cures, the total wall thickness will be a homogeneous and monolithic felt and resin composite matrix that will be chemically resistant to withstand internal exposure to domestic sewerage.

2 PRODUCTS

2.1 MATERIALS

2.1.1 Liner Tube

2.1.1.1 The liner tube shall consist of one (1) or more layers of flexible needled felt or an equivalent woven and/or non-woven material capable of carrying resin, withstanding installation pressures and curing temperatures, and is compatible with the resin system used. The liner shall be fabricated to a size that, when installed, will fit the internal circumference of the existing pipe without any annular space between the liner and existing pipe wall.

2.1.1.2 The resin used shall be compatible with the rehabilitation process, shall be able to cure in the presence or absence of water and the initiation temperature for cure shall be as recommended by the resin manufacturer and reviewed by the Contracting Officer or his/her designated representative.

2.1.1.3 The liner shall be fabricated from materials which when cured, will be chemically resistant to withstand internal exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, methane, petroleum hydrocarbons, saturation with moisture, diluted sulfuric acid, and other chemical reagents determined by the Contracting Officer or his/her designated representative.

2.1.1.4 The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance from the inlet to the outlet of the respective access points. The Contractor shall verify the lengths in the field before impregnation of the tube with resin.

2.1.1.5 Prior to insertion, the liner shall be free of all visible tears, holes, cuts, foreign materials, and other defects.

2.1.1.6 Prior to insertion, the Contractor shall provide data on the maximum allowable stresses and elongation of the tube. The exterior of the manufactured tube shall be marked along its length at regular intervals not to exceed five (5) feet. These marks shall be used as a gauge to measure elongation during insertion. Should the overall elongation of a reach exceed five percent (5%), the liner tube shall be rejected and replaced.

2.1.2 Resin

2.1.2.1 Unless otherwise specified, provide a general purpose, unsaturated, thermosetting, polyester, vinylester, or epoxy resin able to cure in the presence or absence of water, and a catalyst system compatible with the insertion process.

2.1.2.2 Resin shall not be subjected to ultraviolet light and shall form no excessive bubbling or wrinkling during lining.

2.2 PHYSICAL PROPERTIES

2.2.1 The CIPP system shall conform to and comply with the minimum standards listed below.

Characteristic	Test Method	Polyester Resin	Vinylester & Epoxy Resins
Flexural Strength	ASTM D790	4,500 psi	5,000 psi
Flexural Modulus (short term)	ASTM D790	250,000 psi	300,000 psi
Flexural Modulus (long term)		125,000 psi	150,000 psi

3 EXECUTION

3.1 PREPARATION

3.1.1 Bypass Pumping

3.1.1.1 The Contractor shall provide bypass pumping and/or diversion when required for acceptable completion of the liner installation. Bypass pumping shall consist of furnishing, installing, and maintaining all power, primary and standby pumps, appurtenances and bypass piping required to maintain existing flows and services.

3.1.1.2 Bypass pumping shall be done in such a manner as not to damage private or public property, or create a nuisance or public menace. The pumped sewage shall be in an enclosed hose or pipe that is adequately protected from traffic, and shall be redirected into the sanitary sewer system. Dumping or free flow of sewage on private property, gutters, streets, sidewalks, or into storm sewers is prohibited.

3.1.1.3 The Contractor shall take all necessary precautions including constant monitoring of bypass pumping to insure that no private residences or properties are subjected to a sewage backup or spill. The Contractor shall be liable for all cleanup, damages, and

resultant fines in the event of a spill. After the work is completed, flow shall be restored to normal.

3.1.2 Cleaning and Inspection of Existing Sewer

The Contractor shall be responsible for cleaning, inspecting, confirming the inside diameter and determining the condition of each segment to be lined. The cleaning process shall include the removal of all roots. The Contractor shall perform a television inspection after the sewer cleaning operation, point repairs, and grouting is completed. The television inspection shall be completed in the same direction each time and shall be done with a CCTV color camera recorded in VHS format. A pivot head camera shall be used for all pipelines that are six- (6-) inches in diameter or greater to allow detailed lateral inspection. A copy of the television inspection videotapes from all televising operations shall be provided to the Contracting Officer or his/her designated representative for review prior to the liner installation.

3.1.3 Point Repairs

It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, offset joints, protruding service connections or collapsed pipe that will prevent liner insertion. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or by remotely performed point repair methods acceptable to the Contracting Officer or his/her designated representative, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Before any point repair excavation is pursued, the Contractor shall give the Contracting Officer or his/her designated representative three (3) working days notice. Point repair excavation shall proceed only with the Contracting Officer or his/her designated representative's written authorization. Protruding laterals shall be removed either internally with a cutter or by external point repair.

3.1.4 Grouting of Severe Defects

It shall be the responsibility of the Contractor to grout severe open joints and cracks in the pipeline. The Contractor shall be required to grout all open joints and cracks that in the Contractor's opinion will impede the specified performance of the liner except that all open joints greater than one- (1) inch shall be grouted irrespective of the Contractor's assessment, an estimate of the number of locations to be grouted is provided in the bid schedule. The locations shall be determined by the Contractor based on videotapes provided with the Project Documents.

3.1.5 Existing Construction

The Contractor shall protect all existing structures, lines, etc., manholes to withstand forces generated by equipment, water or air pressure used while inserting the tube.

4 INSTALLATION

4.1 Resin Impregnation

4.1.1 The uncured resin in the original containers and the unimpregnated fiber-felt tube shall be impregnated by vacuum or other means prior to installation. The materials and 'wet-out' procedure shall be subject to inspection by the Contracting Officer or his/her designated representative. A resin and catalyst system that are compatible with the requirements of the method shall be used.

4.1.2 The impregnated liner bag shall be transported to and stored at the site in such a manner that it will not be damaged, exposed to direct sunlight, or result in any public safety hazard. The impregnated liner bag shall be kept cool during shipment and storage. All materials shall be subject to inspection and review prior to installation.

4.2 Liner Installation

4.2.1 The impregnated tube shall be inserted through access approved by the Contracting Officer or his/her designated representative by means of the installation process. The application of hydrostatic head, compressed air, or other means shall fully extend the liner to the next access or termination point and inflate and firmly adhere the liner to the pipe wall.

4.2.2 The liner shall be installed at a rate less than ten (10) feet per minute at all times.

4.3 Curing

4.3.1 After placement is completed a suitable heat source and distribution equipment shall be provided. The equipment shall be capable of circulating hot water, air, and/or steam throughout the section by means of a pre-strung hose which has been perforated in accordance with the manufacturer's recommendations or other methods acceptable to the Contracting Officer or his/her designated representative to raise the temperature uniformly above the temperature required to effect a resin cure. This temperature shall be determined by the manufacturer based on the resin/catalyst system employed.

4.3.2 The heat source piping shall be fitted with continuous monitoring thermocouples to gauge the temperature of the incoming and outgoing water, steam, and/or air supply. Water, steam, or air temperature during the cure period shall meet the requirements of the resin manufacturer as measured at the heat source inflow and outflow return lines. At the direction of the Contracting Officer or his/her designated representative, the Contractor shall provide standby equipment to maintain the heat source supply. An additional continuous monitoring thermocouple shall be placed between the impregnated felt tube and the pipe invert at the remote manhole and at a point midway between the upstream and downstream manholes to determine the temperature during the cure. The temperature during the cure shall not be less than 130 degrees F at the boundary between the pipe wall and the liner unless otherwise directed by the Contracting Officer or his/her designated representative because of the resin system used.

4.3.3 The initial cure shall be deemed to be completed when inspection of the exposed portions of the liner appear hard and sound and the remote temperature sensors indicate that an exotherm has occurred. The cure period shall be of duration recommended by the resin manufacturer during which time the recirculation of the water, steam, and/or air and cycling of the heat exchanger continuously maintain the required temperature.

4.3.4 Temperature shall be maintained during the curing period as recommended by the resin manufacturer, and shall follow the healing schedule supplied by the manufacturer and reviewed by the Contracting Officer or his/her designated representative.

4.4 Cool Down

4.4.1 The hardened liner shall be cooled to a temperature below 100 degrees F before relieving the static head or pressure in the lined pipe and returning normal flow back into the system. The cool down may be accomplished by introducing cool water or air into the lined pipe. Care shall be taken in the release of the static head or pressure so that a vacuum will not develop which could damage the newly installed liner.

4.4.2 If the liner tails to make a tight seal at the termination points, a seal consisting of a resin mixture compatible with the liner/resin system shall be applied in accordance with manufacturer specifications and approved by the Contracting Officer or his/her designated representative.

4.5 SERVICE LINE CONNECTION

4.5.1 The Contractor shall verify and certify by a written test report that service laterals to the main sewer are open and watertight. Connections shall be repaired as required by one of the following methods or as recommended by the CIPP manufacturer.

4.5.1.1 Internally reconnected by grouting the area where the service connection enters the pipe to produce a water tight seal approved by the Contracting officer or his/her designated representative. The hole shall be ninety-five (95) percent minimum and one-hundred (100) percent maximum of the original service connection diameter. The invert of the service connection shall match the bottom of the reinstated service opening.

4.5.1.2 By excavating by hand and/or mechanical equipment to the location of the service connections tie-in, cutting the existing pipe and liner material, and installing a saddle acceptable to the Contracting Officer or his/her designated representative. The excavation process shall be completed by mechanical means as defined in the project documents or by hand digging as required.

4.5.1.3 Other remote methods as approved by the Contracting Officer or his/her designated representative.

4.6 TESTING

4.6.1 Material Testing

4.6.1.1 All material testing shall be performed by a registered independent, third-party laboratory.

4.6.1.2 The Contractor shall provide certified test results of the short term properties of the cured lining material from the actual installed liner at locations selected by the Contracting Officer or his/her designated representative.

4.6.1.3 The cured liner shall be sampled and tested for flexural strength and flexural modulus (short term). Flexural strength and modulus shall be tested in accordance with the requirements of ASTM D790. The liner shall be in compliance with the physical properties stated above. A certificate of compliance shall be provided for long term flexural modulus.

4.6.1.4 Corrosion resistance requirements shall be as stated in ASTM Fl 216, Section X2, Chemical Resistance Tests.

4.6.1.5 Delamination testing shall be in accordance with ASTM F121 6, Section 8.4, if required by the Contracting Officer or his/her designated representative.

4.6.2 Field Testing

4.6.2.1 Test line for exfiltration in accordance with ASTM F1216, Section 8.2 prior to service line reconnections. Testing shall exclude maximum pressure limitation (4.3 psi) at lowest end. Leakage testing shall be performed after all dry and non-bondable hoses and tubes are completely removed from the pipe.

4.6.2.2 After completion of all liner insertions, service reconnections, and finish work at the manholes, the sewer shall be televised with a color CCTV tilt-head camera recorded in VHS format. The original tape shall be provided to the Contracting Officer or his/her designated representative.

-- End of Section --

SECTION 02532
PIPE BURSTING

1 GENERAL

1.1 SCOPE

This specification shall cover the rehabilitation of existing sanitary sewers using the PIPE BURSTING SYSTEM. Pipebursting is a system by which the burster unit splits the existing pipe while simultaneously installing a new Polyethylene Pipe of the same size or larger size pipe where the old pipe existed, then reconnect existing sewer service house connections, television inspection of the polyethylene pipe and complete the installation in accordance with the contract documents.

1.2 QUALIFICATIONS:

1.2.1 The Contractor shall be certified by the particular Pipe Bursting System Manufacturer that such a company is a fully trained user of the pipe bursting system.

1.2.2 Polyethylene pipe jointing shall be performed by personnel trained in the use of butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the polyethylene pipe. Training shall be performed by qualified representative.

1.3 SUBMITTALS

Government approval is required for all submittals. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Method of construction and restoration of existing sewer service connections. This shall include detail drawings and written descriptions of the entire construction procedure to install pipe, bypass sewage flow and reconnection of sewer service connections.

SD-03 Product Data

Data Sheets

New pipe, couplings, bursting system.

SD-07 Certificates

Workmen training for installing pipe.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Transport, handle, and store pipe and fittings as recommended by manufacturer. Deliver, store and handle other materials as required to prevent damage.

1.4.2 If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Contracting Officer or his/her designated representative at the Contractor's expense, before proceeding.

2 PRODUCTS

2.1 Polyethylene Plastic Pipe shall be high density polyethylene pipe and meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, ASTM D1248, ASTM D3550. Pipe shall be approved for sanitary sewage.

2.1.1 Sizes of the insertions to be used shall be such to renew the sewer to its original or greater than flow capacity.

2.1.2 All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used.

2.1.3 The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

2.1.4 Dimension Ratios: The minimum wall thickness of the polyethylene pipe shall meet the following:

Depth of Cover (Feet)	Minimum SDR of Pipe
0 - 16.0	19
> 16.1	17

2.2 EQUIPMENT

The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate sufficient force to burst and compact the existing pipe line. See manufacturer's specifications for what size tool should be used in what diameter of pipe, as well as parameters of what size tool for percentage of upsize allowed.

2.2.1 The pipe bursting tool shall be pulled through the sewer by a winch located at the upstream manhole. The bursting unit shall pull the polyethylene pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PE pipe insertion. The pipe bursting unit shall be remotely controlled.

2.2.2 The pipe bursting tool shall be pneumatic. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time expanding the surrounding ground. This action shall not only break the pipe but also create the void into which the burster can be winched and enables forward progress to be made. At the same time the polyethylene pipe, directly attached to the sleeve on the rear of the burster, shall also move forward.

2.2.3 The burster shall have its own forward momentum while being assisted by winching. A hydraulic winch shall give the burster friction by which it can be moved forward. To form a complete operating system, the burster must be matched to a constant tension hydraulic winching system.

2.2.4 WINCH UNIT

A winch shall be attached to the front of the bursting unit. The winch shall provide a constant tension to the burster in order that it may operate in an efficient manner. The winch shall ensure directional stability in keeping the unit on line.

2.2.4.1 The winch shall be hydraulically operated providing a constant tension throughout the operation. The winch shall be of the constant tension type but shall be fitted with a direct reading load gauge to measure the winching load.

2.2.4.2 The winch must automatically maintain a constant tension at a set tonnage reading. The constant tension winch shall supply sufficient cable in one continuous length so that the pull may be continuous between approved winching points.

2.2.4.3 The winch, cable and cable drum must be provided with safety cage and supports so that it may be operated safely without injury to persons or property.

2.2.4.4 The Contractor shall provide a system of guide pulleys and bracing at each manhole to minimize cable contact with the existing sewer between manholes.

2.2.4.5 The supports to the trench shoring in the insertion pit shall remain completely separate from the winch boom support system and shall be so designed that neither the pipe nor the winch cable shall be in contact with them.

2.3 SEWER SERVICE CONNECTIONS

All sewer service connections shall be connected to the main using a method recommended by the manufacturer that will result in a watertight connection.

2.3.1 Sewer service connections shall be connected to the new pipe by various methods. The saddles should be made of a material compatible with that of the pipe.

3 EXECUTION

3.1 BYPASSING SEWAGE

The Contractor, when and where required, shall provide diversion for the pipe bursting/replacement process. The pumps and by-pass lines shall be of adequate capacity and size to handle all flows. All costs for by-pass pumping, required during installation of the pipe shall be subsidiary to the pipe reconstruction item.

3.1.1 The Contractor shall be responsible for continuity of sanitary sewer service to each facility connected to the section of sewer during the execution of the work.

3.1.2 If sewage backup occurs and enters buildings, the Contractor shall be responsible for clean-up, repair, property damage cost and claims at no additional cost of the Government.

3.2 TELEVISION INSPECTION

After completion of all liner insertions, service reconnections, and finish work at the manholes, the sewer shall be televised with a color CCTV tilt-head camera recorded in VHS format and the original tape shall be provided to the Contracting Officer or his/her

designated representative.

3.3 CONSTRUCTION METHOD

Equipment used to perform the work shall be located away from buildings so as not to create noise impact. Provide a silent engine compartment with the winch to reduce machine noise as required to meet local requirements.

3.3.1 The Contractor shall install all pulleys, rollers, bumpers, alignment control devices and other equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances will the pipe be stressed beyond its elastic limit. Winch line is to be centered in pipe to be burst with adjustable boom.

3.3.2 The installed pipe shall be allowed the manufacturer's recommended amount of time, but not less than four (4) hours, for cooling and relaxation due to tensile stressing prior to any reconnection of service lines, sealing of the annulus or backfilling of the insertion pit. Sufficient excess length of new pipe, but not less than four (4) inches, shall be allowed to protrude into the manhole to provide for occurrence. Restraint of pipe ends shall be achieved by means of couplings.

3.3.3 Following the relaxation period, the annular space may be sealed. Sealing shall be made with material approved by the Contracting Officer or his/her designated representative and shall extend in such a manner as to form a smooth, uniform, watertight joint.

3.3.4 Pit Placement Issues

3.3.4.1 Windowing Method

Up to 12" diameter PE pipe, the Contractor shall use the "windowing" method where necessary, to prevent damage to surrounding infrastructure.

3.3.4.2 Tool Removal Back to Starting Pipe via Being Pulled Back Out of the newly Installed PE Pipe

Contractor shall use this method when an exit pit is difficult due to underground utility placement or surrounding infrastructure. In all cases, the tool must have the ability to operate in reverse to prevent damage to the HDPE during removal.

3.4 PIPE JOINING

The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.

3.4.1 The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All joints shall be subject to

acceptance by the Contracting Officer or his/her designated representative.

3.4.2 All defective joints shall be cut out and replaced at no cost to the Government. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Contracting Officer or his/her designated representative shall be discarded and not used.

3.4.3 Terminal sections of pipe that are joined within the insertion pit shall be connected couplings or connectors with tensile strength equivalent to that of the pipe being joined.

3.5 FIELD TESTING

3.5.1 After the existing sewer is completely replaced, internally inspect with television camera and video tape as required. The finished tape shall be continuous over the entire length of the reconstruction and shall be free from visual defects.

3.5.2 Defects which may affect the integrity or strength of the pipe in the opinion of the Contracting Officer or his/her designated representative shall be repaired or the pipe replaced at the Contractor's expense.

-- End of Section --

SECTION 02882

RECREATIONAL FACILITY PLAYGROUNDS

PART 1 GENERAL

1.01 Section Includes

A. Installation of a playground structure model [60-3640-2 and 60-3756] as shown on the plans and herein specified.

1.02 Related Sections

A. Section 02210 -Grading.

B. Section 02200 -Excavation, Filling, and Backfilling for Structures.

1.03 Quality Assurance

A. Installer Qualifications - An experienced installer familiar with local building codes and with the latest safety guidelines, who has completed installation of playground structures similar in material, design, and extent to that indicated for this project, and whose work has resulted in construction with a record of successful in-service performance.

B. Acceptable Manufacturers – Design based upon play structure/components as manufactured by BCI Burke Company, LLC, P.O. Box 549, 600 Van Dyne Road, Fond du Lac, Wisconsin 54936-0549, Tel: (920) 921-9220, Fax: (920) 921-9566, Toll Free: 1-800-266-1250, www.bciburke.com.

C. Product Options - Drawing indicates size, components and dimensional requirements of playground structure and are based on the specific system indicated.

D. Quality Assurance - Refer to Defense FAR Supplement 252.211-7003. Offers of equal products must meet the SALIENT physical, functional, and other characteristics specified. COLOR, TEXTURE, DETAILS, PATTERN, and MATERIAL CONTENT, are SALIENT characteristics and MUST be incorporated as integral to the project design integrity.

1.04 Submittals

A. Product Data: Include physical characteristics such as materials, dimensions and finish.

B. Shop Drawings: Show assembly and installation details.

C. Samples for Verification: Color selections for [upright posts], [steel accessories], [freestanding panels & signs], [swings], [plastic components], [other].

D. Warranty: Include manufacturer's standard warranty.

1.05 References

A. ASTM F1487-01 Standard Consumer Safety Performance Specification for Playground Equipment for Public use CAN/CSA-Z614-98 Children's Playspaces and Equipment.

B. ASTM F1292-99 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.

C. U.S. Consumer Products Safety Commission Handbook for Public Playground Safety.

D. Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Play Areas, amended November 20, 2000.

1.06 Delivery, Storage and Handling

A. Inspect all components on delivery to ensure that no damage occurred during shipping or handling. Materials shall be stored in original undamaged packaging in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft until ready for installation. Inspect components prior to installation.

PART 2 MATERIALS

2.01 Barriers & Enclosures

A. Pipe Walls shall have horizontal top and perimeter members that are fabricated from galvanized steel tubing of at least 1.315" OD x .08" wall. Vertical supports shall be fabricated from galvanized steel tubing of at least 1.029" OD x .07" wall. The bottom mounting brackets shall be fabricated of 7 gauge formed galvanized steel plate. The one-piece, all-welded pipe wall assembly shall be powder-coated.

2.03 Climbers/Climber Ladders

A. Adventure Climb (Deck Mount, Single, Dual) shall be used with 48" high platforms, where applicable. The climber shall be 50 1/2" wide. Each climber shall be manufactured of rotationally molded UV-stabilized polyethylene with double walls no less than .250" thick with textured surface. The Adventure Climb shall have eighteen (18) molded-in foot rests with contoured handholds. The anchor post shall be galvanized steel tubing of at least 1.660" OD x .109" wall and attached using 5/16" self-tapping screws and 3/8" washers. The deck mount Adventure Climb shall attach to the platform using four (4) 3/8" button-head cap screws, 3/8" washers and molded-in threaded inserts. The platform opening shall be restricted to a maximum of 15 inches by a stanchion. The independent Adventure Climb(s) shall have an extension loop(s) formed from galvanized steel tubing of at least 1.315" OD X .08" wall with 1.66 OD and 1.315 OD extensions. The extension loop(s) shall attach using 3/8" button head cap screws and 3/8" nuts. The independent Adventure Climb(s) shall have a pipe barrier or a pass through barrier fabricated with an outer frame of at least 1.900" x .120" wall

galvanized steel tubing, horizontal members of at least 1.3125" x .085" wall, and vertical rungs of at least 1.029" OD x .075" wall galvanized tubing. They shall be attached to the Adventure Climb(s) using 3/8” button head cap screws and molded-in threaded inserts. The extension loops, pass through barriers and pipe barriers shall be finished with a baked-on powder coating after fabrication.

B. Climbers (Atom) shall have a center support of galvanized steel tube of at least 1.66" OD x .111 wall. Rungs shall be galvanized steel tubing of at lest 1.029" OD x .07" wall, bent as required and welded to the center support. Poles shall attach to a stanchion using 3/8" button head cap screw and nut. Stanchion shall be used at the platform entrance and restrict the opening to a maximum of 15 inches.

    1. Stanchion shall be fabricated from galvanized steel tubing at least 1.315" OD x .08" wall with 1.029" OD x .07" wall vertical in-fills.

    2. The Stanchion will attach to the vertical support post with the Series 3000 Mounting Bracket.

    3. The lower end of the Stanchion will attach to the platform with button-head cap screws.

    4. The Atom Climber and Stanchion to be finished with a baked-on powder coating after fabrication

C. Climbers (Satellite) shall be for 48" and 72" high platforms. The 48" platform model shall have two (2) ring platforms and the 72" model shall have three (3) ring platforms. The ring platforms shall be separated and supported by two (2) ring spacers for each platform. The ring platform shall be 48" wide x 40" deep x 15" high and the ring spacer shall be 20" in diameter. The 48" platform model shall have four (4) spacers and the 72" platform model shall have six (6) spacers. The ring platforms and ring spacers shall be manufactured of rotationally molded, UV-stabilized polyethylene with double walls no less than .250" thick with textured surfaces. The ring platforms shall have sixteen (16) integral molded-in handholds and the ring spacers shall have three (3) molded-in handholds, each shall be no greater than 1.5" in diameter. Ring Platform shall be attached to 3.5" OD support posts using attachment brackets as specified in Mounting Brackets, Clamps, Hangers and Fittings.

2.06 Miscellaneous

A. Sliding Poles shall be formed from galvanized steel tubing of at least 1.66" OD x .111" wall. Poles shall attach to a stanchion (Deck Mount) using 3/8" button head cap screw and nut. Stanchion shall be used at the platform entrance and restrict the opening to a maximum of 15 inches. Poles shall attach to an extension loop (free-standing) using 3/8" button head cap screw and 3/8” nut.

    1. Stanchion shall be fabricated from galvanized steel tubing at least 1.315" OD x .08" wall with 1.029" OD x .07" wall vertical in-fills.

2. The Stanchion will attach to the vertical support post with the Series 3000 Mounting Bracket.

3. The lower end of the Stanchion will attach to the platform with button-head cap screws.

4. The stanchion shall be finished with a baked-on powder coating after fabrication

2.07 Mounting Brackets, Clamps, Hangers

A. Brackets, Horizontal Ladder shall be fabricated of a 4 1/2" x 1 3/4" x 7 gauge formed steel plate welded to a 1.029" OD x .07" wall tube.

B. Brackets, Mounting shall be fabricated from 7 gauge steel plate formed to fit outside diameter of 3.5" OD vertical support posts. 7-gauge steel shall have a yield strength no less than 21,500 psi and a tensile strength of 36,000 psi. The following mounting brackets shall be used:

C. Brackets, Pipe Wall shall be fabricated of 4 1/2" x 1 3/4" x 7 gauge formed steel plate welded to a 1.029" OD x .07" wall tube.

D. Brackets, Sit Down Hood shall be fabricated of 4 1/2" x 1 3/4" x 7 gauge formed steel plate with 1" OD x .1875" I.D. welded washer.

Note: All brackets shall be powder-coated after fabrication and color shall be coordinated with the specified post color.

E. Fasteners shall be '300 Series' Stainless Steel, with the exception of carriage bolts and hex head cap screws which shall be coated with yellow die chromate and zinc. All button head cap screws shall be tamper resistant. Carriage bolts and hex head cap screws shall be no less than Grade 5. All button-head cap screws and socket head screws shall be treated with a locking/sealing adhesive.

F. Fittings (T) (2.375" x 2.375") shall be fastened with 3/8" '300 Series' Stainless Steel socket head cap screws and '300 Series' Stainless Steel nuts, seated and recessed in a cast-in hex nut pocket below flush surface. T-fittings shall be set with two (2) cast-in knobs protruding into the horizontal member.

G. Hangers (Platform) shall have cast-in gussets with form-fitted cast-in nut holders.

H. Hangers (Swing) shall have a pendulum fabricated from hot-dipped galvanized malleable iron Grade 32510, fitted with an oil-impregnated bronze bearing and fastened with a plated 3/8" hex head cap screw.

2.08 Overhead Events

A. Wheel Deal shall have a hanger assembly consisting of a straight center support tube fabricated of galvanized steel tubing no less than 2.375" OD x .13 wall. Welded to the center support tube will be four (4) 3/4" diameter threaded steel axle pins. Attached to each axle pin will be a fabricated welded wheel assembly

consisting of an outer ring and three (3) spokes made from 1.315 OD X .08” wall galvanized tubing. One end of the three (3) spokes shall be welded to the ring and the other end shall be welded to a machined steel center hub. The hub will be assembled to and free to rotate about the axle pins of the center support tube. A ball bearing and a thrust bearing shall be provided to assure free rotation of the fabricated wheel about the axles. Means for lubricating the bearings shall be provided. The two (2) horizontal end supports for the hanger assembly shall be fabricated from 2.375 OD X .109” wall of galvanized tubing and capped at each end with a vertical mounting bracket. A sleeve of 2.875 OD X .165” wall of galvanized material shall be welded in the center of each end support. This sleeve shall fit over the center support tube and be fastened to the support tube by a bolt and nut assembly. The end support shall attach to the 3.5" OD support post using attachment brackets.

Note: All metal components to be finished with a baked-on powder coating after fabrication.
Note: All mounting components are as specified in Mounting Brackets, Clamps, Hangers and Fittings.

2.10 Platforms

A. (Punched Steel) Series 3000

1. Closure Plates shall be fabricated of 14 gauge steel and shall be used on 8" Transfer Steps and Platforms. Plates shall be powder-coated.

2. Square Platforms shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed and reinforced with welded in place 12 gauge hot rolled steel strips. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required. Platform shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

3. Triangular Platforms shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed and reinforced with welded in place 12 gauge hot rolled steel strips. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required. Platform shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

2.13 Roofs

A. Rectangular Shingled Roof shall be a one piece all welded panel. The panel shall be powder coated. The steel panels shall be assembled into two sections and framed with steel angles. The sections shall be joined with a gusset at both ends. The roof shall attach to 3.5" OD steel support posts and 4.5" OD steel, aluminum

or Plasticore support posts, using steel angle braces and steel roof adapters. Attachment to the support posts shall be by adapter assemblies bolted to the steel angles with 3/8" button-head cap screws and pinned with zinc plated steel drive pins for the Plasticore and aluminum drive rivets for the steel and aluminum posts.

2.14 Slides

A. Slides (Double Rail) shall be manufactured of rotationally molded, UV-stabilized polyethylene with double walls no less than .250" thick and rails 4" high. Non-sliding surfaces shall be textured. Slides shall be aligned flush to the platform with a 10 gauge galvanized steel plate and shall be secured to the platform with molded 3/8" T-nut inserts and 3/8" button-head cap screws. Exit support shall be furnished by a 10 gauge galvanized steel plate welded to two (2) galvanized steel tube supports of at least 1.66" OD x .085" wall. The exit support assembly shall be powder-coated. At the entrance to each slide, a plastic sit-down hood with molded-in hand grip shall be provided.

B. Slide, Monster (Straight, Right, Left, ‘C, or 90 Degree) shall have three (3) chutes manufactured of rotationally molded, UV stabilized polyethylene no less than .250" wall. The integral entrance with molded-in handgrip makes easy transition from standing to sitting. The slide can be attached to a 32", 48", 56", 64", 72” or 96” high half hex and square platforms and can turn to the right, to the left, or be straight. Middle supports shall be furnished by galvanized steel tube of at least 1.625" OD x .090" wall. Exit support shall be furnished by a 10 gauge galvanized steel plate welded to a galvanized steel support tube of at least 2.375" OD x .130" wall and shall be powder-coated

    1. Monster Slide Entrance shall be manufactured of rotationally molded, UV-stabilized polyethylene with double walls no less than .250" thick, textured and contoured as required. A galvanized steel support tube no less than 1.315" OD x .08" wall shall be built into the hood and shall transfer the load back to the main structure. A molded-in hand-grip, 11/4" thick, shall be provided at the hood for transition from standing to sliding.

2.15 Steps, Transfer Steps and Stair Assemblies

A. Punched Steel

    1. Stair Assemblies shall be configured as follows in relationship to platform height: 4-steps for 48", 3-steps for 40", 2-steps for 32", and 1-step for 16".

        a. Stair assemblies shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed with welded in place 12 gauge hot rolled steel sides. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to

assemblies as required. The bottom riser shall be supported by two (2) galvanized steel posts no less than 1.66" OD x .085" wall. The top riser shall be attached to its platform with 3/8" button-head cap screws. Stair Assemblies shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

b. One-step stair assemblies shall have the top riser secured to a triangle platform assembly with 3/8" button-head cap screws. The bottom stair shall be secured on one side to a galvanized steel tube at least 1.66" OD x .085" wall with 3/8" button-head cap screws, secured on the other side to the rear handrail post. Both bottom supports, steel tube and handrail post shall furnish footings. The triangle assembly shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed and reinforced with welded in place 12 gauge hot rolled steel strips. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required.

c. Handrails on Stair assemblies shall have upper and lower handrail assemblies fabricated of 1.315" OD x .104" wall galvanized steel tubing. Below, the handrails shall be secured to the side plates with 3/8" button-head cap screws. Above, the handrails shall be attached to support assemblies with 3/8" button-head cap screws. All handrails shall be powder-coated after fabrication.

d. Two (2) Support Assemblies [Series 3000] shall be fabricated of 1.315" OD x .08" wall galvanized steel tubing and each shall consist of a support tube and a stabilizer tube fabricated of 1.029" OD x .07" wall which shall be welded to a 7 gauge formed attached plate. The attachment of each support assembly to the 3.5" OD vertical support post shall be with two (2) 3/8" button-head cap screws with washers as specified in Mounting Brackets, Clamps, Hangers and Fittings.

e. Handrails on the one-step stair assembly shall be fabricated of 1.315" OD x .104" wall galvanized steel tubing, bent in the middle to a 180° radius. Each end shall serve as a footing for the transfer stair. Below, the stair side plate shall be secured to the rear post

with two (2) 3/8" button-head cap screws. Above, the stair side plate shall be secured to the forward post with one (1) 3/8" button-head cap screw.

4. Stair assemblies shall furnish access to platforms with the following stair assembly-to-platform height: 9-steps for 72", 8-steps for 64", 7-steps for 56", 6-steps for 48", 5-steps for 40", and 4-steps for 32.

    a. Stair assemblies shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed with welded in place 12 gauge hot rolled steel sides. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required. The bottom riser shall be supported by two (2) galvanized steel posts no less than 1.66" OD x .085" wall. The top riser shall be attached to its platform with 3/8" button-head cap screws. The bottom riser shall be supported by two (2) galvanized steel posts no less than 1.66" OD x .085" wall. The top riser shall be attached to its respective platform with 3/8" button-head cap screws. Stair Assemblies shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

    b. Handrails Stair assemblies shall have handrail assemblies fabricated of 1.315" OD x .104" wall galvanized steel tubing. Below, the handrails shall be secured to the side plates with 3/8" button-head cap screws. Above, the handrails shall be attached to support assemblies with 3/8" button-head cap screws. Handrails shall be powder-coated after fabrication.

    c. Two (2) Support Assemblies [Series 3000] shall be fabricated of 1.315" OD x .08" wall galvanized steel tubing and each shall consist of a support tube and a stabilizer tube fabricated of 1.029" OD x .07" wall which shall be welded to a 7 gauge formed attachment plate. The attachment of each support assembly to the 3.5" OD vertical support post shall be with two (2) 3/8" button-head cap screws with washers as specified in Mounting Brackets, Clamps, Hangers and Fittings.

2.16 Burke Basics

A. Fun Phones shall conduct speech, via tubing, between two (2) specified points. Each point shall consist of a 16 gauge spun metal funnel attached to a one-piece

all-welded galvanized steel tube no less than 1.66" OD x .085" wall which shall be attached using standoffs at least 1.315" x .08" wall to 3.5" OD support posts using attachment brackets.

Note: All mounting brackets shall be as specified in Mounting Brackets, Clamps, Hangers and Fittings.
Note: The points shall be connected with tubing of 1.625" black polyethylene. Bends shall be fabricated of 1.5" I.D. convoluted black polyethylene tubing and secured with 1.9" OD adjustable nylon tubing clamps.

B. Rally Round shall be a one piece of all-welded construction. The Rally Round shall provide a circular play path and shall have two (2) formed rails fabricated from galvanized steel tubing of at least 1.900" OD x .120" wall. Rungs shall be galvanized steel tubing no less than 1.315" OD x .08" wall, welded to the formed rails. The three (3) Rally Round Ladders shall have main supports fabricated from galvanized steel tubing of at least 1.9" OD x .09" wall. Rungs shall be galvanized steel tubing of at least 1.315" OD x .08" wall, formed to a semi-circle and welded to the main supports. The top shall attach to the Rally Round using 3/8" button head cap screws and nuts. The (3) slide poles shall be formed from galvanized steel tubing of at least 1.66" OD x .111" wall. Poles shall attach to the Rally Round using 3/8" button head cap screws and nuts. The assembly shall be powder-coated.

2.17 Signs

A. Signs shall be manufactured from high-density polyethylene plastic with a UV-light inhibitor and flame retardant. Sign shall be attached to the support posts by four (4) 3/8" button-head cap screws and 3/8" nuts. The support post assembly shall be one-piece welded assembly with 2.375" OD x .095" wall tubing and a 10 gauge hot rolled plate and finished with a baked-on powder coating after fabrication.

2.18 Swings

A. Traditional Belt Swing shall have a seat of molded rubber measuring 6" x 24" with a one-piece steel insert bonded into the rubber. The belt swing will attach to the brackets with a pendulum fabricated from hot-dipped galvanized malleable iron Grade 32510, fitted with an oil-impregnated bronze bearing and fastened with a 'Series 300" Stainless Steel button head cap screw and a 'Series 300" Stainless Steel nut and will attach to suspending chains, manufactured of galvanized steel straight coil chain no less than 4/0 and attached to S-hooks 3/8" in diameter. The chains shall attach to a support beam fabricated from galvanized steel tubing of no less than 1.3125 x .085 (wall) and brackets of formed 7 gauge hot-rolled steel plate.

2.19 Support Tubes and Rungs

A. Support Tubes shall be made of galvanized steel tubing no less than 1.315" OD x .08" wall. Tubes and rungs shall be powder-coated.

B. Rungs shall be made of galvanized steel tubing no less than 1.315" OD x .08" wall. Tubes and rungs shall be powder-coated.

2.20 Descriptions of Coatings

A. PVC Coating (Poly-Vinyl Chloride): Prior to coating, each part shall be chemically washed, submerged in a heat-activated primer and dried. After drying, each part shall be pre-heated to a temperature no less than 350° F and immersed in liquid PVC. The coating shall be applied at a rate ranging from .085-.150 in. The PVC shall have a tensile strength no less than 2500 psi, an elongation no less than 290%, a tear strength no less than 420 lb./in. and a hardness (Shore A) of no less than 89 plus/minus 2 Durometer.

    1. UV Stabilizer : UV stabilizer shall be added to PVC to withstand one year in a QUV panel tester without any significant color drift. Burn Rate will meet or exceed Federal Safety Standard MVSS 302. This is the same as a UL 94 HB rating.

B. Powder Coating: Prior to powder coating, all parts shall be cleaned, treated with iron phosphate and sealed with non-chromic process. A polyester/TGIC-free powder-coating with superior color-, gloss-, and UV-stabilizing qualities shall be applied at a rate of 2-5 mils and shall be cured in an oven at temperatures no less than 325° F and no more than 380° F. The powder-coat shall have the following properties:

    1. Adhesion: No less than 100% (cross hatch/tape adhesion test per ASTM D3359-83).

    2. Color/Gloss Change: None below 200% over-bake (test per ASTM D2454-79).

    3. Hardness: No less than 2-h (pencil hardness test per ASTM D3363-74).

    4. Resistance to Impact: No less than 160 in. lb. direct and inverted.

    5. Resistance to Bending: No visible cracking (1/8" bending test per ASTM 522).

    6. Resistance to Salt Spray: No more than 1/8" scribe creep in 1500 hours (salt spray test per ASTM B117-73).

    7. Resistance to Humidity: No visible red rust under 1500 hours (humidity test per ASTM D2247-68).

    8. Degree of Gloss: No less than 60% (specular gloss test per ASTM D523-80).

2.21 Descriptions and Processes of Components

A. Main Frame Structure shall be assembled from cold-formed steel tubing with a yield test of at least 50,000 psi and a tensile strength of at least 55,000 psi. Tube members shall comply with ASTM A-135 and ASTM A-500 Grade A and shall be tested according to ASTM E-8 and cut to length as specified.

    1. Caps for vertical support posts shall be fabricated of cast aluminum and shall be finished with a baked-on powder-coat. Caps shall be riveted in place by the factory.

    2. Tubing Exteriors shall be galvanized, then coated with a chromate conversion coating and finished with a baked-on powder-coat.

    3. Tubing Interiors shall be coated with a zinc-rich compound.

    4. Tubing Walls composing vertical support posts shall be at least 3.5" OD x .12" wall.

B. Nuts shall be '300 Series' Stainless Steel, with the exception of carriage bolts and hex head cap screws which shall be coated with yellow die chromate and zinc. All button head cap screws shall be tamper resistant. Carriage bolts and hex head cap screws shall be no less than Grade 5. All button-head cap screws and socket head screws shall be treated with a locking/sealing adhesive.

C. Plastic Parts, other than recycled materials, shall be manufactured from rotationally molded, linear, low-density polyethylene with a .250" wall and textured non-sliding surfaces. Plastic parts shall inhibit UV light and shall range in density from no less than .938 to no more than .940 per ASTM D-1505. Plastic parts shall have a tensile strength at yield no less than 2900 psi and exhibit no flexural modulus below 120,000 psi

PART 3 EXECUTION

3.01 Site Preparation

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 Installation

A. Install play structure in compliance with manufacturer’s written instructions.

B. Install components in sequence as recommended by manufacturer.

C. Install play structure as indicated on the drawings provided.

D. Variations from the installation indicated must be approved.

E. Variations from the installation indicated and all costs for removal and replacement will be the responsibility of the contractor.

3.03 Cleaning

A. The contractor shall clean the jobsite of excess materials, including post hole excavations.

END OF SECTION

SECTION 02921

SEEDING

1 GENERAL

Scope: Seeding for this project will include placing seed around improved family housing units in two different neighborhoods. Midland and Woodland are existing, developed neighborhoods located on the north and the middle sections of the Whiteman AFB family housing area. Typical planting plans and have been provided to guide the landscape contractor in sodding / seeding placement. Seed shall be placed on all disturbed areas unless plant beds are specified or as determined by the Contracting Officer's Representative.

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 602	(1995a) Agricultural Liming Materials
ASTM D 2028	(1976; R 1997) Cutback Asphalt (Rapid-Curing Type)
ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996el) Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes
ASTM D 977	(1998) Emulsified Asphalt

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1995) Federal Seed Act Regulations Part 201

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; G
Surface Erosion Control Material; G
Chemical Treatment Material; G

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, surface erosion control material and chemical treatment material.

A listing of equipment to be used for the seeding operation.

Delivery; IO

Delivery schedule.

Finished Grade and Topsoil; G

Finished grade status.

Topsoil; IO

Availability of topsoil from the stripping and stock piling operation.

Quantity Check; G

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

Seed Establishment Period; G

Calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.

Maintenance Record; IO

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Application of Pesticide; G

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; G

A 5 pound sample.

Mulch; IO

A 5 pound sample.

SD-06 Test Reports

Equipment Calibration; IO

Certification of calibration tests conducted on the equipment used in the seeding operation.

Soil Test; G

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Seed; G
Topsoil; G
pH Adjuster; G
Fertilizer; G

Organic Material; IO
Soil Conditioner; IO
Mulch; IO
Asphalt Adhesive; IO
Pesticide; G

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

d. Fertilizer. Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Mulch: Composition and source.

h. Asphalt Adhesive: Composition.

i. Pesticide. EPA registration number and registered uses.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

1.4.1.2 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.

1.4.1.3 Pesticides

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

1.4.2 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

Materials shall be stored in designated areas. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.4.4 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours.

2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures shall be proportioned by weight as follows:

Turfgrass Species: Seed of grass species as follows, with not less than 85 percent germination, not less than 98 percent pure seed, and not more than 0.5 percent weed seed:

1. Turf grass species:

   a. 90 percent turf type tall fescue (min. of three varieties in the top 20% of the Kansas State Turfgrass Associations (KTEP) Field Trials)
   b. 10 percent Improved Kentucky bluegrass (Poa pratensis).

Seed blend to be approved by Contracting Officer’s Representative prior to installation.

FIELD SEED

FIELD AREA		Mixture Percent Weight	Percent Pure Live Seed
Poa pratensis	Tall Fescue	K31	85%

2.1.3 Temporary Seed Species

Temporary seed species for surface erosion control or overseeding shall be as follows:

Place oats in the fall and Wheat crop in the winter for erosion control as required. Overseed in required slope conditions with the following:

Botanical Name	Common Name	Percent Pure Live Seed
	trefoil bird's foot 'Empire'	25

Place at 10 lbs / acre innoculated rizovial bacteria cover crop rye for slope conditions

For flat ground blend 5 varieties equal in Turf Master Blend:

Botanical Name	Common Name	Percent Pure Live Seed
	Arid	15
	Rebel	
	Falcon	
	Mustang	
	Apache	

Add 1 lb / 1000 of Manhatten Two Derby Ryegrass.

2.1.4 Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

2.1.5 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed.

2.1.6 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

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 02300A 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 seed 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 shall not be used.

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, sulfur, 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

It shall be as recommended by the soil test. Fertilizer shall be controlled release commercial grade, free flowing, 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 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test. Nitrogen carrier fertilizer shall be commercial grade, free flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.

2.3.4 Organic Material

Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

2.3.4.1 Bonemeal

Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

2.3.4.2 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. It shall contain no chemicals or ingredients harmful to plants. The manure shall be heat treated to kill weed seeds and be free of stones, sticks, and soil.

2.3.4.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted or stabilized with nitrogen.

2.3.4.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost 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 by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.3.4.5 Worm Castings

Worm castings shall be screened from worms and food source, and shall be commercially packaged.

2.3.5 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements of the soil test.

2.3.5.1 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.

2.3.5.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the 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. Polymers shall also be added to the seed and be a starch grafted polyacrylonitrite, with graphite added as a tacky sticker. It shall have an absorption capacity of 100 plus times its weight.

2.3.5.3 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.3.5.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.5.5 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.

2.4.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.4.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.4.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

2.4.4 Paper Fiber

Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

2.5 ASPHALT ADHESIVE

Asphalt adhesive shall conform to the following: Emulsified asphalt, conforming to ASTM D 977, Grade SS-1; and cutback asphalt, conforming to ASTM D 2028, Designation RC-70.

2.6 WATER

Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

2.7 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.

2.8 SURFACE EROSION CONTROL MATERIAL

Surface erosion control material shall conform to the following:

2.8.1 Surface Erosion Control Blanket

Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

2.8.2 Surface Erosion Control Fabric

Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

2.8.3 Surface Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.8.4 Surface Erosion Control Chemicals

Chemicals shall be high-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

2.8.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids shall resist mold growth.

2.8.6 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

3 EXECUTION

3.1 INSTALLING SEED TIME AND CONDITIONS

3.1.1 Seeding Time

Seed shall be installed from April 1 to May 1 for Spring establishment and from Sept 1st to October 15th for fall establishment.

3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing.

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, 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 on site 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 seed species specified.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02300A EARTHWORK, prior to the commencement of the seeding operation.

3.2.2 Application of Soil Amendments

3.2.2.1 Applying pH Adjuster

The pH adjuster shall be applied as recommended by the soil test. The pH adjuster shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage operation.

3.2.2.2 Applying Fertilizer

[The fertilizer shall be applied as recommended by the soil test. Fertilizer shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test. The soil conditioner shall be spread uniformly over the soil a minimum 1 inch depth and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.

3.2.2.4 Applying Super Absorbent Polymers

Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.

3.2.3 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4 inch depth. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 2 inch depth by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

3.2.4.2 Lawn Area Debris

Debris and stones over a minimum 5/8 inch in any dimension shall be removed from the surface.

3.2.4.3 Field Area Debris

Debris and stones over a minimum 2 inch in any dimension shall be removed from the surface.

3.2.4.4 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Installing Seed

Seeding method shall be Broadcast Seeding for smaller areas and Hydroseeding for larger areas or depending on conditions. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

3.3.1.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of [_____] pounds per 1000 square feet using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.1.2 Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled.

3.3.2 Hydroseeding

Seed shall be mixed to ensure broadcast at the rate of 10 pounds per 1000 square feet. Seed and fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

3.3.3 Mulching

3.3.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.3.3.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.3.3 Asphalt Adhesive Tackifier

Asphalt adhesive tackifier shall be sprayed at a rate between 10 to 13 gallons per 1000 square feet. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.3.3.4 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.

3.3.3.5 Asphalt Adhesive Coated Mulch

Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 10 to 13 gallons per 1000 square feet, using power mulch equipment

which shall be equipped with suitable asphalt pump and nozzle. The adhesive-coated mulch shall be applied evenly over the surface. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.3.3.6 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.3.4 Watering Seed

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

3.4 SURFACE EROSION CONTROL

3.4.1 Surface Erosion Control Material

Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

3.4.2 Temporary Seeding

The application rate shall be 1.1 pounds per 1000 square yards. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with temporary seed species listed under Paragraph SEED.

3.4.2.1 Soil Amendments

When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Seed.

3.4.2.2 Remaining Soil Amendments

The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing seed.

3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.6 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.

3.6.1 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.

3.6.2 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. A pesticide plan shall be submitted.

3.7 RESTORATION AND CLEAN UP

3.7.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.

3.7.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.8 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed. Signage shall be in accordance with Section 10430A EXTERIOR SIGNAGE.

3.9 SEED ESTABLISHMENT PERIOD

3.9.1 Commencement

The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of seeding work under this contract and shall continue through the remaining life of the contract and end 12 months after the last day of the seeding operation required by this contract. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be coordinated with Sections 02922A SODDING, 02923A SPRIGGING, and 02930A EXTERIOR PLANTING. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.9.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch high.

3.9.2.1 Lawn Area

A satisfactory stand of grass plants from the seeding operation for a lawn area shall be a minimum 100 grass plants per square foot. Bare spots shall be a maximum 6 inches square. The total bare spots shall be a maximum 2 percent of the total seeded area.

3.9.2.2 Field Area

A satisfactory stand of grass plants from the seeding operation for a field area shall be a minimum 100 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.

3.9.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.9.3.1 Mowing

a. Lawn Areas: Lawn areas shall be mowed to a minimum 3 inch height when the turf is a maximum 4 inches high. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

b. Field Areas: Field areas shall be mowed once during the season to a minimum 3 inch height. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

3.9.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.

3.9.3.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.9.3.4 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

3.9.3.5 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

SECTION 02922

SODDING

1 GENERAL

Scope: Sodding for this project will include placing sod around improved family housing units in two different neighborhoods. Midland and Woodland are existing, developed neighborhoods located on the north and the middle sections of the Whiteman AFB family housing area. Typical planting plans and have been provided to guide the landscape contractor in sodding / seeding placement. Sod shall be placed around all drainage inlets and on swales and other areas as determined by the Contracting Officer's Representative.

1.1 REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602	(1995a) Agricultural Liming Materials
ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996el) 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 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; G
Chemical Treatment Material; G

A listing of equipment to be used for the sodding operation. Manufacturer's literature including physical characteristics, application and installation instructions for equipment and chemical treatment material.

Delivery; G

Delivery schedule.

Finished Grade and Topsoil; G

Finished grade status.

Topsoil; G

Availability of topsoil from the stripping and stock piling operation.

Quantity Check;

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed. The quantity of sod used shall be compared against the total area installed.

Sod Establishment Period; IO

Calendar time period for the sod establishment period. When there is more than one sod establishment period, the boundaries of the sodded area covered for each period shall be described.

Maintenance Record; IO

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Application of Pesticide; G

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; G

A 5 pound sample.

Temporary Seeding; G

Sample of annual seed species and application rate.

SD-06 Test Reports

Equipment Calibration; IO

Certification of calibration tests conducted on the equipment used in the sodding operation.

Soil Test; G

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Sod; G
Topsoil; G
pH Adjuster; G
Fertilizer; G
Organic Material; IO
Soil Conditioner; IO
Pesticide; G

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Sod. Classification, botanical name, common name, mixture percentage of species, percent purity, quality grade, field location and state certification.

b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

d. Fertilizer. Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Pesticide. EPA registration number and registered uses.

1.3 SOURCE INSPECTION

The sources of sod material and delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Sod

Sod shall be protected during delivery to prevent desiccation, internal heat buildup, or contamination.

1.4.1.2 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

1.4.1.3 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.

1.4.1.4 Pesticides

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

1.4.2 Inspection

Sod shall be inspected upon arrival at the job site for conformity to species. Sod shall be checked for visible broadleaf weeds, and a visible consistency with no obvious

patches of foreign grasses that exceed 2 percent of the canopy. Sod that is heating up, dry, moldy, yellow, irregularly shaped, torn, or of uneven thickness shall be rejected. Other materials shall be inspected for compliance with specified requirements. Open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts, shall be rejected. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

1.4.3.1 Sod

Sod shall be stored in designated areas and kept in a moist condition by watering with a fine mist, and covered with moist burlap, straw, or other covering. Covering shall allow air to circulate, preventing internal heat from building up. Sod shall be protected from exposure to wind and direct sunlight until installed.

1.4.3.2 Other Material Storage

Materials shall be stored in designated areas. Lime and fertilizer shall be stored in cool, dry locations, away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with sod operation materials.

1.4.4 Handling

Sod shall not be damaged during handling. Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Time limitation between harvesting and installing sod shall be a maximum 24 hours.

2 PRODUCTS

2.1 SOD

2.1.1 Sod Classification

[State-certified] [State-approved] [Nursery-grown] sod shall be provided as classified by applicable state laws. Sod section shall be sized to permit rolling and lifting without breaking.

2.1.2 Grass Species

Grass species shall be proportioned as follows:

	Mixture Percent Weight	Percent Pure Live Seed
FIELD AREA		
Tall Fescue	K31	85%

Turfgrass Sod: Number 1 Quality/Premium, complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding."

Turfgrass Species: Sod of grass species as follows, with not less than 85 percent germination, not less than 98 percent pure seed, and not more than 0.5 percent weed seed:

1. Turf grass species:

   a. 90 percent turf type tall fescue (min. of three varieties in the top 20% of the National Turfgrass Associations (NTEP) Field Trials)
   b. 10 percent Improved Kentucky bluegrass (Poa pratensis).
   c. Sod blend to be approved by Contracting Officer’s Representative prior to installation.

2.1.3 Quality

Sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, woody plant roots, and other materials detrimental to a healthy stand of grass plants. Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted. Sod to be produced by a professional sod producer and grown on similar soils and climate to site location. Broadleaf weeds and patches of foreign grasses shall be a maximum 2 percent of the sod section.

2.1.4 Thickness

Sod shall be machine cut to a minimum 1-3/8 inch thickness. Measurement for thickness shall exclude top growth and thatch.

2.1.5 Anchors

Sod anchors shall be as recommended by the sod supplier or on all slopes exceeding 3:1.

2.1.6 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

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 02300A EARTHWORK. When additional topsoil is required beyond the available topsoil from stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the sod species specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash, or other material over a maximum 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 shall not be used.

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 as recommended by the soils report.

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

It shall be as recommended by the soil test. Fertilizer shall be controlled release commercial grade, free flowing, 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 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test. Nitrogen carrier fertilizer shall be commercial grade, free flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.

2.3.4 Organic Material

Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

2.3.4.1 Bonemeal

Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

2.3.4.2 Rotted Manure

Rotted manure shall be unleached horse, chicken or cattle manure containing a maximum 25 percent by volume 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 be free of stones, sticks, and soil.

2.3.4.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material free of stones, sticks, soil, and toxic substances harmful to plants, fully composted or stabilized with nitrogen.

2.3.4.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost 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. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.3.4.5 Worm Castings

Worm castings shall be screened from worms and food source, and shall be commercially packaged.

2.3.5 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements for topsoil.

2.3.5.1 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. Green sand shall be balanced with the inclusion of trace minerals and nutrients.

2.3.5.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the 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.

2.3.5.3 Calcined Clay

Calcined clay shall be granular particles 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 a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.3.5.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.5.5 Expanded Shale, Clay, or Slate (ESCS)

Rotary kiln produced ESCS material shall be in conformance with ASTM D 5883.

2.4 WATER

Water shall be the responsibility of the Contractor unless otherwise noted. Water shall not contain elements toxic to plant life.

2.5 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.

3 EXECUTION

3.1 INSTALLING SOD TIME AND CONDITIONS

3.1.1 Sodding Time

Sod shall be installed from April 1 to May 1 for Spring establishment; from May 1 to June 1 for summer establishment; and from Sept 1st to October 15th for fall establishment.

3.1.2 Sodding Conditions

Sodding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the sodding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

Immediately prior to the commencement of sodding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. Provide calibration test results within one week of testing.

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, 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 on site 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 sod species specified. Coordinate with the government on existing soils tests that have been performed at the site.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

Prior to the commencement of the sodding operation, the Contractor shall verify that finished grades are as indicated on drawings; the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02300A EARTHWORK.

3.2.2 Application of Soil Amendments

Apply at a rate recommended by the soils test.

3.2.2.1 Applying pH Adjuster

The pH adjuster shall be applied at the rate recommended by the soil test.

3.2.2.2 Applying Fertilizer

The fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test.

3.2.2.4 Applying Super Absorbent Polymers

Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 2 inches deep prior to placement of sod.

3.2.3 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4 inches deep. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 2 inches deep by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be rolled and completed with a light raking to remove from the surface debris and stones over a minimum 5/8 inch in any dimension.

3.2.4.2 Protection

Areas within the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION

Prior to installing sod, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Areas shall be sodded as indicated on plans or in notes. Specific areas for sodding include around drainage systems, in swales, and next to hardscape elements such as walks, drives. Adequate soil moisture shall be ensured prior to sodding by spraying water on the area to be sodded and wetting the soil to a maximum 1 inch depth.

3.3.1 Installing Sod

Rows of sod sections shall be placed parallel to and tightly against each other. Joints shall be staggered laterally. The sod sections shall not be stretched or overlapped. All joints shall be butted tight. Voids and air drying of roots shall be prevented. Sod

sections shall be laid across the slope on long slopes. Sod sections shall be laid at right angles to the flow of water in ditches. Sod sections shall be anchored on slopes steeper than 3-horizontal-to-1-vertical. Anchoring may be required when surface weight or pressure upon placed sod sections is anticipated to cause lateral movement. Sod anchors shall be placed a minimum 2 feet on center with a minimum 2 anchors per sod section.

3.3.2 Finishing

Displacement of the sod shall be prevented by tamping or rolling the sod in place and knitting the sod to the soil. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed, and holes or missing corners shall be patched with sod.

3.3.3 Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled.

3.3.4 Watering Sod

Watering shall be started immediately after completing each day of installing sod. Water shall be applied at least 3 times per week to supplement rainfall, at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. 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 plant material shall be prevented.

3.4 TEMPORARY SEEDING

[The application rate shall be 1.1 pounds per 1000 square yards. When directed during contract delays affecting the sodding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded with annual seed in accordance with Section 02921A SEEDING. When there is no Section 02921A SEEDING provided in the project, an annual seed species and application rate shall be submitted for approval.

3.4.1 Soil Amendments, Tillage and Watering

When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Sod as required.

3.4.2 Remaining Soil Amendments

The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing sod.

3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of the material used shall be compared with the total area covered to determine the rate of application. The quantity of sod used shall be compared against the total area established with sod. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.6 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.

3.6.1 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.

3.6.2 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.

3.7 RESTORATION AND CLEAN UP

3.7.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the sodding operation shall be restored to original condition at the Contractor's expense.

3.7.2 Clean Up

Excess and waste material shall be removed from the sodded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.8 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the sodding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed. Signage shall be in accordance with Section 10430A EXTERIOR SIGNAGE.

3.9 SOD ESTABLISHMENT PERIOD

3.9.1 Commencement

The sod establishment period to obtain a healthy stand of grass plants shall commence on the first day of sodding work under this contract and shall continue through the remaining life of the contract and end 12 months after the last day of sodding operation required by this contract. Written calendar time period shall be furnished for the sod establishment period. When there is more than 1 sod establishment period, the boundaries of the sodded area covered for each period shall be described. The sod establishment period should be coordinated with Sections 02921A SEEDING, 02923A SPRIGGING, and 02930A EXTERIOR PLANTING. The sod establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.9.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health. A satisfactory stand of grass plants from the sodding operation shall be living sod uniform in color and leaf texture. Bare spots shall be a maximum 1 inch square. Joints between sod pieces shall be tight and free from weeds and other undesirable growth.

3.9.3 Maintenance During Establishment Period

Maintenance of the sodded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.9.3.1 Mowing

Sodded areas shall be mowed to a minimum 3 inch height when the turf is a maximum 4 inch height. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

3.9.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.

3.9.3.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.9.3.4 Repair

Unsatisfactory stand of grass plants shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

3.9.3.5 Maintenance Record

A record of each site visit shall be furnished which describes the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

SECTION 02930

EXTERIOR PLANTING

1 GENERAL

Scope: Exterior planting for this project will include landscape plantings around improved family housing units in two different neighborhoods. Midland and Woodland are existing, developed neighborhoods located on the north and the middle sections of the Whiteman AFB family housing area. Typical planting plans and a specific plant schedule have been provided to guide the landscape contractor in plant material selection and placement. The drawings delineate individual plant materials, mass plantings, and plant bed locations. Review and coordinate all planting with the typical plans provided with respect to solar orientation, sun/shade requirements for individual plant materials.

This section includes information on trees, shrubs, plants, edging, soil amendments, and mulching requirements for the project.

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	(1996el) 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 SUBMITTALS

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

SD-02 Shop Drawings

Shop Drawings; G Landscape plan for improved family housing units displaying plant materials required from plant schedule provided at the appropriate mix allocated. Plans shall reference typical planting plans provided in the drawing set (L1.1-L1.3). Submit quantities of plant materials for review by the Contracting Officer’s Representative.

Scale drawings defining areas at specific units to receive plant materials.

Finished Grade, Topsoil and Underground Utilities; G

Finished grade status; location of underground utilities and facilities; and availability of topsoil from the stripping and stock piling operation.

SD-03 Product Data

Geotextile ; G
Chemical Treatment Material; G

Manufacturer's literature including physical characteristics, application and installation instructions for geotextile and chemical treatment material.

Equipment; G All spreaders and sprayers and/or other equipment required for fertilizer and chemical treatment applications.

A listing of equipment to be used for the planting operation.

Delivery; G

Delivery schedule.

Plant Establishment Period; G,

Calendar time period for the plant establishment period. When there is more than one establishment period, the boundaries of the planted areas covered for each period shall be described.

Maintenance Record; IO

Maintenance work performed, quantity of plant losses, and replacements; and diagnosis of unhealthy plant material.

Application of Pesticide; IO

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; IO

A 5 pound sample.

Mulch; G

A 5 pound sample.

Geotextile; G

A 6 inch square sample and listed use (weed barrier, erosion control).

SD-06 Test Reports

Soil Test; GED
Percolation Test; GED

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Plant Material; IO
Topsoil; IO
pH Adjuster; G
Fertilizer; G
Organic Material; IO
Soil Conditioner; IO
Organic Mulch; G
Mycorrhizal Fungi Inoculum; IO
Pesticide; IO

Prior to delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following.

a. Plant Material: Classification, botanical name, common name, size, quantity by species, and location where grown.

b. Topsoil: Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster: Sieve analysis and calcium carbonate equivalent.

d. Fertilizer: Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Organic Mulch: Composition, source, and treatment against fungi growth.

h. Mycorrhizal Fungi Inoculum: Plant material treated.

i. Pesticide. EPA registration number and registered uses.

SD-10 Operation and Maintenance Data

Maintenance Instructions; IO

Instruction for year-round care of installed plant material.

1.3 SOURCE INSPECTIONS

The nursery or source of plant material and the source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Plant Material Identification

Plant material shall be identified with attached, durable, waterproof labels and weather-resistant ink, stating the correct botanical plant name and size for at least one type of plant material delivered to localized area of the site (within 4 units).

1.4.1.2 Protection During Delivery

Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball. Branches shall be protected by tying-in. Exposed branches shall be covered appropriately during transport. Protect bark, branches, and rootsystems from sunscald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Do not drop plants during delivery. Plant material shall be protected from moisture loss. The Landscape Contractor will be responsible for replacement of all scarred or damaged plant material during transport and at the construction site. The Landscape Contractor will be responsible for verifying that the plant material meets all requirements prior to delivery to the site. Plant material damaged will be rejected. Deliver exterior plants to the site after preparations for planting have been completed and install plant material immediately. If planting is delayed more than six hours after delivery, set exterior plants in shaded area. Protect from wind, weather, mechanical damage, and keep roots moist.

1.4.1.3 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.

1.4.1.4 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. Soil amendments will be required on all plant material installations.

1.4.1.5 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.

1.4.2 Inspection

Plant material shall be well shaped, vigorous and healthy with a well branched root system, free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement or abrasion, including transport injury. Plant material shall be checked for unauthorized substitution and to establish nursery grown status. Plant material showing desiccation, abrasion, transport injury, 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 (ANSI Z60.1). Plant material that measures less than specified, or has been poled, topped off or headed back, shall be rejected. Do not prune trees or shrubs before delivery. 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 materials shall be removed from the job site at the expense of the Landscape Contractor.

1.4.3 Storage

1.4.3.1 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 storage is discouraged. Plant material shall not be stored longer than 10 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.

1.4.3.2 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.

1.4.4 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.

1.4.5 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.

1.5 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.

2 PRODUCTS

2.1 PLANT MATERIAL

1.10 TREE AND SHRUB MATERIAL

General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1.11 SHADE AND FLOWERING TREES

Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1 for type of trees required. Provide balled and burlapped trees.

Branching Height: One-third and one-half of tree height.
Small Upright and Spreading Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:

Provide balled and burlapped or container-grown trees.
Multistem Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:

1.12 DECIDUOUS SHRUBS

Form and Size: Deciduous shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.
Provide balled and burlapped or container-grown shrubs.

1.13 CONIFEROUS EVERGREENS

Form and Size: Normal-quality, well-balanced, coniferous evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.
Provide balled and burlapped evergreen trees.

1.14 BROADLEAF EVERGREENS

Form and Size: Normal-quality, well-balanced, broadleaf evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.
Provide balled and burlapped or container-grown broadleaf evergreen trees and shrubs.

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 Plant Schedule

The plant schedule shall provide botanical names as included in one or more of the publications listed under "Nomenclature" in ANLA Z60.1. The minimum information that a plant schedule provides shall be the botanical name, common name, classification, caliper, height, method of handling or shipping, and special characteristics.

2.1.3 Substitutions

Substitutions will not be permitted without written request and approval from the Contracting Officer.

2.1.4 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.

2.1.5 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.

2.1.6 Method of Shipment to Maintain Health of Root System

2.1.6.1 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.

2.1.6.2 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.

2.1.6.3 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.

2.1.6.4 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.

2.1.6.5 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.

2.1.6.6 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.

2.1.6.7 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.

2.1.6.8 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.

2.1.6.9 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.

2.1.6.10 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 02300A 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. Final soil amendments should be as recommended by the soils report. Vermiculite is not recommended. Soil amendments shall be installed with all exterior plants as recommended by the soils report.

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

It shall be as recommended by the soil test. 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. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

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 super absorbent polymers, calcined clay, or gypsum for single use or in combination to meet topsoil requirements for the plant material specified and as recommended in the soils report.

2.3.4.1 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.

2.3.4.2 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.

2.3.4.3 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.4.4 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 shredded dark oak bark organic mulch. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Mulch shall be applied to all exterior plant materials to a depth of 3 inches.

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 2 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, redwood, or fir; rough sawn; free from knots, holes, 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 galvanized 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 galvanized steel 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. The hose shall be at least ½ inch in diameter, black or other acceptable color, cut to length 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 MYCORRHIZAL FUNGI INOCULUM

Mycorrhizal fungi inoculum shall be composed of multiple-fungus inoculum as recommended by the manufacturer for the plant material specified.

2.12 WATER

Unless otherwise directed, water shall be the responsibility of the Contractor. Water shall not contain elements toxic to plant life.

2.13 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.

3 EXECUTION

3.1 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

3.1.1 Deciduous Plant Material Time

Deciduous plant material shall be installed from September 15th to November 1st (Fall) or March 15th to May 15th (Spring).

3.1.2 Evergreen Plant Material Time

Evergreen plant material shall be installed from September 15th to November 1st (Fall) or March 15th to May 15th (Spring).

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. Coordinate with the government on existing soils tests that have been performed at the site.

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 02300A 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. The pit shall be scarified properly to allow for root growth. Cylindrical pits with vertical sides shall not be used. Augers for tree pits are discouraged.

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 1-2” above the existing grade and even to 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 Backfill Soil Mixture

The backfill soil mixture may be a mix of topsoil and soil amendments suitable for the plant material specified. Soil amendments for backfilling trees will consist of 1/3 original soil, 1/3 topsoil, and 1/3 peat, gypsum, manure. When practical, the excavated soil from the plant pit that is not amended provides the best backfill and shall be used. Refer to the soils test recommendations for final soil amendment recommendations.

3.4.3 Adding Mycorrhizal Fungi Inoculum

Mycorrhizal fungi inoculum shall be added as recommended by the manufacturer for the plant material specified.

3.4.4 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.

3.4.4.1 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.

3.4.4.2 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.

3.4.4.3 Container-Grown and Balled and Potted Plant Material

The plant material shall be carefully removed from containers that are not biodegradeable. 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.

3.4.4.4 Earth Berm

An earth berm saucer, 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.

3.4.5 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.

3.4.6 Watering

Plant pits and plant beds shall be watered immediately after backfilling, until completely saturated. Watering shall be continued as needed until plant materials are well-established.

3.4.7 Staking and Guying

Staking will be required for all trees, due to high wind velocity of the area. Staking should remain on trees for a period of one year, or until well-established root system is in place.

3.4.7.1 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.

3.4.7.2 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.

3.4.7.3 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 saucer 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.

3.4.8 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.

3.4.9 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 24 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 3 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 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". Pruning tools shall be washed with a mixture of 1 cap of bleach to 1 quart of water in-between cuts on different plant materials to prevent spread of disease.

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 and hosed down as required.

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 02922A SODDING. 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. The post-fertilizer should provide a 10-6-4 or as recommended by the soil analysis. 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,.

DIVISION 13 – SPECIAL CONSTRUCTION

13280 Asbestos Abatement
13281 Lead Hazard Control Activities

SECTION 13280A

ASBESTOS ABATEMENT
11/01

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.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z87.1	(1989; Errata; Z87.1a) Occupational and Educational Eye and Face Protection
ANSI Z88.2	(1992) Respiratory Protection
ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 732	(1995) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 1331	(1989; R 1995) Surface and Interfacial Tension of Solutions of Surface-Active Agents
ASTM D 2794	(1993; R 1999el) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 4397	(1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM E 119	(2000) Fire Tests of Building Construction and Materials
ASTM E 1368	(2000) Visual Inspection of Asbestos Abatement Projects
ASTM E 736	(1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

ASTM E 84	(2000a) Surface Burning Characteristics of Building Materials
ASTM E 96	(2000) Water Vapor Transmission of Materials

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(1990) Compressed Air for Human Respiration
CGA G-7.1	(1997) Commodity Specification for Air

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(1999) Methods of Fire Tests for Flame-Resistant Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100	(1984; Supple 1985, 1987, 1988 & 1990) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90/018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 340/1-90/019	(1990) Asbestos/NESHAP Adequately Wet Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations, and Definitions

49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996; Rev thru Aug 1999) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

a. Adequately Wet: A term defined in 40 CFR 61, Subpart M, and EPA 340/1-90/019 meaning to sufficiently mix or penetrate with liquid to prevent the release of particulate. If visible emissions are observed coming from asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.

b. Aggressive Method: Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact asbestos-containing material (ACM).

c. Amended Water: Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter when tested in accordance with ASTM D 1331.

d. Asbestos: Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

e. Asbestos-Containing Material (ACM): Any materials containing more than one percent asbestos.

f. Asbestos Fiber: A particulate form of asbestos, 5 micrometers or longer, with a length-to-width ratio of at least 3 to 1.

g. Authorized Person: Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

h. Building Inspector: Individual who inspects buildings for asbestos and has EPA Model Accreditation Plan (MAP) "Building Inspector" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

i. Certified Industrial Hygienist (CIH): An Industrial Hygienist certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

j. Class I Asbestos Work: Activities defined by OSHA involving the removal of thermal system insulation (TSI) and surfacing ACM.

k. Class II Asbestos Work: Activities defined by OSHA involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos - containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Certain "incidental" roofing materials such as mastic, flashing and cements when they are still intact are excluded from Class II asbestos work. Removal of small amounts of these materials which would fit into a glovebag may be classified as a Class III job.

l. Class III Asbestos Work: Activities defined by OSHA that involve repair and maintenance operations, where ACM, including TSI and surfacing ACM, is likely to be disturbed. Operations may include drilling, abrading, cutting a hole, cable pulling, crawling through tunnels or attics and spaces above the ceiling, where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.

m. Class IV Asbestos Work: Maintenance and custodial construction activities during which employees contact but do not disturb ACM and activities to clean-up dust, waste and debris resulting from Class I, II, and III activities. This may include dusting surfaces where ACM waste and debris and accompanying dust exists and cleaning up loose ACM debris from TSI or surfacing ACM following construction.

n. Clean room: An uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

o. Competent Person: In addition to the definition in 29 CFR 1926, Section .32(f), a person who is capable of identifying existing asbestos hazards as defined in 29 CFR 1926, Section .1101, selecting the appropriate control strategy, has the authority to take prompt corrective measures to eliminate them and has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

p. Contractor/Supervisor: Individual who supervises asbestos abatement work and has EPA Model Accreditation Plan "Contractor/Supervisor" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

q. Critical Barrier: One or more layers of plastic sealed over all openings into a regulated area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a regulated area from migrating to an adjacent area.

r. Decontamination Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

s. Demolition: The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

t. Disposal Bag: A 0.15 mm 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926, Section .1101, used for transporting asbestos waste from containment to disposal site.

u. Disturbance: Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in 1 standard sized glovebag or waste bag, not larger than 1.5 m 60 inches in length and width in order to access a building component.

v. Equipment Room or Area: An area adjacent to the regulated area used for the decontamination of employees and their equipment.

w. Employee Exposure: That exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

x. Fiber: A fibrous particulate, 5 micrometers or longer, with a length to width ratio of at least 3 to 1.

y. Friable ACM: A term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Subpart E, Appendix A, Section 1, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent, as determined by a method other than point counting by PLM, the asbestos content is verified by point counting using PLM.

z. Glovebag: Not more than a 1.5 by 1.5 m 60 by 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

aa. High-Efficiency Particulate Air (HEPA) Filter: A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

bb. Homogeneous Area: An area of surfacing material or thermal system insulation that is uniform in color and texture.

cc. Industrial Hygienist: A professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational health hazards.

dd. Intact: ACM which has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix. Removal of "intact" asphaltic, resinous, cementitious products does not render the ACM non-intact simply by being separated into smaller pieces.

ee. Model Accreditation Plan (MAP): USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763, Subpart E, Appendix C.

ff. Modification: A changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system.

gg. Negative Exposure Assessment: A demonstration by the Contractor to show that employee exposure during an operation is expected to be consistently below the OSHA Permissible Exposure Limits (PELs).

hh. NESHAP: National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61, Subpart M.

ii. Nonfriable ACM: A NESHAP term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material containing more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Subpart E, Appendix A, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

jj. Nonfriable ACM (Category I): A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90/018 meaning asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

kk. Nonfriable ACM (Category II): A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90/018 meaning any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos, as determined using the methods specified in 40 CFR 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

ll. Permissible Exposure Limits (PELs):

(1) PEL-Time weighted average(TWA): Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8 hour time weighted average (TWA), as determined by the method prescribed in 29 CFR 1926, Section .1101, Appendix A, or the current version of NIOSH Pub No. 84-100 analytical method 7400.

(2) PEL-Excursion Limit: An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes as determined by the method prescribed in 29 CFR 1926, Section .1101, Appendix A, or the current version of NIOSH Pub No. 84-100 analytical method 7400.

mm. Regulated Area: An OSHA term defined in 29 CFR 1926, Section .1101 meaning an area established by the Contractor to demarcate areas where Class I, II, and III asbestos work is conducted; also any adjoining area where debris and waste from such asbestos work accumulate; and an area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limit.

nn. Removal: All operations where ACM is taken out or stripped from structures or substrates, and includes demolition operations.

oo. Repair: Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM attached to structures or substrates. If the amount of asbestos so "disturbed" cannot be contained in 1 standard glovebag or waste bag, Class I precautions are required.

pp. Spills/Emergency Cleanups: Cleanup of sizable amounts of asbestos waste and debris which has occurred, for example, when water damage occurs in a building, and sizable amounts of ACM are dislodged. A Competent Person evaluates the site and ACM to be handled, and based on the type, condition and extent of the dislodged material, classifies the cleanup as Class I, II, or III. Only if the material was intact and the cleanup involves mere contact of ACM, rather than disturbance, could there be a Class IV classification.

qq. Surfacing ACM: Asbestos-containing material which contains more than 1% asbestos and is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

rr. Thermal system insulation (TSI) ACM: ACM which contains more than 1% asbestos and is applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

ss. Transite: A generic name for asbestos cement wallboard and pipe.

tt. Worker: Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926, Section .1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation required by 40 CFR 763, Subpart E, Appendix C, if required by the OSHA Class of work to be performed or by the state where the work is to be performed.

1.3 DESCRIPTION OF WORK

The work covered by this section includes the removal of asbestos-containing materials (ACM) which are encountered during demolition and renovation activities associated with this project and describes procedures and equipment required to protect workers and occupants of the regulated area from contact with airborne asbestos fibers and ACM dust and debris. Activities include OSHA Class II work operations involving ACM. The work also includes containment, storage, transportation and disposal of the generated ACM wastes. More specific operational procedures shall be detailed in the required Accident Prevention Plan and its subcomponents, the Asbestos Hazard Abatement Plan and Activity Hazard Analyses required in paragraph SAFETY AND HEALTH PROGRAM AND PLANS.

1.3.1 Abatement Work Tasks

The specific ACM to be abated is identified on Table 1, "Summary of Work Tasks". The appropriate RESPONSE ACTION DETAIL SHEETS (item to be abated and methods to be used) and SET-UP DETAIL SHEETS (containment techniques to include safety precautions and methods) are included at the end of this

section.

1.3.2 Unexpected Discovery of Asbestos

For any previously untested building components suspected to contain asbestos and located in areas impacted by the work, the Contractor shall notify the Contracting Officer (CO) who will have the option of ordering up to 10 bulk samples to be obtained at the Contractor's expense and delivered to a laboratory accredited under the National Institute of Standards and Technology (NIST) "National Voluntary Laboratory Accreditation Program (NVLAP)" and analyzed by PLM at no additional cost to the Government. Any additional components identified as ACM that have been approved by the Contracting Officer for removal shall be removed by the Contractor and will be paid for by an equitable adjustment to the contract price under the CONTRACT CLAUSE titled "changes". Sampling activities undertaken to determine the presence of additional ACM shall be conducted by personnel who have successfully completed the EPA Model Accreditation Plan (MAP) "Building Inspector" training course required by 40 CFR 763, Subpart E, Appendix C.

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-03 Product Data

Respiratory Protection Program; G, AE

Records of the respirator program.

Cleanup and Disposal; G, AE

Waste shipment records. Weigh bills and delivery tickets shall be furnished for information only.

Detailed Drawings; G

Descriptions, detail project drawings, and site layout to include worksite containment area techniques as prescribed on applicable SET-UP DETAIL SHEETS, local exhaust ventilation system locations, decontamination units and load-out units, other temporary waste storage facility, access tunnels, location of temporary utilities (electrical, water, sewer) and boundaries of each regulated area.

Materials and Equipment;

Manufacturer's catalog data for all materials and equipment to be used in the work, including brand name, model, capacity, performance characteristics and any other pertinent information. Test results and certificates from the manufacturer of encapsulants substantiating compliance with performance requirements of this specification. Material Safety Data Sheets

for all chemicals to be used onsite in the same format as implemented in the Contractor's HAZARD COMMUNICATION PROGRAM. Data shall include, but shall not be limited to, the following items:

a. High Efficiency Filtered Air (HEPA) local exhaust equipment

b. Vacuum cleaning equipment

c. Pressure differential monitor for HEPA local exhaust equipment

d. Air monitoring equipment

e. Respirators

f. Personal protective clothing and equipment

(1) Coveralls
(2) Underclothing
(3) Other work clothing
(4) Foot coverings
(5) Hard hats
(6) Eye protection
(7) Other items required and approved by Contractors Designated IH and Competent Person

g. Glovebag

h. Duct Tape

i. Disposal Containers

(1) Disposal bags
(2) Fiberboard drums
(3) Paperboard boxes

j. Sheet Plastic

(1) Polyethylene Sheet - General
(2) Polyethylene Sheet - Flame Resistant
(3) Polyethylene Sheet - Reinforced

k. Wetting Agent

(1) Amended Water
(2) Removal encapsulant

l. Strippable Coating

m. Prefabricated Decontamination Unit

n. Other items

o. Chemical encapsulant

p. Chemical encasement materials

q. Material Safety Data Sheets (for all chemicals proposed)

Qualifications; G, AE

A written report providing evidence of qualifications for personnel, facilities and equipment assigned to the work.

Training Program;

A copy of the written project site-specific training material as indicated in 29 CFR 1926, Section .1101 that will be used to train onsite employees. The training document shall be signed by the Contractor's Designated IH and Competent Person.

Medical Requirements;

Physician's written opinion.

Encapsulants; G, AE

Certificates stating that encapsulants meet the applicable specified performance requirements.

SD-06 Test Reports

Exposure Assessment and Air Monitoring; G, AE

Initial exposure assessments, negative exposure assessments, air-monitoring results and documentation.

Local Exhaust Ventilation;

Pressure differential recordings.

Licenses, Permits and Notifications; G, AE

Licenses, permits, and notifications.

SD-07 Certificates

Vacuum, Filtrationand Ventilation Equipment;

Manufacturer's certifications showing compliance with ANSI Z9.2 for:

a. Vacuums.

b. Water filtration equipment.

c. Ventilation equipment.

d. Other equipment required to contain airborne asbestos fibers.

1.5 QUALIFICATIONS

1.5.1 Written Qualifications and Organization Report

The Contractor shall furnish a written qualifications and organization report providing evidence of qualifications of the Contractor, Contractor's Project Supervisor, Designated Competent Person, supervisors and workers; Designated IH (person assigned to project and firm name); independent testing laboratory (including name of firm, principal, and analysts who will perform analyses); all subcontractors to be used including disposal transportation and disposal facility firms, subcontractor supervisors, subcontractor workers; and any others assigned to perform asbestos abatement and support activities. The report shall include an organization chart showing the Contractor's staff organization for this project by name and title, chain of command and reporting relationship with all subcontractors. The report shall be signed by the Contractor, the Contractor's onsite project manager, Designated Competent Person, Designated IH, designated testing laboratory and the principals of all subcontractors to be used. The Contractor shall include the following statement in the report: "By signing this report I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926, Section .1101, 40 CFR 61, Subpart M, and the federal, state and local requirements specified in paragraph SAFETY AND HEALTH PROGRAM AND PLANS for those asbestos abatement activities that they will be involved in."

1.5.2 Specific Requirements

The Contractor shall designate in writing, personnel meeting the following qualifications:

a. Designated Competent Person: The name, address, telephone number, and resume of the Contractor's Designated Competent Person shall be provided. Evidence that the full-time Designated Competent Person is qualified in accordance with 29 CFR 1926, Sections .32 and .1101, has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C, and is experienced in the administration and supervision of asbestos abatement projects, including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, etc. The duties of the Competent Person shall include the following: controlling entry to and exit from the regulated area; supervising any employee exposure monitoring required by 29 CFR 1926, Section .1101; ensuring that all employees working within a regulated area wear the appropriate personal protective equipment (PPE), are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and decontamination procedures specified; and ensuring that engineering controls in use are in proper operating conditions and are functioning properly. The Designated Competent Person shall be responsible for compliance with applicable federal, state and local requirements, the Contractor's Accident Prevention Plan and Asbestos Hazard Abatement Plan. The Designated Competent Person shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher

training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Contractor shall submit evidence that this person has a minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA competent person requirements. The Designated Competent Person shall be onsite at all times during the conduct of this project.

b. Project and Other Supervisors: The Contractor shall provide the name, address, telephone number, and resume of the Project Supervisor and other supervisors who have responsibility to implement the Accident Prevention Plan, including the Asbestos Hazard Abatement Plan and Activity Hazard Analyses, the authority to direct work performed under this contract and verify compliance, and have EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C. The Project Supervisor and other supervisors shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Contractor shall submit evidence that the Project Supervisor has a minimum of 2 years of on-the-job asbestos abatement experience relevant to project supervisor responsibilities and the other supervisors have a minimum of 1 year on-the-job asbestos abatement experience commensurate with the responsibilities they will have on this project.

c. Designated Industrial Hygienist: The Contractor shall provide the name, address, telephone number, resume and other information specified below for the Industrial Hygienist (IH) selected to prepare the Contractor's Asbestos Hazard Abatement Plan, prepare and perform training, direct air monitoring and assist the Contractor's Competent Person in implementing and ensuring that safety and health requirements are complied with during the performance of all required work. The Designated IH shall be a person who is board certified in the practice of industrial hygiene as determined and documented by the American Board of Industrial Hygiene (ABIH), has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C, and has a minimum of 2 years of comprehensive experience in planning and overseeing asbestos abatement activities. The Designated IH shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Designated IH shall be completely independent from the Contractor according to federal, state, or local regulations; that is, shall not be a Contractor's employee or be an employee or principal of a firm in a business relationship with the Contractor negating such independent status. A copy of the Designated IH's current valid ABIH certification shall be included. The Designated IH shall visit the site at least once per week for the duration of asbestos activities and shall be available for emergencies. In addition, the Designated IH shall prepare, and the Contractor shall submit, the name, address, telephone numbers and resumes of additional IH's and industrial hygiene technicians (IHT) who will be assisting the Designated IH in performing onsite tasks. IHs and

IHTs supporting the Designated IH shall have a minimum of 2 years of practical onsite asbestos abatement experience. The formal reporting relationship between the Designated IH and the support IHs and IHTs, the Designated Competent Person, and the Contractor shall be indicated.

d. Asbestos Abatement Workers: Asbestos abatement workers shall meet the requirements contained in 29 CFR 1926, Section .1101, 40 CFR 61, Subpart M, and other applicable federal, state and local requirements. Worker training documentation shall be provided as required on the "Certificate of Workers Acknowledgment" in this paragraph.

e. Worker Training and Certification of Worker Acknowledgment: Training documentation will be required for each employee who will perform OSHA Class IIasbestos abatement operations. Such documentation shall be submitted on a Contractor generated form titled "Certificate of Workers Acknowledgment", to be completed for each employee in the same format and containing the same information as the example certificate at the end of this section. Training course completion certificates (initial and most recent update refresher) required by the information checked on the form shall be attached.

f. Physician: The Contractor shall provide the name, medical qualifications, address, telephone number and resume of the physician who will or has performed the medical examinations and evaluations of the persons who will conduct the asbestos abatement work tasks. The physician shall be currently licensed by the state where the workers will be or have been examined, have expertise in pneumoconiosis and shall be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1926, Section .1101 and paragraph MEDICAL REQUIREMENTS. The physician shall be familiar with the site's hazards and the scope of this project.

g. First Aid and CPR Trained Persons: The names of at least 2 persons who are currently trained in first aid and CPR by the American Red Cross or other approved agency shall be designated and shall be onsite at all times during site operations. They shall be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030 and shall be included in the Contractor's Bloodborne Pathogen Program. These persons may perform other duties but shall be immediately available to render first aid when needed. A copy of each designated person's current valid First Aid and CPR certificate shall be provided.

h. Independent Testing Laboratory: The Contractor shall provide the name, address and telephone number of the independent testing laboratory selected to perform the sample analyses and report the results. The testing laboratory shall be completely independent from the Contractor as recognized by federal, state or local regulations. Written verification of the following criteria, signed by the testing laboratory principal and the Contractor, shall be submitted:

(1) Phase contrast microscopy (PCM): The laboratory is fully equipped and proficient in conducting PCM of airborne samples using the methods specified by 29 CFR 1926, Section .1101, OSHA method ID-160, the most current version of NIOSH Pub No. 84-100 Method 7400, and NIOSH Pub No. 84-100 Method 7402, transmission electron microscopy (TEM); the laboratory is currently judged proficient (classified as acceptable) in counting airborne asbestos samples by PCM by successful participation in each of the last 4 rounds in the American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing (PAT) Program; the names of the selected microscopists who will analyze airborne samples by PCM with verified documentation of their proficiency to conduct PCM analyses by being judged proficient in counting samples as current participating analysts in the AIHA PAT Program, and having successfully completed the Asbestos Sampling and Analysis course (NIOSH 582 or equivalent) with a copy of course completion certificate provided; when the PCM analysis is to be conducted onsite, documentation shall be provided certifying that the onsite analyst meets the same requirements.

(2) Polarized light microscopy (PLM): The laboratory is fully equipped and proficient in conducting PLM analyses of suspect ACM bulk samples in accordance with 40 CFR 763, Subpart E, Appendix E; the laboratory is currently accredited by NIST under the NVLAP for bulk asbestos analysis and will use analysts (names shall be provided) with demonstrated proficiency to conduct PLM to include its application to the identification and quantification of asbestos content.

(3) PCM/TEM: The laboratory is fully equipped and each analyst (name shall be provided) possesses demonstrated proficiency in conducting PCM and TEM analysis of airborne samples using NIOSH Pub No. 84-100 Method 7400 PCM and NIOSH Pub No. 84-100 Method 7402 (TEM confirmation of asbestos content of PCM results) from the same filter.

i. Disposal Facility, Transporter: The Contractor shall provide written evidence that the landfill to be used is approved for asbestos disposal by the USEPA and state and local regulatory agencies. Copies of signed agreements between the Contractor (including subcontractors and transporters) and the asbestos waste disposal facility to accept and dispose of all asbestos containing waste generated during the performance of this contract shall be provided. Qualifications shall be provided for each subcontractor or transporter to be used, indicating previous experience in transport and disposal of asbestos waste to include all required state and local waste hauler requirements for asbestos. The Contractor and transporters shall meet the DOT requirements of 49 CFR 171, 49 CFR 172, and 49 CFR 173 as well as registration requirements of 49 CFR 107 and other applicable state or local requirements. The disposal facility shall meet the requirements of 40 CFR 61, Sections .154 or .155, as required in 40 CFR 61, Section .150(b), and other applicable state or local requirements.

1.5.3 Federal, State or Local Citations on Previous Projects

The Contractor and all subcontractors shall submit a statement, signed by an officer of the company, containing a record of any citations issued by

Federal, State or local regulatory agencies relating to asbestos activities (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company shall be provided.

1.6 REGULATORY REQUIREMENTS

In addition to detailed requirements of this specification, work performed under this contract shall comply with EM 385-1-1, applicable federal, state, and local laws, ordinances, criteria, rules and regulations regarding handling, storing, transporting, and disposing of asbestos waste materials. This includes, but is not limited to, OSHA standards, 29 CFR 1926, especially Section .1101, 40 CFR 61, Subpart M and 40 CFR 763; and U.S. Department of Transportaion (DOT) regulations 49 CFR Part 171, 49 CFR Part 172, Subparts B and C, and 49 CFR Part 173, Subpart M. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply. The following state and local laws, rules and regulations regarding demolition, removal, renovation, spill/emergency cleanup, housekeeping, handling, storing, transporting and disposing of asbestos material apply: Missouri Department of Natural Resources, Air Pollution Control Program, 10 C.S.R. 10-6.240.

1.7 SAFETY AND HEALTH PROGRAM AND PLANS

The Contractor shall develop and submit a written comprehensive site-specific Accident Prevention Plan at least 30 days prior to the preconstruction conference. The Accident Prevention Plan shall address requirements of EM 385-1-1, Appendix A, covering onsite work to be performed by the Contractor and subcontractors. The Accident Prevention Plan shall incorporate an Asbestos Hazard Abatement Plan, and Activity Hazard Analyses as separate appendices into 1 site specific Accident Prevention Plan document. Any portions of the Contractor's overall Safety and Health Program that are referenced in the Accident Prevention Plan, e.g., respirator program, hazard communication program, confined space entry program, etc., shall be included as appendices to the Accident Prevention Plan. The plan shall take into consideration all the individual asbestos abatement work tasks identified in Table 1. The plan shall be prepared, signed and sealed, including certification number, and dated by the Contractor's Designated IH, Competent Person, and Project Supervisor.

1.7.1 Asbestos Hazard Abatement Plan Appendix

The Asbestos Hazard Abatement Plan appendix to the Accident Prevention Plan shall include, but not be limited to, the following:

a. The personal protective equipment to be used;

b. The location and description of regulated areas including clean and dirty areas,access tunnels, and decontamination unit (clean room, shower room, equipment room, storage areas such as load-out unit);

c. Initial exposure assessment in accordance with 29 CFR 1926, Section .1101;

d. Level of supervision;

e. Method of notification of other employers at the worksite;

f. Abatement method to include containment and control procedures;

g. Interface of trades involved in the construction;

h. Sequencing of asbestos related work;

i. Storage and disposal procedures and plan;

j. Type of wetting agent and asbestos encapsulant to be used;

k. Location of local exhaust equipment;

l. Air monitoring methods (personal, environmental and clearance);

m. Bulk sampling and analytical methods (if required);

n. A detailed description of the method to be employed in order to control the spread of ACM wastes and airborne fiber concentrations;

o. Fire and medical emergency response procedures;

p. The security procedures to be used for all regulated areas.

1.7.2 Activity Hazard Analyses Appendix

Activity Hazard Analyses, for each major phase of work, shall be submitted and updated during the project. The Activity Hazard Analyses format shall be in accordance with EM 385-1-1 (Figure 1-1). The analysis shall define the activities to be performed for a major phase of work, identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the Activity Hazard Analyses has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the onsite Government representatives. The Activity Hazard Analyses shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations.

1.8 PRECONSTRUCTION CONFERENCE AND ONSITE SAFETY

The Contractor and the Contractor's Designated Competent Person, Project Supervisor, and Designated IH shall meet with the Contracting Officer prior to beginning work at a safety preconstruction conference to discuss the details of the Contractor's submitted Accident Prevention Plan to include the Asbestos Hazard Abatement Plan and Activity Hazard Analyses appendices. Deficiencies in the Accident Prevention Plan will be discussed and the Accident Prevention Plan shall be revised to correct the deficiencies and resubmitted for acceptance. Any changes required in the specification as a result of the Accident Prevention Plan shall be identified specifically in the plan to allow for free discussion and acceptance by the Contracting

Officer, prior to the start of work. Onsite work shall not begin until the Accident Prevention Plan has been accepted. A copy of the written Accident Prevention Plan shall be maintained onsite. Changes and modifications to the accepted Accident Prevention Plan shall be made with the knowledge and concurrence of the Designated IH, the Project Supervisor, Designated Competent Person, and the Contracting Officer. Should any unforeseen hazard become evident during the performance of the work, the Designated IH shall bring such hazard to the attention of the Project Supervisor, Designated Competent Person, and the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, all necessary action shall be taken by the Contractor to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Once accepted by the Contracting Officer, the Accident Prevention Plan, including the Asbestos Hazard Abatement Plan and Activity Hazard Analyses will be enforced as if an addition to the contract. Disregarding the provisions of this contract or the accepted Accident Prevention Plan will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

1.9 SECURITY

Lockable access areas (personnel and load-out decontamination units) shall be provided for each regulated area. A log book shall be kept documenting entry into and out of the regulated area. Entry into regulated areas shall only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas shall be trained, be medically evaluated, and wear the required personal protective equipment for the specific regulated area to be entered.

1.10 MEDICAL REQUIREMENTS

Medical requirements shall conform to 29 CFR 1926, Section .1101.

1.10.1 Medical Examinations

Before being exposed to airborne asbestos fibers, workers shall be provided with a medical examination as required by 29 CFR 1926, Section .1101 and other pertinent state or local requirements. This requirement shall have been satisfied within the last 12 months. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. X-ray films of asbestos workers shall be identified to the consulting radiologist and medical record jackets shall be marked with the word "asbestos."

1.10.1.1 Information Provided to the Physician

The Contractor shall provide the following information in writing to the examining physician:

a. A copy of 29 CFR 1926, Section .1101 and Appendices D, E, G, and I;

b. A description of the affected employee's duties as they relate to the employee's exposure;

c. The employee's representative exposure level or anticipated exposure level;

d. A description of any personal protective and respiratory equipment used or to be used;

e. Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

1.10.1.2 Written Medical Opinion

For each worker, a written medical opinion prepared and signed by a licensed physician indicating the following:

a. Summary of the results of the examination.

b. The potential for an existing physiological condition that would place the employee at an increased risk of health impairment from exposure to asbestos.

c. The ability of the individual to wear personal protective equipment, including respirators, while performing strenuous work tasks under cold and/or heat stress conditions.

d. A statement that the employee has been informed of the results of the examination, provided with a copy of the results, informed of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure, and informed of any medical condition that may result from asbestos exposure.

1.10.2 Medical and Exposure Records

Complete and accurate records shall be maintained of each employee's medical examinations, medical records, and exposure data, as required by 29 CFR 1910, Section .1910.20 and 29 CFR 1926, Section .1101 for a period of 30 years after termination of employment. Records of the required medical examinations and exposure data shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health (OSHA) or authorized representatives of the employee and an employee's physician upon request of the employee or former employee. A copy of the required medical certification for each employee shall be maintained on file at the worksite for review, as requested by the Contracting Officer or the representatives.

1.11 TRAINING PROGRAM

1.11.1 General Training Requirements

The Contractor shall establish a training program as specified by EPA Model Accreditation Plan (MAP), training requirements at 40 CFR 763, Subpart E, Appendix C, the State of Missouri regulation no. 10 CSR 10-6.250, OSHA requirements at 29 CFR 1926, Section .1101(k)(9), and this specification. Contractor employees shall complete the required training for the type of work they are to perform and such training shall be documented and provided to the Contracting Officer as specified in paragraph QUALIFICATIONS.

1.11.2 Project Specific Training

Prior to commencement of work, each worker shall be instructed by the

Contractor's Designated IH and Competent Person in the following project specific training:

a. The hazards and health effects of the specific types of ACM to be abated;

b. The content and requirements of the Contractor's Accident Prevention Plan to include the Asbestos Hazard Abatement Plan and Activity Hazard Analyses and site-specific safety and health precautions;

c. Hazard Communication Program;

d. Hands-on training for each asbestos abatement technique to be employed;

e. Heat and/or cold stress monitoring specific to this project;

f. Air monitoring program and procedures;

g. Medical surveillance to include medical and exposure record-keeping procedures;

h. The association of cigarette smoke and asbestos-related disease;

i. Security procedures;

j. Specific work practice controls and engineering controls required for each Class of work in accordance with 29 CFR 1926, Section .1101.

1.12 RESPIRATORY PROTECTION PROGRAM

The Contractor's Designated IH shall establish in writing, and implement a respiratory protection program in accordance with 29 CFR 1926, Section .1101, 29 CFR 1910, Section .134, ANSI Z88.2, CGA G-7, CGA G-7.1 and DETAIL SHEET 12. The Contractor's Designated IH shall establish minimum respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations encountered during the performance of the asbestos abatement work. The Contractor's respiratory protection program shall include, but not be limited to, the following elements:

a. The company policy, used for the assignment of individual responsibility, accountability, and implementation of the respiratory protection program.

b. The standard operating procedures covering the selection and use of respirators. Respiratory selection shall be determined by the hazard to which the worker is exposed.

c. Medical evaluation of each user to verify that the worker may be assigned to an activity where respiratory protection is required.

d. Training in the proper use and limitations of respirators.

e. Respirator fit-testing, i.e., quantitative, qualitative and individual functional fit checks.

f. Regular cleaning and disinfection of respirators.

g. Routine inspection of respirators during cleaning and after each use when designated for emergency use.

h. Storage of respirators in convenient, clean, and sanitary locations.

i. Surveillance of regulated area conditions and degree of employee exposure (e.g., through air monitoring).

j. Regular evaluation of the continued effectiveness of the respiratory protection program.

k. Recognition and procedures for the resolution of special problems as they affect respirator use (e.g., no facial hair that comes between the respirator face piece and face or interferes with valve function; prescription eye wear usage; contact lenses usage; etc.).

l. Proper training in putting on and removing respirators.

1.12.1 Respiratory Fit Testing

A qualitative or quantitative fit test conforming to 29 CFR 1926, Section 1101, Appendix C shall be conducted by the Contractor's Designated IH for each Contractor worker required to wear a respirator, and for the Contracting Officer and authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test shall be performed for each worker wearing a negative-pressure respirator prior to initially wearing a respirator on this project and every 6 months thereafter. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn, or of full-facepiece air purifying respirators where they are worn at levels at which half-facepiece air purifying respirators are permitted. If physical changes develop that will affect the fit, a new fit test for the worker shall be performed. Functional fit checks shall be performed by employees each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.12.2 Respirator Selection and Use Requirements

The Contractor shall provide respirators, and ensure that they are used as required by 29 CFR 1926, Section .1101 and in accordance with the manufacturer's recommendations. Respirators shall be jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (MSHA/NIOSH), or by NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. Personnel who handle ACM, enter regulated areas that require the wearing of a respirator, or who are otherwise carrying out abatement activities that require the wearing of a respirator, shall be provided with approved respirators that are fully protective of the worker at the measured or anticipated airborne asbestos concentration level to be encountered. For air-purifying respirators, the particulate filter portion of the cartridges or canister approved for use in airborne asbestos environments shall be high-efficiency particulate air (HEPA). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type shall be made by the Contractor's Designated

IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered. Recommendations made by the Contractor's Designated IH to downgrade respirator type shall be submitted in writing to the Contracting Officer. The Contractor's Designated Competent Person in consultation with the Designated IH, shall have the authority to take immediate action to upgrade or downgrade respiratory type when there is an immediate danger to the health and safety of the wearer. Respirators shall be used in the following circumstances:

a. During all Class I asbestos jobs.

b. During all Class II work where the ACM is not removed in a substantially intact state.

c. During all Class II and III work which is not performed using wet methods. Respirators need not be worn during removal of ACM from sloped roofs when a negative exposure assessment has been made and ACM is removed in an intact state.

d. During all Class II and III asbestos jobs where the Contractor does not produce a negative exposure assessment.

e. During all Class III jobs where TSI or surfacing ACM is being disturbed.

f. During all Class IV work performed within regulated areas where employees performing other work are required to wear respirators.

g. During all work where employees are exposed above the PEL-TWA or PEL-Excursion Limit.

h. In emergencies

1.12.3 Class I Work

The Contractor shall provide: (1) a tight-fitting, powered air purifying respirator equipped with high efficiency filters, or (2) a full-facepiece supplied air respirator operated in the pressure demand mode, equipped with HEPA egress cartridges, or (3) an auxiliary positive pressure self-contained breathing apparatus, for all employees within the regulated area where Class I work is being performed; provided that a negative exposure assessment has not been produced, and that the exposure level will not exceed 1 f/cc as an 8-hour time weighted average. A full-facepiece supplied air respirator, operated in the pressure demand mode, equipped with an auxiliary positive pressure self-contained breathing apparatus shall be provided under such conditions, if the exposure assessment indicates exposure levels above 1 f/cc as an 8-hour time weighted average.

1.12.4 Class IIWork

The Contractor shall provide an air purifying respirator, other than a disposable respirator, equipped with high-efficiency filters whenever the employee performs Class II asbestos jobs where the Contractor does not produce a negative exposure assessment.

1.12.5 Sanitation

Employees who wear respirators shall be permitted to leave work areas to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

1.13 HAZARD COMMUNICATION PROGRAM

A hazard communication program shall be established and implemented in accordance with 29 CFR 1926, Section .59. Material safety data sheets (MSDSs) shall be provided for all hazardous materials brought onto the worksite. One copy shall be provided to the Contracting Officer and 1 copy shall be included in the Contractor's Hazard Communication Program.

1.14 LICENSES, PERMITS AND NOTIFICATIONS

1.14.1 General Legal Requirements

Necessary licenses, permits and notifications shall be obtained in conjunction with the project's asbestos abatement, transportation and disposal actions and timely notification furnished of such actions as required by federal, state, regional, and local authorities. The Contractor shall notify the Regional Office of the USEPA, the Missouri Department of Natural Resources, and the Contracting Officer in writing, at least 20 days prior to the commencement of work, in accordance with 10 CSR 10-6.240, 40 CFR 61, Subpart M, and local requirements to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents. Notification shall be by Certified Mail, Return Receipt Requested. The Contractor shall furnish copies of the receipts to the Contracting Officer, in writing, prior to the commencement of work. A copy of the rental company's written acknowledgment and agreement shall be provided as required by paragraph RENTAL EQUIPMENT. For licenses, permits, and notifications that the Contractor is responsible for obtaining, the Contractor shall pay any associated fees or other costs incurred.

A. Air Pollution Control Program (Asbestos)
   Missouri Department of Natural Resources
   P.O. Box 176
   Jefferson City, Missouri 65102

B. Region 7
   Asbestos NESHAP Contact
   Air and Waste Management Division
   USEPA
   901 North 5th Street
   Kansas City, Kansas 66101
   (913) 551-7003

1.14.2 Litigation and Notification

The Contractor shall notify the Contracting Officer if any of the following occur:

a. The Contractor or any of the subcontractors are served with notice of violation of any law, regulation, permit or license which relates to this contract;

b. Proceedings are commenced which could lead to revocation of related permits or licenses; permits, licenses or other Government

authorizations relating to this contract are revoked;

c. Litigation is commenced which would affect this contract;

d. The Contractor or any of the subcontractors become aware that their equipment or facilities are not in compliance or may fail to comply in the future with applicable laws or regulations.

1.15 PERSONAL PROTECTIVE EQUIPMENT

Three complete sets of personal protective equipment shall be made available to the Contracting Officer and authorized visitors for entry to the regulated area. Contracting Officer and authorized visitors shall be provided with training equivalent to that provided to Contractor employees in the selection, fitting, and use of the required personal protective equipment and the site safety and health requirements. Contractor workers shall be provided with personal protective clothing and equipment and the Contractor shall ensure that it is worn properly. The Contractor's Designated IH and Designated Competent Person shall select and approve all the required personal protective clothing and equipment to be used.

1.15.1 Respirators

Respirators shall be in accordance with paragraph RESPIRATORY PROTECTION PROGRAM.

1.15.2 Whole Body Protection

Personnel exposed to airborne concentrations of asbestos that exceed the PELs, or for all OSHA Classes of work for which a required negative exposure assessment is not produced, shall be provided with whole body protection and such protection shall be worn properly. The Contractor's Designated IH and Competent Person shall select and approve the whole body protection to be used. The Competent Person shall examine work suits worn by employees at least once per work shift for rips or tears that may occur during performance of work. When rips or tears are detected while an employee is working, rips and tears shall be immediately mended, or the work suit shall be immediately replaced. Disposable whole body protection shall be disposed of as asbestos contaminated waste upon exiting from the regulated area. Reusable whole body protection worn shall be either disposed of as asbestos contaminated waste upon exiting from the regulated area or be properly laundered in accordance with 29 CFR 1926, Section .1101. Whole body protection used for asbestos abatement shall not be removed from the worksite by a worker to be cleaned. Recommendations made by the Contractor's Designated IH to downgrade whole body protection shall be submitted in writing to the Contracting Officer. The Contractor's Designated Competent Person, in consultation with the Designated IH, has the authority to take immediate action to upgrade or downgrade whole body protection when there is an immediate danger to the health and safety of the wearer.

1.15.2.1 Coveralls

Disposable-breathable coveralls with a zipper front shall be provided. Sleeves shall be secured at the wrists, and foot coverings secured at the ankles. See DETAIL SHEET 13.

1.15.2.2 Underwear

Disposable underwear shall be provided. If reusable underwear are used, they shall be disposed of as asbestos contaminated waste or laundered in accordance with 29 CFR 1926, Section .1101. Asbestos abatement workers shall not remove contaminated reusable underwear worn during abatement of ACM from the site to be laundered.

1.15.2.3 Work Clothing

An additional coverall shall be provided when the abatement and control method employed does not provide for the exit from the regulated area directly into an attached decontamination unit. Cloth work clothes for wear under the protective coverall, and foot coverings, shall be provided when work is being conducted in low temperature conditions. Cloth work clothes shall be either disposed of as asbestos contaminated waste or properly laundered in accordance with 29 CFR 1926, Section .1101.

1.15.2.4 Gloves

Gloves shall be provided to protect the hands. Where there is the potential for hand injuries (i.e., scrapes, punctures, cuts, etc.) a suitable glove shall be provided and used.

1.15.2.5 Foot Coverings

Cloth socks shall be provided and worn next to the skin. Footwear, as required by OSHA and EM 385-1-1, that is appropriate for safety and health hazards in the area shall be worn. Rubber boots shall be used in moist or wet areas. Reusable footwear removed from the regulated area shall be thoroughly decontaminated or disposed of as ACM waste. Disposable protective foot covering shall be disposed of as ACM waste. If rubber boots are not used, disposable foot covering shall be provided.

1.15.2.6 Head Covering

Hood type disposable head covering shall be provided. In addition, protective head gear (hard hats) shall be provided as required. Hard hats shall only be removed from the regulated area after being thoroughly decontaminated.

1.15.2.7 Protective Eye Wear

Eye protection provided shall be in accordance with ANSI Z87.1.

1.16 HYGIENE FACILITIES AND PRACTICES

The Contractor shall establish a decontamination area for the decontamination of employees, material and equipment. The Contractor shall ensure that employees enter and exit the regulated area through the decontamination area.

1.16.1 Shower Facilities

Shower facilities, when provided, shall comply with 29 CFR 1910, Section .141(d)(3).

1.16.2 3-Stage Decontamination Area

A temporary negative pressure decontamination unit that is adjacent and attached in a leak-tight manner to the regulated area shall be provided as described in SET-UP DETAIL SHEET Numbers 22 and 23. Utilization of prefabricated units shall have prior approval of the Contracting Officer. The decontamination unit shall have an equipment room and a clean room separated by a shower that complies with 29 CFR 1910, Section .141 (unless the Contractor can demonstrate that such facilities are not feasible). Equipment and surfaces of containers filled with ACM shall be cleaned prior to removing them from the equipment room or area. Surfaces of the equipment room shall be wet wiped 2 times after each shift. Materials used for wet wiping shall be disposed of as asbestos contaminated waste. Two separate lockers shall be provided for each asbestos worker, one in the equipment room and one in the clean room. Hot water service may be secured from the building hot water system provided backflow protection is installed by the Contractor at the point of connection. Should sufficient hot water be unavailable, the Contractor shall provide a minimum 160 L 40 gal. electric water heater with minimum recovery rate of 80 L 20 gal. per hour and a temperature controller for each showerhead. The Contractor shall provide a minimum of 1 shower. Instantaneous type in-line water heater may be incorporated at each shower head in lieu of hot water heater, upon approval by the Contracting Officer. Flow and temperature controls shall be located within the shower and shall be adjustable by the user. The wastewater pump shall be sized for 1.25 times the showerhead flow-rate at a pressure head sufficient to satisfy the filter head loss and discharge line losses. The pump shall supply a minimum 1.6 L/s 25 gpm flow with 10.7 m 35 ft. of pressure head. Used shower water shall be collected and filtered to remove asbestos contamination. Filters and residue shall be disposed of as asbestos contaminated material, per DETAIL SHEETS 9 and 14. Filtered water shall be discharged to the sanitary system. Wastewater filters shall be installed in series with the first stage pore size of 20 microns and the second stage pore size of 5 microns. The floor of the decontamination unit's clean room shall be kept dry and clean at all times. Water from the shower shall not be allowed to wet the floor in the clean room. Surfaces of the clean room and shower shall be wet-wiped 2 times after each shift change with a disinfectant solution. Proper housekeeping and hygiene requirements shall be maintained. Soap and towels shall be provided for showering, washing and drying. Any cloth towels provided shall be disposed of as ACM waste or shall be laundered in accordance with 29 CFR 1926, Section .1101.

1.16.3 Load-Out Unit

A temporary load-out unit that is adjacent and connected to the regulated area, and access tunnel if necessary, shall be provided as described in DETAIL SHEET Number 20 and 25. Utilization of prefabricated units shall have prior approval of the Contracting Officer. The load-out unit shall be attached in a leak-tight manner to each regulated area. Surfaces of the load-out unit and access tunnel shall be adequately wet-wiped 2 times after each shift change. Materials used for wet wiping shall be disposed of as asbestos contaminated waste.

1.16.4 Single Stage Decontamination Area

A decontamination area (equipment room/area) shall be provided for Class I work involving less than 7.5 m 25 feet or 0.9 square meters10 square feet of TSI or surfacing ACM, and for Class II asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment produced before the operation. The equipment room or area shall be

adjacent to the regulated area for the decontamination of employees, material, and their equipment which is contaminated with asbestos. The equipment room or area shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area. Surfaces of the equipment room shall be wet wiped 2 times after each shift. Materials used for wet wiping shall be disposed of as asbestos contaminated waste.

1.16.5 Decontamination Requirements for Class IV Work

The Contractor shall ensure that employees performing Class IV work within a regulated area comply with the hygiene practice required of employees performing work which has a higher classification within that regulated area, or the Contractor shall provide alternate decontamination area facilities for employees cleaning up debris and material which is TSI or surfacing ACM.

1.16.6 Decontamination Area Entry Procedures

The Contractor shall ensure that employees entering the decontamination area through the clean room or clean area:

a. Remove street clothing in the clean room or clean area and deposit it in lockers.

b. Put on protective clothing and respiratory protection before leaving the clean room or clean area.

c. Pass through the equipment room to enter the regulated area.

1.16.7 Decontamination Area Exit Procedures

The Contractor shall ensure that the following procedures are followed:

a. Before leaving the regulated area, respirators shall be worn while employees remove all gross contamination and debris from their work clothing using a HEPA vacuum.

b. Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers (see Detail Sheets 9 and 14) for disposal and/or laundering.

c. Employees shall not remove their respirators in the equipment room.

d. Employees shall shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, the Contractor shall ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

e. After showering, employees shall enter the clean room before changing into street clothes.

1.16.8 Lunch Areas

The Contractor shall provide lunch areas in which the airborne concentrations of asbestos are below 0.01 f/cc.

1.16.9 Smoking

Smoking, if allowed by the Contractor, shall only be permitted in designated areas approved by the Contracting Officer.

1.17 REGULATED AREAS

All Class I and II asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they shall demarcate the regulated area. Access to regulated areas shall be limited to authorized persons. The Contractor shall control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

1.18 WARNING SIGNS AND TAPE

Warning signs and tape printed in English shall be provided at the regulated boundaries and entrances to regulated areas. The Contractor shall ensure that all personnel working in areas contiguous to regulated areas comprehend the warning signs. Signs shall be located to allow personnel to read the signs and take the necessary protective steps required before entering the area. Warning signs, as shown and described in DETAIL SHEET 11, shall be in vertical format conforming to 29 CFR 1910 and 29 CFR 1926, Section .1101, a minimum of 500 by 350 mm 20 by 14 inches, and displaying the following legend in the lower panel:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
[RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA]

Spacing between lines shall be at least equal to the height of the upper of any two lines. Warning tape shall be provided as shown and described on DETAIL SHEET 11. Decontamination unit signage shall be as shown and described on DETAIL SHEET 15.

1.19 WARNING LABELS

Warning labels shall be affixed to all asbestos disposal containers used to contain asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements are acceptable. Warning labels shall be as described in DETAIL SHEET 14, shall conform to 29 CFR 1926, Section .1101 and shall be of sufficient size to be clearly legible displaying the

following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

1.20 LOCAL EXHAUST VENTILATION

Local exhaust ventilation units shall conform to ANSI Z9.2 and 29 CFR 1926, Section .1101. Filters on local exhaust system equipment shall conform to ANSI Z9.2 and UL 586. Filter shall be UL labeled.

1.21 TOOLS

Vacuums shall be leak proof to the filter, equipped with HEPA filters, of sufficient capacity and necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material. Power tools shall not be used to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system, or has otherwise been approved for use by the Contracting Officer. Residual asbestos shall be removed from reusable tools prior to storage and reuse. Reusable tools shall be thoroughly decontaminated prior to being removed from regulated areas.

1.22 RENTAL EQUIPMENT

If rental equipment is to be used, written notification shall be provided to the rental agency, concerning the intended use of the equipment, the possibility of asbestos contamination of the equipment and the steps that will be taken to decontaminate such equipment. A written acceptance of the terms of the Contractor's notification shall be obtained from the rental agency.

1.23 AIR MONITORING EQUIPMENT

The Contractor's Designated IH shall approve air monitoring equipment to be used to collect samples. The equipment shall include, but shall not be limited to:

a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute when equipped with a sampling train of tubing and filter cassette.

b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute when equipped with a sampling train of tubing and filter cassette, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps shall also be equipped with an automatic flow control unit which shall maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink

bands, to be used with low flow pumps in accordance with 29 CFR 1926, Section .1101 for personal air sampling.

d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands, to be used with high flow pumps when conducting environmental area sampling using NIOSH Pub No. 84-100 Methods 7400 and 7402.

e. Appropriate plastic tubing to connect the air sampling pump to the selected filter cassette.

f. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 20 to plus 60 degrees C minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

1.24 EXPENDABLE SUPPLIES

1.24.1 Glovebag

Glovebags shall be provided as described in 29 CFR 1926, Section .1101 and SET-UP DETAIL SHEET 10. The glovebag assembly shall be 0.15 mm6 mil thick plastic, prefabricated and seamless at the bottom with preprinted OSHA warning label.

1.24.2 Duct Tape

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container shall be provided.

1.24.3 Disposal Containers

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers shall be provided for ACM wastes as required by 29 CFR 1926 Section .1101 and DETAIL SHEETS 9A, 9B, 9C and 14.

1.24.4 Disposal Bags

Leak-tight bags, 0.15 mm 6 mil thick, shall be provided for placement of asbestos generated waste as described in DETAIL SHEET 9A.

1.24.5 Fiberboard Drums

Fiberboard drums shall be provided if required by state or local regulations.

1.24.6 Cardboard Boxes

Heavy-duty corrugated cardboard boxes, coated with plastic or wax to retard deterioration from moisture, shall be provided as described in DETAIL SHEET 9C, if required by state and local requirements. Boxes shall fit into selected ACM disposal bags. Filled boxes shall be sealed leak-tight with duct tape.

1.24.7 Sheet Plastic

Sheet plastic shall be polyethylene of 0.15 mm 6 mil minimum thickness and shall be provided in the largest sheet size necessary to minimize seams ,as indicated on the project drawings. Film shall conform to ASTM D 4397, except as specified below:

1.24.7.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets shall be provided. Film shall conform to the requirements of NFPA 701.

1.24.7.2 Reinforced

Reinforced sheets shall be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock shall consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between 2 layers of polyethylene film. Film shall meet flame resistant standards of NFPA 701.

1.24.8 Amended Water

Amended water shall meet the requirements of ASTM D 1331.

1.24.9 Mastic Removing Solvent

Mastic removing solvent shall be nonflammable and shall not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite shall have a flash point greater than 60 degrees C.140 degrees F.

1.24.10 Leak-tight Wrapping

Two layers of 0.15 mm6 mil minimum thick polyethylene sheet stock shall be used for the containment of removed asbestos-containing components or materials too large to be placed in disposal bags as described in DETAIL SHEET 9B. Upon placement of the ACM component or material, each layer shall be individually leak-tight sealed with duct tape.

1.24.11 Viewing Inspection Window

Where feasible, a minimum of 1 clear, 3 mm1/8 inch thick, acrylic sheet, 450 by 610 mm18 by 24 inches, shall be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows shall be sealed leak-tight with industrial grade duct tape.

1.24.12 Wetting Agents

Removal encapsulant (a penetrating encapsulant) shall be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant shall be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS.

1.24.13 Strippable Coating

Strippable coating in aerosol cans shall be used to adhere to surfaces and

to be removed cleanly by stripping, at the completion of work. This work shall only be done in well ventilated areas.

1.25 MISCELLANEOUS ITEMS

A sufficient quantity of other items, such as, but not limited to: scrapers, brushes, brooms, staple guns, tarpaulins, shovels, rubber squeegees, dust pans, other tools, scaffolding, staging, enclosed chutes, wooden ladders, lumber necessary for the construction of containments, UL approved temporary electrical equipment, material and cords, ground fault circuit interrupters, water hoses of sufficient length, fire extinguishers, first aid kits, portable toilets, logbooks, log forms, markers with indelible ink, spray paint in bright color to mark areas, project boundary fencing, etc., shall be provided.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Encapsulants shall conform to USEPA requirements, shall contain no toxic or hazardous substances and no solvent and shall meet the following requirements:

ALL ENCAPSULANTS

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Combustion Toxicity Zero Mortality	Univ. of Pittsburgh Protocol
Life Expectancy, 20 yrs Accelerated Aging Test	ASTM C 732
Permeability, Min. 23 ng per Pa-sec-square m	ASTM E 96

Additional Requirements for Bridging Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 730 N/m	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Min. 4.7 N-m (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Penetrating Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test,	ASTM E 736

ALL ENCAPSULANTS

Requirement	Test Standard
730 N/m	
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Min. 4.7 N-m (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Lockdown Encapsulant

Requirement	Test Standard
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength, 1.5 kN/m (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

ALL ENCAPSULANTS

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Combustion Toxicity Zero Mortality	Univ. of Pittsburgh Protocol
Life Expectancy, 20 yrs Accelerated Aging Test	ASTM C 732
Permeability, Minimum 0.4 perms	ASTM E 96

Additional Requirements for Bridging Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 50 pounds of force/foot	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Minimum 43 in-lb (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

ALL ENCAPSULANTS

Requirement	Test Standard

Additional Requirements for Penetrating Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 50 pounds of force/foot	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test(Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Minimum 43 in-lb (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Lockdown Encapsulant

Requirement	Test Standard
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test(Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength, 100 pounds of force/foot (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

2.2 RECYCLABLE MATERIALS

The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Asbestos abatement work tasks shall be performed as summarized in paragraph DESCRIPTION OF WORK and including Table 1 and the Contractor's Accident Prevention Plan, Asbestos Hazard Abatement Plan, and the Activity Hazard Analyses. The Contractor shall use the engineering controls and work practices required in 29 CFR 1926, Section .1101(g) in all operations regardless of the levels of exposure. Personnel shall wear and utilize protective clothing and equipment as specified. The Contractor shall not permit eating, smoking, drinking, chewing or applying cosmetics in the regulated area. All hot work (burning, cutting, welding, etc.) shall be conducted under controlled conditions in conformance with 29 CFR 1926, Section .352, Fire Prevention. Personnel of other trades, not engaged in asbestos abatement activities, shall not be exposed at any time to airborne concentrations of asbestos unless all the administrative and personal protective provisions of the Contractor's Accident Prevention Plan are

complied with. Power to the regulated area shall be locked-out and tagged in accordance with 29 CFR 1910, and temporary electrical service with ground fault circuit interrupters shall be provided as needed. Temporary electrical service shall be disconnected when necessary for wet removal. The Contractor shall stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. The Contractor shall correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work shall resume only upon notification by the Contracting Officer. Corrective actions shall be documented.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

Asbestos abatement shall be performed without damage to or contamination of adjacent work or area. Where such work or area is damaged or contaminated, as verified by the Contracting Officer using visual inspection or sample analysis, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the Government, as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, work shall stop in all effected areas immediately and the spill shall be cleaned. When satisfactory visual inspection and air sampling analysis results are obtained and have been evaluated by the Contractor's Designated IH and the Contracting Officer, work shall proceed.

3.3 OBJECTS

3.3.1 Removal of Mobile Objects

Mobile objects, furniture, personal items, and equipment will be removed from the area of work by the Government before asbestos abatement work begins.

3.3.2 Stationary Objects

Stationary objects, furniture, and equipment shall remain in place and shall be precleaned using HEPA vacuum followed by adequate wet wiping. Stationary objects and furnishings shall be covered with 2 layers of polyethylene and edges sealed with duct tape.

3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS

Building ventilating systems supplying air into or returning air out of a regulated area shall be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910, Section .147. Air-tight critical barriers shall be installed on building ventilating openings located inside the regulated area that supply or return air from the building ventilation system or serve to exhaust air from the building. The critical barriers shall consist of 2 layers of polyethylene. Edges to wall, ceiling and floor surfaces shall be sealed with industrial grade duct tape. Critical barriers shall be installed as shown on appended SET-UP DETAIL SHEETS.

3.5 PRECLEANING

Surfaces shall be cleaned by HEPA vacuum and adequately wet wiped prior to establishment of containment.

3.6 METHODS OF COMPLIANCE

3.6.1 Mandated Practices

The Contractor shall employ proper handling procedures in accordance with 29 CFR 1926 and 40 CFR 61, Subpart M, and the specified requirements. The specific abatement techniques and items identified shall be detailed in the Contractor's Asbestos Hazard Abatement Plan including, but not limited to, details of construction materials, equipment, and handling procedures. The Contractor shall use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters to collect debris and dust containing ACM.

b. Wet methods or wetting agents to control employee exposures during asbestos handling, removal, cutting, and cleanup; except where it can be demonstrated that the use of wet methods is unfeasible due to, for example, the creation of electrical hazards, equipment malfunction, and in roofing.

c. Prompt clean-up and disposal in leak-tight containers of wastes and debris contaminated with asbestos.

d. Inspection and repair of polyethylene in work and high traffic areas.

e. Cleaning of equipment and surfaces of containers filled with ACM prior to removing them from the equipment room or area.

3.6.2 Control Methods

The Contractor shall use the following control methods to comply with the PELs:

a. Local exhaust ventilation equipped with HEPA filter dust collection systems;

b. Enclosure or isolation of processes producing asbestos dust;

c. Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;

d. Use of other work practices and engineering controls;

e. Where the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the PELs, the Contractor shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with paragraph, RESPIRATORY PROTECTION PROGRAM.

3.6.3 Unacceptable Practices

The following work practices and engineering controls shall not be used for work related to asbestos or for work which disturbs ACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean-up of dust and debris containing ACM.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.6.4 Negative Pressure Enclosure (NPE) System

The NPE system shall be as shown in SETUP DETAIL SHEET 4 and 8. The system shall provide at least 4 air changes per hour inside the containment. The local exhaust unit equipment shall be operated 24 hours per day until the containment is removed, and shall be leak-proof to the filter and equipped with HEPA filters. Air movement shall be directed away from the employees and toward a HEPA filtration device. The NPE shall be smoke tested for leaks at the beginning of each shift. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.5 mm 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential shall be monitored continuously, 24 hours per day, with an automatic manometric recording instrument. Pressure differential recordings shall be provided daily on the same day collected. Readings shall be reviewed by the Contractor's Designated Competent Person and IH prior to submittal. The Contracting Officer shall be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system shall not be used as the local exhaust system for the regulated area. The local exhaust system shall terminate outdoors unless an alternate arrangement is allowed by the Contract Officer. All filters used shall be new at the beginning of the project and shall be periodically changed as necessary and disposed of as ACM waste.

3.6.5 Mini-Enclosures

Mini-containment (small walk-in enclosure) as shown in SETUP DETAIL SHEET 7 to accommodate no more than 2 persons, may be used if the disturbance or removal can be completely contained by the enclosure with the following specifications and work practices. The mini-enclosure shall be inspected for leaks and smoke tested before each use. Air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

3.6.6 Class II Work

In addition to the requirements of paragraphs Mandated Practices and Control Methods, the following engineering controls and work practices

shall be used:

a. A Competent Person shall supervise the work.

b. For indoor work, critical barriers shall be placed over all openings to the regulated area.

c. Impermeable dropcloths shall be placed on surfaces beneath all removal activity.

3.6.7 Specific Control Methods for Class II Work

In addition to requirements of paragraph Class II Work, Class II work shall be performed using the following methods:

3.6.7.1 Vinyl Flooring Materials

When removing vinyl flooring materials which contain ACM, the Contractor shall use the following practices as shown in SETUP DETAIL SHEET 4 and RESPONSE ACTION DETAIL SHEET 62. Tiles shall be removed intact (if possible); wetting is not required when tiles are heated and removed intact. Flooring or its backing shall not be sanded. Scraping of residual adhesive and/or backing shall be performed using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. The Contractor shall use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors.

3.6.7.2 Other Class II Jobs

The Contractor shall use the enclosure as shown in SETUP DETAIL SHEET 4 when performing Class II removal of the paper underlayment ACM. This paper underlayment was identified under vinyl sheet flooring and wood subflooring in the bathroom. The material shall be thoroughly wetted with amended water prior to and during its removal. The material shall be removed in an intact state as possible. Cutting or abrading the material is prohibited. The ACM removed shall be immediately bagged or wrapped. After the material is removed, prepare the area for final clearance sampling as shown on SETUP DETAIL SHEET 17.

The Contractor shall use the enclosure as shown in SETUP DETAIL SHEET 1 and work practices as shown RESPONSE ACTION DETAIL SHEET 45 when performing Class II removal of the sealant ACM. This sealant was identified in floor penetrations in the furnace closets. The material shall be thoroughly wetted with amended water prior to and during its removal. The material shall be removed in an intact state as possible. Cutting or abrading the material is prohibited. The ACM removed shall be immediately bagged or wrapped.

The Contractor shall use the enclosure as shown in SETUP DETAIL SHEET 21 and work practices as shown RESPONSE ACTION DETAIL SHEET 45 when performing Class II removal of the sink lining ACM. This material was identified on stainless steel sinks in the kitchens. The material shall be thoroughly wetted with amended water prior to and during its removal. The entire sink shall be removed intact. The removed sink shall be immediately bagged or wrapped.

3.6.8 Cleaning After Asbestos Removal

After completion of all asbestos removal work, surfaces from which ACM has been removed shall be wet wiped or sponged clean, or cleaned by some equivalent method to remove all visible residue. Run-off water shall be collected and filtered through a dual filtration system. A first filter shall be provided to remove fibers 20 micrometers and larger, and a final filter provided that removes fibers 5 micrometers and larger. After the gross amounts of asbestos have been removed from every surface, remaining visible accumulations of asbestos on floors shall be collected using plastic shovels, rubber squeegees, rubber dustpans, and HEPA vacuum cleaners as appropriate to maintain the integrity of the regulated area. Surfaces or locations which could harbor accumulations or residual asbestos dust shall be checked after vacuuming to verify that no asbestos-containing material remains; and shall be re-vacuumed as necessary to remove the ACM.

3.6.9 Class II Asbestos Work Response Action Detail Sheets

The following Class II Asbestos Work Response Action Detail Sheet is specified on Table 1 for each individual work task to be performed:

a. Vinyl Asbestos Tile Adhered to Wood Floor System by Asbestos Free Adhesive: See Sheet 62

b. Miscellaneous Asbestos-Containing Materials: See Sheet 45

3.7 FINAL CLEANING AND VISUAL INSPECTION

Upon completion of abatement, the regulated area shall be cleaned by collecting, packing, and storing all gross contamination; see SET-UP DETAIL SHEETS 9, 14 and 20. A final cleaning shall be performed using HEPA vacuum and wet cleaning of all exposed surfaces and objects in the regulated area. Upon completion of the cleaning, the Contractor shall conduct a visual pre-inspection of the cleaned area in preparation for a final inspection before final air clearance monitoring and recleaning, as necessary. Upon completion of the final cleaning, the Contractor and the Contracting Officer shall conduct a final visual inspection of the cleaned regulated area in accordance with ASTM E 1368 and document the results on the Final Cleaning and Visual Inspection as specified on the SET-UP DETAIL SHEET 19. If the Contracting Officer rejects the clean regulated area as not meeting final cleaning requirements, the Contractor shall reclean as necessary and have a follow-on inspection conducted with the Contracting Officer. Recleaning and follow-up reinspection shall be at the Contractor's expense.

3.8 LOCKDOWN

Prior to removal of plastic barriers and after clean-up of gross contamination and final visual inspection, a post removal (lockdown) encapsulant shall be spray applied to ceiling, walls, floors, and other surfaces in the regulated area.

3.9 EXPOSURE ASSESSMENT AND AIR MONITORING

3.9.1 General Requirements For Exposure

Exposure assessment, air monitoring and analysis of airborne concentration

of asbestos fibers shall be performed in accordance with 29 CFR 1926, Section .1101, the Contractor's air monitoring plan, and as specified. Personal exposure air monitoring (collected at the breathing zone) that is representative of the exposure of each employee who is assigned to work within a regulated area shall be performed by the Contractor's Designated IH. Breathing zone samples shall be taken for at least 25 percent of the workers in each shift, or a minimum of 2, whichever is greater. Air monitoring results at the 95 percent confidence level shall be calculated as shown in Table 2 at the end of this section. The Contractor shall provide an onsite independent testing laboratory with qualified analysts and appropriate equipment to conduct sample analyses of air samples using the methods prescribed in 29 CFR 1926, Section .1101, to include NIOSH Pub No. 84-100 Method 7400. Preabatement and abatement environmental air monitoring shall be performed by the Contractor's Designated IH. Final clearance environmental air monitoring, shall be performed by the Contractor's Designated IH. Environmental and final clearance air monitoring shall be performed using NIOSH Pub No. 84-100 Method 7400 (PCM) with optional confirmation of results by NIOSH Pub No. 84-100 Method 7402 (TEM). For environmental and final clearance, air monitoring shall be conducted at a sufficient velocity and duration to establish the limit of detection of the method used at 0.005 f/cc. Confirmation of asbestos fiber concentrations (asbestos f/cc) from environmental and final clearance samples collected and analyzed by NIOSH Pub No. 84-100 Method 7400 (total f/cc) may be conducted using TEM in accordance with NIOSH Pub No. 84-100 Method 7402. When such confirmation is conducted, it shall be from the same sample filter used for the NIOSH Pub No. 84-100 Method 7400 PCM analysis. For all Contractor required environmental or final clearance air monitoring, confirmation of asbestos fiber concentrations, using NIOSH Pub No. 84-100 Method 7402, shall be at the Contractor's expense. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. Results of breathing zone samples shall be posted at the job site and made available to the Contracting Officer. The Contractor shall maintain a fiber concentration inside a regulated area less than or equal to 0.1 f/cc expressed as an 8 hour, time-weighted average (TWA) during the conduct of the asbestos abatement. If fiber concentration rises above 0.1 f/cc, work procedures shall be investigated with the Contracting Officer to determine the cause. At the discretion of the Contracting Officer, fiber concentration may exceed 0.1 f/cc but shall not exceed 1.0 f/cc expressed as an 8-hour TWA. The Contractor's workers shall not be exposed to an airborne fiber concentration in excess of 1.0 f/cc, as averaged over a sampling period of 30 minutes. Should either an environmental concentration of 1.0 f/cc expressed as an 8-hour TWA or a personal excursion concentration of 1.0 f/cc expressed as a 30-minute sample occur inside a regulated work area, the Contractor shall stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Work shall not restart until authorized by the Contracting Officer.

3.9.2 Initial Exposure Assessment

The Contractor's Designated IH shall conduct an exposure assessment immediately before or at the initiation of an asbestos abatement operation to ascertain expected exposures during that operation. The assessment shall be completed in time to comply with the requirements which are triggered by exposure data or the lack of a negative exposure assessment, and to provide information necessary to assure that all control systems planned are appropriate for that operation. The assessment shall take into

consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the Contractor which indicate the levels of airborne asbestos likely to be encountered on the job.

3.9.3 Negative Exposure Assessment

The Contractor shall provide a negative exposure assessment for the specific asbestos job which will be performed. The negative exposure assessment shall be provided within 5 days of the initiation of the project and conform to the following criteria:

a. Objective Data: Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the PEL-TWA and PEL-Excursion Limit under those work conditions having the greatest potential for releasing asbestos.

b. Prior Asbestos Jobs: Where the Contractor has monitored prior asbestos jobs for the PEL and the PEL-Excursion Limit within 12 months of the current job, the monitoring and analysis were performed in compliance with asbestos standard in effect; the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations; the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job; and these data show that under the conditions prevailing and which will prevail in the current workplace, there is a high degree of certainty that the monitoring covered exposure from employee exposures will not exceed the PEL-TWA and PEL-Excursion Limit.

c. Initial Exposure Monitoring: The results of initial exposure monitoring of the current job, made from breathing zone air samples that are representative of the 8-hour PEL-TWA and 30-minute short-term exposures of each employee. The monitoring covered exposure from operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

3.9.4 Independent Environmental Monitoring

The air monitoring contractor has been provided a copy of the contract that includes this abatement work. The abatement contractor will provide the air monitoring contractor with an up-to-date copy of the accepted Asbestos Hazard Abatement Plan, Accident Prevention Plan and pertinent detailed drawings. The air monitoring contractor is required to comply with the abatement contractor's safety and health requirements. The abatement contractor will coordinate all onsite activities with the air monitoring contractor, the COR, and other affected parties as directed by the COR. The abatement contractor will provide the air monitoring contractor with an up-to-date schedule of abatement contractor work activities. The air monitoring contractor will coordinate with the abatement contractor and the COR during the performance Government required air monitoring. The

abatement contractor is responsible for performing exposure assessment and personal air monitoring of abatement contractor's work. The air monitoring contractor is responsible for performing these tasks for its employee.

3.9.5 Preabatement Environmental Air Monitoring

Preabatement environmental air monitoring shall be established 1 day prior to the masking and sealing operations for each regulated area to determine background concentrations before abatement work begins. As a minimum, preabatement air samples shall be collected using NIOSH Pub No. 84-100 Method 7400, PCM at these locations: outside the building; inside the building, but outside the regulated area perimeter; and inside each regulated work area. One sample shall be collected for every 185 square meters 2000 square feet of floor space. At least 2 samples shall be collected outside the building: at the exhaust of the HEPA unit; and downwind from the abatement site. The PCM samples shall be analyzed within 24 hours; and if any result in fiber concentration greater than 0.01 f/cc, asbestos fiber concentration shall be confirmed using NIOSH Pub No. 84-100 Method 7402 (TEM).

3.9.6 Environmental Air Monitoring During Abatement

Until an exposure assessment is provided to the Contracting Officer, environmental air monitoring shall be conducted at locations and frequencies that will accurately characterize any evolving airborne asbestos fiber concentrations. The assessment shall demonstrate that the product or material containing asbestos minerals, or the abatement involving such product or material, cannot release airborne asbestos fibers in concentrations exceeding 0.01 f/cc as a TWA under those work conditions having the greatest potential for releasing asbestos. The monitoring shall be at least once per shift at locations including, but not limited to, close to the work inside a regulated area; preabatement sampling locations; outside entrances to a regulated area; close to glovebag operations; representative locations outside of the perimeter of a regulated area; inside clean room; and at the exhaust discharge point of local exhaust system ducted to the outside of a containment (if used). If the sampling outside regulated area shows airborne fiber levels have exceeded background or 0.01 f/cc, whichever is greater, work shall be stopped immediately, and the Contracting Officer notified. The condition causing the increase shall be corrected. Work shall not restart until authorized by the Contracting Officer.

3.9.7 Final Clearance Air Monitoring

Prior to conducting final clearance air monitoring, the Contractor and the Contracting Officer shall conduct a final visual inspection of the regulated area where asbestos abatement has been completed. The final visual inspection shall be as specified in SET-UP DETAIL SHEET 19. Final clearance air monitoring shall not begin until acceptance of the Contractor's final cleaning by the Contracting Officer. The Contractor's Designated IH shall conduct final clearance air monitoring using aggressive air sampling techniques as defined in EPA 560/5-85-024 or as otherwise required by federal or state requirements. The sampling and analytical method used will be NIOSH Pub No. 84-100 Method 7400 (PCM) and Table 3 with confirmation of results by NIOSH Pub No. 84-100 Method 7402 (TEM).

3.9.7.1 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH Pub No. 84-100 Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, shall be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) shall be confirmed from that same filter using NIOSH Pub No. 84-100 Method 7402 (TEM) at Contractor's expense. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning shall be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria shall be done.

3.9.7.2 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, the Contractor shall pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.9.8 Air-Monitoring Results and Documentation

Air sample fiber counting shall be completed and results provided within 24 hours after completion of a sampling period. The Contracting Officer shall be notified immediately of any airborne levels of asbestos fibers in excess of established requirements. Written sampling results shall be provided within 5 working days of the date of collection. The written results shall be signed by testing laboratory analyst, testing laboratory principal and the Contractor's Designated IH. The air sampling results shall be documented on a Contractor's daily air monitoring log. The daily air monitoring log shall contain the following information for each sample:

a. Sampling and analytical method used;

b. Date sample collected;

c. Sample number;

d. Sample type: BZ = Breathing Zone (Personal), P = Preabatement, E = Environmental, C = Abatement Clearance;

e. Location/activity/name where sample collected;

f. Sampling pump manufacturer, model and serial number, beginning flow rate, end flow rate, average flow rate (L/min);

g. Calibration date, time, method, location, name of calibrator, signature;

h. Sample period (start time, stop time, elapsed time (minutes);

i. Total air volume sampled (liters);

j. Sample results (f/cc);

k. Laboratory name, location, analytical method, analyst, confidence level. In addition, the printed name and a signature and date block for the Industrial Hygienist who conducted the sampling and

for the Industrial Hygienist who reviewed the daily air monitoring log verifying the accuracy of the information.

3.10 CLEARANCE CERTIFICATION

When asbestos abatement is complete, ACM waste is removed from the regulated areas, and final clean-up is completed, the Contracting Officer will certify the areas as safe before allowing the warning signs and boundary warning tape to be removed. After final clean-up and acceptable airborne concentrations are attained, but before the HEPA unit is turned off and the containment removed, the Contractor shall remove all pre-filters on the HVAC system servicing the work area and provide new pre-filters. The Contractor shall dispose of such filters as asbestos contaminated materials. HVAC, mechanical, and electrical systems shall be re-established in proper working order. The Contractor and the Contracting Officer shall visually inspect all surfaces within the containment for residual material or accumulated debris. The Contractor shall reclean all areas showing dust or residual materials. The Contracting Officer will certify in writing that the area is safe before unrestricted entry is permitted. The Government will have the option to perform monitoring to certify the areas are safe before entry is permitted.

3.11 CLEANUP AND DISPOSAL

3.11.1 Title to ACM Materials

ACM material resulting from abatement work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified and in accordance with applicable federal, state and local regulations.

3.11.2 Collection and Disposal of Asbestos

All ACM waste shall be collected and including contaminated wastewater filters, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing, shall be collected and placed in leak-tight containers such as double plastic bags (see DETAIL SHEET 9A); sealed double wrapped polyethylene sheet (see DETAIL 9B); sealed fiberboard boxes (see DETAIL SHEET 9C); or other approved containers. Waste within the containers shall be wetted in case the container is breeched. Asbestos-containing waste shall be disposed of at an EPA, state and local approved asbestos landfill. For temporary storage, sealed impermeable containers shall be stored in an asbestos waste load-out unit or in a storage/transportation conveyance (i.e., dumpster, roll-off waste boxes, etc.) in a manner acceptable to and in an area assigned by the Contracting Officer. Procedure for hauling and disposal shall comply with 40 CFR 61, Subpart M, state, regional, and local standards.

3.11.3 Scale Weight Measurement

Scales used for measurement shall be public scales. Weighing shall be at a point nearest the work at which a public scale is available. Scales shall be standard truck scales of the beam type; scales shall be equipped with the type registering beam and an "over and under" indicator; and shall be capable of accommodating the entire vehicle. Scales shall be tested, approved and sealed by an inspector of the State of Missouri. Scales shall be calibrated and resealed as often as necessary and at least once every three months to ensure continuous accuracy. Vehicles used for hauling ACM

shall be weighed empty daily at such time as directed and each vehicle shall bear a plainly legible identification mark.

3.11.4 Weigh Bill and Delivery Tickets

Copies of weigh bills and delivery tickets shall be submitted to the Contracting Officer during the progress of the work. The Contractor shall furnish the Contracting Officer scale tickets for each load of ACM weighed and certified. These tickets shall include tare weight; identification mark for each vehicle weighed; and date, time and location of loading and unloading. Tickets shall be furnished at the point and time individual trucks arrive at the worksite. A master log of all vehicle loading shall be furnished for each day of loading operations. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified weigh bills and/or certified tickets and manifests of all ACM actually disposed by the Contractor for this contract.

3.11.5 Asbestos Waste Shipment Record

The Contractor shall complete and provide the Contracting Officer final completed copies of the Waste Shipment Record for all shipments of waste material as specified in 40 CFR 61, Subpart M and other required state waste manifest shipment records, within 3 days of delivery to the landfill. Each Waste Shipment Record shall be signed and dated by the [Contractor] [Contracting Officer], the waste transporter and disposal facility operator.

TABLE 1

SUMMARY OF WORK TASKS

TASK(1)	A	B	C	D
LOCATION(2)	Kitchen, Entry	Bathrooms	Furnace Closets	Kitchen
DESCRIPTION(3)	Vinyl Floor Tile	Paper Underlayment	Sealant	Sink Lining
TECHNIQUE(4)	REM	REM	REM	REM
FRIABLE(5)	NF-1	FR	NF-1	FR
FORM(6)	IA	IA	IA	IA
CONDITION(6)	G	G	G	G
QUANTITY(7)				
LINEAR FT.				
SQUARE FEET	200	35	1	4
EACH				

NOTES:

(1) Alpha sequence of work tasks (A, B, C, etc.). Each category of friability has a separate task.

(2) Specific location of the work (building, floor, area, etc.)

(3) Description of material.

(4) Technique to be used: Removal = REM; Dismantle = DISM; Encapsulation = ENCAP; Encasement = ENCAS; Enclosure = ENCL; Repair = REP.

(5) Friability of materials: Friable = FR; Non-friable = NF-1 or NF-2; (number indicates friable category).

(6) Form: Interior or Exterior Architectural = IA or EA; Mechanical/Electrical = ME. Condition: Good = G; Fair = F; Poor = P.

(7) Quantity of ACM in Linear Feet (ft); Square Feet (sf); Each number of items.

TABLE 2

FORMULA FOR CALCULATION OF THE 95 PERCENT CONFIDENCE LEVEL
(Reference: NIOSH 7400)

Fibers/cc(01.95 percent CL) = X + [(X) * (1.645) * (CV)]

Where: X = ((E)(AC))/((V)(1000))

E = ((F/Nf) - (B/Nb))/Af

CV = The precision value; 0.45 shall be used unless the analytical laboratory provides the Contracting Officer with documentation (Round Robin Program participation and results) that the laboratory's precision is better.

AC = Effective collection area of the filter in square millimeters

V = Air volume sampled in liters

E = Fiber density on the filter in fibers per square millimeter

F/Nf = Total fiber count per graticule field

B/Nb = Mean field blank count per graticule field

Af = Graticule field area in square millimeters

TWA = C1/T1 + C2/T2 = Cn/Tn

Where: C = Concentration of contaminant

T = Time sampled.

TABLE 3

NI0SH METHOD 7400

PCM ENVIRONMENTAL AIR SAMPLING PROTOCOL (NON-PERSONAL)

Sample Location	Minimum No. of Samples	Filter Pore Size (Note 1)	Min. Vol. (Note 2) (Liters)	Sampling Rate (liters/min.)
Inside Abatement Area	0.5/140 Square Meters (Notes 3 & 4)	0.45 microns	3850	2-16
Each Room in 1 Abatement Area Less than 140 Square meters		0.45 microns	3850	2-16
Field Blank	2	0.45 microns	0	0
Laboratory Blank	1	0.45 microns	0	0

Notes:

1. Type of filter is Mixed Cellulose Ester.

2. Ensure detection limit for PCM analysis is established at 0.005 fibers/cc.

3. One sample shall be added for each additional 140 square meters. (The corresponding I-P units are 5/1500 square feet).

4. A minimum of 5 samples are to be taken per abatement area, plus 2 field blanks.

TABLE 4

EPA AHERA METHOD: TEM AIR SAMPLING PROTOCOL

Location Sampled	Minimum No. of Samples	Filter Pore Size	Min. Vol. (Liters)	Sampling Rate (liters/min.)
Inside Abatement Area	5	0.45 microns	1500	2-16
Outside Abatement Area	5	0.45 microns	1500	2-16
Field Blank	2	0.45 microns	0	0
Laboratory Blank	1	0.45 microns	0	0

Notes:

1. Type of filter is Mixed Cellulose Ester.

2. The detection limit for TEM analysis is 70 structures/square mm.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME _____ CONTRACT NO. _____
PROJECT ADDRESS _____
CONTRACTOR FIRM NAME _____
EMPLOYEE'S NAME _____,_____,_____,
(Print) (Last) (First) (MI)

Social Security Number: _____-_____-_____,

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH TYPES OF LUNG DISEASE AND CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS, THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NONSMOKING PUBLIC.

Your employer's contract for the above project requires that you be provided and you complete formal asbestos training specific to the type of work you will perform and project specific training; that you be supplied with proper personal protective equipment including a respirator, that you be trained in its use; and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required personal protective equipment. These things are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you. The Contractor's Designated Industrial Hygienist will check the block(s) for the type of formal training you have completed. Review the checked blocks prior to signing this certification.

FORMAL TRAINING:
_____ a. For Competent Persons and Supervisors: I have completed EPA's Model Accreditation Program (MAP) training course, "Contractor/Supervisor", that meets this State's requirements.

b. For Workers:
_____ (1) For OSHA Class I work: I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (2) For OSHA Class II work (where there will be abatement of more than one type of Class II materials, i.e., roofing, siding, floor tile, etc.): I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
(3) For OSHA Class II work (there will only be abatement of one type of Class II material):
_____ (a) I have completed an 8-hour training class on the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls of 29 CFR 1926, Section .1101(g) and hands-on training.
_____ (b) I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (4) For OSHA Class III work: I have completed at least a 16-hour course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, Section .92(a)(2) and the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926, Section .1101, and hands-on training.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

_____ (5) For OSHA Class IV work: I have completed at least a 2-hr course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, (a)(1), and the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926, Section .1101(g) and hands-on training.

_____ c. Workers, Supervisors and the Designated Competent Person: I have completed annual refresher training as required by EPA's MAP that meets this State's requirements.

PROJECT SPECIFIC TRAINING:
_____ I have been provided and have completed the project specific training required by this Contract. My employer's Designated Industrial Hygienist and Designated Competent Person conducted the training.

RESPIRATORY PROTECTION:
_____ I have been trained in accordance with the criteria in the Contractor's Respiratory Protection program. I have been trained in the dangers of handling and breathing asbestos dust and in the proper work procedures and use and limitations of the respirator(s) I will wear. I have been trained in and will abide by the facial hair and contact lens use policy of my employer.

RESPIRATOR FIT-TEST TRAINING:
_____ I have been trained in the proper selection, fit, use, care, cleaning,maintenance, and storage of the respirator(s) that I will wear. I have been fit-tested in accordance with the criteria in the Contractor's Respiratory Program and have received a satisfactory fit. I have been assigned my individual respirator. I have been taught how to properly perform positive and negative pressure fit-check upon donning negative pressure respirators each time.

MEDICAL EXAMINATION:
_____ I have had a medical examination within the last twelve months which was paid for by my employer. The examination included: health history, pulmonary function tests, and may have included an evaluation of a chest x-ray. A physician made a determination regarding my physical capacity to perform work tasks on the project while wearing personal protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's Industrial Hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

_____ were no limitations to performing the required work tasks.
_____ were identified physical limitations to performing the required work tasks.

Date of the medical examination _____

Employee Signature _____ date _____
Contractor's Industrial
Hygienist Signature _____ date _____

-- End of Section --

1. SOLICITATION NO. DACA41-02-R-0010 is amended as follows:

a. SPECIFICATIONS:

(1) Revised Pages: The following pages are deleted and replaced with revised pages of the same number. A copy of each revised page accompanies this amendment.

TC-2	SF1442-1
TC-4	3 of 28

(2) Reissued Pages: Page SF1442-2 is reissued without change. A copy of the reissued page accompanies this amendment.

(3) New Section: The following sections are new sections which are added. A copy of each new section accompanies this amendment.

Section No.	Section Title
01100	General
02531	Cured-In-Place Pipe (CIPP)
02532	Pipe Bursting
02882	Recreation Facility Playgrounds
02921	Seeding
02922	Sodding
02930	Exterior Planting
13280	Asbestos Abatement
13281	Lead Hazard Control Activities

(4) Revised Section: Section 01100 – GENERAL is deleted and replaced by a revised section of the same number. A copy of the revised section accompanies this amendment.

(5) Submittal Registers: The Submittal Registers (pages 1 thru 12), located at the end of Section 01330 – Submittal Procedures, are deleted and replaced by revised Submittals Registers (pages 1 thru 15). A copy of the revised Submittal Registers accompanies this amendment.

(6) Narrative Changes:

(a) GENERAL: All References to “PURCHASE REQUEST NUMBER W58XUW-2155-2127” are deleted.

(b) SECTION 00010 - SOLICITATION CONTRACT FORM

NOTES: The following note has been added.

"(20) The following clauses apply only to design-build portion of the contract (CLINs 0005 – 0007): Section 00800 – SCR-DB-005, 006, 008, 009, 010, 012, 014, 016, 019, and 020 and Section 01012."

(c) SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following have been deleted:

52.232-28	Invitation to Propose Performance-Based Payments	MAR 2000
	BID BOND REQUIREMENTS	JUL 2002

(d) SECTION 00110 - SUBMISSION REQUIREMENTS AND INSTRUCTION

1. The page limitation is modified from 150 to 75 pages for Volume I.

2. References to Volume 3 anywhere in this section are corrected to Volume 2.

(e) SECTION 00120 - PROPOSAL EVALUATION AND CONTRACT AWARD

Paragraph 4 is modified as follows:

"4. RELATIVE WEIGHT OF TECHNICAL EVALUATION CRITERIA

Factor 1 is the most important technical factor. Within Factor 1, subfactor a is the most important; subfactor b is slightly less important than subfactor a; subfactor c is slightly less important than subfactor b; and subfactor d is slightly less important than subfactor c.

Factor 2 is slightly less important than Factor 1. Within Factor 2, subfactors a, b and c are equal, subfactor d is slightly less important than subfactor c, and subfactor e is less important than subfactor d.

Factor 3 is less important than Factor 2 and is approximately equal to combined weight of Factor 2, subfactors a, b and c. Within Factor 3, subfactor a is significantly more important than subfactor b.

Factor 4 is significantly less important than the combined weight of Factors 1, 2 and 3."

(g) SECTION 00700 - CONTRACT CLAUSES

The following have been added by full text:

1. “52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:
Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.
If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.
(3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.
(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).
(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

(End of Clause)”

2. “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 index of drawings.

(End of clause)"

(g) SECTION 00800 - SPECIAL CONTRACT REQUIREMENTS

The following have been modified:

1. "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 fifteen percent (15%) 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 Summary of Changes) "

2. "252.211-12 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 following amounts for each calendar day of delay until the work is completed or accepted.

$38.67/unit/day for all units on a street until all units on a street are accepted.
$1,100.00 /day past the total completion of work for each phase.

(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)"

3. "52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract with then (10) calendar days after the date the Contractor received the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 620* calendar days after the date of receipt by him of notice to proceed as set forth in the schedule below except as specified in the various landscaping sections. The time stated for completion shall include final cleanup of the premises.

*This is an estimate only. The final number will be determined by the successful offeror's proposal.

SCHEDULE:

Item of Work	Commencement Time	Duration
Phase 1: Improvements in the Midland neighborhood, including all sitework	Upon Contractor's acknowledgement of Receipt of Notice to Proceed	_____** Calendar Days
Phase 2: Base Bid and Sets 2, 3, and 4 improvements in the Woodview neighborhood, including all sitework	Upon Contractor's acknowledgement of Receipt of Notice to Proceed for Phase 2	_____** Calendar Days
Phase 3: Improvements for the remaining sets of units, including all design and sitework	Upon Contractor's acknowledgement of Receipt of Notice to Proceed for Phase 3	_____** Calendar Days
Total Construction Period including demolition	Upon Contractor's acknowledgement of original Receipt of Notice to Proceed	_____** Calendar Days

**Phasing Schedule to be determined by successful offeror's proposal.

NOTES:

1. Government will accept structures under a single roof back by complete streets (both sides, intersection to intersection) rather than by complete phase. The contractor must complete all trails, playgrounds, roadwork, and signage that are adjacent to houses being accepted The Contractor must provide accessibility for all residents of the street and for fire-fighting equipment. Liquidated Damages will be $38.67/unit/day for ALL units on a street until ALL units on a street are accepted by the Contracting Officer.

2. The completion times, by street, will be determined by the phasing plans in the Contractor's proposal.

3. Once the Government has accepted 50% of a phase, the Contractor will be given another phase to start within 30 calendar days. A maximum of two phases maybe under construction at one time with at least 50% of earlier phase accepted.

4. Commencement of design for the fifth, sixth, and seventh sets of units will begin upon inclusion of these units by the Government, either as part of the original award or by exercise of option after award. Prior to the start of any construction activities for

these units, the Contracting Officer shall approve the 100% design.

(End of clause)"

(h) SECTION 00810 WAGE RATES:

General Decision No. MO020001 is deleted in its entirety.

(i) Section 02050 - DEMOLITION : The following paragraph is added:

"3.3.3 SALVAGEABLE LANDSCAPING ROCK
The Contractor can assume that existing landscaping rock adjacent to housing units (lava rock / river rock) is not contaminated with chlordane and can therefore be considered reusable salvage."

(j) Section 02315 - EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS:

1. Paragraph 2.1.4 is deleted and replace with the following paragraph:

"2.1.4 Expansive Soils - Expansive soils are defined as soils that have a plasticity index equal to or greater than 12 when tested in accordance with ASTM D 4318."

2. Paragraph 3.13 & 3.14 are deleted and replace with the following paragraphs:

"3.13 SUBGRADE PREPARATION - Building footings, foundations and garage slabs shall bear on a minimum of 24 inches of compacted fill material, consisting of non-expansive "cohesive material" or the subgrade shall be prepared with lime-treatment or fly ash stabilization per the Geotechnical Engineering Services Report. The subgrade under exterior slabs (driveways, sidewalks) will not be required to be removed and replaced with non-expansive or treated soil. In no case shall a sector of a building foundation bear partially on compacted subgrade. Excavations and surfaces supporting concrete shall be clean and thoroughly "crumbed out", being free of clumps of loose earth and unsatisfactory material. If in the opinion of the Contracting Officer a surface supporting concrete has been "softened" due to ponding of water, freezing, or remolding due to traffic or improper excavation techniques, the material in question shall be replaced with neat concrete. Material removed beneath slabs-on-grade shall be replaced with satisfactory material, compacted to the required density. Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill

material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. The moisture content of expansive cohesive soils shall be adjusted to within 3 to 8 percent of optimum moisture content prior to compaction. The moisture content of non-expansive cohesive soils shall be adjusted to within -1 to +3 percent of optimum moisture content prior to compaction. Minimum subgrade density shall be as specified in paragraph FILLING AND BACKFILLING."

"3.14 FILLING AND BACKFILLING - Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Satisfactory materials shall be placed in horizontal layers not exceeding 8 inches in loose thickness, or 6 inches when hand-operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as specified. Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and 1 foot above other utility lines shall be free from stones larger than 1 inch in any dimension. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes or concrete to avoid damage to coatings or wrappings. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall. Each layer of fill and backfill shall be compacted to not less than the percentage of maximum density specified below:

Percent Laboratory maximum density	
Cohesive material	Cohesionless material

Under structures, building slabs, steps, paved areas, around footings, and in trenches	90	95
Under sidewalks and grassed areas	85	90
Expansive materials	Compacted to not less than eighty-five (85) percent nor more than ninety (90) percent	
Nonfrost susceptible materials	95	

Subgrade

Under building slabs, steps, and paved areas, top 12 inches	90	95
Lime or flyash treated subgrade	90	
Under sidewalks, top 6 inches	85	90

Approved compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified herein before to the required density prior to further construction thereon. Recompaction over underground utilities and heating lines shall be by hand tamping."

3. The following paragraph is added:

"3.20 RE-USE OF EXISTING FOUNDATION BACKFILL MATERIAL
The Contractor shall assume that the soil out 6 inches from existing building foundations may contain chlordane in amounts above the Missouri Department of Natural Resources' target concentration levels for residential areas. The backfill at most existing foundations will not be disturbed as a part of this project. Where any such existing foundation backfill is disturbed however, the Contractor shall remove it and re-use it on this project as new backfill material, either at the same address or at another address within the project area. No such material shall be removed from the project area. Wherever such potentially contaminated backfill is re-used however, such backfill shall be topped off with a layer of uncontaminated soil, minimum thickness of 3 inches."

(k) Specification 02830 SEGMENTAL CONCRETE BLOCK RETAINING WALL:

The following information is added to the beginning of paragraph 1.4 SEGMENTAL RETAINING WALL DESIGN:

"All walls under 48" high shall be constructed per the manufacturers printed instructions. All walls over 48" high shall be designed per the following requirements." Specification 02870 SITE FURNISHINGS – Delete paragraph 2.1.1.1. "Pre-cast Concrete."

(l) Specification 02870 SITE FURNISHINGS:

1. Paragraph 2.1.1.2. – Change the specification section referenced from Section 03330 to Section 03300.

(m) Specification 02870 SITE FURNISHINGS – Delete paragraph 2.5.5. "Ash Receptacles."

(n) Specification Section 02921 SEEDING: Paragraph 1.1: Add the following note: "Sod shall be placed at all inlets (15 ft. x 15 ft. min.) and on all slopes exceeding 3:1 slope. Seed shall be placed on all other disturbed areas unless plant beds are specified."

(o) Specification Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE: paragraph 1.4.2.1 Strength Requirements: The first 3 sentences are deleted and are replaced by the following:

"All concrete shall have a 28-day compressive strength of 4,000 psi. Compressive strength shall be determined in accordance with ASTM C 39/C 39M."

b. DRAWINGS: IMPROVE FAMILY HOUSING FY 2003: Narrative Changes:

(1) Sheet 4 – In the Design-Build Housing Unit Schedule ADD Unit address 706 Titan Loop to the "Unit Type C7" category. Plan drawing is shown on Sheet A1.12.

(2) Sheet CO.1: UTILITY PLAN GENERAL NOTES:

(a) Note 1: The following information is added to Note 1:
" At locations where water lines cross streets, the Contractor shall bore under the street to install the new water lines. Pipe Sleeves are not required on the service lines. The Contractor is not required to replace the existing valves and valve boxes."

(b) Note 2 is deleted and replaced by the following note:

"2. The Contractor shall replace all existing Sanitary Sewer Lines from the Main to the

Living Units. At the Contractor's option, Pipe Bursting or Pipe Lining may be used at street crossings. (Refer to Specification Section 02532 - Pipe Bursting and Section 02531 – Cured-In-Place Concrete for Pipe Lining.) Duplex Unit are served by 6-inch lines and Single Units are served by 4-inch lines."

(3) Sheets C2.5 through C2.16 – Add General Note: "Playground, trails, benches, and bollards shown for reference only. Refer to sheets C2.17 through C2.20 and sheets C3.25 through C3.27 for these site improvements."

(4) Sheet C6.1: DETAIL 6 – DETAIL AT DRIVEWAY:

(a) The "12-inch dimension" of the Tapered Section of the Concrete Drive is deleted.

(b) The following note is added: "Note - Thicken driveway approach apron to 6 inch thickness from street curb back to first CJ (6 feet). "

(5) Sheet C6.2:

(a) Detail 5 – Add note "Compact subgrade. Modify top 6" of grade with lime and compact per paving specifications."

(b) Detail 7 – Change "Re:C6.2/5" to "Re: C6.2/8."

(c) Detail 8 – Add note: "Pipe thickness shall be 0237" min. (Schedule 40)."

(d) Detail 15 – Add note: "Match existing crosswalks for dimensions of lines."

(6) Sheet C6.3:

(a) Details 1 through 6 – Provide 20' x 20' reinforced concrete slab with 4" wwm for all shelters. Base material to be compacted gravel on compacted sub-base.

(b) Shelter Details 5 and 6 – Type of footing (spread column footing shown in detail 6 or round column footing shown in detail 5) is contractor's option. All concrete is provided by contractor, and shall be 4000 psi. Anchor bolts ¾" x 12" with 10" embedment. Provide a full depth expansion joint between concrete slabs on grade and vertical structure surfaces such as foundations.

(c) General Note: The following notes are added:

1. "Provide control joints for concrete slabs at 10' o.c. each way per detail 2, drawing C6.1, unless indicated otherwise in the drawing."

2. "Provide three moveable picnic tables (as specified in Section 02870 Site Furnishings) for each shelter on the plans, details 1 and 2, drawing C6.2."

(7) Sheets L1.1 through L1.3 :

(a) Note #12 as is deleted and is replaced by the following note:

"12. The base bid requires sod for turf establishment around all inlet areas (15' x 15' min.), for all slopes exceeding 3:1, and in drainage swale locations."

(b) In the PLANT SCHEDULE, all references to "MS" are changed to "PTL" and all references to "Maiden Grass" is changed to "Miscanthus Grass".

(8) Sheets A1.11 through A1.15 : The following note is added to the C4, C7 & C8 Unit Plan General Notes:

"All "C" type units have existing full basements."

2. Offerors are required to acknowledge receipt of this amendment on the Proposal Form, in the space provided, or by separate letter or telegram prior to receipt of offers. Failure to acknowledge all amendments may cause rejection of the offer.

3. Offers will be received until 2:00 p.m. local time at place of receipt of offers, 27 August 2002 in Room 757, Federal Building, 601 E. 12th Street, Kansas City, Missouri 64106-2896.

Encls
Spec pages as listed

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

SPECIFICATIONS FOR CONSTRUCTION OF
IMPROVE MILITARY FAMILY
HOUSING, PHASE 3
WHITEMAN AIR FORCE BASE, MISSOURI

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SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACA41-02-R-0010	[ ] SEALED BID *(IFB)* [X] NEGOTIATED *(RFP)*	7/26/2002	1

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

4.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.
		47501 & 53439

7. ISSUED BY CODE	8. ADDRESS OFFER TO
U.S. Army Engineer District, Kansas City 760 Federal Building, 601 E. 12th Street Kansas City, Missouri 64106-2896 Tel: (816) 983-3802 Fax: (816) 426-5169	See Item 7

9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. *(Include area code)*	
	Pamela Wellons	816-983-3802 Ext.	(NO COLLECT CALLS)

SOLICITATION

NOTE: In sealed bid solicitation "offer" and "offeror" mean "bid" and "Bidder".

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

IMPROVE MILITARY FAMILY HOUSING, PHASE 3
WHITEMAN AIR FORCE BASE, MISSOURI

11. The Contractor shall begin performance within 10 calendar days and complete it within ** calendar days after receiving [ ] award [X] notice to proceed. This performance period is [ ] mandatory, [X] negotiable. ** See 00800)

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

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and *** copies to perform the work required are due at the place specified in Item 8 by 2:00 p.m. local time 8/27/2002 *(date).* If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelolpes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.
*** See 00110

B. An offer guarantee [X] is, [ ] is not required. NOT TO EXCEED 20% OF TOTAL BID AMOUNT

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.

00010-1

OFFER *(Must be fully completed by offeror)*

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*

DUNS NO:

CODE FACILITY CODE

15. TELEPHONE NO. *(Include area code)*

(FAX #)

16. REMITTANCE ADDRESS (Include only if different from Item 14)

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 requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.*

AMOUNTS: See attached Proposal Schedule.

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

19. ACKNOWLEDGEMENT OF AMENDMENTS

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

AMENDMENT NO.								
DATE								

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

AWARD *(To be completed by Government)*

21. ITEMS ACCEPTED

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN ITEM *(4 copies unless otherwise specified)*

26. ADMINISTERED BY CODE

25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO

☐ 10 U.S.C. 2304(c) ( ) ☐ 41 U.S.C. 253(c) ( )

27. PAYMENT WILL BE MADE BY

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

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

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

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type of print)*

31A. NAME OF CONTRATING OFFICER *(Type or print)*

30B. SIGNATURE	31b. UNITED STATED OF AMERICA	31C. AWARD DATE

SECTION 01100

GENERAL

PART 1 GENERAL

1.1 INQUIRIES

Pursuant to SECTION 00100 paragraph titled "Instructions to Offerors--Competitive Acquisition", 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: Mr. Richard Whitesell. Inquiries for which oral explanation or advice on the plans and specifications will suffice may be referred to Mr. Whitsell by calling Area Code 816-983-3465. 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 SUPERINTENDENCE OF SUBCONTRACTORS

(a) The Contractor shall be required to furnish the following:

(1) If more than 50% and less than 70% of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(2) If 70% or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(b) If the Contracting Officer, at any time after 50% of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirement for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.3 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.

1.4 WORK DELAYS

The Contractor may anticipate a work delay of up to 10 working days during the contract period due to Whiteman AFB operations. This time is included in the overall contract completion time and iwll be included in the Contractor's proposal price. During this work delay, no site access to any of the work areas will be allowed. The Contracting Officer will provide 48 hours notice to the Contractor prior to the work delay.

1.5 EMERGENCY OUTAGES

The Contractor shall notify the Contracting Officer immediately when an emergency outage of a utility occurs due to Contractor cutting or damaging the utility. No outage shall exceed four (4) hours in duration. The Contractor shall bear the cost for all repairs. The following list of contacts shall also be informed when an outage occurs.

SECURITY SENSORS	509 SFS/SPOSS 2154 CS/SCLGC
PHONE LINES COMMERCIAL	509 CS
SECURITY	509 CS/SCLGC
FIRE ALARMS	509 CES/DEF
POWER LINES COMMERCIAL	509 CS
SECURITY	509 SFS/SPOS
FIRE ALARMS	509 CES/DEF

1.6 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 offeror 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 Decisions of the Secretary of Labor, attached to and a part of this contract, all work required within 5 feet outside building lines shall be considered Residential Construction. All other construction not defined herein as Residential Construction shall be considered Heavy Construction.

1.7 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.

1.8 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.)

1.9 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.

1.10 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)

1.11 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.

1.12 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)

1.13 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.

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)	(5)	(5)	(5)	(5)	(5)	(4)	(4)	(4)	(4)	(3)	(6)

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

work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE titled "Default (Fixed Price Construction)." (ER 415-1-15)

1.14 WORKING HOURS

Working hours for this project will be limited to Monday through Friday, 7:30 a.m. to 4:30 p.m., except as follows: Work will not be permitted on weekends and Federal holidays. In unusual circumstances, such as when utility turn-off is required for an extended period of time, authorization for weekend or holiday work may be requested from the Contracting Officer; these instances must be coordinated well in advance, in writing. Likewise, utility turn-off of short duration or work which will disrupt normal operations or traffic flow must be scheduled at least 3 working days in advance and may require schedule changes to ensure that safety is maintained.

1.15 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 State Statute	coverage complying with applicable
Employers' Liability	minimum amount of $100,000.00
General Liability on Comprehensive Form of Policy which includes, but is not limited to, insurance for all work required herein	minimum limits of $500,000 per occurrence for bodily injury
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)

1.16 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.

1.17 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 DATE OF SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1)

(a) The date of the U.S. Army Corps of Engineers Safety and Health Requirements Manual in effect on the date of this solicitation is 3 September 1996. See Section 00700, Contract Clause titled "Accident Prevention."

(b) Section 06.I of EM 385-1-1 is deleted. Job hazard analysis for confined space entry procedures is still required, as per 01.A.09 of EM 385-1-1. OSHA Standards 29 CFR 1910.146 or 29 CFR 1926 shall apply.

(c) 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 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)

(g) Color Boards:

1. The Contractor shall submit a minimum of three (3) complete sets of color boards within 120 calendar days of receipt of Notice to Proceed. Construction color boards shall be submitted in a 3-ring notebook binder with all materials securely mounted on rigid 8-1/2 by 11-inch presentation (mat) board, with a maximum spread of 25-1/2 by 33 inches for foldouts, clearly coded regarding location of materials in the facility.

2. An index shall be provided listing pertinent contract specifications and drawings for each sample and any proposed substitutions or variances shall be so designated. The Contractor shall also certify, in writing, that all submittal items technically comply with the project specifications.

3. Color boards shall reflect all actual finish textures, patterns, and

colors required for this contract as specified on the Interior Room Finish Schedule, the Exterior Finish Schedule and Interior Finish Materials Legend located in the Contract Drawings, and the sample requirements of the submittal registers. All materials must be labeled with the manufacturer's name, pattern and color reference. Patterned material samples (i.e., carpet) must be of sufficient size to enable evaluation of the pattern. Samples shall be keyed or coded to match any key or code system in the Contract Drawings.

4. The Contractor shall express mail a minimum of three (3) copies of the color boards to the Contracting Officer. The Contracting Officer will forward one copy of the colorboards to CENWK-EC-D for review and concurrence. Concurrence or comments will be provided not later than 45 calendar days after receipt of the submittal. This paragraph does not cover the quality of finishing materials. The quality, physical requirements, and method of installation shall be submitted with the appropriate shop drawings. The Contractor shall not submit any of the above requirements with the color boards. Specific locations where the various materials are required are shown on the drawings.

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 DAMAGE TO WORK (1966 MAR OCE)

The responsibility for damage to any part of the permanent work shall be as set forth in the CONTRACT CLAUSE titled "Permits and Responsibilities." However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs as 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 work an equitable adjustment pursuant to CONTRACT CLAUSE titled, "Changes," of the contract, will be made as full compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

1.26 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.

1.27 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."

1.28 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.

1.29 UPKEEP OF ROADWAY AREAS WITHIN A MILITARY INSTALLATION WHICH THE CONTRACTOR USES

In addition to the requirements in CONTRACT CLAUSE titled "Operations and Storage Areas," the Contractor shall comply with the following requirements: Where the construction work is on or adjacent to, or involves hauling over public roads, streets, or highways located on a military installation, 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. The Contractor shall keep the roads including adjacent construction site free of debris including litter, waste construction material, mud etc., that might be caused to accumulate thereon by his operations, and upon completion of the work, shall clean up the said roads and construction site and repair any damage occasioned with his operations under this contract to the satisfaction of the Contracting Officer. The drainage from the roads shall not be obstructed by the construction work.

1.30 PROTECTION OF UTILITY LINES

(a) 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.

(b) All requests for access and/or locations must be made through the Contracting Officer's Representative (COR) or Resident Engineer. The Director of Public Works will work directly with the Resident Engineer to provide timely information to the Contractor.

1.31 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)

1.32 SECURITY MEASURES FOR STORAGE OF EXPLOSIVES ONSITE

When explosives are stored on the project site the following security measures shall be followed which are in accordance with the requirements contained in the Corps of Engineers Manual, EM 385-1-1, dated April 1981, as amended, Part II of the Federal Safety and Health Regulations; Metal and Nonmetallic Mine Safety, Title 30, Code of Federal Regulations, and Commerce in Explosives, Title 26, Code of Federal Regulations.

(a) The explosive storage area shall be provided with perimeter fence, chain link or other approved type, not less than 6 feet in height plus extension arms with three strands of barbed wire. The storage area shall be provided with a gate which shall be secured with a chain and padlock. The gate shall be locked at all times except when explosives are being removed or placed in the area.

(b) Minimum distance between a storage magazine and the perimeter fence shall be 25 feet.

(c) The area outside the perimeter fence for a minimum distance of 10 feet and the area inside the perimeter fence shall be kept clear of vegetation and all combustible matter.

(d) The storage area shall be well lighted during the hours of darkness. (MRD Ltr, 16 May 73, HST - 11, 30, 31 23 Apr 75)

1.33 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."

1.34 UNEXPECTED DISCOVERY OF ASBESTOS ON CONSTRUCTION (RENOVATION AND DEMOLITION)

The buildings and areas to be renovated or demolished have been surveyed for the presence of asbestos-containing materials. This survey is not a warranty that asbestos-containing materials are either not present or limited to the amounts found in the survey. Should suspected asbestos-containing material be encountered, the Contractor shall promptly, and before the conditions or the substance encountered is disturbed, give a written notice to the Contracting Officer of the suspected asbestos-containing material conditions encountered. As directed by tee Contracting Officer, the Contractor shall remove and dispose of any and all asbestos-containing material as necessary to accomplish the required work which shall be performed in accordance with all pertinent local, state, and federal laws. An equitable adjustment will be made to the Contractor in accordance with the CONTRACT CLAUSE entitled "Changes", for the additional work directed by the Contracting Officer.

1.35 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.

1.36 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."

1.37 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.

1.38 ENCOUNTERING EXISTING UNDERGROUMD UTILITIES

During any excavation activity, existing underground utilities encountered shall be immediately reported to the Contracting Officer.

Within 48 hours of encountering underground utilities, the Contractor shall submit to Contracting Officer a marked-up copy of contract drawing that best represents the location, general description and approximate depth of the utilities below finished grade.

Also, the Contractor shall incorporate the above information in required

marked-up full scale contract drawing indicating as-built conditions in accordance with all contract provisions pertaining to "As-Built Drawings."

1.39 DAILY WORK SCHEDULES

In order to closely coordinate work under this contract, the Contractor shall prepare for and attend a weekly coordination meeting with the Contracting Officer and Using Service at which time the Contractor shall submit for coordination and approval, his proposed daily work schedule for the next 2-week period. Required temporary utility services, time and duration of interruptions, road cuts, and repairs requiring traffic control, and protection of adjoining areas shall be included with the Contractor's proposed 2-week work schedule. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings.

1.40 SITE FENCING AND MOWING

The Contractor shall provide orange snow fencing around the entire work site; all site storage areas are considered a part of the work site. When grass/weeds exceed six inches in height, all areas contained by orange snow fencing shall be mowed. Snow fencing on pavement shall be supported by weighted orange barrels.

1.41 deleted

1.42 CLEANLINESS OF PAVED SURFACES

When paved surfaces are jointly used by the Air Force and Contractor, the Contractor shall keep all paved surfaces, such as runways, taxiways, and hardstands, clean at all times and, specifically, free from small stones which might damage aircraft propellers or jet aircraft.

1.43 WORK ON WEEKENDS OR HOLIDAYS

If the Contractor intends to work on weekends or holidays that will require the use of the south gate, the Contractor shall notify the Security Police and the Resident Office by noon the Thursday prior to the weekend or 48 hours prior to a holiday.

1.44 UTILITY MARKING

The Contractor shall be required at the request of other contractors working in the area to flag the utilities being installed on this contract within 14 days of the request by the other contractor working in the area.

1.45 SPECIAL SAFETY REQUIREMENTS

The Contractor shall comply with Air Force and local fire regulations and NFPA 241-1986 "Safeguarding Building Construction and Demolition Operations." Fire extinguishers rated and approved by the National Fire Protection Association, of sufficient size, type, and quantity to cope with all known hazards, shall be provided by the Contractor at the construction

site during the execution of this contract; the extinguishers shall be removed upon acceptance of the project.

1.46 BASE POLICY FOR THE OPERATION OF ALL HYDRANTS AND VALVES ON THE BASE WATER DISTRIBUTION SYSTEM

The following is the base policy for the operation of all hydrants and valves on the base water distribution system:

a. The fire alarm communication center will be immediately notified at 4507 or 4508, of out-of-service hydrants, sprinkler system, stand pipes, etc. The alarm room will also be notified when hydrants are returned to service.

b. Civil Engineering personnel are responsible for operation of all valves and are the only one to open or close these valves. In an emergency (water main break) a Contractor may close a valve and notify the Fire Department at 4507 or 4508 and Mains Maintenance at 6357 immediately.

c. When fire hydrants are out-of-service the Fire Department will immediately place a metal placard 12 inches in diameter with waterproof white letters on a red background reading "OUT-OF-SERVICE". The placards will be placed in a way that identifies hydrants from approaching direction.

d. When fire hydrants are placed back in service, the Fire Department will immediately remove placards.

e. Every effort will be made to return hydrants to service as soon as possible. Hydrants awaiting parts will be assigned an emergency work order. When hydrants are shut down due to construction, call the Fire Department as listed above.

f. The use of fire hydrants by other than fire protection personnel will be coordinated and approved by the Base Fire Chief. Such use will not render the hydrant inoperative for fire protection operations.

1.47 POLICY FOR STORAGE OF HAZARDOUS MATERIALS ON CONSTRUCTION SITES

The following is the policy for storage of hazardous materials on construction sites located at Whiteman AFB MO.

a. Definition of hazardous materials is any substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, and is likely to cause death injury.

b. Hazardous material will not be stored in Government facilities, without special authorization from base. Contact point will be the Fire Department at extension 6080.

c. Each construction site shall have a hazardous material storage area. This area will be the only location that hazardous material shall be stored on a construction site. Exceptions must have prior written approval from the base. Contact point will be the Fire Department at extension 6080.

d. Number every trailer, building and shed with a number at least 6 inches by 4 inches; this number will correspond with the numbers listed below in item e.1.

e. The Contractor will provide an emergency folder that will be kept on-site and up-to-date at all times (on the injury board). This folder shall contain:

(1) Construction site map identifying every road, building, trailer, and shed on site by number, as well as hazardous material storage location.

(2) A copy of every MSDS (material safety data sheet) with amount and location of all hazardous material on site.

f. The Contractor will also provide a copy of each map and MSDS to the Base Fire Department, Building 34 (Dispatch Office) immediately upon delivery of all hazardous material to construction site.

1.48 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)

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 --

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		02220	SD-03 Product Data, Work Plan	1.3													
		02241	SD-03 Product Data, Work Plant, Equipment,														
			Machine and Tools	1.4													
			SD-06 Test Reports, Sampling & Testing,														
			Field Density	1.4													
			SD-09 Manufacturer's Field Reports, Waybills &														
			Delivery Tickets, Coarse Aggregate	1.4													
		02300	SD-03 Product Data, Earthwork	1.3													
			SD-07 Certificates, Testing	1.3													
		02315	SD-06 Test Reports, Testing	1.3													
		02316	SD-06 Test Reports, Field Density Tests,														
			Testing of Backfill Materials	1.3													
		02361	SD-04 Samples, Pesticides	1.2													
			SD-07 Certificates, Qualifications of pesticide														
			applicators	1.2													
			SD-08 Manufacturer's Instructions, Pesticides	1.2													
			SD-11 Closeout Submittals, Warranty	1.2													
			SD-11 Closeout Submittals, Application report	1.2													
		02531	SD-02 Shop Dwgs, Liner,Curing Detls,Serv.Cor	1.3													

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			SD-02 Shop Dwgs, Design Calcs for CIPP	1.3													
			SD-03 Product Data, Data Sheets, Lining Mat'ls	1.3													
			SD-03 Product Data, Data Sheets, Resins	1.3													
			SD-03 Product Data, Data Sheets, Stor.Proced.	1.3													
			SD-03 Product Data, Temp.Control	1.3													
			SD-03 Product Data, Curing	1.3													
			SD-03 Product Data, Serv.Conn.Methods	1.3													
			SD-03 Product Data, Trimming & Finishing	1.3													
		02532	SD-02 Shop Drawings, Method of Constr&Rest	1.3													
			SD-03 Product Data, Data Sheets, New Pipe	1.3													
			SD-03 Product Data, Data Sheets, Couplings	1.3													
			SD-03 Product Data, Data Sheets, Bursting Sys	1.3													
			SD-07 Certificates, Workmen Training	1.3													
		02630	SD-02 Shop Drawings, Precast Concrete Struct	1.2													
			SD-02 Shop Drawings, Metal Items	1.2													
			SD-03 Product Data, Cast-iron Soil Piping	1.2													
			SD-03 Product Data, Clay Piping	1.2													
			SD-03 Product Data, Concrete Piping	1.2													
			SD-03 Product Data, Corrug.Alum.Piping	1.2													
			SD-03 Product Data, Corrug.Steel Piping	1.2													
			SD-03 Product Data, Comp.Plast.Piping	1.2													
			SD-03 Product Data, Polyvinyl Chloride Piping	1.2													
			SD-03 Product Data, Corr.Plastic Piping	1.2													

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			SD-03 Product Data, Subsur.Drainage Piping	1.2													
			SD-04 Samples, Pipeline Materials	1.2													
			SD-07 Certificates, Pipeline & Fittings	1.2													
			SD-07 Certificates, CI Frames,Covers&Gratings	1.2													
			SD-07 Certificates, Precast Conc.Structures	1.2													
		02713	SD-03 Product Data,Job-Mix Formula Mix Desig	1.2													
			SD-03 Prod.Data,Job-Mix Formula Waybills&De	1.2													
			SD-06 Test Reports, Sampling&Testing	1.2													
		02744A	SD-03 Product Data, Job Mix Certification	1.2													
			SD-03 Product Data, Waybills&Delivery Tickets	1.2													
			SD-03 Product Data, Waybills&Deli.Tick.dur.job	1.2													
			SD-06 Test Reports, Sampling&Testing	1.2													
		02744N	SD-06 Test Reports, Emulsified Asphalt	1.2													
		02770	SD-03 Product Data, Concrete	1.2													
			SD-06 Test Reports, Field Quality Control	1.2													
		02832	SD-02 Shop Drawings, Retaining Wall Design	1.3													
			SD-03 Product Data, Manufacturer's Data	1.3													
			SD-03 Product Data, Qualifications	1.3													
			SD-03 Product Data, Soil Testing	1.3													
			SD-03 Product Data, Reinforcement Testing	1.3													

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			SD-03 Product Data, Calculations	1.3													
			SD-04 Samples, Segmental Concrete Units	1.3													
			SD-04 Samples, Reinforcement	1.3													
			SD-07 Certificates, Reinforcement	1.3													
		02870	SD-02 Shop Drawings, Site Furnishing Stds	1.3													
			SD-03 Product Data, Site Furnishings	1.3													
			SD-03 Product Data, Installation	1.3													
			SD-03 Product Data, Materials	1.3													
			SD-04 Samples, Finish	1.3													
			SD-06 Test Reports, Recycled Material	1.3													
			SD-06 Test Reports, Post-installation	1.3													
		02882	SD-02 Shop Drawings	1.04													
			SD-03 Product Data	1.04													
			SD-04 Samples	1.04													
			SD-07 Certificates, Warranty	1.04													
		02921A	SD-03 Product Data, Equipment	1.2													
			SD-03 Product Data, Surface Erosion Ctrl Mat'l	1.2													
			SD-03 Product Data, Chemical Treatment Mat'l	1.2													
			SD-03 Product Data, Delivery	1.2													
			SD-03 Product Data, Finished Grade Status	1.2													
			SD-03 Product Data, Topsoil	1.2													
			SD-03 Product Data, Quantity Check	1.2													

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			SD-03 Product Data, Seed Est. Period	1.2													
			SD-03 Product Data, Maintenance Record	1.2													
			SD-03 Product Data, Application of Pesticide	1.2													
			SD-04 Samples, Delivered Topsoil	1.2													
			SD-04 Samples, Soil Amendments	1.2													
			SD-04 Samples, Mulch	1.2													
			SD-06 Test Reports, Equipment Calibration	1.2													
			SD-06 Test Reports, Soil Test	1.2													
			SD-07 Certificates, Seed	1.2													
			SD-07 Certificates, Topsoil	1.2													
			SD-07 Certificates, pH Adjuster	1.2													
			SD-07 Certificates, Fertilizer	1.2													
			SD-07 Certificates, Organic Material	1.2													
			SD-07 Certificates, Soil Conditioner	1.2													
			SD-07 Certificates, Mulch	1.2													
			SD-07 Certificates, Asphalt Adhesive	1.2													
			SD-07 Certificates, Pesticide	1.2													
		02922A	SD-03 Product Data, Equipment	1.2													
			SD-03 Product Data, Chemical Treatment Mat'l	1.2													
			SD-03 Product Data, Delivery Schedule	1.2													
			SD-07 Product Data, Finished Grade & Topsoil	1.2													
			SD-07 Product Data, Topsoil	1.2													
			SD-07 Product Data, Quantity Check	1.2													
			SD-07 Product Data, Sod Establishment Period	1.2													

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			SD-07 Product Data, Maintenance Record	1.2													
			SD-07 Product Data, Application of Pesticide	1.2													
			SD-04 Samples, Delivered Topsoil	1.2													
			SD-04 Samples, Soil Amendments	1.2													
			SD-04 Samples, Temporary Seeding	1.2													
			SD-06 Test Reports, Equipment Calibration	1.2													
			SD-06 Test Reports, Soil Test	1.2													
			SD-07 Certificates, Sod	1.2													
			SD-07 Certificates, Topsoil	1.2													
			SD-07 Certificates, pH Adjuster	1.2													
			SD-07 Certificates, Fertilizer	1.2													
			SD-07 Certificates, Organic Material	1.2													
			SD-07 Certificates, Soil Conditioner	1.2													
			SD-07 Certificates, Pesticide	1.2													
		02930A	SD-02 Shop Drawings, Landscape Plan	1.2													
			SD-02 Shop Drawings, Fin.Gr.Topsoil & Un.Util	1.2													
			SD-03 Product Data, Geotextile	1.2													
			SD-03 Product Data, Chemical Treatment Mat'l	1.2													
			SD-03 Product Data, Equipment	1.2													
			SD-03 Product Data, Delivery	1.2													
			SD-03 Product Data, Plant Est. Period	1.2													
			SD-03 Product Data, Maintenance Record	1.2													
			SD-03 Product Data, Application of Pesticide	1.2													
			SD-04 Samples, Delivered Topsoil	1.2													

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			SD-04 Samples, Soil Amendments	1.2													
			SD-04 Samples, Mulch	1.2													
			SD-04 Samples, Geotextile	1.2													
			SD-06 Test Reports, Soil Test	1.2													
			SD-06 Test Reports, Percolation Test	1.2													
			SD-07 Certificates, Plant Material	1.2													
			SD-07 Certificates, Topsoil	1.2													
			SD-07 Certificates, pH Adjuster	1.2													
			SD-07 Certificates, Fertilizer	1.2													
			SD-07 Certificates, Organic Material	1.2													
			SD-07 Certificates, Soil Conditioner	1.2													
			SD-07 Certificates, Organic Mulch	1.2													
			SD-07 Certificates, Mycorrhizal Fungi Inoculum	1.2													
			SD-07 Certificates, Pesticide	1.2													
			SD-10 O&M Data, Maintenance Instructions	1.2													
		03100	SD-03 Product Data, Form Materials	1.2													
			SD-03 Product Data, Form Releasing Agents	1.2													
		03200	SD-02 Shop Drawings, Conc.Reinf.System	1.2													
			SD-07 Certificates, Reinforcing Steel	1.2													
		03300	SD-03 Product Data, Mixture Proportions	1.2													
			SD-06 Test Reports, Testing&Insp. For CQC	1.2													
			SD-07 Certificates, Qualifications	1.2													

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			SD-07 Certificates, Materials Certification	1.2													
		04200	SD-03 Product Data, Clay or Shale Brick	1.2													
			SD-03 Product Data, Conc. Masonry Units	1.2													
			SD-04 Samples, Clay or Shale Brick	1.2													
			SD-04 Samples, Portable Panel	1.2													
			SD-06 Test Reports, Efflorescence Test, Field														
			Testing of Mortar	1.2													
			SD-06 Test Reports, Field Testing of Grout	1.2													
			SD-06 Test Reports, Prism Tests, Masonry	1.2													
			SD-06 Test Reports, Special Inspection	1.2													
			SD-06 Test Reports, Masonry Inspector Rpts	1.2													
			SD-07 Certificates, Clay or Shale Brick	1.2													
			SD-07 Certificates, Concrete Masonry Units	1.2													
			SD-07 Certificates, Anchors,Ties,Exp.Jt Matls	1.2													
			SD-07 Certificates, Joint Reinforcement	1.2													
			SD-07 Certificates, Reinf.Steel Bars & Rods	1.2													
			SD-07 Certificates, Masonry Cement	1.2													
			SD-07 Certificates, Mortar Coloring	1.2													
			SD-07 Certificates, Mortar Admixtures	1.2													
			SD-07 Certificates, Grout Admixtures	1.2													
			SD-08 Manu.Instr., Cold Weather Installation	1.2													
		05120	SD-02 Shop Drawings, Erection Plan	1.3													
			SD-07 Certificates, Mill Test Reports	1.3													

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		05500	SD-02 Shop Drawings, Misc. Metal Items	1.1													
		06100	SD-02 Shop Drawings, Trussed Rafters	1.2													
			SD-05 Design Data, Trussed Rafters	1.2													
			SD-06 Test Reports, Preserv.-trtd Lumber&Plyw	1.2													
		06200	SD-02 Shop Drawings, Prefab. Millwork	1.2													
			SD-07 Certificates, Certificates of Grade	1.2													
			SD-07 Certificates, Certificates of Compliance	1.2													
		07311	SD-03 Product Data, Roofing System	1.2													
			SD-04 Samples, Finishes	1.2													
		07413	SD-02 Shop Drawings, Metal Siding	1.3													
			SD-04 Samples, Accessories	1.3													
			SD-04 Samples, Gutters & Downspouts	1.3													
			SD-08 Manuf.Instr., Gutters & Downspouts	1.3													
			SD-08 Manuf.Instr., Wall Panels	1.3													
		07920	SD-03 Product Data, Sealant	1.2													
			SD-07 Certificates, Sealant	1.2													
		08210	SD-02 Shop Drawings, Doors	1.2													
			SD-03 Product Data, Doors	1.2													

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			SD-03 Product Data, Accessories	1.2													
			SD-03 Product Data, Sample warranty	1.2													
			SD-03 Product Data, Fire Resistance Rating	1.2													
		08361	SD-02 Shop Drawings, Doors	1.2													
			SD-03 Product Data, Doors	1.2													
			SD-08 Manuf.Instr., Doors	1.2													
			SD-10 Operation & Maintenance Data, Doors	1.2													
		08610	SD-02 Shop Drawings, Windows	1.3													
			SD-02 Shop Drawings, Doors	1.3													
			SD-03 Product Data, Windows	1.3													
			SD-03 Product Data, Doors	1.3													
			SD-03 Product Data, Insect Screens	1.3													
			SD-04 Samples, Finish	1.3													
			SD-07 Certificates, Windows	1.3													
			SD-07 Certificates, Doors	1.3													
			SD-08 Manuf.Instr., Installation	1.3													
		08710	SD-02 Shop Drawings, Hardware Schedule	1.2													
			SD-02 Shop Drawings, Keying System	1.2													
			SD-03 Product Data, Hardware Items	1.2													
			SD-08 Manuf.Instr., Installation	1.2													
			SD-10 Oper.&Maint.Data, Hdwe Schedule Items	1.2													
			SD-11 Closeout Submittals, Key Bitting	1.2													

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		09250	SD-04 Samples, Knock Down Texture Coating	1.3													
			SD-07 Certificates, Gypsum Wallboard	1.3													
			SD-07 Certificates, Water-Resist. Gypsum Bd	1.3													
		09310	SD-03 Product Data, Tile	1.2													
			SD-03 Product Data, Mortar, Grout & Adhesive	1.2													
			SD-04 Samples, Tile	1.2													
			SD-07 Certificates, Tile	1.2													
			SD-07 Certificates, Mortar, Grout & Adhesive	1.2													
			SD-08 Manuf.Instr., Tile	1.2													
			SD-08 Manuf.Instr., Mortar & Grout	1.2													
		09650	SD-03 Product Data, Resilient Flooring & Acces	1.2													
			SD-04 Samples, Resilient Flooring & Acces.	1.2													
		09680	SD-03 Product Data, Carpet & Accessories	1.2													
			SD-04 Samples, Carpet & Accessories	1.2													
		09900	SD-03 Product Data, Paint	1.2													
			SD-07 Certificates, Lead	1.2													
			SD-07 Certificates, Mildewcide & Insecticide	1.2													
			SD-07 Certificates,Volatile Org.Compnd Cont.	1.2													
			SD-08 Manuf.Instr., Mixing & Thinning	1.2													
			SD-08 Manuf.Instr., Application	1.2													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Improve Family Housing FY 2002, Whiteman AFB, MO

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
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		09915	SD-04 Samples, Color board	1.3													
		10800	SD-03 Product Data, Finishes	1.2													
			SD-03 Product Data, Accessory Items	1.2													
		10900	SD-04 Samples, Color	1.2													
			SD-07 Certificates, List of Materials	1.2													
			SD-08 Manuf. Instr.	1.2													
		12390	SD-02 Shop Drawings, Cabinets & Countertops	1.10													
			SD-03 Product Data, Cabinets & Countertops	1.10													
			SD-04 Samples, Cabinets & Countertops	1.10													
			SD-07 Certificates, Compliance of Cabinets	1.10													
		13280A	SD-03 Product Data, Resp.Prot.Program	1.4													
			SD-03 Product Data, Cleanup & Disposal	1.4													
			SD-03 Product Data, Detailed Drawings	1.4													
			SD-03 Product Data - Materials & Equipment:	1.4													
			a. High Efficiency Filtered Air HEPA Equip	1.4													
			b. Vacuum cleaning equipment	1.4													
			c. Pressure differential monitor for HEPA Eq.	1.4													
			d. Air monitoring equipment	1.4													
			e. Respirators	1.4													
			f. Personal Prot. Clothing & Equipment:	1.4													

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			(1) Coveralls	1.4													
			(2) Underclothing	1.4													
			(3) Other work clothing	1.4													
			(4) Foot coverings	1.4													
			(5) Hard hats	1.4													
			(6) Eye protection	1.4													
			(7) Other items req.&appr. By Contrs Desig	1.4													
			g. Glovebag	1.4													
			h. Duct Tape	1.4													
			I. Disposal Containers:	1.4													
			(1) Disposal bags	1.4													
			(2) Fireboard drums	1.4													
			(3) Paperboard boxes	1.4													
			j. Sheet Plastic:	1.4													
			(1) Polyethylene Sheet-General	1.4													
			(2) Polyethylene Sheet - Flame Resistant	1.4													
			(3) Polyethylene Sheet-Reinforced	1.4													
			k. Wetting Agent:	1.4													
			(1) Amended Water	1.4													
			(2) Removal encapsulant	1.4													
			l. Strippable Coating	1.4													
			m. Prefabricated Decontamination Unit	1.4													
			n. Other items	1.4													
			o. Chemical encapsulant	1.4													
			p. Chemical encasement materials	1.4													
			q. Material Safety Data Sheets (all chemicals)	1.4													

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			SD-03 Product Data - Qualifications	1.4													
			Training Program	1.4													
			Medical Requirements	1.4													
			Encapsulants	1.4													
			SD-06 Test Reports	1.4													
			Exposure Assessment & Air Monitoring	1.4													
			Local Exhaust Ventilation	1.4													
			Licenses, Permits & Notifications	1.4													
			SD-07 Certificates	1.4													
			a. Vacuums	1.4													
			b. Water filtration equipment	1.4													
			c. Ventilation equipment	1.4													
			d. Other equipment req. to contain asbestos	1.4													
		13281A	SD-03 Product Data, Materials & Equipment	1.4													
			SD-03 Product Data, Expendable Supplies	1.4													
			SD-03 Product Data, Qualifications	1.4													
			SD-06 Test Reports, Pressure Differential Log	1.4													
			SD-06 Test Reports,Licenses,Permits & Notifica	1.4													
			SD-06 Test Reports, Accident Prevention Plan	1.4													
			SD-06 Test Reports, Sampling & Analysis	1.4													
			SD-06 Test Reports, Clearance Report	1.4													
		15190	SD-02 Shop Drawings, Gas Piping System	1.3													
			SD-06 Test Reports, Pressure Tests	1.3													
			SD-06 Test Reports, Tests with Gas	1.3													

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		15250	SD-04 Samples, Thermal Insulation Materials	1.3													
		15400	SD-03 Product Data, Plumbing Fixture Schedul	1.3													
		15566	SD-02 Shop Drawings, Heating Equipment	1.3													
			SD-02 Shop Drawings, Installation	1.3													
			SD-03 Product Data, Heating Equipment	1.3													
			SD-10 Oper.& Maint.Data, Heating Equipment	1.3													
		15730	SD-02 Shop Dwgs, Field-Assbld Refrig.Piping	1.2													
			SD-02 Shop Dwgs, Control Sys. Wiring Diagran	1.2													
			SD-03 Product Data, Air Conditioners	1.2													
			SD-03 Product Data, Filters	1.2													
			SD-03 Product Data, Thermostats	1.2													
			SD-03 Product Data, Refrig. Piping & Access.	1.2													
			SD-06 Test Reports, Salt-spray Tests	1.2													
			SD-06 Test Reports, Start-up & Initial Oper.Tes	1.2													
			SD-07 Certificates, Year 2000 Compliance War	1.2													
			SD-08 Manuf.Instr., Air Conditioners	1.2													
			SD-08 Manuf.Instr., Filters	1.2													
			SD-08 Manuf.Instr., Thermostats	1.2													
			SD-08 Manuf.Instr., Refrig. Piping & Access.	1.2													
			SD-10 Oper.&Maint.Data, Air Conditioners	1.2													
			SD-10 Oper.&Maint.Data, Filters	1.2													
			SD-10 Oper.&Maint.Data, Thermostats	1.2													

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		15895	SD-03 Product Data, Components	1.2													
		16415	SD-03 Product Data, Manufacturer's Catalog	1.3													
			SD-03 Product Data, Matl, Equip.& Fixture Lists	1.3													
			SD-07 Certificates, Materials & Equipment	1.3													
		16528	SD-03 Product Data, Equipment & Materials	1.2													

DIVISION 2 – SITE WORK

02050	Demolition
02110	Clearing and Grubbing
02241	Aggregate Base Course
02300	Earthwork
02315	Excavation, Filling and Backfilling for Structures
02316	Excavation, Filling and Backfilling for Utilities Systems
02361	Soil Treatment for Subterranean Termite Control
02531	Cured-In-Place Pipe (CIPP)
02532	Pipe Bursting
02630	Storm Drainage
02713	Bituminous Base Course
02730	Sanitary Sewers
02744A	Bituminous Road-Mix Surface Course
02744N	Bituminous Tack Coats
02763	Pavement Marking
02770	Concrete Sidewalks and Curbs and Gutters
02832	Segmental Concrete Block Retaining Wall
02870	Site Furnishings
02882	Recreation Facility Playgrounds
02921	Seeding
02922	Sodding
02930	Exterior Planting
02964	Cold Milling of Bituminous Pavements

SECTION 02531
CURED-IN-PLACE PIPE (CIPP)

1 GENERAL

1.1 SCOPE

This Specification covers the work necessary to furnish and install complete, the cured-in-place pipe (CIPP). The Contractor shall provide all materials, labor, equipment, and services necessary for bypass pumping and/or diversion of sewage flows, cleaning and television inspection of sewer to be lined, finer installation, reconnection of service connections, and final television inspection and testing of lined pipe system.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

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

ASTM D543	Standard Test Methods for Resistance of Plastics to Chemical Reagents
ASTM D790	Standard Test Methods for Unreinforced and Reinforced Insulating Materials Flexural Properties of Plastics and Electrical
ASTM F1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin-impregnated Tube

1.3 SUBMITTALS

Government approval is required for all submittals. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Construction details control, handling and inserting the liner, curing details, service connection methods, and trimming and finishing. The Contractor shall also provide manufacturers' certification, field measurements, and pipe sizing calculations, which demonstrate that the liner has been properly undersized to avoid the creation of wrinkles or folds.

The CIPP shall be designed to a minimum wall thickness based on the individual project parameters and the condition of the existing conduit. Prior to installation of the liner, design calculations shall be submitted to determine the minimum thickness of the liner to be installed. The pipe design shall have sufficient strength to support all dead loads, live loads and groundwater loads imposed.

SD-03 Product Data

Data Sheets

Lining materials, resins, storage procedures, temperature control, curing, service connection methods, trimming and finishing

SD-07 Certificates

Liner materials are in compliance with the specifications, codes, and standards.

1.4 QUALITY ASSURANCE

1.4.1 The finished liner shall be continuous over the entire length of an insertion run between two (2) manholes or access points and shall be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination.

1.4.2 Wrinkles in the finished liner pipe that reduce the hydraulic capacity of the pipe are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense. Methods of repair shall be proposed by the Contractor and submitted to the Contracting Officer or his/her designated representative for review.

1.4.3 When cured the CIPP shall form a mechanical bond with the existing pipe.

1.4.4 The finished pipe must be such that when the thermosetting resin cures, the total wall thickness will be a homogeneous and monolithic felt and resin composite matrix that will be chemically resistant to withstand internal exposure to domestic sewerage.

2 PRODUCTS

2.1 MATERIALS

2.1.1 Liner Tube

2.1.1.1 The liner tube shall consist of one (1) or more layers of flexible needled felt or an equivalent woven and/or non-woven material capable of carrying resin, withstanding installation pressures and curing temperatures, and is compatible with the resin system used. The liner shall be fabricated to a size that, when installed, will fit the internal circumference of the existing pipe without any annular space between the liner and existing pipe wall.

2.1.1.2 The resin used shall be compatible with the rehabilitation process, shall be able to cure in the presence or absence of water and the initiation temperature for cure shall be as recommended by the resin manufacturer and reviewed by the Contracting Officer or his/her designated representative.

2.1.1.3 The liner shall be fabricated from materials which when cured, will be chemically resistant to withstand internal exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, methane, petroleum hydrocarbons, saturation with moisture, diluted sulfuric acid, and other chemical reagents determined by the Contracting Officer or his/her designated representative.

2.1.1.4 The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance from the inlet to the outlet of the respective access points. The Contractor shall verify the lengths in the field before impregnation of the tube with resin.

2.1.1.5 Prior to insertion, the liner shall be free of all visible tears, holes, cuts, foreign materials, and other defects.

2.1.1.6 Prior to insertion, the Contractor shall provide data on the maximum allowable stresses and elongation of the tube. The exterior of the manufactured tube shall be marked along its length at regular intervals not to exceed five (5) feet. These marks shall be used as a gauge to measure elongation during insertion. Should the overall elongation of a reach exceed five percent (5%), the liner tube shall be rejected and replaced.

2.1.2 Resin

2.1.2.1 Unless otherwise specified, provide a general purpose, unsaturated, thermosetting, polyester, vinylester, or epoxy resin able to cure in the presence or absence of water, and a catalyst system compatible with the insertion process.

2.1.2.2 Resin shall not be subjected to ultraviolet light and shall form no excessive bubbling or wrinkling during lining.

2.2 PHYSICAL PROPERTIES

2.2.1 The CIPP system shall conform to and comply with the minimum standards listed below.

Characteristic	Test Method	Polyester Resin	Vinylester & Epoxy Resins
Flexural Strength	ASTM D790	4,500 psi	5,000 psi
Flexural Modulus (short term)	ASTM D790	250,000 psi	300,000 psi
Flexural Modulus (long term)		125,000 psi	150,000 psi

3 EXECUTION

3.1 PREPARATION

3.1.1 Bypass Pumping

3.1.1.1 The Contractor shall provide bypass pumping and/or diversion when required for acceptable completion of the liner installation. Bypass pumping shall consist of furnishing, installing, and maintaining all power, primary and standby pumps, appurtenances and bypass piping required to maintain existing flows and services.

3.1.1.2 Bypass pumping shall be done in such a manner as not to damage private or public property, or create a nuisance or public menace. The pumped sewage shall be in an enclosed hose or pipe that is adequately protected from traffic, and shall be redirected into the sanitary sewer system. Dumping or free flow of sewage on private property, gutters, streets, sidewalks, or into storm sewers is prohibited.

3.1.1.3 The Contractor shall take all necessary precautions including constant monitoring of bypass pumping to insure that no private residences or properties are subjected to a sewage backup or spill. The Contractor shall be liable for all cleanup, damages, and

resultant fines in the event of a spill. After the work is completed, flow shall be restored to normal.

3.1.2 Cleaning and Inspection of Existing Sewer

The Contractor shall be responsible for cleaning, inspecting, confirming the inside diameter and determining the condition of each segment to be lined. The cleaning process shall include the removal of all roots. The Contractor shall perform a television inspection after the sewer cleaning operation, point repairs, and grouting is completed. The television inspection shall be completed in the same direction each time and shall be done with a CCTV color camera recorded in VHS format. A pivot head camera shall be used for all pipelines that are six- (6-) inches in diameter or greater to allow detailed lateral inspection. A copy of the television inspection videotapes from all televising operations shall be provided to the Contracting Officer or his/her designated representative for review prior to the liner installation.

3.1.3 Point Repairs

It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, offset joints, protruding service connections or collapsed pipe that will prevent liner insertion. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or by remotely performed point repair methods acceptable to the Contracting Officer or his/her designated representative, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Before any point repair excavation is pursued, the Contractor shall give the Contracting Officer or his/her designated representative three (3) working days notice. Point repair excavation shall proceed only with the Contracting Officer or his/her designated representative's written authorization. Protruding laterals shall be removed either internally with a cutter or by external point repair.

3.1.4 Grouting of Severe Defects

It shall be the responsibility of the Contractor to grout severe open joints and cracks in the pipeline. The Contractor shall be required to grout all open joints and cracks that in the Contractor's opinion will impede the specified performance of the liner except that all open joints greater than one- (1) inch shall be grouted irrespective of the Contractor's assessment, an estimate of the number of locations to be grouted is provided in the bid schedule. The locations shall be determined by the Contractor based on videotapes provided with the Project Documents.

3.1.5 Existing Construction

The Contractor shall protect all existing structures, lines, etc., manholes to withstand forces generated by equipment, water or air pressure used while inserting the tube.

4 INSTALLATION

4.1 Resin Impregnation

4.1.1 The uncured resin in the original containers and the unimpregnated fiber-felt tube shall be impregnated by vacuum or other means prior to installation. The materials and 'wet-out' procedure shall be subject to inspection by the Contracting Officer or his/her designated representative. A resin and catalyst system that are compatible with the requirements of the method shall be used.

4.1.2 The impregnated liner bag shall be transported to and stored at the site in such a manner that it will not be damaged, exposed to direct sunlight, or result in any public safety hazard. The impregnated liner bag shall be kept cool during shipment and storage. All materials shall be subject to inspection and review prior to installation.

4.2 Liner Installation

4.2.1 The impregnated tube shall be inserted through access approved by the Contracting Officer or his/her designated representative by means of the installation process. The application of hydrostatic head, compressed air, or other means shall fully extend the liner to the next access or termination point and inflate and firmly adhere the liner to the pipe wall.

4.2.2 The liner shall be installed at a rate less than ten (10) feet per minute at all times.

4.3 Curing

4.3.1 After placement is completed a suitable heat source and distribution equipment shall be provided. The equipment shall be capable of circulating hot water, air, and/or steam throughout the section by means of a pre-strung hose which has been perforated in accordance with the manufacturer's recommendations or other methods acceptable to the Contracting Officer or his/her designated representative to raise the temperature uniformly above the temperature required to effect a resin cure. This temperature shall be determined by the manufacturer based on the resin/catalyst system employed.

4.3.2 The heat source piping shall be fitted with continuous monitoring thermocouples to gauge the temperature of the incoming and outgoing water, steam, and/or air supply. Water, steam, or air temperature during the cure period shall meet the requirements of the resin manufacturer as measured at the heat source inflow and outflow return lines. At the direction of the Contracting Officer or his/her designated representative, the Contractor shall provide standby equipment to maintain the heat source supply. An additional continuous monitoring thermocouple shall be placed between the impregnated felt tube and the pipe invert at the remote manhole and at a point midway between the upstream and downstream manholes to determine the temperature during the cure. The temperature during the cure shall not be less than 130 degrees F at the boundary between the pipe wall and the liner unless otherwise directed by the Contracting Officer or his/her designated representative because of the resin system used.

4.3.3 The initial cure shall be deemed to be completed when inspection of the exposed portions of the liner appear hard and sound and the remote temperature sensors indicate that an exotherm has occurred. The cure period shall be of duration recommended by the resin manufacturer during which time the recirculation of the water, steam, and/or air and cycling of the heat exchanger continuously maintain the required temperature.

4.3.4 Temperature shall be maintained during the curing period as recommended by the resin manufacturer, and shall follow the healing schedule supplied by the manufacturer and reviewed by the Contracting Officer or his/her designated representative.

4.4 Cool Down

4.4.1 The hardened liner shall be cooled to a temperature below 100 degrees F before relieving the static head or pressure in the lined pipe and returning normal flow back into the system. The cool down may be accomplished by introducing cool water or air into the lined pipe. Care shall be taken in the release of the static head or pressure so that a vacuum will not develop which could damage the newly installed liner.

4.4.2 If the liner tails to make a tight seal at the termination points, a seal consisting of a resin mixture compatible with the liner/resin system shall be applied in accordance with manufacturer specifications and approved by the Contracting Officer or his/her designated representative.

4.5 SERVICE LINE CONNECTION

4.5.1 The Contractor shall verify and certify by a written test report that service laterals to the main sewer are open and watertight. Connections shall be repaired as required by one of the following methods or as recommended by the CIPP manufacturer.

4.5.1.1 Internally reconnected by grouting the area where the service connection enters the pipe to produce a water tight seal approved by the Contracting officer or his/her designated representative. The hole shall be ninety-five (95) percent minimum and one-hundred (100) percent maximum of the original service connection diameter. The invert of the service connection shall match the bottom of the reinstated service opening.

4.5.1.2 By excavating by hand and/or mechanical equipment to the location of the service connections tie-in, cutting the existing pipe and liner material, and installing a saddle acceptable to the Contracting Officer or his/her designated representative. The excavation process shall be completed by mechanical means as defined in the project documents or by hand digging as required.

4.5.1.3 Other remote methods as approved by the Contracting Officer or his/her designated representative.

4.6 TESTING

4.6.1 Material Testing

4.6.1.1 All material testing shall be performed by a registered independent, third-party laboratory.

4.6.1.2 The Contractor shall provide certified test results of the short term properties of the cured lining material from the actual installed liner at locations selected by the Contracting Officer or his/her designated representative.

4.6.1.3 The cured liner shall be sampled and tested for flexural strength and flexural modulus (short term). Flexural strength and modulus shall be tested in accordance with the requirements of ASTM D790. The liner shall be in compliance with the physical properties stated above. A certificate of compliance shall be provided for long term flexural modulus.

4.6.1.4 Corrosion resistance requirements shall be as stated in ASTM Fl 216, Section X2, Chemical Resistance Tests.

4.6.1.5 Delamination testing shall be in accordance with ASTM F121 6, Section 8.4, if required by the Contracting Officer or his/her designated representative.

4.6.2 Field Testing

4.6.2.1 Test line for exfiltration in accordance with ASTM F1216, Section 8.2 prior to service line reconnections. Testing shall exclude maximum pressure limitation (4.3 psi) at lowest end. Leakage testing shall be performed after all dry and non-bondable hoses and tubes are completely removed from the pipe.

4.6.2.2 After completion of all liner insertions, service reconnections, and finish work at the manholes, the sewer shall be televised with a color CCTV tilt-head camera recorded in VHS format. The original tape shall be provided to the Contracting Officer or his/her designated representative.

-- End of Section --

SECTION 02532
PIPE BURSTING

1 GENERAL

1.1 SCOPE

This specification shall cover the rehabilitation of existing sanitary sewers using the PIPE BURSTING SYSTEM. Pipebursting is a system by which the burster unit splits the existing pipe while simultaneously installing a new Polyethylene Pipe of the same size or larger size pipe where the old pipe existed, then reconnect existing sewer service house connections, television inspection of the polyethylene pipe and complete the installation in accordance with the contract documents.

1.2 QUALIFICATIONS:

1.2.1 The Contractor shall be certified by the particular Pipe Bursting System Manufacturer that such a company is a fully trained user of the pipe bursting system.

1.2.2 Polyethylene pipe jointing shall be performed by personnel trained in the use of butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the polyethylene pipe. Training shall be performed by qualified representative.

1.3 SUBMITTALS

Government approval is required for all submittals. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Method of construction and restoration of existing sewer service connections. This shall include detail drawings and written descriptions of the entire construction procedure to install pipe, bypass sewage flow and reconnection of sewer service connections.

SD-03 Product Data

Data Sheets

New pipe, couplings, bursting system.

SD-07 Certificates

Workmen training for installing pipe.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Transport, handle, and store pipe and fittings as recommended by manufacturer. Deliver, store and handle other materials as required to prevent damage.

1.4.2 If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Contracting Officer or his/her designated representative at the Contractor's expense, before proceeding.

2 PRODUCTS

2.1 Polyethylene Plastic Pipe shall be high density polyethylene pipe and meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, ASTM D1248, ASTM D3550. Pipe shall be approved for sanitary sewage.

2.1.1 Sizes of the insertions to be used shall be such to renew the sewer to its original or greater than flow capacity.

2.1.2 All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used.

2.1.3 The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

2.1.4 Dimension Ratios: The minimum wall thickness of the polyethylene pipe shall meet the following:

Depth of Cover (Feet)	Minimum SDR of Pipe
0 - 16.0	19
> 16.1	17

2.2 EQUIPMENT

The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate sufficient force to burst and compact the existing pipe line. See manufacturer's specifications for what size tool should be used in what diameter of pipe, as well as parameters of what size tool for percentage of upsize allowed.

2.2.1 The pipe bursting tool shall be pulled through the sewer by a winch located at the upstream manhole. The bursting unit shall pull the polyethylene pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PE pipe insertion. The pipe bursting unit shall be remotely controlled.

2.2.2 The pipe bursting tool shall be pneumatic. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time expanding the surrounding ground. This action shall not only break the pipe but also create the void into which the burster can be winched and enables forward progress to be made. At the same time the polyethylene pipe, directly attached to the sleeve on the rear of the burster, shall also move forward.

2.2.3 The burster shall have its own forward momentum while being assisted by winching. A hydraulic winch shall give the burster friction by which it can be moved forward. To form a complete operating system, the burster must be matched to a constant tension hydraulic winching system.

2.2.4 WINCH UNIT

A winch shall be attached to the front of the bursting unit. The winch shall provide a constant tension to the burster in order that it may operate in an efficient manner. The winch shall ensure directional stability in keeping the unit on line.

2.2.4.1 The winch shall be hydraulically operated providing a constant tension throughout the operation. The winch shall be of the constant tension type but shall be fitted with a direct reading load gauge to measure the winching load.

2.2.4.2 The winch must automatically maintain a constant tension at a set tonnage reading. The constant tension winch shall supply sufficient cable in one continuous length so that the pull may be continuous between approved winching points.

2.2.4.3 The winch, cable and cable drum must be provided with safety cage and supports so that it may be operated safely without injury to persons or property.

2.2.4.4 The Contractor shall provide a system of guide pulleys and bracing at each manhole to minimize cable contact with the existing sewer between manholes.

2.2.4.5 The supports to the trench shoring in the insertion pit shall remain completely separate from the winch boom support system and shall be so designed that neither the pipe nor the winch cable shall be in contact with them.

2.3 SEWER SERVICE CONNECTIONS

All sewer service connections shall be connected to the main using a method recommended by the manufacturer that will result in a watertight connection.

2.3.1 Sewer service connections shall be connected to the new pipe by various methods. The saddles should be made of a material compatible with that of the pipe.

3 EXECUTION

3.1 BYPASSING SEWAGE

The Contractor, when and where required, shall provide diversion for the pipe bursting/replacement process. The pumps and by-pass lines shall be of adequate capacity and size to handle all flows. All costs for by-pass pumping, required during installation of the pipe shall be subsidiary to the pipe reconstruction item.

3.1.1 The Contractor shall be responsible for continuity of sanitary sewer service to each facility connected to the section of sewer during the execution of the work.

3.1.2 If sewage backup occurs and enters buildings, the Contractor shall be responsible for clean-up, repair, property damage cost and claims at no additional cost of the Government.

3.2 TELEVISION INSPECTION

After completion of all liner insertions, service reconnections, and finish work at the manholes, the sewer shall be televised with a color CCTV tilt-head camera recorded in VHS format and the original tape shall be provided to the Contracting Officer or his/her

designated representative.

3.3 CONSTRUCTION METHOD

Equipment used to perform the work shall be located away from buildings so as not to create noise impact. Provide a silent engine compartment with the winch to reduce machine noise as required to meet local requirements.

3.3.1 The Contractor shall install all pulleys, rollers, bumpers, alignment control devices and other equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances will the pipe be stressed beyond its elastic limit. Winch line is to be centered in pipe to be burst with adjustable boom.

3.3.2 The installed pipe shall be allowed the manufacturer's recommended amount of time, but not less than four (4) hours, for cooling and relaxation due to tensile stressing prior to any reconnection of service lines, sealing of the annulus or backfilling of the insertion pit. Sufficient excess length of new pipe, but not less than four (4) inches, shall be allowed to protrude into the manhole to provide for occurrence. Restraint of pipe ends shall be achieved by means of couplings.

3.3.3 Following the relaxation period, the annular space may be sealed. Sealing shall be made with material approved by the Contracting Officer or his/her designated representative and shall extend in such a manner as to form a smooth, uniform, watertight joint.

3.3.4 Pit Placement Issues

3.3.4.1 Windowing Method

Up to 12" diameter PE pipe, the Contractor shall use the "windowing" method where necessary, to prevent damage to surrounding infrastructure.

3.3.4.2 Tool Removal Back to Starting Pipe via Being Pulled Back Out of the newly Installed PE Pipe

Contractor shall use this method when an exit pit is difficult due to underground utility placement or surrounding infrastructure. In all cases, the tool must have the ability to operate in reverse to prevent damage to the HDPE during removal.

3.4 PIPE JOINING

The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.

3.4.1 The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All joints shall be subject to

acceptance by the Contracting Officer or his/her designated representative.

3.4.2 All defective joints shall be cut out and replaced at no cost to the Government. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Contracting Officer or his/her designated representative shall be discarded and not used.

3.4.3 Terminal sections of pipe that are joined within the insertion pit shall be connected couplings or connectors with tensile strength equivalent to that of the pipe being joined.

3.5 FIELD TESTING

3.5.1 After the existing sewer is completely replaced, internally inspect with television camera and video tape as required. The finished tape shall be continuous over the entire length of the reconstruction and shall be free from visual defects.

3.5.2 Defects which may affect the integrity or strength of the pipe in the opinion of the Contracting Officer or his/her designated representative shall be repaired or the pipe replaced at the Contractor's expense.

-- End of Section --

SECTION 02882

RECREATIONAL FACILITY PLAYGROUNDS

PART 1 GENERAL

1.01 Section Includes

A. Installation of a playground structure model [60-3640-2 and 60-3756] as shown on the plans and herein specified.

1.02 Related Sections

A. Section 02210 -Grading.

B. Section 02200 -Excavation, Filling, and Backfilling for Structures.

1.03 Quality Assurance

A. Installer Qualifications - An experienced installer familiar with local building codes and with the latest safety guidelines, who has completed installation of playground structures similar in material, design, and extent to that indicated for this project, and whose work has resulted in construction with a record of successful in-service performance.

B. Acceptable Manufacturers – Design based upon play structure/components as manufactured by BCI Burke Company, LLC, P.O. Box 549, 600 Van Dyne Road, Fond du Lac, Wisconsin 54936-0549, Tel: (920) 921-9220, Fax: (920) 921-9566, Toll Free: 1-800-266-1250, www.bciburke.com.

C. Product Options - Drawing indicates size, components and dimensional requirements of playground structure and are based on the specific system indicated.

D. Quality Assurance - Refer to Defense FAR Supplement 252.211-7003. Offers of equal products must meet the SALIENT physical, functional, and other characteristics specified. COLOR, TEXTURE, DETAILS, PATTERN, and MATERIAL CONTENT, are SALIENT characteristics and MUST be incorporated as integral to the project design integrity.

1.04 Submittals

A. Product Data: Include physical characteristics such as materials, dimensions and finish.

B. Shop Drawings: Show assembly and installation details.

C. Samples for Verification: Color selections for [upright posts], [steel accessories], [freestanding panels & signs], [swings], [plastic components], [other].

D. Warranty: Include manufacturer's standard warranty.

1.05 References

A. ASTM F1487-01 Standard Consumer Safety Performance Specification for Playground Equipment for Public use CAN/CSA-Z614-98 Children's Playspaces and Equipment.

B. ASTM F1292-99 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.

C. U.S. Consumer Products Safety Commission Handbook for Public Playground Safety.

D. Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Play Areas, amended November 20, 2000.

1.06 Delivery, Storage and Handling

A. Inspect all components on delivery to ensure that no damage occurred during shipping or handling. Materials shall be stored in original undamaged packaging in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft until ready for installation. Inspect components prior to installation.

PART 2 MATERIALS

2.01 Barriers & Enclosures

A. Pipe Walls shall have horizontal top and perimeter members that are fabricated from galvanized steel tubing of at least 1.315" OD x .08" wall. Vertical supports shall be fabricated from galvanized steel tubing of at least 1.029" OD x .07" wall. The bottom mounting brackets shall be fabricated of 7 gauge formed galvanized steel plate. The one-piece, all-welded pipe wall assembly shall be powder-coated.

2.03 Climbers/Climber Ladders

A. Adventure Climb (Deck Mount, Single, Dual) shall be used with 48" high platforms, where applicable. The climber shall be 50 1/2" wide. Each climber shall be manufactured of rotationally molded UV-stabilized polyethylene with double walls no less than .250" thick with textured surface. The Adventure Climb shall have eighteen (18) molded-in foot rests with contoured handholds. The anchor post shall be galvanized steel tubing of at least 1.660" OD x .109" wall and attached using 5/16" self-tapping screws and 3/8" washers. The deck mount Adventure Climb shall attach to the platform using four (4) 3/8" button-head cap screws, 3/8" washers and molded-in threaded inserts. The platform opening shall be restricted to a maximum of 15 inches by a stanchion. The independent Adventure Climb(s) shall have an extension loop(s) formed from galvanized steel tubing of at least 1.315" OD X .08" wall with 1.66 OD and 1.315 OD extensions. The extension loop(s) shall attach using 3/8" button head cap screws and 3/8" nuts. The independent Adventure Climb(s) shall have a pipe barrier or a pass through barrier fabricated with an outer frame of at least 1.900" x .120" wall

galvanized steel tubing, horizontal members of at least 1.3125" x .085" wall, and vertical rungs of at least 1.029" OD x .075" wall galvanized tubing. They shall be attached to the Adventure Climb(s) using 3/8” button head cap screws and molded-in threaded inserts. The extension loops, pass through barriers and pipe barriers shall be finished with a baked-on powder coating after fabrication.

B. Climbers (Atom) shall have a center support of galvanized steel tube of at least 1.66" OD x .111 wall. Rungs shall be galvanized steel tubing of at lest 1.029" OD x .07" wall, bent as required and welded to the center support. Poles shall attach to a stanchion using 3/8" button head cap screw and nut. Stanchion shall be used at the platform entrance and restrict the opening to a maximum of 15 inches.

    1. Stanchion shall be fabricated from galvanized steel tubing at least 1.315" OD x .08" wall with 1.029" OD x .07" wall vertical in-fills.

    2. The Stanchion will attach to the vertical support post with the Series 3000 Mounting Bracket.

    3. The lower end of the Stanchion will attach to the platform with button-head cap screws.

    4. The Atom Climber and Stanchion to be finished with a baked-on powder coating after fabrication

C. Climbers (Satellite) shall be for 48" and 72" high platforms. The 48" platform model shall have two (2) ring platforms and the 72" model shall have three (3) ring platforms. The ring platforms shall be separated and supported by two (2) ring spacers for each platform. The ring platform shall be 48" wide x 40" deep x 15" high and the ring spacer shall be 20" in diameter. The 48" platform model shall have four (4) spacers and the 72" platform model shall have six (6) spacers. The ring platforms and ring spacers shall be manufactured of rotationally molded, UV-stabilized polyethylene with double walls no less than .250" thick with textured surfaces. The ring platforms shall have sixteen (16) integral molded-in handholds and the ring spacers shall have three (3) molded-in handholds, each shall be no greater than 1.5" in diameter. Ring Platform shall be attached to 3.5" OD support posts using attachment brackets as specified in Mounting Brackets, Clamps, Hangers and Fittings.

2.06 Miscellaneous

A. Sliding Poles shall be formed from galvanized steel tubing of at least 1.66" OD x .111" wall. Poles shall attach to a stanchion (Deck Mount) using 3/8" button head cap screw and nut. Stanchion shall be used at the platform entrance and restrict the opening to a maximum of 15 inches. Poles shall attach to an extension loop (free-standing) using 3/8" button head cap screw and 3/8” nut.

    1. Stanchion shall be fabricated from galvanized steel tubing at least 1.315" OD x .08" wall with 1.029" OD x .07" wall vertical in-fills.

2. The Stanchion will attach to the vertical support post with the Series 3000 Mounting Bracket.

3. The lower end of the Stanchion will attach to the platform with button-head cap screws.

4. The stanchion shall be finished with a baked-on powder coating after fabrication

2.07 Mounting Brackets, Clamps, Hangers

A. Brackets, Horizontal Ladder shall be fabricated of a 4 1/2" x 1 3/4" x 7 gauge formed steel plate welded to a 1.029" OD x .07" wall tube.

B. Brackets, Mounting shall be fabricated from 7 gauge steel plate formed to fit outside diameter of 3.5" OD vertical support posts. 7-gauge steel shall have a yield strength no less than 21,500 psi and a tensile strength of 36,000 psi. The following mounting brackets shall be used:

C. Brackets, Pipe Wall shall be fabricated of 4 1/2" x 1 3/4" x 7 gauge formed steel plate welded to a 1.029" OD x .07" wall tube.

D. Brackets, Sit Down Hood shall be fabricated of 4 1/2" x 1 3/4" x 7 gauge formed steel plate with 1" OD x .1875" I.D. welded washer.

Note: All brackets shall be powder-coated after fabrication and color shall be coordinated with the specified post color.

E. Fasteners shall be '300 Series' Stainless Steel, with the exception of carriage bolts and hex head cap screws which shall be coated with yellow die chromate and zinc. All button head cap screws shall be tamper resistant. Carriage bolts and hex head cap screws shall be no less than Grade 5. All button-head cap screws and socket head screws shall be treated with a locking/sealing adhesive.

F. Fittings (T) (2.375" x 2.375") shall be fastened with 3/8" '300 Series' Stainless Steel socket head cap screws and '300 Series' Stainless Steel nuts, seated and recessed in a cast-in hex nut pocket below flush surface. T-fittings shall be set with two (2) cast-in knobs protruding into the horizontal member.

G. Hangers (Platform) shall have cast-in gussets with form-fitted cast-in nut holders.

H. Hangers (Swing) shall have a pendulum fabricated from hot-dipped galvanized malleable iron Grade 32510, fitted with an oil-impregnated bronze bearing and fastened with a plated 3/8" hex head cap screw.

2.08 Overhead Events

A. Wheel Deal shall have a hanger assembly consisting of a straight center support tube fabricated of galvanized steel tubing no less than 2.375" OD x .13 wall. Welded to the center support tube will be four (4) 3/4" diameter threaded steel axle pins. Attached to each axle pin will be a fabricated welded wheel assembly

consisting of an outer ring and three (3) spokes made from 1.315 OD X .08” wall galvanized tubing. One end of the three (3) spokes shall be welded to the ring and the other end shall be welded to a machined steel center hub. The hub will be assembled to and free to rotate about the axle pins of the center support tube. A ball bearing and a thrust bearing shall be provided to assure free rotation of the fabricated wheel about the axles. Means for lubricating the bearings shall be provided. The two (2) horizontal end supports for the hanger assembly shall be fabricated from 2.375 OD X .109” wall of galvanized tubing and capped at each end with a vertical mounting bracket. A sleeve of 2.875 OD X .165” wall of galvanized material shall be welded in the center of each end support. This sleeve shall fit over the center support tube and be fastened to the support tube by a bolt and nut assembly. The end support shall attach to the 3.5" OD support post using attachment brackets.

Note: All metal components to be finished with a baked-on powder coating after fabrication.
Note: All mounting components are as specified in Mounting Brackets, Clamps, Hangers and Fittings.

2.10 Platforms

A. (Punched Steel) Series 3000

1. Closure Plates shall be fabricated of 14 gauge steel and shall be used on 8" Transfer Steps and Platforms. Plates shall be powder-coated.

2. Square Platforms shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed and reinforced with welded in place 12 gauge hot rolled steel strips. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required. Platform shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

3. Triangular Platforms shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed and reinforced with welded in place 12 gauge hot rolled steel strips. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required. Platform shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

2.13 Roofs

A. Rectangular Shingled Roof shall be a one piece all welded panel. The panel shall be powder coated. The steel panels shall be assembled into two sections and framed with steel angles. The sections shall be joined with a gusset at both ends. The roof shall attach to 3.5" OD steel support posts and 4.5" OD steel, aluminum

or Plasticore support posts, using steel angle braces and steel roof adapters. Attachment to the support posts shall be by adapter assemblies bolted to the steel angles with 3/8" button-head cap screws and pinned with zinc plated steel drive pins for the Plasticore and aluminum drive rivets for the steel and aluminum posts.

2.14 Slides

A. Slides (Double Rail) shall be manufactured of rotationally molded, UV-stabilized polyethylene with double walls no less than .250" thick and rails 4" high. Non-sliding surfaces shall be textured. Slides shall be aligned flush to the platform with a 10 gauge galvanized steel plate and shall be secured to the platform with molded 3/8" T-nut inserts and 3/8" button-head cap screws. Exit support shall be furnished by a 10 gauge galvanized steel plate welded to two (2) galvanized steel tube supports of at least 1.66" OD x .085" wall. The exit support assembly shall be powder-coated. At the entrance to each slide, a plastic sit-down hood with molded-in hand grip shall be provided.

B. Slide, Monster (Straight, Right, Left, ‘C, or 90 Degree) shall have three (3) chutes manufactured of rotationally molded, UV stabilized polyethylene no less than .250" wall. The integral entrance with molded-in handgrip makes easy transition from standing to sitting. The slide can be attached to a 32", 48", 56", 64", 72” or 96” high half hex and square platforms and can turn to the right, to the left, or be straight. Middle supports shall be furnished by galvanized steel tube of at least 1.625" OD x .090" wall. Exit support shall be furnished by a 10 gauge galvanized steel plate welded to a galvanized steel support tube of at least 2.375" OD x .130" wall and shall be powder-coated

    1. Monster Slide Entrance shall be manufactured of rotationally molded, UV-stabilized polyethylene with double walls no less than .250" thick, textured and contoured as required. A galvanized steel support tube no less than 1.315" OD x .08" wall shall be built into the hood and shall transfer the load back to the main structure. A molded-in hand-grip, 11/4" thick, shall be provided at the hood for transition from standing to sliding.

2.15 Steps, Transfer Steps and Stair Assemblies

A. Punched Steel

    1. Stair Assemblies shall be configured as follows in relationship to platform height: 4-steps for 48", 3-steps for 40", 2-steps for 32", and 1-step for 16".

        a. Stair assemblies shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed with welded in place 12 gauge hot rolled steel sides. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to

assemblies as required. The bottom riser shall be supported by two (2) galvanized steel posts no less than 1.66" OD x .085" wall. The top riser shall be attached to its platform with 3/8" button-head cap screws. Stair Assemblies shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

b. One-step stair assemblies shall have the top riser secured to a triangle platform assembly with 3/8" button-head cap screws. The bottom stair shall be secured on one side to a galvanized steel tube at least 1.66" OD x .085" wall with 3/8" button-head cap screws, secured on the other side to the rear handrail post. Both bottom supports, steel tube and handrail post shall furnish footings. The triangle assembly shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed and reinforced with welded in place 12 gauge hot rolled steel strips. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required.

c. Handrails on Stair assemblies shall have upper and lower handrail assemblies fabricated of 1.315" OD x .104" wall galvanized steel tubing. Below, the handrails shall be secured to the side plates with 3/8" button-head cap screws. Above, the handrails shall be attached to support assemblies with 3/8" button-head cap screws. All handrails shall be powder-coated after fabrication.

d. Two (2) Support Assemblies [Series 3000] shall be fabricated of 1.315" OD x .08" wall galvanized steel tubing and each shall consist of a support tube and a stabilizer tube fabricated of 1.029" OD x .07" wall which shall be welded to a 7 gauge formed attached plate. The attachment of each support assembly to the 3.5" OD vertical support post shall be with two (2) 3/8" button-head cap screws with washers as specified in Mounting Brackets, Clamps, Hangers and Fittings.

e. Handrails on the one-step stair assembly shall be fabricated of 1.315" OD x .104" wall galvanized steel tubing, bent in the middle to a 180° radius. Each end shall serve as a footing for the transfer stair. Below, the stair side plate shall be secured to the rear post

with two (2) 3/8" button-head cap screws. Above, the stair side plate shall be secured to the forward post with one (1) 3/8" button-head cap screw.

4. Stair assemblies shall furnish access to platforms with the following stair assembly-to-platform height: 9-steps for 72", 8-steps for 64", 7-steps for 56", 6-steps for 48", 5-steps for 40", and 4-steps for 32.

    a. Stair assemblies shall be fabricated from a minimum of 12 gauge hot rolled sheet steel which shall be punched, formed with welded in place 12 gauge hot rolled steel sides. Mounting plates shall be fabricated from 7 gauge hot rolled sheet steel and welded to assemblies as required. The bottom riser shall be supported by two (2) galvanized steel posts no less than 1.66" OD x .085" wall. The top riser shall be attached to its platform with 3/8" button-head cap screws. The bottom riser shall be supported by two (2) galvanized steel posts no less than 1.66" OD x .085" wall. The top riser shall be attached to its respective platform with 3/8" button-head cap screws. Stair Assemblies shall be dipped in a Poly-vinyl chloride bath with topside drain holes of .25" nominal diameter after curing.

    b. Handrails Stair assemblies shall have handrail assemblies fabricated of 1.315" OD x .104" wall galvanized steel tubing. Below, the handrails shall be secured to the side plates with 3/8" button-head cap screws. Above, the handrails shall be attached to support assemblies with 3/8" button-head cap screws. Handrails shall be powder-coated after fabrication.

    c. Two (2) Support Assemblies [Series 3000] shall be fabricated of 1.315" OD x .08" wall galvanized steel tubing and each shall consist of a support tube and a stabilizer tube fabricated of 1.029" OD x .07" wall which shall be welded to a 7 gauge formed attachment plate. The attachment of each support assembly to the 3.5" OD vertical support post shall be with two (2) 3/8" button-head cap screws with washers as specified in Mounting Brackets, Clamps, Hangers and Fittings.

2.16 Burke Basics

A. Fun Phones shall conduct speech, via tubing, between two (2) specified points. Each point shall consist of a 16 gauge spun metal funnel attached to a one-piece

all-welded galvanized steel tube no less than 1.66" OD x .085" wall which shall be attached using standoffs at least 1.315" x .08" wall to 3.5" OD support posts using attachment brackets.

Note: All mounting brackets shall be as specified in Mounting Brackets, Clamps, Hangers and Fittings.
Note: The points shall be connected with tubing of 1.625" black polyethylene. Bends shall be fabricated of 1.5" I.D. convoluted black polyethylene tubing and secured with 1.9" OD adjustable nylon tubing clamps.

B. Rally Round shall be a one piece of all-welded construction. The Rally Round shall provide a circular play path and shall have two (2) formed rails fabricated from galvanized steel tubing of at least 1.900" OD x .120" wall. Rungs shall be galvanized steel tubing no less than 1.315" OD x .08" wall, welded to the formed rails. The three (3) Rally Round Ladders shall have main supports fabricated from galvanized steel tubing of at least 1.9" OD x .09" wall. Rungs shall be galvanized steel tubing of at least 1.315" OD x .08" wall, formed to a semi-circle and welded to the main supports. The top shall attach to the Rally Round using 3/8" button head cap screws and nuts. The (3) slide poles shall be formed from galvanized steel tubing of at least 1.66" OD x .111" wall. Poles shall attach to the Rally Round using 3/8" button head cap screws and nuts. The assembly shall be powder-coated.

2.17 Signs

A. Signs shall be manufactured from high-density polyethylene plastic with a UV-light inhibitor and flame retardant. Sign shall be attached to the support posts by four (4) 3/8" button-head cap screws and 3/8" nuts. The support post assembly shall be one-piece welded assembly with 2.375" OD x .095" wall tubing and a 10 gauge hot rolled plate and finished with a baked-on powder coating after fabrication.

2.18 Swings

A. Traditional Belt Swing shall have a seat of molded rubber measuring 6" x 24" with a one-piece steel insert bonded into the rubber. The belt swing will attach to the brackets with a pendulum fabricated from hot-dipped galvanized malleable iron Grade 32510, fitted with an oil-impregnated bronze bearing and fastened with a 'Series 300" Stainless Steel button head cap screw and a 'Series 300" Stainless Steel nut and will attach to suspending chains, manufactured of galvanized steel straight coil chain no less than 4/0 and attached to S-hooks 3/8" in diameter. The chains shall attach to a support beam fabricated from galvanized steel tubing of no less than 1.3125 x .085 (wall) and brackets of formed 7 gauge hot-rolled steel plate.

2.19 Support Tubes and Rungs

A. Support Tubes shall be made of galvanized steel tubing no less than 1.315" OD x .08" wall. Tubes and rungs shall be powder-coated.

B. Rungs shall be made of galvanized steel tubing no less than 1.315" OD x .08" wall. Tubes and rungs shall be powder-coated.

2.20 Descriptions of Coatings

A. PVC Coating (Poly-Vinyl Chloride): Prior to coating, each part shall be chemically washed, submerged in a heat-activated primer and dried. After drying, each part shall be pre-heated to a temperature no less than 350° F and immersed in liquid PVC. The coating shall be applied at a rate ranging from .085-.150 in. The PVC shall have a tensile strength no less than 2500 psi, an elongation no less than 290%, a tear strength no less than 420 lb./in. and a hardness (Shore A) of no less than 89 plus/minus 2 Durometer.

    1. UV Stabilizer : UV stabilizer shall be added to PVC to withstand one year in a QUV panel tester without any significant color drift. Burn Rate will meet or exceed Federal Safety Standard MVSS 302. This is the same as a UL 94 HB rating.

B. Powder Coating: Prior to powder coating, all parts shall be cleaned, treated with iron phosphate and sealed with non-chromic process. A polyester/TGIC-free powder-coating with superior color-, gloss-, and UV-stabilizing qualities shall be applied at a rate of 2-5 mils and shall be cured in an oven at temperatures no less than 325° F and no more than 380° F. The powder-coat shall have the following properties:

    1. Adhesion: No less than 100% (cross hatch/tape adhesion test per ASTM D3359-83).

    2. Color/Gloss Change: None below 200% over-bake (test per ASTM D2454-79).

    3. Hardness: No less than 2-h (pencil hardness test per ASTM D3363-74).

    4. Resistance to Impact: No less than 160 in. lb. direct and inverted.

    5. Resistance to Bending: No visible cracking (1/8" bending test per ASTM 522).

    6. Resistance to Salt Spray: No more than 1/8" scribe creep in 1500 hours (salt spray test per ASTM B117-73).

    7. Resistance to Humidity: No visible red rust under 1500 hours (humidity test per ASTM D2247-68).

    8. Degree of Gloss: No less than 60% (specular gloss test per ASTM D523-80).

2.21 Descriptions and Processes of Components

A. Main Frame Structure shall be assembled from cold-formed steel tubing with a yield test of at least 50,000 psi and a tensile strength of at least 55,000 psi. Tube members shall comply with ASTM A-135 and ASTM A-500 Grade A and shall be tested according to ASTM E-8 and cut to length as specified.

    1. Caps for vertical support posts shall be fabricated of cast aluminum and shall be finished with a baked-on powder-coat. Caps shall be riveted in place by the factory.

    2. Tubing Exteriors shall be galvanized, then coated with a chromate conversion coating and finished with a baked-on powder-coat.

    3. Tubing Interiors shall be coated with a zinc-rich compound.

    4. Tubing Walls composing vertical support posts shall be at least 3.5" OD x .12" wall.

B. Nuts shall be '300 Series' Stainless Steel, with the exception of carriage bolts and hex head cap screws which shall be coated with yellow die chromate and zinc. All button head cap screws shall be tamper resistant. Carriage bolts and hex head cap screws shall be no less than Grade 5. All button-head cap screws and socket head screws shall be treated with a locking/sealing adhesive.

C. Plastic Parts, other than recycled materials, shall be manufactured from rotationally molded, linear, low-density polyethylene with a .250" wall and textured non-sliding surfaces. Plastic parts shall inhibit UV light and shall range in density from no less than .938 to no more than .940 per ASTM D-1505. Plastic parts shall have a tensile strength at yield no less than 2900 psi and exhibit no flexural modulus below 120,000 psi

PART 3 EXECUTION

3.01 Site Preparation

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 Installation

A. Install play structure in compliance with manufacturer’s written instructions.

B. Install components in sequence as recommended by manufacturer.

C. Install play structure as indicated on the drawings provided.

D. Variations from the installation indicated must be approved.

E. Variations from the installation indicated and all costs for removal and replacement will be the responsibility of the contractor.

3.03 Cleaning

A. The contractor shall clean the jobsite of excess materials, including post hole excavations.

END OF SECTION

SECTION 02921

SEEDING

1 GENERAL

Scope: Seeding for this project will include placing seed around improved family housing units in two different neighborhoods. Midland and Woodland are existing, developed neighborhoods located on the north and the middle sections of the Whiteman AFB family housing area. Typical planting plans and have been provided to guide the landscape contractor in sodding / seeding placement. Seed shall be placed on all disturbed areas unless plant beds are specified or as determined by the Contracting Officer's Representative.

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 602	(1995a) Agricultural Liming Materials
ASTM D 2028	(1976; R 1997) Cutback Asphalt (Rapid-Curing Type)
ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996el) Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes
ASTM D 977	(1998) Emulsified Asphalt

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1995) Federal Seed Act Regulations Part 201

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; G
Surface Erosion Control Material; G
Chemical Treatment Material; G

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, surface erosion control material and chemical treatment material.

A listing of equipment to be used for the seeding operation.

Delivery; IO

Delivery schedule.

Finished Grade and Topsoil; G

Finished grade status.

Topsoil; IO

Availability of topsoil from the stripping and stock piling operation.

Quantity Check; G

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

Seed Establishment Period; G

Calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.

Maintenance Record; IO

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Application of Pesticide; G

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; G

A 5 pound sample.

Mulch; IO

A 5 pound sample.

SD-06 Test Reports

Equipment Calibration; IO

Certification of calibration tests conducted on the equipment used in the seeding operation.

Soil Test; G

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Seed; G
Topsoil; G
pH Adjuster; G
Fertilizer; G

Organic Material; IO
Soil Conditioner; IO
Mulch; IO
Asphalt Adhesive; IO
Pesticide; G

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

d. Fertilizer. Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Mulch: Composition and source.

h. Asphalt Adhesive: Composition.

i. Pesticide. EPA registration number and registered uses.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

1.4.1.2 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.

1.4.1.3 Pesticides

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

1.4.2 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

Materials shall be stored in designated areas. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.4.4 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours.

2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures shall be proportioned by weight as follows:

Turfgrass Species: Seed of grass species as follows, with not less than 85 percent germination, not less than 98 percent pure seed, and not more than 0.5 percent weed seed:

1. Turf grass species:

   a. 90 percent turf type tall fescue (min. of three varieties in the top 20% of the Kansas State Turfgrass Associations (KTEP) Field Trials)
   b. 10 percent Improved Kentucky bluegrass (Poa pratensis).

Seed blend to be approved by Contracting Officer’s Representative prior to installation.

FIELD SEED

FIELD AREA		Mixture Percent Weight	Percent Pure Live Seed
Poa pratensis	Tall Fescue	K31	85%

2.1.3 Temporary Seed Species

Temporary seed species for surface erosion control or overseeding shall be as follows:

Place oats in the fall and Wheat crop in the winter for erosion control as required. Overseed in required slope conditions with the following:

Botanical Name	Common Name	Percent Pure Live Seed
	trefoil bird's foot 'Empire'	25

Place at 10 lbs / acre innoculated rizovial bacteria cover crop rye for slope conditions

For flat ground blend 5 varieties equal in Turf Master Blend:

Botanical Name	Common Name	Percent Pure Live Seed
	Arid	15
	Rebel	
	Falcon	
	Mustang	
	Apache	

Add 1 lb / 1000 of Manhatten Two Derby Ryegrass.

2.1.4 Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

2.1.5 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed.

2.1.6 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

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 02300A 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 seed 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 shall not be used.

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, sulfur, 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

It shall be as recommended by the soil test. Fertilizer shall be controlled release commercial grade, free flowing, 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 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test. Nitrogen carrier fertilizer shall be commercial grade, free flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.

2.3.4 Organic Material

Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

2.3.4.1 Bonemeal

Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

2.3.4.2 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. It shall contain no chemicals or ingredients harmful to plants. The manure shall be heat treated to kill weed seeds and be free of stones, sticks, and soil.

2.3.4.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted or stabilized with nitrogen.

2.3.4.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost 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 by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.3.4.5 Worm Castings

Worm castings shall be screened from worms and food source, and shall be commercially packaged.

2.3.5 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements of the soil test.

2.3.5.1 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.

2.3.5.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the 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. Polymers shall also be added to the seed and be a starch grafted polyacrylonitrite, with graphite added as a tacky sticker. It shall have an absorption capacity of 100 plus times its weight.

2.3.5.3 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.3.5.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.5.5 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.

2.4.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.4.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.4.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

2.4.4 Paper Fiber

Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

2.5 ASPHALT ADHESIVE

Asphalt adhesive shall conform to the following: Emulsified asphalt, conforming to ASTM D 977, Grade SS-1; and cutback asphalt, conforming to ASTM D 2028, Designation RC-70.

2.6 WATER

Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

2.7 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.

2.8 SURFACE EROSION CONTROL MATERIAL

Surface erosion control material shall conform to the following:

2.8.1 Surface Erosion Control Blanket

Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

2.8.2 Surface Erosion Control Fabric

Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

2.8.3 Surface Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.8.4 Surface Erosion Control Chemicals

Chemicals shall be high-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

2.8.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids shall resist mold growth.

2.8.6 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

3 EXECUTION

3.1 INSTALLING SEED TIME AND CONDITIONS

3.1.1 Seeding Time

Seed shall be installed from April 1 to May 1 for Spring establishment and from Sept 1st to October 15th for fall establishment.

3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing.

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, 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 on site 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 seed species specified.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02300A EARTHWORK, prior to the commencement of the seeding operation.

3.2.2 Application of Soil Amendments

3.2.2.1 Applying pH Adjuster

The pH adjuster shall be applied as recommended by the soil test. The pH adjuster shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage operation.

3.2.2.2 Applying Fertilizer

[The fertilizer shall be applied as recommended by the soil test. Fertilizer shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test. The soil conditioner shall be spread uniformly over the soil a minimum 1 inch depth and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.

3.2.2.4 Applying Super Absorbent Polymers

Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.

3.2.3 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4 inch depth. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 2 inch depth by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

3.2.4.2 Lawn Area Debris

Debris and stones over a minimum 5/8 inch in any dimension shall be removed from the surface.

3.2.4.3 Field Area Debris

Debris and stones over a minimum 2 inch in any dimension shall be removed from the surface.

3.2.4.4 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Installing Seed

Seeding method shall be Broadcast Seeding for smaller areas and Hydroseeding for larger areas or depending on conditions. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

3.3.1.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of [_____] pounds per 1000 square feet using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.1.2 Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled.

3.3.2 Hydroseeding

Seed shall be mixed to ensure broadcast at the rate of 10 pounds per 1000 square feet. Seed and fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

3.3.3 Mulching

3.3.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.3.3.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.3.3 Asphalt Adhesive Tackifier

Asphalt adhesive tackifier shall be sprayed at a rate between 10 to 13 gallons per 1000 square feet. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.3.3.4 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.

3.3.3.5 Asphalt Adhesive Coated Mulch

Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 10 to 13 gallons per 1000 square feet, using power mulch equipment

which shall be equipped with suitable asphalt pump and nozzle. The adhesive-coated mulch shall be applied evenly over the surface. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.3.3.6 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.3.4 Watering Seed

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

3.4 SURFACE EROSION CONTROL

3.4.1 Surface Erosion Control Material

Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

3.4.2 Temporary Seeding

The application rate shall be 1.1 pounds per 1000 square yards. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with temporary seed species listed under Paragraph SEED.

3.4.2.1 Soil Amendments

When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Seed.

3.4.2.2 Remaining Soil Amendments

The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing seed.

3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.6 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.

3.6.1 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.

3.6.2 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. A pesticide plan shall be submitted.

3.7 RESTORATION AND CLEAN UP

3.7.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.

3.7.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.8 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed. Signage shall be in accordance with Section 10430A EXTERIOR SIGNAGE.

3.9 SEED ESTABLISHMENT PERIOD

3.9.1 Commencement

The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of seeding work under this contract and shall continue through the remaining life of the contract and end 12 months after the last day of the seeding operation required by this contract. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be coordinated with Sections 02922A SODDING, 02923A SPRIGGING, and 02930A EXTERIOR PLANTING. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.9.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch high.

3.9.2.1 Lawn Area

A satisfactory stand of grass plants from the seeding operation for a lawn area shall be a minimum 100 grass plants per square foot. Bare spots shall be a maximum 6 inches square. The total bare spots shall be a maximum 2 percent of the total seeded area.

3.9.2.2 Field Area

A satisfactory stand of grass plants from the seeding operation for a field area shall be a minimum 100 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.

3.9.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.9.3.1 Mowing

a. Lawn Areas: Lawn areas shall be mowed to a minimum 3 inch height when the turf is a maximum 4 inches high. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

b. Field Areas: Field areas shall be mowed once during the season to a minimum 3 inch height. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

3.9.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.

3.9.3.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.9.3.4 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

3.9.3.5 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

SECTION 02922

SODDING

1 GENERAL

Scope: Sodding for this project will include placing sod around improved family housing units in two different neighborhoods. Midland and Woodland are existing, developed neighborhoods located on the north and the middle sections of the Whiteman AFB family housing area. Typical planting plans and have been provided to guide the landscape contractor in sodding / seeding placement. Sod shall be placed around all drainage inlets and on swales and other areas as determined by the Contracting Officer's Representative.

1.1 REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602	(1995a) Agricultural Liming Materials
ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996el) 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 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; G
Chemical Treatment Material; G

A listing of equipment to be used for the sodding operation. Manufacturer's literature including physical characteristics, application and installation instructions for equipment and chemical treatment material.

Delivery; G

Delivery schedule.

Finished Grade and Topsoil; G

Finished grade status.

Topsoil; G

Availability of topsoil from the stripping and stock piling operation.

Quantity Check;

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed. The quantity of sod used shall be compared against the total area installed.

Sod Establishment Period; IO

Calendar time period for the sod establishment period. When there is more than one sod establishment period, the boundaries of the sodded area covered for each period shall be described.

Maintenance Record; IO

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Application of Pesticide; G

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; G

A 5 pound sample.

Temporary Seeding; G

Sample of annual seed species and application rate.

SD-06 Test Reports

Equipment Calibration; IO

Certification of calibration tests conducted on the equipment used in the sodding operation.

Soil Test; G

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Sod; G
Topsoil; G
pH Adjuster; G
Fertilizer; G
Organic Material; IO
Soil Conditioner; IO
Pesticide; G

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Sod. Classification, botanical name, common name, mixture percentage of species, percent purity, quality grade, field location and state certification.

b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

d. Fertilizer. Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Pesticide. EPA registration number and registered uses.

1.3 SOURCE INSPECTION

The sources of sod material and delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Sod

Sod shall be protected during delivery to prevent desiccation, internal heat buildup, or contamination.

1.4.1.2 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

1.4.1.3 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.

1.4.1.4 Pesticides

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

1.4.2 Inspection

Sod shall be inspected upon arrival at the job site for conformity to species. Sod shall be checked for visible broadleaf weeds, and a visible consistency with no obvious

patches of foreign grasses that exceed 2 percent of the canopy. Sod that is heating up, dry, moldy, yellow, irregularly shaped, torn, or of uneven thickness shall be rejected. Other materials shall be inspected for compliance with specified requirements. Open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts, shall be rejected. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

1.4.3.1 Sod

Sod shall be stored in designated areas and kept in a moist condition by watering with a fine mist, and covered with moist burlap, straw, or other covering. Covering shall allow air to circulate, preventing internal heat from building up. Sod shall be protected from exposure to wind and direct sunlight until installed.

1.4.3.2 Other Material Storage

Materials shall be stored in designated areas. Lime and fertilizer shall be stored in cool, dry locations, away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with sod operation materials.

1.4.4 Handling

Sod shall not be damaged during handling. Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Time limitation between harvesting and installing sod shall be a maximum 24 hours.

2 PRODUCTS

2.1 SOD

2.1.1 Sod Classification

[State-certified] [State-approved] [Nursery-grown] sod shall be provided as classified by applicable state laws. Sod section shall be sized to permit rolling and lifting without breaking.

2.1.2 Grass Species

Grass species shall be proportioned as follows:

	Mixture Percent Weight	Percent Pure Live Seed
FIELD AREA		
Tall Fescue	K31	85%

Turfgrass Sod: Number 1 Quality/Premium, complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding."

Turfgrass Species: Sod of grass species as follows, with not less than 85 percent germination, not less than 98 percent pure seed, and not more than 0.5 percent weed seed:

1. Turf grass species:

   a. 90 percent turf type tall fescue (min. of three varieties in the top 20% of the National Turfgrass Associations (NTEP) Field Trials)
   b. 10 percent Improved Kentucky bluegrass (Poa pratensis).
   c. Sod blend to be approved by Contracting Officer’s Representative prior to installation.

2.1.3 Quality

Sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, woody plant roots, and other materials detrimental to a healthy stand of grass plants. Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted. Sod to be produced by a professional sod producer and grown on similar soils and climate to site location. Broadleaf weeds and patches of foreign grasses shall be a maximum 2 percent of the sod section.

2.1.4 Thickness

Sod shall be machine cut to a minimum 1-3/8 inch thickness. Measurement for thickness shall exclude top growth and thatch.

2.1.5 Anchors

Sod anchors shall be as recommended by the sod supplier or on all slopes exceeding 3:1.

2.1.6 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

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 02300A EARTHWORK. When additional topsoil is required beyond the available topsoil from stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the sod species specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash, or other material over a maximum 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 shall not be used.

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 as recommended by the soils report.

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

It shall be as recommended by the soil test. Fertilizer shall be controlled release commercial grade, free flowing, 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 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test. Nitrogen carrier fertilizer shall be commercial grade, free flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.

2.3.4 Organic Material

Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

2.3.4.1 Bonemeal

Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

2.3.4.2 Rotted Manure

Rotted manure shall be unleached horse, chicken or cattle manure containing a maximum 25 percent by volume 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 be free of stones, sticks, and soil.

2.3.4.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material free of stones, sticks, soil, and toxic substances harmful to plants, fully composted or stabilized with nitrogen.

2.3.4.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost 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. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.3.4.5 Worm Castings

Worm castings shall be screened from worms and food source, and shall be commercially packaged.

2.3.5 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements for topsoil.

2.3.5.1 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. Green sand shall be balanced with the inclusion of trace minerals and nutrients.

2.3.5.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the 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.

2.3.5.3 Calcined Clay

Calcined clay shall be granular particles 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 a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.3.5.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.5.5 Expanded Shale, Clay, or Slate (ESCS)

Rotary kiln produced ESCS material shall be in conformance with ASTM D 5883.

2.4 WATER

Water shall be the responsibility of the Contractor unless otherwise noted. Water shall not contain elements toxic to plant life.

2.5 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.

3 EXECUTION

3.1 INSTALLING SOD TIME AND CONDITIONS

3.1.1 Sodding Time

Sod shall be installed from April 1 to May 1 for Spring establishment; from May 1 to June 1 for summer establishment; and from Sept 1st to October 15th for fall establishment.

3.1.2 Sodding Conditions

Sodding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the sodding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

Immediately prior to the commencement of sodding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. Provide calibration test results within one week of testing.

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, 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 on site 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 sod species specified. Coordinate with the government on existing soils tests that have been performed at the site.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

Prior to the commencement of the sodding operation, the Contractor shall verify that finished grades are as indicated on drawings; the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02300A EARTHWORK.

3.2.2 Application of Soil Amendments

Apply at a rate recommended by the soils test.

3.2.2.1 Applying pH Adjuster

The pH adjuster shall be applied at the rate recommended by the soil test.

3.2.2.2 Applying Fertilizer

The fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test.

3.2.2.4 Applying Super Absorbent Polymers

Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 2 inches deep prior to placement of sod.

3.2.3 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4 inches deep. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 2 inches deep by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be rolled and completed with a light raking to remove from the surface debris and stones over a minimum 5/8 inch in any dimension.

3.2.4.2 Protection

Areas within the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION

Prior to installing sod, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Areas shall be sodded as indicated on plans or in notes. Specific areas for sodding include around drainage systems, in swales, and next to hardscape elements such as walks, drives. Adequate soil moisture shall be ensured prior to sodding by spraying water on the area to be sodded and wetting the soil to a maximum 1 inch depth.

3.3.1 Installing Sod

Rows of sod sections shall be placed parallel to and tightly against each other. Joints shall be staggered laterally. The sod sections shall not be stretched or overlapped. All joints shall be butted tight. Voids and air drying of roots shall be prevented. Sod

sections shall be laid across the slope on long slopes. Sod sections shall be laid at right angles to the flow of water in ditches. Sod sections shall be anchored on slopes steeper than 3-horizontal-to-1-vertical. Anchoring may be required when surface weight or pressure upon placed sod sections is anticipated to cause lateral movement. Sod anchors shall be placed a minimum 2 feet on center with a minimum 2 anchors per sod section.

3.3.2 Finishing

Displacement of the sod shall be prevented by tamping or rolling the sod in place and knitting the sod to the soil. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed, and holes or missing corners shall be patched with sod.

3.3.3 Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled.

3.3.4 Watering Sod

Watering shall be started immediately after completing each day of installing sod. Water shall be applied at least 3 times per week to supplement rainfall, at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. 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 plant material shall be prevented.

3.4 TEMPORARY SEEDING

[The application rate shall be 1.1 pounds per 1000 square yards. When directed during contract delays affecting the sodding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded with annual seed in accordance with Section 02921A SEEDING. When there is no Section 02921A SEEDING provided in the project, an annual seed species and application rate shall be submitted for approval.

3.4.1 Soil Amendments, Tillage and Watering

When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Sod as required.

3.4.2 Remaining Soil Amendments

The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing sod.

3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of the material used shall be compared with the total area covered to determine the rate of application. The quantity of sod used shall be compared against the total area established with sod. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.6 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.

3.6.1 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.

3.6.2 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.

3.7 RESTORATION AND CLEAN UP

3.7.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the sodding operation shall be restored to original condition at the Contractor's expense.

3.7.2 Clean Up

Excess and waste material shall be removed from the sodded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.8 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the sodding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed. Signage shall be in accordance with Section 10430A EXTERIOR SIGNAGE.

3.9 SOD ESTABLISHMENT PERIOD

3.9.1 Commencement

The sod establishment period to obtain a healthy stand of grass plants shall commence on the first day of sodding work under this contract and shall continue through the remaining life of the contract and end 12 months after the last day of sodding operation required by this contract. Written calendar time period shall be furnished for the sod establishment period. When there is more than 1 sod establishment period, the boundaries of the sodded area covered for each period shall be described. The sod establishment period should be coordinated with Sections 02921A SEEDING, 02923A SPRIGGING, and 02930A EXTERIOR PLANTING. The sod establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.9.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health. A satisfactory stand of grass plants from the sodding operation shall be living sod uniform in color and leaf texture. Bare spots shall be a maximum 1 inch square. Joints between sod pieces shall be tight and free from weeds and other undesirable growth.

3.9.3 Maintenance During Establishment Period

Maintenance of the sodded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.9.3.1 Mowing

Sodded areas shall be mowed to a minimum 3 inch height when the turf is a maximum 4 inch height. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

3.9.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.

3.9.3.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.9.3.4 Repair

Unsatisfactory stand of grass plants shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

3.9.3.5 Maintenance Record

A record of each site visit shall be furnished which describes the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

SECTION 02930

EXTERIOR PLANTING

1 GENERAL

Scope: Exterior planting for this project will include landscape plantings around improved family housing units in two different neighborhoods. Midland and Woodland are existing, developed neighborhoods located on the north and the middle sections of the Whiteman AFB family housing area. Typical planting plans and a specific plant schedule have been provided to guide the landscape contractor in plant material selection and placement. The drawings delineate individual plant materials, mass plantings, and plant bed locations. Review and coordinate all planting with the typical plans provided with respect to solar orientation, sun/shade requirements for individual plant materials.

This section includes information on trees, shrubs, plants, edging, soil amendments, and mulching requirements for the project.

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	(1996el) 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 SUBMITTALS

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

SD-02 Shop Drawings

Shop Drawings; G Landscape plan for improved family housing units displaying plant materials required from plant schedule provided at the appropriate mix allocated. Plans shall reference typical planting plans provided in the drawing set (L1.1-L1.3). Submit quantities of plant materials for review by the Contracting Officer’s Representative.

Scale drawings defining areas at specific units to receive plant materials.

Finished Grade, Topsoil and Underground Utilities; G

Finished grade status; location of underground utilities and facilities; and availability of topsoil from the stripping and stock piling operation.

SD-03 Product Data

Geotextile ; G
Chemical Treatment Material; G

Manufacturer's literature including physical characteristics, application and installation instructions for geotextile and chemical treatment material.

Equipment; G All spreaders and sprayers and/or other equipment required for fertilizer and chemical treatment applications.

A listing of equipment to be used for the planting operation.

Delivery; G

Delivery schedule.

Plant Establishment Period; G,

Calendar time period for the plant establishment period. When there is more than one establishment period, the boundaries of the planted areas covered for each period shall be described.

Maintenance Record; IO

Maintenance work performed, quantity of plant losses, and replacements; and diagnosis of unhealthy plant material.

Application of Pesticide; IO

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; IO

A 5 pound sample.

Mulch; G

A 5 pound sample.

Geotextile; G

A 6 inch square sample and listed use (weed barrier, erosion control).

SD-06 Test Reports

Soil Test; GED
Percolation Test; GED

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Plant Material; IO
Topsoil; IO
pH Adjuster; G
Fertilizer; G
Organic Material; IO
Soil Conditioner; IO
Organic Mulch; G
Mycorrhizal Fungi Inoculum; IO
Pesticide; IO

Prior to delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following.

a. Plant Material: Classification, botanical name, common name, size, quantity by species, and location where grown.

b. Topsoil: Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster: Sieve analysis and calcium carbonate equivalent.

d. Fertilizer: Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Organic Mulch: Composition, source, and treatment against fungi growth.

h. Mycorrhizal Fungi Inoculum: Plant material treated.

i. Pesticide. EPA registration number and registered uses.

SD-10 Operation and Maintenance Data

Maintenance Instructions; IO

Instruction for year-round care of installed plant material.

1.3 SOURCE INSPECTIONS

The nursery or source of plant material and the source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Plant Material Identification

Plant material shall be identified with attached, durable, waterproof labels and weather-resistant ink, stating the correct botanical plant name and size for at least one type of plant material delivered to localized area of the site (within 4 units).

1.4.1.2 Protection During Delivery

Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball. Branches shall be protected by tying-in. Exposed branches shall be covered appropriately during transport. Protect bark, branches, and rootsystems from sunscald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Do not drop plants during delivery. Plant material shall be protected from moisture loss. The Landscape Contractor will be responsible for replacement of all scarred or damaged plant material during transport and at the construction site. The Landscape Contractor will be responsible for verifying that the plant material meets all requirements prior to delivery to the site. Plant material damaged will be rejected. Deliver exterior plants to the site after preparations for planting have been completed and install plant material immediately. If planting is delayed more than six hours after delivery, set exterior plants in shaded area. Protect from wind, weather, mechanical damage, and keep roots moist.

1.4.1.3 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.

1.4.1.4 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. Soil amendments will be required on all plant material installations.

1.4.1.5 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.

1.4.2 Inspection

Plant material shall be well shaped, vigorous and healthy with a well branched root system, free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement or abrasion, including transport injury. Plant material shall be checked for unauthorized substitution and to establish nursery grown status. Plant material showing desiccation, abrasion, transport injury, 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 (ANSI Z60.1). Plant material that measures less than specified, or has been poled, topped off or headed back, shall be rejected. Do not prune trees or shrubs before delivery. 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 materials shall be removed from the job site at the expense of the Landscape Contractor.

1.4.3 Storage

1.4.3.1 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 storage is discouraged. Plant material shall not be stored longer than 10 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.

1.4.3.2 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.

1.4.4 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.

1.4.5 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.

1.5 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.

2 PRODUCTS

2.1 PLANT MATERIAL

1.10 TREE AND SHRUB MATERIAL

General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1.11 SHADE AND FLOWERING TREES

Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1 for type of trees required. Provide balled and burlapped trees.

Branching Height: One-third and one-half of tree height.
Small Upright and Spreading Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:

Provide balled and burlapped or container-grown trees.
Multistem Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:

1.12 DECIDUOUS SHRUBS

Form and Size: Deciduous shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.
Provide balled and burlapped or container-grown shrubs.

1.13 CONIFEROUS EVERGREENS

Form and Size: Normal-quality, well-balanced, coniferous evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.
Provide balled and burlapped evergreen trees.

1.14 BROADLEAF EVERGREENS

Form and Size: Normal-quality, well-balanced, broadleaf evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.
Provide balled and burlapped or container-grown broadleaf evergreen trees and shrubs.

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 Plant Schedule

The plant schedule shall provide botanical names as included in one or more of the publications listed under "Nomenclature" in ANLA Z60.1. The minimum information that a plant schedule provides shall be the botanical name, common name, classification, caliper, height, method of handling or shipping, and special characteristics.

2.1.3 Substitutions

Substitutions will not be permitted without written request and approval from the Contracting Officer.

2.1.4 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.

2.1.5 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.

2.1.6 Method of Shipment to Maintain Health of Root System

2.1.6.1 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.

2.1.6.2 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.

2.1.6.3 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.

2.1.6.4 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.

2.1.6.5 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.

2.1.6.6 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.

2.1.6.7 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.

2.1.6.8 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.

2.1.6.9 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.

2.1.6.10 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 02300A 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. Final soil amendments should be as recommended by the soils report. Vermiculite is not recommended. Soil amendments shall be installed with all exterior plants as recommended by the soils report.

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

It shall be as recommended by the soil test. 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. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

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 super absorbent polymers, calcined clay, or gypsum for single use or in combination to meet topsoil requirements for the plant material specified and as recommended in the soils report.

2.3.4.1 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.

2.3.4.2 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.

2.3.4.3 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.4.4 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 shredded dark oak bark organic mulch. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Mulch shall be applied to all exterior plant materials to a depth of 3 inches.

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 2 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, redwood, or fir; rough sawn; free from knots, holes, 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 galvanized 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 galvanized steel 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. The hose shall be at least ½ inch in diameter, black or other acceptable color, cut to length 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 MYCORRHIZAL FUNGI INOCULUM

Mycorrhizal fungi inoculum shall be composed of multiple-fungus inoculum as recommended by the manufacturer for the plant material specified.

2.12 WATER

Unless otherwise directed, water shall be the responsibility of the Contractor. Water shall not contain elements toxic to plant life.

2.13 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.

3 EXECUTION

3.1 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

3.1.1 Deciduous Plant Material Time

Deciduous plant material shall be installed from September 15th to November 1st (Fall) or March 15th to May 15th (Spring).

3.1.2 Evergreen Plant Material Time

Evergreen plant material shall be installed from September 15th to November 1st (Fall) or March 15th to May 15th (Spring).

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. Coordinate with the government on existing soils tests that have been performed at the site.

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 02300A 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. The pit shall be scarified properly to allow for root growth. Cylindrical pits with vertical sides shall not be used. Augers for tree pits are discouraged.

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 1-2” above the existing grade and even to 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 Backfill Soil Mixture

The backfill soil mixture may be a mix of topsoil and soil amendments suitable for the plant material specified. Soil amendments for backfilling trees will consist of 1/3 original soil, 1/3 topsoil, and 1/3 peat, gypsum, manure. When practical, the excavated soil from the plant pit that is not amended provides the best backfill and shall be used. Refer to the soils test recommendations for final soil amendment recommendations.

3.4.3 Adding Mycorrhizal Fungi Inoculum

Mycorrhizal fungi inoculum shall be added as recommended by the manufacturer for the plant material specified.

3.4.4 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.

3.4.4.1 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.

3.4.4.2 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.

3.4.4.3 Container-Grown and Balled and Potted Plant Material

The plant material shall be carefully removed from containers that are not biodegradeable. 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.

3.4.4.4 Earth Berm

An earth berm saucer, 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.

3.4.5 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.

3.4.6 Watering

Plant pits and plant beds shall be watered immediately after backfilling, until completely saturated. Watering shall be continued as needed until plant materials are well-established.

3.4.7 Staking and Guying

Staking will be required for all trees, due to high wind velocity of the area. Staking should remain on trees for a period of one year, or until well-established root system is in place.

3.4.7.1 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.

3.4.7.2 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.

3.4.7.3 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 saucer 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.

3.4.8 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.

3.4.9 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 24 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 3 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 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". Pruning tools shall be washed with a mixture of 1 cap of bleach to 1 quart of water in-between cuts on different plant materials to prevent spread of disease.

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 and hosed down as required.

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 02922A SODDING. 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. The post-fertilizer should provide a 10-6-4 or as recommended by the soil analysis. 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,.

DIVISION 13 – SPECIAL CONSTRUCTION

13280 Asbestos Abatement
13281 Lead Hazard Control Activities

SECTION 13280A

ASBESTOS ABATEMENT
11/01

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.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z87.1	(1989; Errata; Z87.1a) Occupational and Educational Eye and Face Protection
ANSI Z88.2	(1992) Respiratory Protection
ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 732	(1995) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 1331	(1989; R 1995) Surface and Interfacial Tension of Solutions of Surface-Active Agents
ASTM D 2794	(1993; R 1999el) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 4397	(1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM E 119	(2000) Fire Tests of Building Construction and Materials
ASTM E 1368	(2000) Visual Inspection of Asbestos Abatement Projects
ASTM E 736	(1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

ASTM E 84	(2000a) Surface Burning Characteristics of Building Materials
ASTM E 96	(2000) Water Vapor Transmission of Materials

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(1990) Compressed Air for Human Respiration
CGA G-7.1	(1997) Commodity Specification for Air

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(1999) Methods of Fire Tests for Flame-Resistant Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100	(1984; Supple 1985, 1987, 1988 & 1990) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90/018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 340/1-90/019	(1990) Asbestos/NESHAP Adequately Wet Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations, and Definitions

49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996; Rev thru Aug 1999) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

a. Adequately Wet: A term defined in 40 CFR 61, Subpart M, and EPA 340/1-90/019 meaning to sufficiently mix or penetrate with liquid to prevent the release of particulate. If visible emissions are observed coming from asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.

b. Aggressive Method: Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact asbestos-containing material (ACM).

c. Amended Water: Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter when tested in accordance with ASTM D 1331.

d. Asbestos: Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

e. Asbestos-Containing Material (ACM): Any materials containing more than one percent asbestos.

f. Asbestos Fiber: A particulate form of asbestos, 5 micrometers or longer, with a length-to-width ratio of at least 3 to 1.

g. Authorized Person: Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

h. Building Inspector: Individual who inspects buildings for asbestos and has EPA Model Accreditation Plan (MAP) "Building Inspector" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

i. Certified Industrial Hygienist (CIH): An Industrial Hygienist certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

j. Class I Asbestos Work: Activities defined by OSHA involving the removal of thermal system insulation (TSI) and surfacing ACM.

k. Class II Asbestos Work: Activities defined by OSHA involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos - containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Certain "incidental" roofing materials such as mastic, flashing and cements when they are still intact are excluded from Class II asbestos work. Removal of small amounts of these materials which would fit into a glovebag may be classified as a Class III job.

l. Class III Asbestos Work: Activities defined by OSHA that involve repair and maintenance operations, where ACM, including TSI and surfacing ACM, is likely to be disturbed. Operations may include drilling, abrading, cutting a hole, cable pulling, crawling through tunnels or attics and spaces above the ceiling, where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.

m. Class IV Asbestos Work: Maintenance and custodial construction activities during which employees contact but do not disturb ACM and activities to clean-up dust, waste and debris resulting from Class I, II, and III activities. This may include dusting surfaces where ACM waste and debris and accompanying dust exists and cleaning up loose ACM debris from TSI or surfacing ACM following construction.

n. Clean room: An uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

o. Competent Person: In addition to the definition in 29 CFR 1926, Section .32(f), a person who is capable of identifying existing asbestos hazards as defined in 29 CFR 1926, Section .1101, selecting the appropriate control strategy, has the authority to take prompt corrective measures to eliminate them and has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

p. Contractor/Supervisor: Individual who supervises asbestos abatement work and has EPA Model Accreditation Plan "Contractor/Supervisor" training; accreditation required by 40 CFR 763, Subpart E, Appendix C.

q. Critical Barrier: One or more layers of plastic sealed over all openings into a regulated area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a regulated area from migrating to an adjacent area.

r. Decontamination Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

s. Demolition: The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

t. Disposal Bag: A 0.15 mm 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926, Section .1101, used for transporting asbestos waste from containment to disposal site.

u. Disturbance: Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in 1 standard sized glovebag or waste bag, not larger than 1.5 m 60 inches in length and width in order to access a building component.

v. Equipment Room or Area: An area adjacent to the regulated area used for the decontamination of employees and their equipment.

w. Employee Exposure: That exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

x. Fiber: A fibrous particulate, 5 micrometers or longer, with a length to width ratio of at least 3 to 1.

y. Friable ACM: A term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Subpart E, Appendix A, Section 1, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent, as determined by a method other than point counting by PLM, the asbestos content is verified by point counting using PLM.

z. Glovebag: Not more than a 1.5 by 1.5 m 60 by 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

aa. High-Efficiency Particulate Air (HEPA) Filter: A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

bb. Homogeneous Area: An area of surfacing material or thermal system insulation that is uniform in color and texture.

cc. Industrial Hygienist: A professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational health hazards.

dd. Intact: ACM which has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix. Removal of "intact" asphaltic, resinous, cementitious products does not render the ACM non-intact simply by being separated into smaller pieces.

ee. Model Accreditation Plan (MAP): USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763, Subpart E, Appendix C.

ff. Modification: A changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system.

gg. Negative Exposure Assessment: A demonstration by the Contractor to show that employee exposure during an operation is expected to be consistently below the OSHA Permissible Exposure Limits (PELs).

hh. NESHAP: National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61, Subpart M.

ii. Nonfriable ACM: A NESHAP term defined in 40 CFR 61, Subpart M and EPA 340/1-90/018 meaning any material containing more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Subpart E, Appendix A, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

jj. Nonfriable ACM (Category I): A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90/018 meaning asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

kk. Nonfriable ACM (Category II): A NESHAP term defined in 40 CFR 61, Subpart E and EPA 340/1-90/018 meaning any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos, as determined using the methods specified in 40 CFR 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

ll. Permissible Exposure Limits (PELs):

(1) PEL-Time weighted average(TWA): Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8 hour time weighted average (TWA), as determined by the method prescribed in 29 CFR 1926, Section .1101, Appendix A, or the current version of NIOSH Pub No. 84-100 analytical method 7400.

(2) PEL-Excursion Limit: An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes as determined by the method prescribed in 29 CFR 1926, Section .1101, Appendix A, or the current version of NIOSH Pub No. 84-100 analytical method 7400.

mm. Regulated Area: An OSHA term defined in 29 CFR 1926, Section .1101 meaning an area established by the Contractor to demarcate areas where Class I, II, and III asbestos work is conducted; also any adjoining area where debris and waste from such asbestos work accumulate; and an area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limit.

nn. Removal: All operations where ACM is taken out or stripped from structures or substrates, and includes demolition operations.

oo. Repair: Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM attached to structures or substrates. If the amount of asbestos so "disturbed" cannot be contained in 1 standard glovebag or waste bag, Class I precautions are required.

pp. Spills/Emergency Cleanups: Cleanup of sizable amounts of asbestos waste and debris which has occurred, for example, when water damage occurs in a building, and sizable amounts of ACM are dislodged. A Competent Person evaluates the site and ACM to be handled, and based on the type, condition and extent of the dislodged material, classifies the cleanup as Class I, II, or III. Only if the material was intact and the cleanup involves mere contact of ACM, rather than disturbance, could there be a Class IV classification.

qq. Surfacing ACM: Asbestos-containing material which contains more than 1% asbestos and is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

rr. Thermal system insulation (TSI) ACM: ACM which contains more than 1% asbestos and is applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

ss. Transite: A generic name for asbestos cement wallboard and pipe.

tt. Worker: Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926, Section .1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation required by 40 CFR 763, Subpart E, Appendix C, if required by the OSHA Class of work to be performed or by the state where the work is to be performed.

1.3 DESCRIPTION OF WORK

The work covered by this section includes the removal of asbestos-containing materials (ACM) which are encountered during demolition and renovation activities associated with this project and describes procedures and equipment required to protect workers and occupants of the regulated area from contact with airborne asbestos fibers and ACM dust and debris. Activities include OSHA Class II work operations involving ACM. The work also includes containment, storage, transportation and disposal of the generated ACM wastes. More specific operational procedures shall be detailed in the required Accident Prevention Plan and its subcomponents, the Asbestos Hazard Abatement Plan and Activity Hazard Analyses required in paragraph SAFETY AND HEALTH PROGRAM AND PLANS.

1.3.1 Abatement Work Tasks

The specific ACM to be abated is identified on Table 1, "Summary of Work Tasks". The appropriate RESPONSE ACTION DETAIL SHEETS (item to be abated and methods to be used) and SET-UP DETAIL SHEETS (containment techniques to include safety precautions and methods) are included at the end of this

section.

1.3.2 Unexpected Discovery of Asbestos

For any previously untested building components suspected to contain asbestos and located in areas impacted by the work, the Contractor shall notify the Contracting Officer (CO) who will have the option of ordering up to 10 bulk samples to be obtained at the Contractor's expense and delivered to a laboratory accredited under the National Institute of Standards and Technology (NIST) "National Voluntary Laboratory Accreditation Program (NVLAP)" and analyzed by PLM at no additional cost to the Government. Any additional components identified as ACM that have been approved by the Contracting Officer for removal shall be removed by the Contractor and will be paid for by an equitable adjustment to the contract price under the CONTRACT CLAUSE titled "changes". Sampling activities undertaken to determine the presence of additional ACM shall be conducted by personnel who have successfully completed the EPA Model Accreditation Plan (MAP) "Building Inspector" training course required by 40 CFR 763, Subpart E, Appendix C.

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-03 Product Data

Respiratory Protection Program; G, AE

Records of the respirator program.

Cleanup and Disposal; G, AE

Waste shipment records. Weigh bills and delivery tickets shall be furnished for information only.

Detailed Drawings; G

Descriptions, detail project drawings, and site layout to include worksite containment area techniques as prescribed on applicable SET-UP DETAIL SHEETS, local exhaust ventilation system locations, decontamination units and load-out units, other temporary waste storage facility, access tunnels, location of temporary utilities (electrical, water, sewer) and boundaries of each regulated area.

Materials and Equipment;

Manufacturer's catalog data for all materials and equipment to be used in the work, including brand name, model, capacity, performance characteristics and any other pertinent information. Test results and certificates from the manufacturer of encapsulants substantiating compliance with performance requirements of this specification. Material Safety Data Sheets

for all chemicals to be used onsite in the same format as implemented in the Contractor's HAZARD COMMUNICATION PROGRAM. Data shall include, but shall not be limited to, the following items:

a. High Efficiency Filtered Air (HEPA) local exhaust equipment

b. Vacuum cleaning equipment

c. Pressure differential monitor for HEPA local exhaust equipment

d. Air monitoring equipment

e. Respirators

f. Personal protective clothing and equipment

(1) Coveralls
(2) Underclothing
(3) Other work clothing
(4) Foot coverings
(5) Hard hats
(6) Eye protection
(7) Other items required and approved by Contractors Designated IH and Competent Person

g. Glovebag

h. Duct Tape

i. Disposal Containers

(1) Disposal bags
(2) Fiberboard drums
(3) Paperboard boxes

j. Sheet Plastic

(1) Polyethylene Sheet - General
(2) Polyethylene Sheet - Flame Resistant
(3) Polyethylene Sheet - Reinforced

k. Wetting Agent

(1) Amended Water
(2) Removal encapsulant

l. Strippable Coating

m. Prefabricated Decontamination Unit

n. Other items

o. Chemical encapsulant

p. Chemical encasement materials

q. Material Safety Data Sheets (for all chemicals proposed)

Qualifications; G, AE

A written report providing evidence of qualifications for personnel, facilities and equipment assigned to the work.

Training Program;

A copy of the written project site-specific training material as indicated in 29 CFR 1926, Section .1101 that will be used to train onsite employees. The training document shall be signed by the Contractor's Designated IH and Competent Person.

Medical Requirements;

Physician's written opinion.

Encapsulants; G, AE

Certificates stating that encapsulants meet the applicable specified performance requirements.

SD-06 Test Reports

Exposure Assessment and Air Monitoring; G, AE

Initial exposure assessments, negative exposure assessments, air-monitoring results and documentation.

Local Exhaust Ventilation;

Pressure differential recordings.

Licenses, Permits and Notifications; G, AE

Licenses, permits, and notifications.

SD-07 Certificates

Vacuum, Filtrationand Ventilation Equipment;

Manufacturer's certifications showing compliance with ANSI Z9.2 for:

a. Vacuums.

b. Water filtration equipment.

c. Ventilation equipment.

d. Other equipment required to contain airborne asbestos fibers.

1.5 QUALIFICATIONS

1.5.1 Written Qualifications and Organization Report

The Contractor shall furnish a written qualifications and organization report providing evidence of qualifications of the Contractor, Contractor's Project Supervisor, Designated Competent Person, supervisors and workers; Designated IH (person assigned to project and firm name); independent testing laboratory (including name of firm, principal, and analysts who will perform analyses); all subcontractors to be used including disposal transportation and disposal facility firms, subcontractor supervisors, subcontractor workers; and any others assigned to perform asbestos abatement and support activities. The report shall include an organization chart showing the Contractor's staff organization for this project by name and title, chain of command and reporting relationship with all subcontractors. The report shall be signed by the Contractor, the Contractor's onsite project manager, Designated Competent Person, Designated IH, designated testing laboratory and the principals of all subcontractors to be used. The Contractor shall include the following statement in the report: "By signing this report I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926, Section .1101, 40 CFR 61, Subpart M, and the federal, state and local requirements specified in paragraph SAFETY AND HEALTH PROGRAM AND PLANS for those asbestos abatement activities that they will be involved in."

1.5.2 Specific Requirements

The Contractor shall designate in writing, personnel meeting the following qualifications:

a. Designated Competent Person: The name, address, telephone number, and resume of the Contractor's Designated Competent Person shall be provided. Evidence that the full-time Designated Competent Person is qualified in accordance with 29 CFR 1926, Sections .32 and .1101, has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C, and is experienced in the administration and supervision of asbestos abatement projects, including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, etc. The duties of the Competent Person shall include the following: controlling entry to and exit from the regulated area; supervising any employee exposure monitoring required by 29 CFR 1926, Section .1101; ensuring that all employees working within a regulated area wear the appropriate personal protective equipment (PPE), are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and decontamination procedures specified; and ensuring that engineering controls in use are in proper operating conditions and are functioning properly. The Designated Competent Person shall be responsible for compliance with applicable federal, state and local requirements, the Contractor's Accident Prevention Plan and Asbestos Hazard Abatement Plan. The Designated Competent Person shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher

training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Contractor shall submit evidence that this person has a minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA competent person requirements. The Designated Competent Person shall be onsite at all times during the conduct of this project.

b. Project and Other Supervisors: The Contractor shall provide the name, address, telephone number, and resume of the Project Supervisor and other supervisors who have responsibility to implement the Accident Prevention Plan, including the Asbestos Hazard Abatement Plan and Activity Hazard Analyses, the authority to direct work performed under this contract and verify compliance, and have EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C. The Project Supervisor and other supervisors shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Contractor shall submit evidence that the Project Supervisor has a minimum of 2 years of on-the-job asbestos abatement experience relevant to project supervisor responsibilities and the other supervisors have a minimum of 1 year on-the-job asbestos abatement experience commensurate with the responsibilities they will have on this project.

c. Designated Industrial Hygienist: The Contractor shall provide the name, address, telephone number, resume and other information specified below for the Industrial Hygienist (IH) selected to prepare the Contractor's Asbestos Hazard Abatement Plan, prepare and perform training, direct air monitoring and assist the Contractor's Competent Person in implementing and ensuring that safety and health requirements are complied with during the performance of all required work. The Designated IH shall be a person who is board certified in the practice of industrial hygiene as determined and documented by the American Board of Industrial Hygiene (ABIH), has EPA Model Accreditation Plan (MAP) "Contractor/Supervisor" training accreditation required by 40 CFR 763, Subpart E, Appendix C, and has a minimum of 2 years of comprehensive experience in planning and overseeing asbestos abatement activities. The Designated IH shall provide, and the Contractor shall submit, the "Contractor/Supervisor" course completion certificate and the most recent certificate for required refresher training with the employee "Certificate of Worker Acknowledgment" required by this paragraph. The Designated IH shall be completely independent from the Contractor according to federal, state, or local regulations; that is, shall not be a Contractor's employee or be an employee or principal of a firm in a business relationship with the Contractor negating such independent status. A copy of the Designated IH's current valid ABIH certification shall be included. The Designated IH shall visit the site at least once per week for the duration of asbestos activities and shall be available for emergencies. In addition, the Designated IH shall prepare, and the Contractor shall submit, the name, address, telephone numbers and resumes of additional IH's and industrial hygiene technicians (IHT) who will be assisting the Designated IH in performing onsite tasks. IHs and

IHTs supporting the Designated IH shall have a minimum of 2 years of practical onsite asbestos abatement experience. The formal reporting relationship between the Designated IH and the support IHs and IHTs, the Designated Competent Person, and the Contractor shall be indicated.

d. Asbestos Abatement Workers: Asbestos abatement workers shall meet the requirements contained in 29 CFR 1926, Section .1101, 40 CFR 61, Subpart M, and other applicable federal, state and local requirements. Worker training documentation shall be provided as required on the "Certificate of Workers Acknowledgment" in this paragraph.

e. Worker Training and Certification of Worker Acknowledgment: Training documentation will be required for each employee who will perform OSHA Class IIasbestos abatement operations. Such documentation shall be submitted on a Contractor generated form titled "Certificate of Workers Acknowledgment", to be completed for each employee in the same format and containing the same information as the example certificate at the end of this section. Training course completion certificates (initial and most recent update refresher) required by the information checked on the form shall be attached.

f. Physician: The Contractor shall provide the name, medical qualifications, address, telephone number and resume of the physician who will or has performed the medical examinations and evaluations of the persons who will conduct the asbestos abatement work tasks. The physician shall be currently licensed by the state where the workers will be or have been examined, have expertise in pneumoconiosis and shall be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1926, Section .1101 and paragraph MEDICAL REQUIREMENTS. The physician shall be familiar with the site's hazards and the scope of this project.

g. First Aid and CPR Trained Persons: The names of at least 2 persons who are currently trained in first aid and CPR by the American Red Cross or other approved agency shall be designated and shall be onsite at all times during site operations. They shall be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030 and shall be included in the Contractor's Bloodborne Pathogen Program. These persons may perform other duties but shall be immediately available to render first aid when needed. A copy of each designated person's current valid First Aid and CPR certificate shall be provided.

h. Independent Testing Laboratory: The Contractor shall provide the name, address and telephone number of the independent testing laboratory selected to perform the sample analyses and report the results. The testing laboratory shall be completely independent from the Contractor as recognized by federal, state or local regulations. Written verification of the following criteria, signed by the testing laboratory principal and the Contractor, shall be submitted:

(1) Phase contrast microscopy (PCM): The laboratory is fully equipped and proficient in conducting PCM of airborne samples using the methods specified by 29 CFR 1926, Section .1101, OSHA method ID-160, the most current version of NIOSH Pub No. 84-100 Method 7400, and NIOSH Pub No. 84-100 Method 7402, transmission electron microscopy (TEM); the laboratory is currently judged proficient (classified as acceptable) in counting airborne asbestos samples by PCM by successful participation in each of the last 4 rounds in the American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing (PAT) Program; the names of the selected microscopists who will analyze airborne samples by PCM with verified documentation of their proficiency to conduct PCM analyses by being judged proficient in counting samples as current participating analysts in the AIHA PAT Program, and having successfully completed the Asbestos Sampling and Analysis course (NIOSH 582 or equivalent) with a copy of course completion certificate provided; when the PCM analysis is to be conducted onsite, documentation shall be provided certifying that the onsite analyst meets the same requirements.

(2) Polarized light microscopy (PLM): The laboratory is fully equipped and proficient in conducting PLM analyses of suspect ACM bulk samples in accordance with 40 CFR 763, Subpart E, Appendix E; the laboratory is currently accredited by NIST under the NVLAP for bulk asbestos analysis and will use analysts (names shall be provided) with demonstrated proficiency to conduct PLM to include its application to the identification and quantification of asbestos content.

(3) PCM/TEM: The laboratory is fully equipped and each analyst (name shall be provided) possesses demonstrated proficiency in conducting PCM and TEM analysis of airborne samples using NIOSH Pub No. 84-100 Method 7400 PCM and NIOSH Pub No. 84-100 Method 7402 (TEM confirmation of asbestos content of PCM results) from the same filter.

i. Disposal Facility, Transporter: The Contractor shall provide written evidence that the landfill to be used is approved for asbestos disposal by the USEPA and state and local regulatory agencies. Copies of signed agreements between the Contractor (including subcontractors and transporters) and the asbestos waste disposal facility to accept and dispose of all asbestos containing waste generated during the performance of this contract shall be provided. Qualifications shall be provided for each subcontractor or transporter to be used, indicating previous experience in transport and disposal of asbestos waste to include all required state and local waste hauler requirements for asbestos. The Contractor and transporters shall meet the DOT requirements of 49 CFR 171, 49 CFR 172, and 49 CFR 173 as well as registration requirements of 49 CFR 107 and other applicable state or local requirements. The disposal facility shall meet the requirements of 40 CFR 61, Sections .154 or .155, as required in 40 CFR 61, Section .150(b), and other applicable state or local requirements.

1.5.3 Federal, State or Local Citations on Previous Projects

The Contractor and all subcontractors shall submit a statement, signed by an officer of the company, containing a record of any citations issued by

Federal, State or local regulatory agencies relating to asbestos activities (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company shall be provided.

1.6 REGULATORY REQUIREMENTS

In addition to detailed requirements of this specification, work performed under this contract shall comply with EM 385-1-1, applicable federal, state, and local laws, ordinances, criteria, rules and regulations regarding handling, storing, transporting, and disposing of asbestos waste materials. This includes, but is not limited to, OSHA standards, 29 CFR 1926, especially Section .1101, 40 CFR 61, Subpart M and 40 CFR 763; and U.S. Department of Transportaion (DOT) regulations 49 CFR Part 171, 49 CFR Part 172, Subparts B and C, and 49 CFR Part 173, Subpart M. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply. The following state and local laws, rules and regulations regarding demolition, removal, renovation, spill/emergency cleanup, housekeeping, handling, storing, transporting and disposing of asbestos material apply: Missouri Department of Natural Resources, Air Pollution Control Program, 10 C.S.R. 10-6.240.

1.7 SAFETY AND HEALTH PROGRAM AND PLANS

The Contractor shall develop and submit a written comprehensive site-specific Accident Prevention Plan at least 30 days prior to the preconstruction conference. The Accident Prevention Plan shall address requirements of EM 385-1-1, Appendix A, covering onsite work to be performed by the Contractor and subcontractors. The Accident Prevention Plan shall incorporate an Asbestos Hazard Abatement Plan, and Activity Hazard Analyses as separate appendices into 1 site specific Accident Prevention Plan document. Any portions of the Contractor's overall Safety and Health Program that are referenced in the Accident Prevention Plan, e.g., respirator program, hazard communication program, confined space entry program, etc., shall be included as appendices to the Accident Prevention Plan. The plan shall take into consideration all the individual asbestos abatement work tasks identified in Table 1. The plan shall be prepared, signed and sealed, including certification number, and dated by the Contractor's Designated IH, Competent Person, and Project Supervisor.

1.7.1 Asbestos Hazard Abatement Plan Appendix

The Asbestos Hazard Abatement Plan appendix to the Accident Prevention Plan shall include, but not be limited to, the following:

a. The personal protective equipment to be used;

b. The location and description of regulated areas including clean and dirty areas,access tunnels, and decontamination unit (clean room, shower room, equipment room, storage areas such as load-out unit);

c. Initial exposure assessment in accordance with 29 CFR 1926, Section .1101;

d. Level of supervision;

e. Method of notification of other employers at the worksite;

f. Abatement method to include containment and control procedures;

g. Interface of trades involved in the construction;

h. Sequencing of asbestos related work;

i. Storage and disposal procedures and plan;

j. Type of wetting agent and asbestos encapsulant to be used;

k. Location of local exhaust equipment;

l. Air monitoring methods (personal, environmental and clearance);

m. Bulk sampling and analytical methods (if required);

n. A detailed description of the method to be employed in order to control the spread of ACM wastes and airborne fiber concentrations;

o. Fire and medical emergency response procedures;

p. The security procedures to be used for all regulated areas.

1.7.2 Activity Hazard Analyses Appendix

Activity Hazard Analyses, for each major phase of work, shall be submitted and updated during the project. The Activity Hazard Analyses format shall be in accordance with EM 385-1-1 (Figure 1-1). The analysis shall define the activities to be performed for a major phase of work, identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the Activity Hazard Analyses has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the onsite Government representatives. The Activity Hazard Analyses shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations.

1.8 PRECONSTRUCTION CONFERENCE AND ONSITE SAFETY

The Contractor and the Contractor's Designated Competent Person, Project Supervisor, and Designated IH shall meet with the Contracting Officer prior to beginning work at a safety preconstruction conference to discuss the details of the Contractor's submitted Accident Prevention Plan to include the Asbestos Hazard Abatement Plan and Activity Hazard Analyses appendices. Deficiencies in the Accident Prevention Plan will be discussed and the Accident Prevention Plan shall be revised to correct the deficiencies and resubmitted for acceptance. Any changes required in the specification as a result of the Accident Prevention Plan shall be identified specifically in the plan to allow for free discussion and acceptance by the Contracting

Officer, prior to the start of work. Onsite work shall not begin until the Accident Prevention Plan has been accepted. A copy of the written Accident Prevention Plan shall be maintained onsite. Changes and modifications to the accepted Accident Prevention Plan shall be made with the knowledge and concurrence of the Designated IH, the Project Supervisor, Designated Competent Person, and the Contracting Officer. Should any unforeseen hazard become evident during the performance of the work, the Designated IH shall bring such hazard to the attention of the Project Supervisor, Designated Competent Person, and the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, all necessary action shall be taken by the Contractor to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Once accepted by the Contracting Officer, the Accident Prevention Plan, including the Asbestos Hazard Abatement Plan and Activity Hazard Analyses will be enforced as if an addition to the contract. Disregarding the provisions of this contract or the accepted Accident Prevention Plan will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

1.9 SECURITY

Lockable access areas (personnel and load-out decontamination units) shall be provided for each regulated area. A log book shall be kept documenting entry into and out of the regulated area. Entry into regulated areas shall only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas shall be trained, be medically evaluated, and wear the required personal protective equipment for the specific regulated area to be entered.

1.10 MEDICAL REQUIREMENTS

Medical requirements shall conform to 29 CFR 1926, Section .1101.

1.10.1 Medical Examinations

Before being exposed to airborne asbestos fibers, workers shall be provided with a medical examination as required by 29 CFR 1926, Section .1101 and other pertinent state or local requirements. This requirement shall have been satisfied within the last 12 months. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. X-ray films of asbestos workers shall be identified to the consulting radiologist and medical record jackets shall be marked with the word "asbestos."

1.10.1.1 Information Provided to the Physician

The Contractor shall provide the following information in writing to the examining physician:

a. A copy of 29 CFR 1926, Section .1101 and Appendices D, E, G, and I;

b. A description of the affected employee's duties as they relate to the employee's exposure;

c. The employee's representative exposure level or anticipated exposure level;

d. A description of any personal protective and respiratory equipment used or to be used;

e. Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

1.10.1.2 Written Medical Opinion

For each worker, a written medical opinion prepared and signed by a licensed physician indicating the following:

a. Summary of the results of the examination.

b. The potential for an existing physiological condition that would place the employee at an increased risk of health impairment from exposure to asbestos.

c. The ability of the individual to wear personal protective equipment, including respirators, while performing strenuous work tasks under cold and/or heat stress conditions.

d. A statement that the employee has been informed of the results of the examination, provided with a copy of the results, informed of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure, and informed of any medical condition that may result from asbestos exposure.

1.10.2 Medical and Exposure Records

Complete and accurate records shall be maintained of each employee's medical examinations, medical records, and exposure data, as required by 29 CFR 1910, Section .1910.20 and 29 CFR 1926, Section .1101 for a period of 30 years after termination of employment. Records of the required medical examinations and exposure data shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health (OSHA) or authorized representatives of the employee and an employee's physician upon request of the employee or former employee. A copy of the required medical certification for each employee shall be maintained on file at the worksite for review, as requested by the Contracting Officer or the representatives.

1.11 TRAINING PROGRAM

1.11.1 General Training Requirements

The Contractor shall establish a training program as specified by EPA Model Accreditation Plan (MAP), training requirements at 40 CFR 763, Subpart E, Appendix C, the State of Missouri regulation no. 10 CSR 10-6.250, OSHA requirements at 29 CFR 1926, Section .1101(k)(9), and this specification. Contractor employees shall complete the required training for the type of work they are to perform and such training shall be documented and provided to the Contracting Officer as specified in paragraph QUALIFICATIONS.

1.11.2 Project Specific Training

Prior to commencement of work, each worker shall be instructed by the

Contractor's Designated IH and Competent Person in the following project specific training:

a. The hazards and health effects of the specific types of ACM to be abated;

b. The content and requirements of the Contractor's Accident Prevention Plan to include the Asbestos Hazard Abatement Plan and Activity Hazard Analyses and site-specific safety and health precautions;

c. Hazard Communication Program;

d. Hands-on training for each asbestos abatement technique to be employed;

e. Heat and/or cold stress monitoring specific to this project;

f. Air monitoring program and procedures;

g. Medical surveillance to include medical and exposure record-keeping procedures;

h. The association of cigarette smoke and asbestos-related disease;

i. Security procedures;

j. Specific work practice controls and engineering controls required for each Class of work in accordance with 29 CFR 1926, Section .1101.

1.12 RESPIRATORY PROTECTION PROGRAM

The Contractor's Designated IH shall establish in writing, and implement a respiratory protection program in accordance with 29 CFR 1926, Section .1101, 29 CFR 1910, Section .134, ANSI Z88.2, CGA G-7, CGA G-7.1 and DETAIL SHEET 12. The Contractor's Designated IH shall establish minimum respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations encountered during the performance of the asbestos abatement work. The Contractor's respiratory protection program shall include, but not be limited to, the following elements:

a. The company policy, used for the assignment of individual responsibility, accountability, and implementation of the respiratory protection program.

b. The standard operating procedures covering the selection and use of respirators. Respiratory selection shall be determined by the hazard to which the worker is exposed.

c. Medical evaluation of each user to verify that the worker may be assigned to an activity where respiratory protection is required.

d. Training in the proper use and limitations of respirators.

e. Respirator fit-testing, i.e., quantitative, qualitative and individual functional fit checks.

f. Regular cleaning and disinfection of respirators.

g. Routine inspection of respirators during cleaning and after each use when designated for emergency use.

h. Storage of respirators in convenient, clean, and sanitary locations.

i. Surveillance of regulated area conditions and degree of employee exposure (e.g., through air monitoring).

j. Regular evaluation of the continued effectiveness of the respiratory protection program.

k. Recognition and procedures for the resolution of special problems as they affect respirator use (e.g., no facial hair that comes between the respirator face piece and face or interferes with valve function; prescription eye wear usage; contact lenses usage; etc.).

l. Proper training in putting on and removing respirators.

1.12.1 Respiratory Fit Testing

A qualitative or quantitative fit test conforming to 29 CFR 1926, Section 1101, Appendix C shall be conducted by the Contractor's Designated IH for each Contractor worker required to wear a respirator, and for the Contracting Officer and authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test shall be performed for each worker wearing a negative-pressure respirator prior to initially wearing a respirator on this project and every 6 months thereafter. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn, or of full-facepiece air purifying respirators where they are worn at levels at which half-facepiece air purifying respirators are permitted. If physical changes develop that will affect the fit, a new fit test for the worker shall be performed. Functional fit checks shall be performed by employees each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.12.2 Respirator Selection and Use Requirements

The Contractor shall provide respirators, and ensure that they are used as required by 29 CFR 1926, Section .1101 and in accordance with the manufacturer's recommendations. Respirators shall be jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (MSHA/NIOSH), or by NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. Personnel who handle ACM, enter regulated areas that require the wearing of a respirator, or who are otherwise carrying out abatement activities that require the wearing of a respirator, shall be provided with approved respirators that are fully protective of the worker at the measured or anticipated airborne asbestos concentration level to be encountered. For air-purifying respirators, the particulate filter portion of the cartridges or canister approved for use in airborne asbestos environments shall be high-efficiency particulate air (HEPA). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type shall be made by the Contractor's Designated

IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered. Recommendations made by the Contractor's Designated IH to downgrade respirator type shall be submitted in writing to the Contracting Officer. The Contractor's Designated Competent Person in consultation with the Designated IH, shall have the authority to take immediate action to upgrade or downgrade respiratory type when there is an immediate danger to the health and safety of the wearer. Respirators shall be used in the following circumstances:

a. During all Class I asbestos jobs.

b. During all Class II work where the ACM is not removed in a substantially intact state.

c. During all Class II and III work which is not performed using wet methods. Respirators need not be worn during removal of ACM from sloped roofs when a negative exposure assessment has been made and ACM is removed in an intact state.

d. During all Class II and III asbestos jobs where the Contractor does not produce a negative exposure assessment.

e. During all Class III jobs where TSI or surfacing ACM is being disturbed.

f. During all Class IV work performed within regulated areas where employees performing other work are required to wear respirators.

g. During all work where employees are exposed above the PEL-TWA or PEL-Excursion Limit.

h. In emergencies

1.12.3 Class I Work

The Contractor shall provide: (1) a tight-fitting, powered air purifying respirator equipped with high efficiency filters, or (2) a full-facepiece supplied air respirator operated in the pressure demand mode, equipped with HEPA egress cartridges, or (3) an auxiliary positive pressure self-contained breathing apparatus, for all employees within the regulated area where Class I work is being performed; provided that a negative exposure assessment has not been produced, and that the exposure level will not exceed 1 f/cc as an 8-hour time weighted average. A full-facepiece supplied air respirator, operated in the pressure demand mode, equipped with an auxiliary positive pressure self-contained breathing apparatus shall be provided under such conditions, if the exposure assessment indicates exposure levels above 1 f/cc as an 8-hour time weighted average.

1.12.4 Class IIWork

The Contractor shall provide an air purifying respirator, other than a disposable respirator, equipped with high-efficiency filters whenever the employee performs Class II asbestos jobs where the Contractor does not produce a negative exposure assessment.

1.12.5 Sanitation

Employees who wear respirators shall be permitted to leave work areas to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

1.13 HAZARD COMMUNICATION PROGRAM

A hazard communication program shall be established and implemented in accordance with 29 CFR 1926, Section .59. Material safety data sheets (MSDSs) shall be provided for all hazardous materials brought onto the worksite. One copy shall be provided to the Contracting Officer and 1 copy shall be included in the Contractor's Hazard Communication Program.

1.14 LICENSES, PERMITS AND NOTIFICATIONS

1.14.1 General Legal Requirements

Necessary licenses, permits and notifications shall be obtained in conjunction with the project's asbestos abatement, transportation and disposal actions and timely notification furnished of such actions as required by federal, state, regional, and local authorities. The Contractor shall notify the Regional Office of the USEPA, the Missouri Department of Natural Resources, and the Contracting Officer in writing, at least 20 days prior to the commencement of work, in accordance with 10 CSR 10-6.240, 40 CFR 61, Subpart M, and local requirements to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents. Notification shall be by Certified Mail, Return Receipt Requested. The Contractor shall furnish copies of the receipts to the Contracting Officer, in writing, prior to the commencement of work. A copy of the rental company's written acknowledgment and agreement shall be provided as required by paragraph RENTAL EQUIPMENT. For licenses, permits, and notifications that the Contractor is responsible for obtaining, the Contractor shall pay any associated fees or other costs incurred.

A. Air Pollution Control Program (Asbestos)
   Missouri Department of Natural Resources
   P.O. Box 176
   Jefferson City, Missouri 65102

B. Region 7
   Asbestos NESHAP Contact
   Air and Waste Management Division
   USEPA
   901 North 5th Street
   Kansas City, Kansas 66101
   (913) 551-7003

1.14.2 Litigation and Notification

The Contractor shall notify the Contracting Officer if any of the following occur:

a. The Contractor or any of the subcontractors are served with notice of violation of any law, regulation, permit or license which relates to this contract;

b. Proceedings are commenced which could lead to revocation of related permits or licenses; permits, licenses or other Government

authorizations relating to this contract are revoked;

c. Litigation is commenced which would affect this contract;

d. The Contractor or any of the subcontractors become aware that their equipment or facilities are not in compliance or may fail to comply in the future with applicable laws or regulations.

1.15 PERSONAL PROTECTIVE EQUIPMENT

Three complete sets of personal protective equipment shall be made available to the Contracting Officer and authorized visitors for entry to the regulated area. Contracting Officer and authorized visitors shall be provided with training equivalent to that provided to Contractor employees in the selection, fitting, and use of the required personal protective equipment and the site safety and health requirements. Contractor workers shall be provided with personal protective clothing and equipment and the Contractor shall ensure that it is worn properly. The Contractor's Designated IH and Designated Competent Person shall select and approve all the required personal protective clothing and equipment to be used.

1.15.1 Respirators

Respirators shall be in accordance with paragraph RESPIRATORY PROTECTION PROGRAM.

1.15.2 Whole Body Protection

Personnel exposed to airborne concentrations of asbestos that exceed the PELs, or for all OSHA Classes of work for which a required negative exposure assessment is not produced, shall be provided with whole body protection and such protection shall be worn properly. The Contractor's Designated IH and Competent Person shall select and approve the whole body protection to be used. The Competent Person shall examine work suits worn by employees at least once per work shift for rips or tears that may occur during performance of work. When rips or tears are detected while an employee is working, rips and tears shall be immediately mended, or the work suit shall be immediately replaced. Disposable whole body protection shall be disposed of as asbestos contaminated waste upon exiting from the regulated area. Reusable whole body protection worn shall be either disposed of as asbestos contaminated waste upon exiting from the regulated area or be properly laundered in accordance with 29 CFR 1926, Section .1101. Whole body protection used for asbestos abatement shall not be removed from the worksite by a worker to be cleaned. Recommendations made by the Contractor's Designated IH to downgrade whole body protection shall be submitted in writing to the Contracting Officer. The Contractor's Designated Competent Person, in consultation with the Designated IH, has the authority to take immediate action to upgrade or downgrade whole body protection when there is an immediate danger to the health and safety of the wearer.

1.15.2.1 Coveralls

Disposable-breathable coveralls with a zipper front shall be provided. Sleeves shall be secured at the wrists, and foot coverings secured at the ankles. See DETAIL SHEET 13.

1.15.2.2 Underwear

Disposable underwear shall be provided. If reusable underwear are used, they shall be disposed of as asbestos contaminated waste or laundered in accordance with 29 CFR 1926, Section .1101. Asbestos abatement workers shall not remove contaminated reusable underwear worn during abatement of ACM from the site to be laundered.

1.15.2.3 Work Clothing

An additional coverall shall be provided when the abatement and control method employed does not provide for the exit from the regulated area directly into an attached decontamination unit. Cloth work clothes for wear under the protective coverall, and foot coverings, shall be provided when work is being conducted in low temperature conditions. Cloth work clothes shall be either disposed of as asbestos contaminated waste or properly laundered in accordance with 29 CFR 1926, Section .1101.

1.15.2.4 Gloves

Gloves shall be provided to protect the hands. Where there is the potential for hand injuries (i.e., scrapes, punctures, cuts, etc.) a suitable glove shall be provided and used.

1.15.2.5 Foot Coverings

Cloth socks shall be provided and worn next to the skin. Footwear, as required by OSHA and EM 385-1-1, that is appropriate for safety and health hazards in the area shall be worn. Rubber boots shall be used in moist or wet areas. Reusable footwear removed from the regulated area shall be thoroughly decontaminated or disposed of as ACM waste. Disposable protective foot covering shall be disposed of as ACM waste. If rubber boots are not used, disposable foot covering shall be provided.

1.15.2.6 Head Covering

Hood type disposable head covering shall be provided. In addition, protective head gear (hard hats) shall be provided as required. Hard hats shall only be removed from the regulated area after being thoroughly decontaminated.

1.15.2.7 Protective Eye Wear

Eye protection provided shall be in accordance with ANSI Z87.1.

1.16 HYGIENE FACILITIES AND PRACTICES

The Contractor shall establish a decontamination area for the decontamination of employees, material and equipment. The Contractor shall ensure that employees enter and exit the regulated area through the decontamination area.

1.16.1 Shower Facilities

Shower facilities, when provided, shall comply with 29 CFR 1910, Section .141(d)(3).

1.16.2 3-Stage Decontamination Area

A temporary negative pressure decontamination unit that is adjacent and attached in a leak-tight manner to the regulated area shall be provided as described in SET-UP DETAIL SHEET Numbers 22 and 23. Utilization of prefabricated units shall have prior approval of the Contracting Officer. The decontamination unit shall have an equipment room and a clean room separated by a shower that complies with 29 CFR 1910, Section .141 (unless the Contractor can demonstrate that such facilities are not feasible). Equipment and surfaces of containers filled with ACM shall be cleaned prior to removing them from the equipment room or area. Surfaces of the equipment room shall be wet wiped 2 times after each shift. Materials used for wet wiping shall be disposed of as asbestos contaminated waste. Two separate lockers shall be provided for each asbestos worker, one in the equipment room and one in the clean room. Hot water service may be secured from the building hot water system provided backflow protection is installed by the Contractor at the point of connection. Should sufficient hot water be unavailable, the Contractor shall provide a minimum 160 L 40 gal. electric water heater with minimum recovery rate of 80 L 20 gal. per hour and a temperature controller for each showerhead. The Contractor shall provide a minimum of 1 shower. Instantaneous type in-line water heater may be incorporated at each shower head in lieu of hot water heater, upon approval by the Contracting Officer. Flow and temperature controls shall be located within the shower and shall be adjustable by the user. The wastewater pump shall be sized for 1.25 times the showerhead flow-rate at a pressure head sufficient to satisfy the filter head loss and discharge line losses. The pump shall supply a minimum 1.6 L/s 25 gpm flow with 10.7 m 35 ft. of pressure head. Used shower water shall be collected and filtered to remove asbestos contamination. Filters and residue shall be disposed of as asbestos contaminated material, per DETAIL SHEETS 9 and 14. Filtered water shall be discharged to the sanitary system. Wastewater filters shall be installed in series with the first stage pore size of 20 microns and the second stage pore size of 5 microns. The floor of the decontamination unit's clean room shall be kept dry and clean at all times. Water from the shower shall not be allowed to wet the floor in the clean room. Surfaces of the clean room and shower shall be wet-wiped 2 times after each shift change with a disinfectant solution. Proper housekeeping and hygiene requirements shall be maintained. Soap and towels shall be provided for showering, washing and drying. Any cloth towels provided shall be disposed of as ACM waste or shall be laundered in accordance with 29 CFR 1926, Section .1101.

1.16.3 Load-Out Unit

A temporary load-out unit that is adjacent and connected to the regulated area, and access tunnel if necessary, shall be provided as described in DETAIL SHEET Number 20 and 25. Utilization of prefabricated units shall have prior approval of the Contracting Officer. The load-out unit shall be attached in a leak-tight manner to each regulated area. Surfaces of the load-out unit and access tunnel shall be adequately wet-wiped 2 times after each shift change. Materials used for wet wiping shall be disposed of as asbestos contaminated waste.

1.16.4 Single Stage Decontamination Area

A decontamination area (equipment room/area) shall be provided for Class I work involving less than 7.5 m 25 feet or 0.9 square meters10 square feet of TSI or surfacing ACM, and for Class II asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment produced before the operation. The equipment room or area shall be

adjacent to the regulated area for the decontamination of employees, material, and their equipment which is contaminated with asbestos. The equipment room or area shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area. Surfaces of the equipment room shall be wet wiped 2 times after each shift. Materials used for wet wiping shall be disposed of as asbestos contaminated waste.

1.16.5 Decontamination Requirements for Class IV Work

The Contractor shall ensure that employees performing Class IV work within a regulated area comply with the hygiene practice required of employees performing work which has a higher classification within that regulated area, or the Contractor shall provide alternate decontamination area facilities for employees cleaning up debris and material which is TSI or surfacing ACM.

1.16.6 Decontamination Area Entry Procedures

The Contractor shall ensure that employees entering the decontamination area through the clean room or clean area:

a. Remove street clothing in the clean room or clean area and deposit it in lockers.

b. Put on protective clothing and respiratory protection before leaving the clean room or clean area.

c. Pass through the equipment room to enter the regulated area.

1.16.7 Decontamination Area Exit Procedures

The Contractor shall ensure that the following procedures are followed:

a. Before leaving the regulated area, respirators shall be worn while employees remove all gross contamination and debris from their work clothing using a HEPA vacuum.

b. Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers (see Detail Sheets 9 and 14) for disposal and/or laundering.

c. Employees shall not remove their respirators in the equipment room.

d. Employees shall shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, the Contractor shall ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

e. After showering, employees shall enter the clean room before changing into street clothes.

1.16.8 Lunch Areas

The Contractor shall provide lunch areas in which the airborne concentrations of asbestos are below 0.01 f/cc.

1.16.9 Smoking

Smoking, if allowed by the Contractor, shall only be permitted in designated areas approved by the Contracting Officer.

1.17 REGULATED AREAS

All Class I and II asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they shall demarcate the regulated area. Access to regulated areas shall be limited to authorized persons. The Contractor shall control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

1.18 WARNING SIGNS AND TAPE

Warning signs and tape printed in English shall be provided at the regulated boundaries and entrances to regulated areas. The Contractor shall ensure that all personnel working in areas contiguous to regulated areas comprehend the warning signs. Signs shall be located to allow personnel to read the signs and take the necessary protective steps required before entering the area. Warning signs, as shown and described in DETAIL SHEET 11, shall be in vertical format conforming to 29 CFR 1910 and 29 CFR 1926, Section .1101, a minimum of 500 by 350 mm 20 by 14 inches, and displaying the following legend in the lower panel:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
[RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA]

Spacing between lines shall be at least equal to the height of the upper of any two lines. Warning tape shall be provided as shown and described on DETAIL SHEET 11. Decontamination unit signage shall be as shown and described on DETAIL SHEET 15.

1.19 WARNING LABELS

Warning labels shall be affixed to all asbestos disposal containers used to contain asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements are acceptable. Warning labels shall be as described in DETAIL SHEET 14, shall conform to 29 CFR 1926, Section .1101 and shall be of sufficient size to be clearly legible displaying the

following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

1.20 LOCAL EXHAUST VENTILATION

Local exhaust ventilation units shall conform to ANSI Z9.2 and 29 CFR 1926, Section .1101. Filters on local exhaust system equipment shall conform to ANSI Z9.2 and UL 586. Filter shall be UL labeled.

1.21 TOOLS

Vacuums shall be leak proof to the filter, equipped with HEPA filters, of sufficient capacity and necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material. Power tools shall not be used to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system, or has otherwise been approved for use by the Contracting Officer. Residual asbestos shall be removed from reusable tools prior to storage and reuse. Reusable tools shall be thoroughly decontaminated prior to being removed from regulated areas.

1.22 RENTAL EQUIPMENT

If rental equipment is to be used, written notification shall be provided to the rental agency, concerning the intended use of the equipment, the possibility of asbestos contamination of the equipment and the steps that will be taken to decontaminate such equipment. A written acceptance of the terms of the Contractor's notification shall be obtained from the rental agency.

1.23 AIR MONITORING EQUIPMENT

The Contractor's Designated IH shall approve air monitoring equipment to be used to collect samples. The equipment shall include, but shall not be limited to:

a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute when equipped with a sampling train of tubing and filter cassette.

b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute when equipped with a sampling train of tubing and filter cassette, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps shall also be equipped with an automatic flow control unit which shall maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink

bands, to be used with low flow pumps in accordance with 29 CFR 1926, Section .1101 for personal air sampling.

d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands, to be used with high flow pumps when conducting environmental area sampling using NIOSH Pub No. 84-100 Methods 7400 and 7402.

e. Appropriate plastic tubing to connect the air sampling pump to the selected filter cassette.

f. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 20 to plus 60 degrees C minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

1.24 EXPENDABLE SUPPLIES

1.24.1 Glovebag

Glovebags shall be provided as described in 29 CFR 1926, Section .1101 and SET-UP DETAIL SHEET 10. The glovebag assembly shall be 0.15 mm6 mil thick plastic, prefabricated and seamless at the bottom with preprinted OSHA warning label.

1.24.2 Duct Tape

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container shall be provided.

1.24.3 Disposal Containers

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers shall be provided for ACM wastes as required by 29 CFR 1926 Section .1101 and DETAIL SHEETS 9A, 9B, 9C and 14.

1.24.4 Disposal Bags

Leak-tight bags, 0.15 mm 6 mil thick, shall be provided for placement of asbestos generated waste as described in DETAIL SHEET 9A.

1.24.5 Fiberboard Drums

Fiberboard drums shall be provided if required by state or local regulations.

1.24.6 Cardboard Boxes

Heavy-duty corrugated cardboard boxes, coated with plastic or wax to retard deterioration from moisture, shall be provided as described in DETAIL SHEET 9C, if required by state and local requirements. Boxes shall fit into selected ACM disposal bags. Filled boxes shall be sealed leak-tight with duct tape.

1.24.7 Sheet Plastic

Sheet plastic shall be polyethylene of 0.15 mm 6 mil minimum thickness and shall be provided in the largest sheet size necessary to minimize seams ,as indicated on the project drawings. Film shall conform to ASTM D 4397, except as specified below:

1.24.7.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets shall be provided. Film shall conform to the requirements of NFPA 701.

1.24.7.2 Reinforced

Reinforced sheets shall be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock shall consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between 2 layers of polyethylene film. Film shall meet flame resistant standards of NFPA 701.

1.24.8 Amended Water

Amended water shall meet the requirements of ASTM D 1331.

1.24.9 Mastic Removing Solvent

Mastic removing solvent shall be nonflammable and shall not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite shall have a flash point greater than 60 degrees C.140 degrees F.

1.24.10 Leak-tight Wrapping

Two layers of 0.15 mm6 mil minimum thick polyethylene sheet stock shall be used for the containment of removed asbestos-containing components or materials too large to be placed in disposal bags as described in DETAIL SHEET 9B. Upon placement of the ACM component or material, each layer shall be individually leak-tight sealed with duct tape.

1.24.11 Viewing Inspection Window

Where feasible, a minimum of 1 clear, 3 mm1/8 inch thick, acrylic sheet, 450 by 610 mm18 by 24 inches, shall be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows shall be sealed leak-tight with industrial grade duct tape.

1.24.12 Wetting Agents

Removal encapsulant (a penetrating encapsulant) shall be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant shall be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS.

1.24.13 Strippable Coating

Strippable coating in aerosol cans shall be used to adhere to surfaces and

to be removed cleanly by stripping, at the completion of work. This work shall only be done in well ventilated areas.

1.25 MISCELLANEOUS ITEMS

A sufficient quantity of other items, such as, but not limited to: scrapers, brushes, brooms, staple guns, tarpaulins, shovels, rubber squeegees, dust pans, other tools, scaffolding, staging, enclosed chutes, wooden ladders, lumber necessary for the construction of containments, UL approved temporary electrical equipment, material and cords, ground fault circuit interrupters, water hoses of sufficient length, fire extinguishers, first aid kits, portable toilets, logbooks, log forms, markers with indelible ink, spray paint in bright color to mark areas, project boundary fencing, etc., shall be provided.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Encapsulants shall conform to USEPA requirements, shall contain no toxic or hazardous substances and no solvent and shall meet the following requirements:

ALL ENCAPSULANTS

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Combustion Toxicity Zero Mortality	Univ. of Pittsburgh Protocol
Life Expectancy, 20 yrs Accelerated Aging Test	ASTM C 732
Permeability, Min. 23 ng per Pa-sec-square m	ASTM E 96

Additional Requirements for Bridging Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 730 N/m	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Min. 4.7 N-m (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Penetrating Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test,	ASTM E 736

ALL ENCAPSULANTS

Requirement	Test Standard
730 N/m	
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Min. 4.7 N-m (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Lockdown Encapsulant

Requirement	Test Standard
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength, 1.5 kN/m (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

ALL ENCAPSULANTS

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Combustion Toxicity Zero Mortality	Univ. of Pittsburgh Protocol
Life Expectancy, 20 yrs Accelerated Aging Test	ASTM C 732
Permeability, Minimum 0.4 perms	ASTM E 96

Additional Requirements for Bridging Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 50 pounds of force/foot	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Minimum 43 in-lb (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

ALL ENCAPSULANTS

Requirement	Test Standard

Additional Requirements for Penetrating Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test, 50 pounds of force/foot	ASTM E 736
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test(Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance, Minimum 43 in-lb (Gardner Impact Test)	ASTM D 2794
Flexibility, no rupture or cracking (Mandrel Bend Test)	ASTM D 522

Additional Requirements for Lockdown Encapsulant

Requirement	Test Standard
Fire Resistance, Negligible affect on fire resistance rating over 3 hour test(Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength, 100 pounds of force/foot (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

2.2 RECYCLABLE MATERIALS

The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Asbestos abatement work tasks shall be performed as summarized in paragraph DESCRIPTION OF WORK and including Table 1 and the Contractor's Accident Prevention Plan, Asbestos Hazard Abatement Plan, and the Activity Hazard Analyses. The Contractor shall use the engineering controls and work practices required in 29 CFR 1926, Section .1101(g) in all operations regardless of the levels of exposure. Personnel shall wear and utilize protective clothing and equipment as specified. The Contractor shall not permit eating, smoking, drinking, chewing or applying cosmetics in the regulated area. All hot work (burning, cutting, welding, etc.) shall be conducted under controlled conditions in conformance with 29 CFR 1926, Section .352, Fire Prevention. Personnel of other trades, not engaged in asbestos abatement activities, shall not be exposed at any time to airborne concentrations of asbestos unless all the administrative and personal protective provisions of the Contractor's Accident Prevention Plan are

complied with. Power to the regulated area shall be locked-out and tagged in accordance with 29 CFR 1910, and temporary electrical service with ground fault circuit interrupters shall be provided as needed. Temporary electrical service shall be disconnected when necessary for wet removal. The Contractor shall stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. The Contractor shall correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work shall resume only upon notification by the Contracting Officer. Corrective actions shall be documented.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

Asbestos abatement shall be performed without damage to or contamination of adjacent work or area. Where such work or area is damaged or contaminated, as verified by the Contracting Officer using visual inspection or sample analysis, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the Government, as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, work shall stop in all effected areas immediately and the spill shall be cleaned. When satisfactory visual inspection and air sampling analysis results are obtained and have been evaluated by the Contractor's Designated IH and the Contracting Officer, work shall proceed.

3.3 OBJECTS

3.3.1 Removal of Mobile Objects

Mobile objects, furniture, personal items, and equipment will be removed from the area of work by the Government before asbestos abatement work begins.

3.3.2 Stationary Objects

Stationary objects, furniture, and equipment shall remain in place and shall be precleaned using HEPA vacuum followed by adequate wet wiping. Stationary objects and furnishings shall be covered with 2 layers of polyethylene and edges sealed with duct tape.

3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS

Building ventilating systems supplying air into or returning air out of a regulated area shall be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910, Section .147. Air-tight critical barriers shall be installed on building ventilating openings located inside the regulated area that supply or return air from the building ventilation system or serve to exhaust air from the building. The critical barriers shall consist of 2 layers of polyethylene. Edges to wall, ceiling and floor surfaces shall be sealed with industrial grade duct tape. Critical barriers shall be installed as shown on appended SET-UP DETAIL SHEETS.

3.5 PRECLEANING

Surfaces shall be cleaned by HEPA vacuum and adequately wet wiped prior to establishment of containment.

3.6 METHODS OF COMPLIANCE

3.6.1 Mandated Practices

The Contractor shall employ proper handling procedures in accordance with 29 CFR 1926 and 40 CFR 61, Subpart M, and the specified requirements. The specific abatement techniques and items identified shall be detailed in the Contractor's Asbestos Hazard Abatement Plan including, but not limited to, details of construction materials, equipment, and handling procedures. The Contractor shall use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters to collect debris and dust containing ACM.

b. Wet methods or wetting agents to control employee exposures during asbestos handling, removal, cutting, and cleanup; except where it can be demonstrated that the use of wet methods is unfeasible due to, for example, the creation of electrical hazards, equipment malfunction, and in roofing.

c. Prompt clean-up and disposal in leak-tight containers of wastes and debris contaminated with asbestos.

d. Inspection and repair of polyethylene in work and high traffic areas.

e. Cleaning of equipment and surfaces of containers filled with ACM prior to removing them from the equipment room or area.

3.6.2 Control Methods

The Contractor shall use the following control methods to comply with the PELs:

a. Local exhaust ventilation equipped with HEPA filter dust collection systems;

b. Enclosure or isolation of processes producing asbestos dust;

c. Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;

d. Use of other work practices and engineering controls;

e. Where the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the PELs, the Contractor shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with paragraph, RESPIRATORY PROTECTION PROGRAM.

3.6.3 Unacceptable Practices

The following work practices and engineering controls shall not be used for work related to asbestos or for work which disturbs ACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean-up of dust and debris containing ACM.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.6.4 Negative Pressure Enclosure (NPE) System

The NPE system shall be as shown in SETUP DETAIL SHEET 4 and 8. The system shall provide at least 4 air changes per hour inside the containment. The local exhaust unit equipment shall be operated 24 hours per day until the containment is removed, and shall be leak-proof to the filter and equipped with HEPA filters. Air movement shall be directed away from the employees and toward a HEPA filtration device. The NPE shall be smoke tested for leaks at the beginning of each shift. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.5 mm 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential shall be monitored continuously, 24 hours per day, with an automatic manometric recording instrument. Pressure differential recordings shall be provided daily on the same day collected. Readings shall be reviewed by the Contractor's Designated Competent Person and IH prior to submittal. The Contracting Officer shall be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system shall not be used as the local exhaust system for the regulated area. The local exhaust system shall terminate outdoors unless an alternate arrangement is allowed by the Contract Officer. All filters used shall be new at the beginning of the project and shall be periodically changed as necessary and disposed of as ACM waste.

3.6.5 Mini-Enclosures

Mini-containment (small walk-in enclosure) as shown in SETUP DETAIL SHEET 7 to accommodate no more than 2 persons, may be used if the disturbance or removal can be completely contained by the enclosure with the following specifications and work practices. The mini-enclosure shall be inspected for leaks and smoke tested before each use. Air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

3.6.6 Class II Work

In addition to the requirements of paragraphs Mandated Practices and Control Methods, the following engineering controls and work practices

shall be used:

a. A Competent Person shall supervise the work.

b. For indoor work, critical barriers shall be placed over all openings to the regulated area.

c. Impermeable dropcloths shall be placed on surfaces beneath all removal activity.

3.6.7 Specific Control Methods for Class II Work

In addition to requirements of paragraph Class II Work, Class II work shall be performed using the following methods:

3.6.7.1 Vinyl Flooring Materials

When removing vinyl flooring materials which contain ACM, the Contractor shall use the following practices as shown in SETUP DETAIL SHEET 4 and RESPONSE ACTION DETAIL SHEET 62. Tiles shall be removed intact (if possible); wetting is not required when tiles are heated and removed intact. Flooring or its backing shall not be sanded. Scraping of residual adhesive and/or backing shall be performed using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. The Contractor shall use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors.

3.6.7.2 Other Class II Jobs

The Contractor shall use the enclosure as shown in SETUP DETAIL SHEET 4 when performing Class II removal of the paper underlayment ACM. This paper underlayment was identified under vinyl sheet flooring and wood subflooring in the bathroom. The material shall be thoroughly wetted with amended water prior to and during its removal. The material shall be removed in an intact state as possible. Cutting or abrading the material is prohibited. The ACM removed shall be immediately bagged or wrapped. After the material is removed, prepare the area for final clearance sampling as shown on SETUP DETAIL SHEET 17.

The Contractor shall use the enclosure as shown in SETUP DETAIL SHEET 1 and work practices as shown RESPONSE ACTION DETAIL SHEET 45 when performing Class II removal of the sealant ACM. This sealant was identified in floor penetrations in the furnace closets. The material shall be thoroughly wetted with amended water prior to and during its removal. The material shall be removed in an intact state as possible. Cutting or abrading the material is prohibited. The ACM removed shall be immediately bagged or wrapped.

The Contractor shall use the enclosure as shown in SETUP DETAIL SHEET 21 and work practices as shown RESPONSE ACTION DETAIL SHEET 45 when performing Class II removal of the sink lining ACM. This material was identified on stainless steel sinks in the kitchens. The material shall be thoroughly wetted with amended water prior to and during its removal. The entire sink shall be removed intact. The removed sink shall be immediately bagged or wrapped.

3.6.8 Cleaning After Asbestos Removal

After completion of all asbestos removal work, surfaces from which ACM has been removed shall be wet wiped or sponged clean, or cleaned by some equivalent method to remove all visible residue. Run-off water shall be collected and filtered through a dual filtration system. A first filter shall be provided to remove fibers 20 micrometers and larger, and a final filter provided that removes fibers 5 micrometers and larger. After the gross amounts of asbestos have been removed from every surface, remaining visible accumulations of asbestos on floors shall be collected using plastic shovels, rubber squeegees, rubber dustpans, and HEPA vacuum cleaners as appropriate to maintain the integrity of the regulated area. Surfaces or locations which could harbor accumulations or residual asbestos dust shall be checked after vacuuming to verify that no asbestos-containing material remains; and shall be re-vacuumed as necessary to remove the ACM.

3.6.9 Class II Asbestos Work Response Action Detail Sheets

The following Class II Asbestos Work Response Action Detail Sheet is specified on Table 1 for each individual work task to be performed:

a. Vinyl Asbestos Tile Adhered to Wood Floor System by Asbestos Free Adhesive: See Sheet 62

b. Miscellaneous Asbestos-Containing Materials: See Sheet 45

3.7 FINAL CLEANING AND VISUAL INSPECTION

Upon completion of abatement, the regulated area shall be cleaned by collecting, packing, and storing all gross contamination; see SET-UP DETAIL SHEETS 9, 14 and 20. A final cleaning shall be performed using HEPA vacuum and wet cleaning of all exposed surfaces and objects in the regulated area. Upon completion of the cleaning, the Contractor shall conduct a visual pre-inspection of the cleaned area in preparation for a final inspection before final air clearance monitoring and recleaning, as necessary. Upon completion of the final cleaning, the Contractor and the Contracting Officer shall conduct a final visual inspection of the cleaned regulated area in accordance with ASTM E 1368 and document the results on the Final Cleaning and Visual Inspection as specified on the SET-UP DETAIL SHEET 19. If the Contracting Officer rejects the clean regulated area as not meeting final cleaning requirements, the Contractor shall reclean as necessary and have a follow-on inspection conducted with the Contracting Officer. Recleaning and follow-up reinspection shall be at the Contractor's expense.

3.8 LOCKDOWN

Prior to removal of plastic barriers and after clean-up of gross contamination and final visual inspection, a post removal (lockdown) encapsulant shall be spray applied to ceiling, walls, floors, and other surfaces in the regulated area.

3.9 EXPOSURE ASSESSMENT AND AIR MONITORING

3.9.1 General Requirements For Exposure

Exposure assessment, air monitoring and analysis of airborne concentration

of asbestos fibers shall be performed in accordance with 29 CFR 1926, Section .1101, the Contractor's air monitoring plan, and as specified. Personal exposure air monitoring (collected at the breathing zone) that is representative of the exposure of each employee who is assigned to work within a regulated area shall be performed by the Contractor's Designated IH. Breathing zone samples shall be taken for at least 25 percent of the workers in each shift, or a minimum of 2, whichever is greater. Air monitoring results at the 95 percent confidence level shall be calculated as shown in Table 2 at the end of this section. The Contractor shall provide an onsite independent testing laboratory with qualified analysts and appropriate equipment to conduct sample analyses of air samples using the methods prescribed in 29 CFR 1926, Section .1101, to include NIOSH Pub No. 84-100 Method 7400. Preabatement and abatement environmental air monitoring shall be performed by the Contractor's Designated IH. Final clearance environmental air monitoring, shall be performed by the Contractor's Designated IH. Environmental and final clearance air monitoring shall be performed using NIOSH Pub No. 84-100 Method 7400 (PCM) with optional confirmation of results by NIOSH Pub No. 84-100 Method 7402 (TEM). For environmental and final clearance, air monitoring shall be conducted at a sufficient velocity and duration to establish the limit of detection of the method used at 0.005 f/cc. Confirmation of asbestos fiber concentrations (asbestos f/cc) from environmental and final clearance samples collected and analyzed by NIOSH Pub No. 84-100 Method 7400 (total f/cc) may be conducted using TEM in accordance with NIOSH Pub No. 84-100 Method 7402. When such confirmation is conducted, it shall be from the same sample filter used for the NIOSH Pub No. 84-100 Method 7400 PCM analysis. For all Contractor required environmental or final clearance air monitoring, confirmation of asbestos fiber concentrations, using NIOSH Pub No. 84-100 Method 7402, shall be at the Contractor's expense. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. Results of breathing zone samples shall be posted at the job site and made available to the Contracting Officer. The Contractor shall maintain a fiber concentration inside a regulated area less than or equal to 0.1 f/cc expressed as an 8 hour, time-weighted average (TWA) during the conduct of the asbestos abatement. If fiber concentration rises above 0.1 f/cc, work procedures shall be investigated with the Contracting Officer to determine the cause. At the discretion of the Contracting Officer, fiber concentration may exceed 0.1 f/cc but shall not exceed 1.0 f/cc expressed as an 8-hour TWA. The Contractor's workers shall not be exposed to an airborne fiber concentration in excess of 1.0 f/cc, as averaged over a sampling period of 30 minutes. Should either an environmental concentration of 1.0 f/cc expressed as an 8-hour TWA or a personal excursion concentration of 1.0 f/cc expressed as a 30-minute sample occur inside a regulated work area, the Contractor shall stop work immediately, notify the Contracting Officer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Work shall not restart until authorized by the Contracting Officer.

3.9.2 Initial Exposure Assessment

The Contractor's Designated IH shall conduct an exposure assessment immediately before or at the initiation of an asbestos abatement operation to ascertain expected exposures during that operation. The assessment shall be completed in time to comply with the requirements which are triggered by exposure data or the lack of a negative exposure assessment, and to provide information necessary to assure that all control systems planned are appropriate for that operation. The assessment shall take into

consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the Contractor which indicate the levels of airborne asbestos likely to be encountered on the job.

3.9.3 Negative Exposure Assessment

The Contractor shall provide a negative exposure assessment for the specific asbestos job which will be performed. The negative exposure assessment shall be provided within 5 days of the initiation of the project and conform to the following criteria:

a. Objective Data: Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the PEL-TWA and PEL-Excursion Limit under those work conditions having the greatest potential for releasing asbestos.

b. Prior Asbestos Jobs: Where the Contractor has monitored prior asbestos jobs for the PEL and the PEL-Excursion Limit within 12 months of the current job, the monitoring and analysis were performed in compliance with asbestos standard in effect; the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations; the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job; and these data show that under the conditions prevailing and which will prevail in the current workplace, there is a high degree of certainty that the monitoring covered exposure from employee exposures will not exceed the PEL-TWA and PEL-Excursion Limit.

c. Initial Exposure Monitoring: The results of initial exposure monitoring of the current job, made from breathing zone air samples that are representative of the 8-hour PEL-TWA and 30-minute short-term exposures of each employee. The monitoring covered exposure from operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

3.9.4 Independent Environmental Monitoring

The air monitoring contractor has been provided a copy of the contract that includes this abatement work. The abatement contractor will provide the air monitoring contractor with an up-to-date copy of the accepted Asbestos Hazard Abatement Plan, Accident Prevention Plan and pertinent detailed drawings. The air monitoring contractor is required to comply with the abatement contractor's safety and health requirements. The abatement contractor will coordinate all onsite activities with the air monitoring contractor, the COR, and other affected parties as directed by the COR. The abatement contractor will provide the air monitoring contractor with an up-to-date schedule of abatement contractor work activities. The air monitoring contractor will coordinate with the abatement contractor and the COR during the performance Government required air monitoring. The

abatement contractor is responsible for performing exposure assessment and personal air monitoring of abatement contractor's work. The air monitoring contractor is responsible for performing these tasks for its employee.

3.9.5 Preabatement Environmental Air Monitoring

Preabatement environmental air monitoring shall be established 1 day prior to the masking and sealing operations for each regulated area to determine background concentrations before abatement work begins. As a minimum, preabatement air samples shall be collected using NIOSH Pub No. 84-100 Method 7400, PCM at these locations: outside the building; inside the building, but outside the regulated area perimeter; and inside each regulated work area. One sample shall be collected for every 185 square meters 2000 square feet of floor space. At least 2 samples shall be collected outside the building: at the exhaust of the HEPA unit; and downwind from the abatement site. The PCM samples shall be analyzed within 24 hours; and if any result in fiber concentration greater than 0.01 f/cc, asbestos fiber concentration shall be confirmed using NIOSH Pub No. 84-100 Method 7402 (TEM).

3.9.6 Environmental Air Monitoring During Abatement

Until an exposure assessment is provided to the Contracting Officer, environmental air monitoring shall be conducted at locations and frequencies that will accurately characterize any evolving airborne asbestos fiber concentrations. The assessment shall demonstrate that the product or material containing asbestos minerals, or the abatement involving such product or material, cannot release airborne asbestos fibers in concentrations exceeding 0.01 f/cc as a TWA under those work conditions having the greatest potential for releasing asbestos. The monitoring shall be at least once per shift at locations including, but not limited to, close to the work inside a regulated area; preabatement sampling locations; outside entrances to a regulated area; close to glovebag operations; representative locations outside of the perimeter of a regulated area; inside clean room; and at the exhaust discharge point of local exhaust system ducted to the outside of a containment (if used). If the sampling outside regulated area shows airborne fiber levels have exceeded background or 0.01 f/cc, whichever is greater, work shall be stopped immediately, and the Contracting Officer notified. The condition causing the increase shall be corrected. Work shall not restart until authorized by the Contracting Officer.

3.9.7 Final Clearance Air Monitoring

Prior to conducting final clearance air monitoring, the Contractor and the Contracting Officer shall conduct a final visual inspection of the regulated area where asbestos abatement has been completed. The final visual inspection shall be as specified in SET-UP DETAIL SHEET 19. Final clearance air monitoring shall not begin until acceptance of the Contractor's final cleaning by the Contracting Officer. The Contractor's Designated IH shall conduct final clearance air monitoring using aggressive air sampling techniques as defined in EPA 560/5-85-024 or as otherwise required by federal or state requirements. The sampling and analytical method used will be NIOSH Pub No. 84-100 Method 7400 (PCM) and Table 3 with confirmation of results by NIOSH Pub No. 84-100 Method 7402 (TEM).

3.9.7.1 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH Pub No. 84-100 Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, shall be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) shall be confirmed from that same filter using NIOSH Pub No. 84-100 Method 7402 (TEM) at Contractor's expense. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning shall be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria shall be done.

3.9.7.2 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, the Contractor shall pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.9.8 Air-Monitoring Results and Documentation

Air sample fiber counting shall be completed and results provided within 24 hours after completion of a sampling period. The Contracting Officer shall be notified immediately of any airborne levels of asbestos fibers in excess of established requirements. Written sampling results shall be provided within 5 working days of the date of collection. The written results shall be signed by testing laboratory analyst, testing laboratory principal and the Contractor's Designated IH. The air sampling results shall be documented on a Contractor's daily air monitoring log. The daily air monitoring log shall contain the following information for each sample:

a. Sampling and analytical method used;

b. Date sample collected;

c. Sample number;

d. Sample type: BZ = Breathing Zone (Personal), P = Preabatement, E = Environmental, C = Abatement Clearance;

e. Location/activity/name where sample collected;

f. Sampling pump manufacturer, model and serial number, beginning flow rate, end flow rate, average flow rate (L/min);

g. Calibration date, time, method, location, name of calibrator, signature;

h. Sample period (start time, stop time, elapsed time (minutes);

i. Total air volume sampled (liters);

j. Sample results (f/cc);

k. Laboratory name, location, analytical method, analyst, confidence level. In addition, the printed name and a signature and date block for the Industrial Hygienist who conducted the sampling and

for the Industrial Hygienist who reviewed the daily air monitoring log verifying the accuracy of the information.

3.10 CLEARANCE CERTIFICATION

When asbestos abatement is complete, ACM waste is removed from the regulated areas, and final clean-up is completed, the Contracting Officer will certify the areas as safe before allowing the warning signs and boundary warning tape to be removed. After final clean-up and acceptable airborne concentrations are attained, but before the HEPA unit is turned off and the containment removed, the Contractor shall remove all pre-filters on the HVAC system servicing the work area and provide new pre-filters. The Contractor shall dispose of such filters as asbestos contaminated materials. HVAC, mechanical, and electrical systems shall be re-established in proper working order. The Contractor and the Contracting Officer shall visually inspect all surfaces within the containment for residual material or accumulated debris. The Contractor shall reclean all areas showing dust or residual materials. The Contracting Officer will certify in writing that the area is safe before unrestricted entry is permitted. The Government will have the option to perform monitoring to certify the areas are safe before entry is permitted.

3.11 CLEANUP AND DISPOSAL

3.11.1 Title to ACM Materials

ACM material resulting from abatement work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified and in accordance with applicable federal, state and local regulations.

3.11.2 Collection and Disposal of Asbestos

All ACM waste shall be collected and including contaminated wastewater filters, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing, shall be collected and placed in leak-tight containers such as double plastic bags (see DETAIL SHEET 9A); sealed double wrapped polyethylene sheet (see DETAIL 9B); sealed fiberboard boxes (see DETAIL SHEET 9C); or other approved containers. Waste within the containers shall be wetted in case the container is breeched. Asbestos-containing waste shall be disposed of at an EPA, state and local approved asbestos landfill. For temporary storage, sealed impermeable containers shall be stored in an asbestos waste load-out unit or in a storage/transportation conveyance (i.e., dumpster, roll-off waste boxes, etc.) in a manner acceptable to and in an area assigned by the Contracting Officer. Procedure for hauling and disposal shall comply with 40 CFR 61, Subpart M, state, regional, and local standards.

3.11.3 Scale Weight Measurement

Scales used for measurement shall be public scales. Weighing shall be at a point nearest the work at which a public scale is available. Scales shall be standard truck scales of the beam type; scales shall be equipped with the type registering beam and an "over and under" indicator; and shall be capable of accommodating the entire vehicle. Scales shall be tested, approved and sealed by an inspector of the State of Missouri. Scales shall be calibrated and resealed as often as necessary and at least once every three months to ensure continuous accuracy. Vehicles used for hauling ACM

shall be weighed empty daily at such time as directed and each vehicle shall bear a plainly legible identification mark.

3.11.4 Weigh Bill and Delivery Tickets

Copies of weigh bills and delivery tickets shall be submitted to the Contracting Officer during the progress of the work. The Contractor shall furnish the Contracting Officer scale tickets for each load of ACM weighed and certified. These tickets shall include tare weight; identification mark for each vehicle weighed; and date, time and location of loading and unloading. Tickets shall be furnished at the point and time individual trucks arrive at the worksite. A master log of all vehicle loading shall be furnished for each day of loading operations. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified weigh bills and/or certified tickets and manifests of all ACM actually disposed by the Contractor for this contract.

3.11.5 Asbestos Waste Shipment Record

The Contractor shall complete and provide the Contracting Officer final completed copies of the Waste Shipment Record for all shipments of waste material as specified in 40 CFR 61, Subpart M and other required state waste manifest shipment records, within 3 days of delivery to the landfill. Each Waste Shipment Record shall be signed and dated by the [Contractor] [Contracting Officer], the waste transporter and disposal facility operator.

TABLE 1

SUMMARY OF WORK TASKS

TASK(1)	A	B	C	D
LOCATION(2)	Kitchen, Entry	Bathrooms	Furnace Closets	Kitchen
DESCRIPTION(3)	Vinyl Floor Tile	Paper Underlayment	Sealant	Sink Lining
TECHNIQUE(4)	REM	REM	REM	REM
FRIABLE(5)	NF-1	FR	NF-1	FR
FORM(6)	IA	IA	IA	IA
CONDITION(6)	G	G	G	G
QUANTITY(7)				
LINEAR FT.				
SQUARE FEET	200	35	1	4
EACH				

NOTES:

(1) Alpha sequence of work tasks (A, B, C, etc.). Each category of friability has a separate task.

(2) Specific location of the work (building, floor, area, etc.)

(3) Description of material.

(4) Technique to be used: Removal = REM; Dismantle = DISM; Encapsulation = ENCAP; Encasement = ENCAS; Enclosure = ENCL; Repair = REP.

(5) Friability of materials: Friable = FR; Non-friable = NF-1 or NF-2; (number indicates friable category).

(6) Form: Interior or Exterior Architectural = IA or EA; Mechanical/Electrical = ME. Condition: Good = G; Fair = F; Poor = P.

(7) Quantity of ACM in Linear Feet (ft); Square Feet (sf); Each number of items.

TABLE 2

FORMULA FOR CALCULATION OF THE 95 PERCENT CONFIDENCE LEVEL
(Reference: NIOSH 7400)

Fibers/cc(01.95 percent CL) = X + [(X) * (1.645) * (CV)]

Where: X = ((E)(AC))/((V)(1000))

E = ((F/Nf) - (B/Nb))/Af

CV = The precision value; 0.45 shall be used unless the analytical laboratory provides the Contracting Officer with documentation (Round Robin Program participation and results) that the laboratory's precision is better.

AC = Effective collection area of the filter in square millimeters

V = Air volume sampled in liters

E = Fiber density on the filter in fibers per square millimeter

F/Nf = Total fiber count per graticule field

B/Nb = Mean field blank count per graticule field

Af = Graticule field area in square millimeters

TWA = C1/T1 + C2/T2 = Cn/Tn

Where: C = Concentration of contaminant

T = Time sampled.

TABLE 3

NI0SH METHOD 7400

PCM ENVIRONMENTAL AIR SAMPLING PROTOCOL (NON-PERSONAL)

Sample Location	Minimum No. of Samples	Filter Pore Size (Note 1)	Min. Vol. (Note 2) (Liters)	Sampling Rate (liters/min.)
Inside Abatement Area	0.5/140 Square Meters (Notes 3 & 4)	0.45 microns	3850	2-16
Each Room in 1 Abatement Area Less than 140 Square meters		0.45 microns	3850	2-16
Field Blank	2	0.45 microns	0	0
Laboratory Blank	1	0.45 microns	0	0

Notes:

1. Type of filter is Mixed Cellulose Ester.

2. Ensure detection limit for PCM analysis is established at 0.005 fibers/cc.

3. One sample shall be added for each additional 140 square meters. (The corresponding I-P units are 5/1500 square feet).

4. A minimum of 5 samples are to be taken per abatement area, plus 2 field blanks.

TABLE 4

EPA AHERA METHOD: TEM AIR SAMPLING PROTOCOL

Location Sampled	Minimum No. of Samples	Filter Pore Size	Min. Vol. (Liters)	Sampling Rate (liters/min.)
Inside Abatement Area	5	0.45 microns	1500	2-16
Outside Abatement Area	5	0.45 microns	1500	2-16
Field Blank	2	0.45 microns	0	0
Laboratory Blank	1	0.45 microns	0	0

Notes:

1. Type of filter is Mixed Cellulose Ester.

2. The detection limit for TEM analysis is 70 structures/square mm.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME _____ CONTRACT NO. _____
PROJECT ADDRESS _____
CONTRACTOR FIRM NAME _____
EMPLOYEE'S NAME _____,_____,_____,
(Print) (Last) (First) (MI)

Social Security Number: _____-_____-_____,

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH TYPES OF LUNG DISEASE AND CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS, THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NONSMOKING PUBLIC.

Your employer's contract for the above project requires that you be provided and you complete formal asbestos training specific to the type of work you will perform and project specific training; that you be supplied with proper personal protective equipment including a respirator, that you be trained in its use; and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required personal protective equipment. These things are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you. The Contractor's Designated Industrial Hygienist will check the block(s) for the type of formal training you have completed. Review the checked blocks prior to signing this certification.

FORMAL TRAINING:
_____ a. For Competent Persons and Supervisors: I have completed EPA's Model Accreditation Program (MAP) training course, "Contractor/Supervisor", that meets this State's requirements.

b. For Workers:
_____ (1) For OSHA Class I work: I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (2) For OSHA Class II work (where there will be abatement of more than one type of Class II materials, i.e., roofing, siding, floor tile, etc.): I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
(3) For OSHA Class II work (there will only be abatement of one type of Class II material):
_____ (a) I have completed an 8-hour training class on the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls of 29 CFR 1926, Section .1101(g) and hands-on training.
_____ (b) I have completed EPA's MAP training course, "Worker", that meets this State's requirements.
_____ (4) For OSHA Class III work: I have completed at least a 16-hour course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, Section .92(a)(2) and the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926, Section .1101, and hands-on training.

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

_____ (5) For OSHA Class IV work: I have completed at least a 2-hr course consistent with EPA requirements for training of local education agency maintenance and custodial staff at 40 CFR 763, (a)(1), and the elements of 29 CFR 1926, Section .1101(k)(9)(viii), in addition to the specific work practices and engineering controls at 29 CFR 1926, Section .1101(g) and hands-on training.

_____ c. Workers, Supervisors and the Designated Competent Person: I have completed annual refresher training as required by EPA's MAP that meets this State's requirements.

PROJECT SPECIFIC TRAINING:
_____ I have been provided and have completed the project specific training required by this Contract. My employer's Designated Industrial Hygienist and Designated Competent Person conducted the training.

RESPIRATORY PROTECTION:
_____ I have been trained in accordance with the criteria in the Contractor's Respiratory Protection program. I have been trained in the dangers of handling and breathing asbestos dust and in the proper work procedures and use and limitations of the respirator(s) I will wear. I have been trained in and will abide by the facial hair and contact lens use policy of my employer.

RESPIRATOR FIT-TEST TRAINING:
_____ I have been trained in the proper selection, fit, use, care, cleaning,maintenance, and storage of the respirator(s) that I will wear. I have been fit-tested in accordance with the criteria in the Contractor's Respiratory Program and have received a satisfactory fit. I have been assigned my individual respirator. I have been taught how to properly perform positive and negative pressure fit-check upon donning negative pressure respirators each time.

MEDICAL EXAMINATION:
_____ I have had a medical examination within the last twelve months which was paid for by my employer. The examination included: health history, pulmonary function tests, and may have included an evaluation of a chest x-ray. A physician made a determination regarding my physical capacity to perform work tasks on the project while wearing personal protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's Industrial Hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

_____ were no limitations to performing the required work tasks.
_____ were identified physical limitations to performing the required work tasks.

Date of the medical examination _____

Employee Signature _____ date _____
Contractor's Industrial
Hygienist Signature _____ date _____

-- End of Section --

SECTION 13281A

LEAD HAZARD CONTROL ACTIVITIES
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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 1553	(1993) Practice for Collection of Airborne Particulate Lead During Abatement and Construction Activities
ASTM E 1613	(1999) Standard Test Method for Determination of Lead by Inductivety Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absortion (GFAAS) Techniques
ASTM E 1644	(1998) Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead
ASTM E 1726	(1995) Sample Digestion of Soils for the Determination of Lead by Atomic Spectrometry
ASTM E 1727	(1999) Field Collection of Soil Samples for Lead Determination by Atomic Spectrometry Techniques
ASTM E 1728	(1999) Field Collection of Settled Dust Samples Using Wipe Sampling Methodsfor Lead Determination by Atomic Spectrometry Techniques
ASTM E 1729	(1999) Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques

ASTM E 1741	(2000) Preparaton of Airborne Particulate Lead Samples Collected During Abatement and Construction Activities for Subsequent Analysis by Atomic Spectrometry
ASTM E 1792	(1996a) Wipe Sampling Materials for Lead in Surface Dust
ASTM E 1795	(2000) Non-Reinforced Liquid Coating Encapsulation Products for Leaded Paint in Buildings
ASTM E 1796	(1997) Selection and Use of Liquid Coating Encapsulation Products for Leaded Paint in Buildings
ASTM E 1797	(2000) Reinforced Liquid Coating Encapsulation Products for Leaded Paint in Buildings

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(1999) Methods of Fire Tests for Flame-Resistant Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100	(1984; Supple 1985, 1987, 1988 & 1990) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD 6780	(1995; Errata Aug 1996;Rev Ch. 7 - 1997) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 747-K-99-001	(1999) Protect Your Family From Lead in Your Home

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

24 CFR 35	Lead-Based Paint Poisioning Prevention in Certain Residential Structures
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 745	Lead-Based Paint Poisoning Prevention in

Certain Residential Structures

UNDERWRITERS LABORATORIES (UL)

UL 586 (1996; Rev thru Aug 1999) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

a a. Lead Hazard Control Activity - Any construction work where a worker may be occupationally exposed to lead and procedures have to be followed to assure that: 1). Lead inside the lead hazard control area is cleaned up to appropriate levels and 2). Lead dust does not disperse outside the lead hazard control area at unacceptable levels.

b. Public/Commercial Building - Buildings on real property, including residential real property, generally accessible to the public except target housing, child occupied facilities and industrial buildings. Examples include offices, stores/shopping centers, churches, schools, barracks, hospitals, museums, airports, hotels, convention centers.

c. Industrial Building - Any building used for industrial purposes where normal operations inside the building may produce lead aerosol that will settle out on inside surfaces.

d. Target Housing - Residential real property which is housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any one or more children age 6 years or under resides or is expected to reside in such housing for the elderly or persons with disabilities) or any 0 bedroom dwelling.

e. Child-occupied Facility - Real property which is a building or portion of a building constructed prior to 1978 visited regularly by the same child, 6 years of age or under, on at least two different days, provided that each day's visit lasts at least 6 hours, and the combined annual visits last at least 60 hours. Child-occupied facilities include but are not limited to, day-care centers, preschools and kindergarten classrooms.

f. Residential Real Property - Real property on which there is situated one or more residential dwellings used or occupied, or intended to be used or occupied , in whole or in part, as the home or residence of one or more persons.

1.3 DESCRIPTION OF WORK

The work covered by this section includes work tasks, on Table 1, "Summary of Work Tasks" at the end of this section, and the precautions specified in this section for the protection of workers, building occupants and the environments. Lead-based paint (LBP) will be encountered during renovation and demolition activities on the housing units. Previous testing on a limited number of the housing units has indicated that LBP is present on some of the components which may be impacted by the renovation and demolition activities. The contractor shall remove lead-based paint from

components (when these will be impacted) or the entire component with lead-based paint intact during the renovation or demolition activities. Testing verified that LBP was utilized on the following components at some of the units.

Interior:
Ceiling Header Trim (Wood) - Living Room, Entry
Closet Shelves (Wood) - Main Hall, Bedrooms
Baseboard (Wood) - Utility Closet

Exterior:
Awning Support Column (Metal)
Awning Support Beam (Metal) - covered with aluminum siding
Awning Facsia (Metal) - covered with aluminum siding
Roof Facsia (Metal) - covered with aluminum siding
Privacy Wall (Wood)
Shed Facsia (Metal) - covered with aluminum siding

1.3.1 Protection of Existing Areas To Remain

All project work including, but not limited to, lead hazard work, storage, transportation, and disposal shall be performed without damaging or contaminating adjacent work and areas. Where such work or areas are damaged or contaminated, the Contractor shall restore work and areas to the original condition at no additional cost to the Government.

1.3.2 Coordination with Other Work

The contractor shall coordinate lead hazard control activities with work being performed in adjacent areas. Coordination procedures shall be explained in the Contractor's Accident Prevention Plan and shall describe how the Contractor will prevent lead exposure to other contractors and/or Government personnel performing work unrelated to lead hazard control activities.

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-03 Product Data

Materials and Equipment;
Expendable Supplies;

A description of the materials, equipment and expendable supplies required; including Material Safety Data Sheets (MSDSs) for material brought onsite to perform the work.

Qualifications; G, AE

A report providing evidence of qualifications and designating responsibilities for personnel and laboratories.

SD-06 Test Reports

Pressure Differential Log;
Licences, Permits, and Notifications; G, AE
Accident Prevention Plan (APP); G, AE

A report describing how the Contractor will protect workers, building occupants, and building contents while performing lead hazard control activities; and how project clearance will be performed.

Sampling and Analysis; G, AE

A log of the analytical results required for the sampling. The log shall be kept current.

Clearance Report; G, AE

Report prepared by the QSHP.

1.5 QUALIFICATIONS

1.5.1 Qualifications and Organization Report

The Contractor shall furnish a qualification and organization report. The report shall describe the qualifications of the qualified safety and health professional (QSHP), onsite safety and health supervisor (OSHS), labor staff and the independent risk assessor. The report shall include an organization chart showing the Contractor's personnel by name and title and project specific responsibilities and authorities. The report shall describe the qualifications of the laboratories selected for this project. The report shall be signed by the Contractor and the qualified safety and health professional to indicate that all personnel and laboratories comply with certification and experience requirements of this section and that project personnel have been given the authority to complete the tasks assigned to them.

1.5.2 Personnel and Subcontractor Responsibilities and Qualifications

1.5.2.1 Qualified Safety and Health Professional (QSHP)

The QSHP shall be responsible for development of project specific requirements in the Accident Prevention Plan (APP); supervise implementation of the APP requirements; visit the site as needed to verify effectiveness of the APP and to coordinate resolution of unknown situations that may develop as the work progresses; be available to provide consultation to the Onsite Safety and Health Supervisor (OSHS); review sampling and analytical results to evaluate occupational exposure levels, verify effectiveness of controls and determine if clearance requirements have been met. The QSHP shall have demonstrable experience with the implementation of occupational safety and health regulations.

1.5.2.2 Lead Hazard Control Workers

Lead Hazard Control workers shall be responsible for performing the labor necessary to complete the lead hazard control activities required in this contract.

1.5.2.3 Independent Certified Risk Assessor

The independent Certified Risk Assessor shall be a subcontractor to the prime Contractor on the project. The risk assessor shall be responsible to perform the sampling and evaluating the analytical data to verify clearance levels have been achieved. The independent risk assessor shall sign the clearance report indicating clearance requirements for the contract have been met.

1.5.2.4 Testing Laboratories

The laboratory selected to perform analysis on paint chip, soil or dust wipe samples shall be accredited by EPA's National Lead Laboratory Accreditation Program (NLLAP). The laboratory selected to perform analysis on worker exposure (industrial hygiene) samples shall be in the American Industrial Hygiene Association's Industrial Hygiene Laboratory Accreditation Program (IHLAP) and shall be successfully participating in the Proficiency Analytical Testing (PAT) program for lead.

1.5.2.5 Blood Lead Testing

The laboratory selected to perform analysis on worker blood samples shall be approved by OSHA and meet the requirements contained in http://www.osha-slc.gov/OCIS/toc_bloodlead.html.

1.5.2.6 Disposal Facility and Transporter

The Contractor shall furnish written evidence that the landfill to be used is approved for lead disposal by USEPA, State of Missouri, and local requirements. Copies of any required signed agreements between the Contractor (including subcontractors and transporters) and the lead disposal facility shall be provided.

1.6 REGULATORY REQUIREMENTS

In addition to the detailed requirements of this specification, work shall be performed in accordance with requirements of EM 385-1-1 and applicable regulations including, but not limited to 29 CFR 1910, 29 CFR 1926, especially Section .62, and the accepted Accident Prevention Plan with Appendices. Matters of interpretation of the standards shall be resolved to the satisfaction of and with the concurrence of, the Contracting Officer before starting work. Where these requirements vary, the most stringent shall apply. The following State statutes, regulations and requirements apply to lead hazard control activities to be performed:

Missouri Department of Health
19 CSR 30-70.110 through 19 CSR 30-70.640

1.7 ACCIDENT PREVENTION PLAN (APP)

1.7.1 APP Content and Organization

The Contractor's Accident Prevention Plan shall be organized into 5 parts, consisting of the overall plan and 4 appendices. The overall plan shall address each element in Appendix A of EM 385-1-1 in project specific detail. The elements are: a. Signature Sheet, b. Background Information, c. Statement of Safety and Health Policy, d. Responsibilities and Lines

of Authorities, e. Subcontractors and Suppliers, f. Training, g. Safety and Health Inspections, h. Safety and Health Expectations, Incentive Programs and Compliance, i. Accident Reporting, j. Medical Support, k. Corporate Plans and Programs required by this contract, (HAZCOM, Respiratory Protection).

1.7.1.1 Lead Hazard Control Plan Appendix

The Lead Hazard Control Appendix shall address occupational exposure issues and shall describe the procedures to be followed to protect employees from lead hazards while performing lead hazard control activities. Each of the following elements shall be addressed in the lead hazard control appendix:

a. The location and a brief description of each work activity that will emit lead into the workplace atmosphere. A description of any components containing lead shall be included and keyed to the project drawings.

b. Description of equipment and materials, controls, crew size, worker responsibilities, and operating and maintenance procedures.

c. Description and sketch of the Lead Hazard Control Areas, including decontamination areas.

d. Description of the specific lead control methods and procedures to protect workers and other onsite contractors from lead exposure.

e. Technologic equipment used to keep occupational exposure below the Permissible Exposure Limit and minimize worker exposure to lead (i.e., HEPA-filtered vacuum equipment/cleaners, special negative air enclosure equipment and supplies, etc.).

f. Worker Exposure Assessment including methods and procedures to monitor and document worker exposure to lead. Worker exposure monitoring shall be broken into two parts in the plan. Part A: Initial Determination. The Contractor shall describe worker monitoring (if performed for the "initial determination" described in 29 CFR 1926 (.62) (d). Monitoring for the initial determination may be omitted from the plan if the Contractor has sufficient proof from previous operations as specified in 29 CFR 1926 (.62) (d)(3)(iii) and (iv) that workers will not be exposed over the action level. The Contractor shall substitute objective proof of action level compliance in Part A if "initial determination" monitoring is omitted. Part B: Continued Exposure Monitoring. Worker exposure monitoring after the initial lead exposure determination has been made.

g. Work Practices Program describing the protective clothing to be used to protect workers from lead exposure, house keeping procedures employed to minimize spread on lead contamination in the lead hazard control area, hygiene facilities and practices used to prevent workers from inadvertent ingestion of lead.

h. Administrative Control Procedures, to be used as a last resort, to limit worker exposure to lead. The worker rotation schedule to be employed, should engineering or personal protective equipment precautions fail to be effective, shall be described. This element of the plan shall be omitted if administrative controls

will not be used.

i. Medical Surveillance practices and procedures used to monitor worker exposure to lead and to assure fitness for wearing respiratory protection devices.

j. Worker training meeting the requirements of 29 CFR 1926 Sections (.62) and (.59) to assure workers understand hazard associated with working with lead and how to protect themselves.

k. Security: Security shall be established for each lead hazard control area. Entry into lead hazard control areas shall only be by personnel authorized by the Contractor and the Contracting Officer. Persons entering control areas shall be trained, medically evaluated, and equipped with personal protective equipment required for the specific control area to be entered.

1.7.1.2 Activity Hazard Analyses Appendix

An Activity Hazard Analysis (AHA) shall be prepared for each work task data element specified on the individual work task data element sheets at the end of this section. The AHA shall be submitted to the Contracting Officer prior to beginning specified work. Format shall be in accordance with EM 385-1-1, figure 1-1. The AHA shall be continuously reviewed and modified, when appropriate, to address changing conditions or operations. Each accepted AHA shall be appended to and become part of the APP.

1.7.1.3 Occupant/Building Protection Plan Appendix

The Contractor shall develop and implement an Occupant/Building Protection Plan describing the measures and management procedures to be taken during lead hazard control activities to protect the building occupants/building facilities (and future building occupants/facilities) from exposure to any lead contamination while lead hazard control activities are performed.

1.7.1.4 Clearance Plan Appendix

The Contractor shall develop a Clearance Plan describing practices and procedures used to assure that lead hazard control activities are complete and that lead contamination within the lead hazard control area comply with final clearance levels or visual clearance criteria. Sampling and analysis procedures used to document project completion and clearance goals shall be explained in the Clearance Plan Appendix.

1.7.2 Lead Hazard Information Pamphlet Distribution

Prior to commencing lead hazard control activities, the Contractor shall provide owners/occupants who are affected by the project as defined in 40 CFR 745.Subpart E, the EPA 747-K-99-001. The pamphlet shall be provided in compliance with 40 CFR 745 (.80) through 40 CFR 745 (.88). The Contractor shall collect signatures from affected residents acknowledging they have been informed of planned lead hazard control activities.

1.8 PRE-CONSTRUCTION SAFETY CONFERENCE

1.8.1 Conference General Requirements

The Contractor and the QSHP shall attend a pre-construction safety conference prior to starting work. Items required to be submitted shall be reviewed for completeness, and where specified, for acceptance. Details of the APP shall be revised to correct any deficiencies, and resubmitted for acceptance. Onsite work shall not begin until the APP has been accepted, unless otherwise authorized by the Contracting Officer. One copy of the APP shall be maintained in the Contractor's jobsite file, and a second copy shall be posted where it will be accessible to personnel on the site. As work proceeds, the APP shall be adapted to new situations and conditions. Changes to the APP shall be made by the QSHP with acceptance by the Contracting Officer. Should an unforeseen hazard become evident during performance of the work, the QSHP shall inform the Contracting Officer, both verbally and in writing, for immediate resolution. In the interim, the QSHP shall take necessary action to re-establish and maintain safe working conditions; and to safeguard onsite personnel, visitors, the public, and the environment. Disregard for provisions of this specification, or the accepted APP, shall be cause for stopping of work until the matter is rectified.

1.8.2 Preparatory Inspection Meeting

The Contractor shall arrange and hold a preparatory inspection meeting to review completeness and adequacy of the APP immediately prior to beginning each phase of work.

1.9 MEDICAL SURVEILLANCE REQUIREMENTS

The Contractor shall comply with the following medical surveillance requirements:

a. The Contractor shall make every attempt to keep occupational exposure to lead on this project below the action level of 30 micrograms/cubic meter defined in 29 CFR 1926 (.62). If it is not possible, and if occupational exposures could possibly exceed the action level for 30 or more days per year, the Contractor shall institute a medical surveillance program. The program shall meet the examination frequency and content requirements specified in paragraph (j)(1), (j)(2) and (j)(3) of 29 CFR 1926 (.62). Medical removal as specified in paragraph (k) of 29 CFR 1926 (.62), if necessary, shall be at the Contractor's expense.

b. Medical surveillance and biological monitoring shall be in compliance with 29 CFR 1926 (.62) (g) and (j). Initial biological monitoring shall be performed on lead hazard control workers prior to assignment to the project. Workers shall not be assigned to the project if results indicate a need for restricted activities.

c. All lead hazard control workers shall pass the medical examinations necessary to be approved by the occupational physician to wear respiratory protection on this project. Occupational physician's approval shall be given prior to assignment to the project.

1.10 RESPIRATORY PROTECTION PROGRAM

The Contractor shall have a written respiratory protection program and shall be fully capable of implementing the requirement of the respiratory protection program on this project. The respiratory protection program

shall meet the requirements of 29 CFR 1926 (.62) and 29 CFR 1910 (.134). Project specific respiratory protection requirements shall be included in the lead hazard control plan appendix of the Contractor's accident prevention plan.

1.11 LICENCES, PERMITS AND NOTIFICATIONS

The Contractor shall certify in writing to the state agency responsible for lead hazard activities and the Contracting Officer at least 10 days prior to the commencement of work that licenses, permits and notifications have been obtained. The Contractor is responsible for all associated fees or costs incurred in obtaining the licenses, permits and notifications.

1.12 TRAINING

1.12.1 OSHA Training Requirements

All Contractor personnel and/or subcontractors performing or responsible for onsite oversight of lead hazard control activities shall meet the following training requirements.

a. Content of 29 CFR 1926 (.62) and its appendices.

b. How operations could result in exposure over the action level.

c. Purpose, selection, fitting, use and limitations of respirators.

d. Purpose and description of the medical surveillance program.

e. Use of engineering controls and good work practices to limit occupational exposure to lead.

f. Implementation of the lead hazard control plan appendix of the accident prevention plan.

g. Medical supervision for the use of chelating agents.

h. Employee right of access to medical surveillance records as specified in 29 CFR 1910 (.20).

1.12.2 Qualified Safety and Health Professional

The qualified safety and health professional shall meet the training requirements in paragraph 1.12.1 and shall meet the training, experience and authority requirements in 29 CFR 1926 (.62) to be a competent person and be trained and have the experience and education to meet 40 CFR 745 Subpart L requirements to carry the following certifications:

a. Certified Risk Assessor
b. Certified Project Designer
c. Certified Supervisor

1.12.3 Independent Risk Assessor

The independent risk assessor shall meet the training requirements in paragraph OSHA Training Requirements, above, and shall meet the training and experience requirements in 40 CFR 745 to carry certification as a

certified risk assessor.

1.12.4 Abatement Worker

Workers shall meet the OSHA Training Requirements specified above and the training requirements in 40 CFR 745 Subpart L to carry certification as a Certified Worker, if required.

1.12.5 Training Program Certification

Training to meet 40 CFR 745 Subpart L requirements shall be provided by an EPA accredited training provider and the Contractor shall provide proof in the Qualifications and Organization Report showing that personnel have passed certification examinations for their respective disciplines, that fees for certification have been paid to the EPA (or to the state for state-run programs) and that EPA has certified the QSHP, independent risk assessor, certified workers to perform their duties.

1.13 SAMPLING AND ANALYSIS

1.13.1 Sampling and Analytical Procedures

1.13.1.1 Sampling and Analysis Methods

Analysis shall conform to NIOSH Pub No. 84-100 Method 7082, Lead, for personal sampling required by 29 CFR 1926 (.62). Sampling shall conform to ASTM E 1553.

1.13.1.2 Paint Chip Sampling and Analysis

Sampling shall conform to ASTM E 1729. Analysis shall conform to ASTM E 1613.

1.13.1.3 Dust Wipe Materials, Sampling and Analysis

Sampling shall conform to ASTM E 1792. Analysis shall conform to ASTM E 1613.

1.13.1.4 Soil Sampling and Analysis

Sampling shall conform to ASTM E 1727. Analysis shall conform to ASTM E 1613.

1.13.2 Occupational Exposure Assessment

Sampling and analytical procedures to determine compliance with the occupational exposure monitoring requirement of this section shall be described in the lead hazard control plan appendix of the Contractor's accident prevention plan. Monitoring for the initial determination may be omitted if the Contractor has sufficient proof from previous operations as specified in 29 CFR 1926 (.62) (d)(3)(iii) and (iv) that workers will not be exposed over the action level. The following occupational exposure monitoring requirements apply and shall be implemented if the requirements of 29 CFR 1926 (.62)(d)(3) (iii) and (iv) cannot be demonstrated.

a. During Initial Monitoring the Contractor shall representatively sample employees with the greatest potential for exposure to aerosolized lead.

b. Continued/Additional Monitoring shall meet applicable paragraphs in 29 CFR 1926 (.62)(d)(6), Frequency, after the initial determination has been made.

1.13.3 Lead Hazard Control Area/Containment Monitoring

The Contractor shall perform a visual inspection once per day outside the lead hazard control area to assure visual clearance criteria are maintained while lead hazard control activities are performed. The Contractor shall clean at its own expense, and to the Contracting Officer's satisfaction, all contaminated surfaces outside the lead hazard control area, if surfaces fail visual clearance criteria.

1.13.4 Occupancy During Work

The Contractor shall wipe sample a floor surface at a location no more than 3 m 10 feet outside the lead hazard control area at a frequency of once per day while lead hazard control activities are being performed. Wipe sampling analytical results shall pass clearance criteria for floors specified in this contract. The Contractor shall clean all contaminated surfaces at its own expense and to the Contracting Officer's satisfaction, if floor wipe samples required in this paragraph fail clearance criteria.

1.13.5 Clearance Monitoring

Sampling and analytical procedures to determine the clearance requirements of this section shall be described by the Contractor in the Clearance Plan Appendix of the Accident Prevention Plan. The Contractor shall perform the following sampling and analysis to verify that clearance requirements for the contract (inside the lead hazard control) area have been met.

a. The Contractor shall take dust wipe samples inside the lead hazard control area after the final visual inspection in the quantities and at the locations specified. Dust wipe samples collected for clearance purposes shall be taken a minimum of 1 hour after completion of final post-abatement cleaning activities.

(1) Floors - 1 per room for no less than 4 rooms, hallways or stairwells inside the containment. If there are less than 4 rooms, hallways or stairwells within the containment, then all rooms, hallways or stairwells shall be sampled. In addition, 1 sample shall be taken from the floor outside of the containment area.

(2) Interior Window Sills (if available) - 1 per room for no less than 4 rooms, hallways or stairwells inside the containment. If there are less than 4 rooms, hallways or stairwells within the containment, then all rooms, hallways or stairwells shall be sampled.

b. The Contractor shall perform the final visual inspection inside the lead hazard control area after an exterior abatement. All horizontal surfaces in the outdoor living area closest to the abated surface shall be inspected and found to be free of visible dust and debris. In addition, a visual inspection shall be performed on areas below the abated surface. If paint chips are

present, they must be removed for the site and properly disposed of, according to applicable Federal, State, and local requirements.

1.13.6 Waste Disposal Sampling

The Contractor shall sample, as necessary, the waste streams generated during lead hazard control activities for TCLP analysis to determine waste disposal requirements.

1.13.7 Analytical Results

The Contractor shall develop and maintain during the course of the project a log of analytical results generated by the above sampling requirements. The log shall clearly describe the reason for which the sample was taken (worker exposure, migration control, clearance) the analytical result for each sample and evaluate if the analytical result passed or failed the action levels. At a minimum, the Contractor shall include analytical results for samples required to be taken in paragraphs Occupational Exposure Assessment, Lead Hazard Control Area/Containment Monitoring, Occupancy During Work, and Clearance Monitoring specified above.

1.14 CLEARANCE REQUIREMENTS

The Contractor shall describe clearance requirements for this project in the Clearance Plan Appendix of the Accident Prevention Plan.

a. Clearance levels inside the lead hazard control area, target housing and child occupied facilities, active installations:

(1) Floors 40 micrograms per square foot.
(2) Interior Window Sills 250 micrograms per square foot.

1.15 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The Contractor shall describe the PPE to be used to protect workers from lead hazards in the Lead Hazard Control Plan Appendix of the Accident Prevention Plan. The Contractor shall furnish, at no cost to the workers, clothing for protection from lead-contaminated dust and debris. An adequate supply of these items shall be available for worker and Government personnel use. Protective clothing shall include:

a. Coveralls : Full-body breathable disposable coveralls shall be provided to lead hazard control workers.

b. Boots: Boots and shoes shall be provided as required by EM 385-1-1 Section 05.A.08 for workers. Boot/shoe covers shall be provided to prevent contamination of boots and shoes.

c. Hand Protection: Gloves, etc., shall be provided as required by EM 385-1-1 Section 05.A.10 for workers.

d. Head Protection: Hard hats shall be provided as required by 29 CFR 1910 (.135) and EM 385-1-1 Section 05.D for workers and authorized visitors.

e e. Eye and Face Protection: Eye and face protection shall be

provided as required by 29 CFR 1910 (.133) and EM 385-1-1 Section 05.B for workers and authorized visitors.

f. Respirators: NIOSH certified air-purifying respirators or filtering face pieces shall be provided for use as respiratory protection for airborne lead and for other hazardous airborne contaminants that may be encountered; as determine by the on-site safety and health supervisor. At a minimum, respirators shall be furnished to each employee required to enter a lead hazard control area where an employee exposure assessment has not yet been performed, or where monitoring data establishes the need for respiratory protection, or if requested by the employee.

g. Respirator Cartridges/Filtering Face Pieces: Respirator cartridges shall be changed out/filtering face pieces properly disposed of when the they become sufficiently loaded with particulate matter that workers experience breathing resistance. Cartridges and filtering face pieces shall be N, R or P 100 rated to assure sufficient protection from lead exposure.

1.16 HYGIENE FACILITIES

The Contractor shall describe the personal hygiene facilities to be used by the workers in the Lead Hazard Control Plan Appendix of the Accident Prevention Plan. The Contractor shall provide hygiene facilities for lead hazard control workers. Hygiene facilities shall consist of the following:

1.16.1 Hand Wash Stations

The Contractor shall provide hand washing facilities for use by lead hazard control workers. Hand washing facilities shall comply with the requirements in 29 CFR 1926 (.51) (f). Faces and hands shall be washed when leaving the lead hazard control area and after each work-shift if showers are not provided.

1.16.2 Change Area

The Contractor shall provide a change area to workers. The change area shall be equipped so that contaminated work clothing and street clothes shall be stored separately to prevent cross contamination.

1.16.3 Showers

Showers shall be provided if feasible and if worker exposures exceed the PEL. When provided, showers facilities shall meet the requirements of 29 CFR 1926 (.51) (f).

1.16.4 Eating Area

The Contractor shall set aside an area or provide a room for taking breaks and eating lunch. This area shall be kept as free as practicable from lead contamination. Workers shall be required to follow the procedures in 29 CFR 1926 (.62) (i)(4) when using the room.

1.17 POSTED WARNINGS AND NOTICES

The following regulations, warnings, and notices shall be posted at the

worksite in accordance with 29 CFR 1926 (.62).

1.17.1 Regulations

At least two copies of 29 CFR 1926 (.62) shall be made available for use by either the Contracting Officer or affected workers; and for the purpose of providing required information and training to the workers involved in the project. One copy shall be maintained in the Contractor's jobsite file, and a second copy shall be posted where it will be accessible to workers on the site.

1.17.2 Warning Signs and Labels

Warning signs shall be posted in each lead hazard control area where worker exposure to lead is undetermined or where the exposures are above the permissible exposure limit as defined in 29 CFR 1926 (.62). Signs shall be located to allow personnel to read the signs and take necessary precautions before entering the lead hazard control area.

1.17.2.1 Warning Signs

Warning signs shall be in English, be of sufficient size to be clearly legible, and display the following:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

1.17.2.2 Warning Labels

Warning labels shall be affixed to all lead waste disposal containers used to hold materials, debris and other products contaminated with lead hazards; warning labels shall be in English, and be of sufficient size to be clearly legible, and display the following:

CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY

BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN

ACCORDANCE WITH APPLICABLE FEDERAL, STATE OR LOCAL REGULATIONS.

1.17.3 Worker Information

Right-to-know notices shall be placed in clearly visible areas accessible to personnel on the site, to comply with Federal, state, and local regulations.

1.17.4 Air Monitoring Results

Air monitoring results shall be prepared so as to be easily understood by the workers. One copy shall be maintained in the Contractor's jobsite file, and a second copy shall be posted where it will be accessible to the workers as specified in 29 CFR 1926 (.62).

1.17.5 Emergency Telephone Numbers

A list of emergency telephone numbers shall be posted at the site. The list shall include numbers of the local hospital, emergency squad, police and fire departments, Government and Contractor representatives who can be reached 24 hours per day, and professional consultants directly involved in the project.

1.18 MATERIALS AND EQUIPMENT

Sufficient quantities of health and safety materials required by 29 CFR 1926 (.62), and other materials and equipment needed to complete the project, shall be available and kept on the site.

1.18.1 Abrasive Removal Equipment

The use of powered machine for vibrating, sanding, grinding, or abrasive blasting is prohibited unless equipped with local exhaust ventilation systems equipped with high efficiency particulate air (HEPA) filters.

1.18.2 Vacuum Systems

Vacuum systems shall be suitably sized for the project, and filters shall be capable of trapping and retaining all mono-disperse particles as small as 0.3 micrometers at a minimum efficiency of 99.97 percent. Used filters that are being replaced shall be disposed in a proper manner.

1.18.3 Heat Blower Guns

Heat blower guns shall be flameless, electrical, paint-softener type with controls to limit temperature to 590 degrees C 1,100 degrees F. Heat blower shall be DI (non-grounded) 120 volts ac, and shall be equipped with cone, fan, glass protector and spoon reflector nozzles.

1.18.4 Chemical Paint Strippers

Chemical paint strippers shall not contain methylene chloride and shall be formulated to prevent stain, discoloration, or raising of the substrate materials.

1.18.5 Chemical Paint Stripper Neutralizer

Neutralizers for paint strippers shall be compatible with the substrate and suitable for use with the chemical stripper that has been applied to the surface.

1.18.6 Detergents and Cleaners

Detergents or cleaning agents used shall have demonstrated effectiveness in lead control work using cleaning techniques specified by HUD 6780 guidelines.

1.19 EXPENDABLE SUPPLIES

1.19.1 Polyethylene Bags

Disposable bags shall be polyethylene plastic and shall be a minimum of 0.15 mm 6 mils thick (0.1 mm 4 mils thick if double bags are used) or any other thick plastic material shown to demonstrate at least equivalent

performance; and shall be capable of being made leak-tight. Leak-tight means that solids, liquids or dust cannot escape or spill out.

1.19.2 Polyethylene Leak-tight Wrapping

Wrapping used to wrap lead contaminated debris shall be polyethylene plastic that is a minimum of 0.15 mm 6 mils thick or any other thick plastic material shown to demonstrate at least equivalent performance.

1.19.3 Polyethylene Sheeting

Sheeting shall be polyethylene plastic with a minimum thickness of 0.15 mm 6 mil, or any other thick plastic material shown to demonstrate at least equivalent performance; and shall be provided in the largest sheet size reasonably accommodated by the project to minimize the number of seams. Where the project location constitutes an out of the ordinary potential for fire, or where unusual fire hazards cannot be eliminated, flame-resistant polyethylene sheets which conform to the requirements of NFPA 701 shall be provided.

1.19.4 Tape and Adhesive Spray

Tape and adhesive shall be capable of sealing joints between polyethylene sheets and for attachment of polyethylene sheets to adjacent surfaces. After dry application, tape or adhesive shall retain adhesion when exposed to wet conditions, including amended water. Tape shall be minimum 50 mm 2 inches wide, industrial strength.

1.19.5 Containers

When used, containers shall be leak-tight and shall be labeled in accordance with EPA, DOT and OSHA standards, as specified in paragraph WARNING LABELS.

1.19.6 Chemicals

Chemicals, including caustics and paint strippers, shall be properly labeled, used in accordance with the manufacturers recommendations and stored in leak-tight containers. Material Safety Data Sheets (MSDSs) shall be provided and hazard communication procedures implemented in conformance with paragraph HAZARD COMMUNICATION PROGRAM.

1.20 STORAGE OF MATERIALS

Materials shall be stored protected from damage and contamination. During periods of cold weather, plastic materials shall be protected from the cold. Flammable or hazardous materials shall not be stored inside a building. Materials shall be regularly inspected to identify damaged or deteriorating items. Damaged or deteriorated items shall not be used and shall be removed from the site as soon as they are discovered. Stored materials shall not present a hazard or an inconvenience to workers, visitors, and/or other occupants and employees of the facility in which they are located.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 WORK PROCEDURES

The Contractor shall perform work following practices and procedures described accident prevention plan.

3.1.1 Lead Hazard Control Areas, Equipment and Procedures

The Contractor shall set up lead hazard control areas and operate equipment within the lead hazard control area in a manner that will minimize migration of lead dust beyond the lead hazard control area boundaries and minimize exposure to workers.

3.1.2 Lead Hazard Control Areas

Access into lead hazard control areas by the general public shall be prohibited. Workers entering the lead hazard control area shall meet medical surveillance requirements of this contract and shall be required to understand and follow procedures described in the Contractor's accident prevention plan for reducing lead exposure. Lead hazard control area preparation and restriction requirements follow:

a. Containment features for interior lead hazard control projects: Polyethylene sheeting sealed with spray adhesive and duct tape to designate the lead hazard control area. The floor in the lead hazard control area shall be covered with two layers of polyethylene sheeting. Openings, such as HVAC supply and return air vents, into the lead hazard control area shall be sealed with polyethylene sheeting and duct tape or with sealed rigid coverings.

b. Containment features for exterior lead hazard control projects: Polyethylene sheeting extending a minimum of 10 feet from the working surface, plus another 5 feet for each additional 10 feet in surface height above 20 feet, from the perimeter of the working surfaces. The polyethylene sheeting shall: be securely attached to the building and cover all ground plants or shrubs in the working area; protected from perforating and tearing; contain any water which may accumulate during abatement; and be weighted down to prevent disruption from wind. A roped-off boundary perimeter, using caution tape or a barrier installed at a minimun of 20 feet distance (if feasible) from where the lead control work is performed. All windows within the regulated area or within 20 feet of the working surface shall be closed.

3.2 USE OF HYGIENE FACILITIES

a. Personnel and equipment shall be decontaminated when exiting the lead hazard control area. The Contractor shall comply with the following personnel and equipment decontamination procedures:

   (1) HEPA vacuum outer garments and equipment.
   (2) Wet Wipe Equipment.
   (3) Remover outer layer of garments.
   (4) Thoroughly wash face and hands, if showering not required.
   (5) Shower (if applicable).
   (6) Remove Respirator (if applicable).

(7) Exit lead hazard control area.

b. The Contractor shall provide, and workers shall use, a change room to change into work clothing at the beginning of a work shift. At the end of the work shift workers shall change back into street clothing and leave contaminated work clothing at the site for disposal or laundering.

c. The Contractor shall provide an eating facility as free as practical from lead contamination. Workers shall be allowed usage of the eating facility for rest/lunch breaks.

3.3 FURNISHINGS

The Contractor shall remove furniture and equipment, if present, from the work area before lead hazard control work begins.

3.4 WASTE DISPOSAL PROCEDURES

3.4.1 Construction Debris and/or Sanitary Landfill Waste

The Contractor shall dispose of the following waste streams in a sanitary landfill: Building Construction Debris

3.4.2 Waste Stream Classification

The Contractor shall determine the RCRA waste classification for all waste streams generated by the lead hazard control project. The Contractor shall perform the sampling and analysis specified in paragraph WASTE DISPOSAL, evaluate analytical results and propose waste stream treatment and disposal requirements for the contract. The Contracting Officer will approve waste stream treatment and disposal requirements proposed by the Contractor.

3.4.3 RCRA Subtitle C Hazardous Waste

The Contractor shall dispose of waste streams classified as hazardous at the RCRA subtitle C Treatment Storage and Disposal Facility or at the RCRA subtitle C hazardous wastes landfill.

3.4.4 Hazardous Waste Transportation and Disposal

The Contractor shall be responsible for the transport and disposal of hazardous waste.

3.5 LEAD HAZARD CONTROL PROCEDURES, METHODS AND TECHNIQUES.

3.5.1 Interior Baseboards, Ceiling Trim, Closet Shelving

Prepare areas where the baseboard, ceiling trim and closet shelving is located as indicated in Paragraph 3.1.2 "Lead Hazard Control Areas", subparagraph a. Lightly mist the component with water for dust control prior to removal (except in areas where electrical circuits are present). Use a utility knife or other sharp instrument to score all affected painted seams to minimize paint chipping and dust generation during removal. Remove screws, nails or other fasteners using a flat pry instrument and hammer, carefully prying the component away from the surface to which it is attached. Remove component intact to minimize paint chip and dust

generation. After the component has been removed, carefully remove or bend back nails or other fastening devices and wrap the component with 6-mil polyethylene sheeting and seal with duct tape. Begin cleaning procedures immediately after the component has been removed and sealed using HEPA filtered vacuums and wet cleaning methods. Cleaning of surfaces shall consist of HEPA vacuuming, wet cleaning, and HEPA vacuuming.

3.5.2 Exterior Privacy Fence

Prepare areas where the privacy fencing is located as indicated in Paragraph 3.1.2 "Lead Hazard Control Areas", subparagraph b. Lightly mist the component with water for dust control prior to removal. Use a utility knife or other sharp instrument to score all affected painted seams to minimize paint chipping and dust generation during removal. Remove screws, nails or other fasteners using a flat pry instrument and hammer, carefully prying the component away from the surface to which it is attached. Remove component intact to minimize paint chip and dust generation. After the component has been removed, carefully remove or bend back nails or other fastening devices and wrap the component with 6-mil polyethylene sheeting and seal with duct tape. Begin cleaning procedures immediately after the component has been removed and sealed using HEPA filtered vacuums and wet cleaning methods. Cleaning of surfaces shall consist of HEPA vacuuming, wet cleaning, and HEPA vacuuming.

3.5.3 Other Lead-Based Paint Components

Should renovation or demolition activities impact other components or surfaces identified as lead-based paint, the contractor shall follow the requirements of this specification and the OSHA CFR 1926.62 Construction Standard.

3.5.4 Paint Removal Methods

Prohibited paint removal methods shall include: open flame burning or torching, including the use of heat guns having operating temperatures greater than 590 degrees C 1,100 degrees F; machine sanding or grinding without HEPA exhaust; non-contained hydro blasting or high-pressure water wash; abrasive blasting or sandblasting without HEPA exhaust; dry scraping, except near electrical outlets or when using a heat gun. Chemical paint removers containing methylene chloride are prohibited. Building components and structures adjacent to the removal process shall be appropriately protected from damage due to the removal process employed. Stripping shall be done according to manufacturer's recommendations. Stripped substrates shall be thoroughly washed and neutralized before applying a primer or sealing coat.

3.5.4.1 Low Temperature Heat Gun

Prior to beginning work, electrical fuses and adequate electrical supply shall be verified. Only fuses properly sized for the service, and otherwise permitted by code, shall be used. Properly sized fuses shall not be changed out with larger fuses to increase amperage beyond safe limits. Portable electric generators may be used to safely supply adequate amperage. An accessible garden hose with a pressure-release spray nozzle; a crowbar to remove smoldering wood; and a long-handled sledgehammer to open up walls exposed to smoldering insulation shall be readily available. A fully charged ABC-type (89 N 20 pound minimum) fire extinguisher shall be available within 30 m 100 feet of the work area. Adequate ventilation

shall be provided for the work area. Worker protection shall include respirators equipped with combination HEPA filter/organic vapor cartridges. The Contractor shall equip heat guns with extension tubes or wire mesh as needed to prevent premature burnout of the heating elements and to minimize paint film scorching or smoking. Optimal heat gun/substrate separation is typically 75 to 150 mm 3 to 6 inches.

3.5.4.2 HEPA Sanding

The HEPA vacuum shall be correctly sized to provide adequate airflow, permitting the system to operate properly. If longer exhaust hoses are used, a larger HEPA vacuum shall be provided to handle the extra pressure drop in the vacuum hose. The HEPA filter shall be operated in accordance with manufacturer's instructions. Worker protection shall include respirators or filtering facepieces equipped with HEPA filters.

3.5.4.3 Wet Scraping

Surfaces near electrical outlets shall not be moistened but shall be dry scraped only. Loose material shall be scraped from the surface and deposited onto the containment plastic. Damp scrapings shall be cleaned up as soon as possible to prevent tracking throughout the work area. Scraper blades shall be kept sharp. Additional scraper blades shall be supplied and shall be selected for the type of surface being scraped.

3.5.4.5 HEPA Vacuum Needle Gun

The vacuum needle gun head shall be equipped with a vacuum shroud designed for the surface to be treated. The needle gun shall be operated to maximize surface contact of the vacuum shroud. Work shall be positioned to minimize the degree workers must reach above shoulder level, in order to minimize worker fatigue and loss of needle gun contact with the surface.

3.5.4.6 Onsite Paint Removal

Paint remover shall be applied in accordance with the manufacturer's instructions. Outdoor application shall only be performed in weather conditions recommended by the manufacturer. The work area surrounding the application process shall be secured to prevent access by children and unauthorized personnel. Workers shall be provided with the appropriate personal protective clothing and equipment in accordance with manufacturer's recommendations and good industrial hygiene practice. A portable eyewash shall be provided whenever eye irritant strippers are used. An abundant source of running water shall be provided in the work area. The stripper shall be tested in a small area prior to full scale stripping. Caustic strippers shall not be used on aluminum or glass surfaces. Waste disposal shall be in accordance with paragraph WASTE DISPOSAL PROCEDURES. Stripped surfaces shall be neutralized and washed in accordance with manufacturer's instructions and paragraph CHEMICAL PAINT STRIPPER NEUTRALIZER. Stripped surfaces shall be completely dry before repainting, and shall be repainted only with paints proven compatible with the stripping techniques employed.

3.6 CLEARANCE PROCEDURES

3.6.1 Visual Inspection

QSHP shall perform a visual inspection, using the form at the end of this section, for each lead hazard control area to assure that lead hazard control activities, identified in the individual work task data elements, have been properly completed. The QSHP shall visually verify that lead hazards have been removed, control technology has been appropriately applied/installed and that the lead hazard control area is free of dust and paint chips generated by lead hazard control activities.

3.6.2 Analytical Demonstration of Clearance

After the visual inspection the QSHP shall take clearance samples for laboratory analysis to verify clearance requirements specified in paragraph CLEARANCE REQUIREMENTS have been met.

3.7 EVALUATION OF SAMPLING AND MONITORING RESULTS

Analytical results from samples taken during lead hazard control activities shall be evaluated to determine compliance with occupational safety and health standards and project specific control efficiency and clearance/clean up levels.

3.7.1 Occupational Safety and Health

The QSHP shall review the analytical results from samples taken for the initial exposure assessment and continued occupational safety and health monitoring if required. Effectiveness and adequacy of personal protective equipment, respirators, work practices, hygiene facilities and personal decontamination procedures shall be evaluated and upgrades/downgrades in equipment and procedures made. After notifying the Contracting Officer the following shall be applied:

a. Exposures over the PEL (0.05 mg/cubic meter):

(1) Improve work practices to reduce exposures.

(2) Don respirators.

(3) Assure eating facilities and change rooms are clean and are free from settled dust.

(4) Shower as part of personal decontamination.

b. Exposures over the Action Level (0.03 mg/cubic meter):

(1) Assure exposed individuals enrolled in the medical surveillance program.

(2) Assure exposed individuals enrolled in and up to date with lead exposure training requirements.

3.7.2 Control Efficiency of Containment Features

The QSHP shall review and document results of the visual inspection determining visual clearance criteria are being met while lead hazard control activities are being performed. The QSHP shall review analytical

results from samples taken to determine if lead is migrating outside lead hazard control areas at levels in excess of clearance criteria. The QSHP shall notify the Contracting Officer and apply the following actions if results exceed project specific clearance levels outside the lead hazard control area:

a. Require/improve containment.

b. Improve work practices to reduce lead aerosol generation.

3.7.3 Clearance

The QSHP shall review analytical results for the samples taken to determine compliance with project specific clearance requirements. The following actions apply and shall be performed at the Contractor's expense if project specific clearance levels are exceeded:

Reclean surfaces.
Retest to determine clearance.

3.7.4 Removal of Lead Hazard Control Area

Upon acceptance of the final clearance certification by the Contracting Officer, and when authorized, cleared Lead Hazard Control Area boundary controls and warning signs shall be removed.

3.8 CLEARANCE REPORT

The QSHP shall prepare a clearance report including the following information:

a. Start and completion dates of lead hazard control activities.

b. Type of lead hazard control activity performed (i.e., abatement, interim control, renovation, remodeling), locations and lead hazards controlled or abated.

c. The name and address of each firm conducting lead hazard control activities and the name of each supervisor assigned to the project.

d. The Occupant Protection Plan prepared pursuant to paragraph OCCUPANT PROTECTION PLAN.

e. The name, address and signature of the QSHP or independent risk assessor to indicate clearance requirements have been met.

f. Certification of each Final Cleaning and Visual Inspection performed by the QSHP.

g. Analytical results from clearance sampling performed by the QSHP or independent risk assessor, the name of the laboratory that conducted the analysis. Results shall be provided in both the laboratory report and on the appropriate example forms provided at the end of this section.

h. A detailed written description of the lead hazard control activities performed, including hazard control methods used,

locations of rooms and/or components where lead hazard control activities occurred, reason for selecting particular hazard control methods for each component, and any suggested monitoring of encapsulants or enclosures.

i. Hazardous waste disposal documentation.

j. Contractor provided installation/maintenance manuals.

3.9 TITLE TO MATERIALS

Materials resulting from demolition work, except as specified otherwise, shall be come the property of the Contractor, and shall be disposed of in accordance with Section 02220A DEMOLITION, except as specified.

3.10 PAYMENT FOR HAZARDOUS WASTE

Payment for disposal of hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility certifying the amount of lead-containing materials delivered is returned and a copy is furnished to the Government.

3.11 CERTIFICATION OF VISUAL INSPECTION

Certify that the lead hazard control ares(s) for each individual work task data elements have passed visual clearance criteria and are ready for clearance sampling. To pass visual clearance, lead hazards have to be removed; control technology appropriately applied/installed; the lead hazard control area must be free from visible dust debris, paint chips or any other residue that may have been generated by the lead hazard control activities.

Signature by the QSHP indicates that the described lead hazard control area(s) have passed visual clearance criteria. Provide detailed description of each Lead Hazard Control Area.

_____

_____

_____

BY:_____
QSHP Date

Print name and title _____

CONTRACTING OFFICER ACCEPTANCE OR REJECTION

The Contracting Officer hereby determines that the Contractor has performed visual inspection of the lead hazard control area and by quality assurance inspection, finds the Contractor's work to be:

_____ Acceptable, ready for performance of clearance sampling

_____ Unacceptable, Contractor instructed to re-clean the lead hazard control area

BY: Contracting Officer's Representative

_____
Signature Date

Print name and title_____

Lead Hazard Control Clearance Sampling Certification Form

Date_____

Name of QSHP or Certified Risk
Assessor_____

License No._____

Work Task Data Element _____

Clearance Levels_____
40 CFR 745 Clearance Levels
24 CFR 35 Clearance Levels

Sample quantity and location:
Windows _____
Floors _____
Exterior Soils _____

Date of sample collection_____Date Shipped to lab_____

Shipped by_____
Signature

I certify that the clearance samples taken meet the clearance sampling requirements of this contract.

By:_____ Date:_____
QSHP or independent risk assessor

Print name and Title:_____

CONTRACTING OFFICER ACCEPTANCE OR REJECTION

I have inspected sampling locations and procedures and have found them to be

_____Acceptable, meet contract requirements.

_____Unacceptable, do not meet contract requirements, Contractor is directed to resample.

By: Contracting Officer's Representative

Signature Date

Print Name and Title_____

N

TABLE 1

SUMMARY OF WORK TASKS

TASK(1)
A
B
C
D
LOCATION(2)
A. Interior Closets Throughout
B. Interior Living Room, Entry
C. Interior Utility Closets
D. Exterior
DESCRIPTION(3)
A. Wood Shelving
B. Wood Ceiling Trim
C. Wood Baseboard
D. Wood Privacy Wall
LHCA(4)
Component Removal
QUANTITY(5)
LINEAR FT.
A. 0
B. 76.5
C. 10
D. 0
SQUARE FEET
A. 100
B. 0
C. 0
D. 150
EACH
A. 0
B. 0
C. 0
D. 0
Post LHCA Building/Facility Use(6)
Target Housing/Child Occupied Active Facility
Clearance Requirements(7)
A. 40 CFR 745 Dust Sampling
B. 40 CFR 745 Dust Sampling
C. 40 CFR 745 Dust Sampling
D. 40 CFR 745 Visual Only

NOTES:

(1) Work Task Designation

(2) Specific location of the work (building, floor, area, etc.)

(3) Description of material.

(4) Lead Hazard Control Activity (at all task locations).

(5) Quantity of LBP in Linear Feet (ft); Square Feet (sf); Each number of items.

(6) Post Lead Hazard Activity Control Building/Facility Use (at all task locations).

(7) Clearance Requirements

-- End of Section --

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