

CAB92  
DEPARTMENT OF THE ARMY  
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS  
P. O. BOX 1530  
ALBUQUERQUE, NEW MEXICO 87103-1580

CESWA-ED-G (200-1c)

18 May 1992

MEMORANDUM FOR Commander, Tulsa District, ATTN: CESWT-EC-GP/  
Bob Wilson

SUBJECT: 95% Design Submittal for Cell #3, Landfill #5, Soil Cap  
at Cannon AFB, NM

1. Enclosed are two copies of the 95% Design Submittal for Cell  
#3, Landfill #5, Cannon AFB. Please review and provide comments  
for this project to the Albuquerque District by 1 June 1992.

2. If you have any questions or require additional information  
please contact Mr. Mark Wittrock at (505) 766-1722.

FOR THE COMMANDER:

Encl

GARY L. GAMEL, P.E.  
Chief, Engineering and Planning Division

CF:

✓ Commander 6 copies  
27th Engineer Squadron  
ATTN: CEE/Mr. Jim Richard  
Cannon AFB, NM 88103-3251

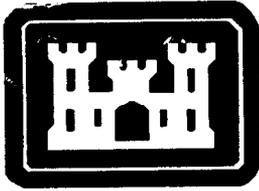


3.8.2 Final Inspection

A final inspection shall be held by the Contracting Officer to determine that deficiencies noted in the preliminary inspection have been corrected. Time for the inspection shall be established in writing.

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SOLICITATION NO. DACA47-92-B-XXXX  
DATE: MAY 1992

US Army Corps  
of Engineers  
Albuquerque District



**SPECIFICATIONS**

**FOR**

**LANDFILL #5 CELL #3  
SOIL CAP**

**CANNON AIR FORCE BASE  
CURRY COUNTY, CLOVIS, NEW MEXICO**

**100% REVIEW**

**"INCREASE PROFIT - SUBMIT VECP'S"**

Specifications: Landfill 5, Cell 3, Soil Cap, CAFB

SECTION 00800

SPECIAL CLAUSES

1. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (FAR 52.212-3) (APR 1984).

(a) The Contractor shall be required to (a) commence work under this contract within ten (10) calendar days after the date the Contractor receives notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than the dates or number of calendar days after the date of receipt by him of notice to proceed set forth in the schedule below, except as specified in the turfing sections and final as-built drawings, which will be accomplished as specified below:

SCHEDULE

<u>Item of Work</u>	<u>Commencement Time in Calendar Days After Receipt of Notice To Proceed</u>	<u>Liquidated Damages Per Calendar Day</u>
(1) All work		
(2) Final As-Built Drawings	*	*

\*The Contractor shall commence work on final as-built drawings upon his receipt of the approved preliminary as-built drawings and the reproducible original contract drawings. The Contractor shall have 60 calendar days after such receipt to complete and return to the Contracting Officer all specified final as-built drawing work. Upon satisfactory completion of this work the Contractor shall have earned the amount shown for Final As-Built Drawings in the Bid Schedule.

(b) The time stated for completion shall include final cleanup of the premises.

2. LIQUIDATED DAMAGES - CONSTRUCTION (FAR 52.212-5) (APR 1984).

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum stated in Clause 1(a) above for each day of delay. for completing the work on this contract, exclusive of the work in the Section, ESTABLISHMENT OF TURF.

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

3. CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (DFAR 252.236-7001) (DEC 1991):

(a) The Government

(1) Will provide the Contractor, without charge, one (1) set of reduced scale and one (1) set of large scale reproducible contract drawings and five (5) sets of specifications except publications incorporated into the technical provisions by reference;

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

(c) Large scale drawings shall, in general, govern small scale drawings. Figures marked on drawings shall, in general, be followed in preference to scale measurements.

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

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

CONTRACT DRAWINGS	
LANDFILL 5, CELL 3 SOIL CAP, CAFB	
Sequence No.	Title
1 thru 5	The list of drawings and maps set out in the index on the drawings is hereby incorporated by reference into these specifications.  Schedules included in the drawings are for the purpose of defining requirements other than quantities.

4. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15) (OCT 1989).

(a) This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the Contract Clause entitled "DEFAULT (FIXED PRICE CONSTRUCTION)". In order for the Contracting Officer to award a time extension under this clause, the 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
7	6	5	5	5	7	5	7	4	4	5	8

(c) Upon acknowledgement 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.

(d) 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 entitled "Default (Fixed Price Construction)."

5. PERFORMANCE OF WORK BY CONTRACTOR (FAR 52.236-1) (APR 1984). The Contractor shall perform on the site, and with its own organization, work equivalent to at least ..... percent (..%) of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

6. LIMITATIONS ON SUBCONTRACTING (FAR 52.219-14) (OCT 1987). By submission of an offer and execution of a contract, the offeror/contractor agrees that in performance of the contract in the case of a contract for:

(a) Services (except construction). At least 50 percent of the cost of contract performance incurred for personnel shall be expended for employees of the concern.

(b) Supplies (other than procurement from a regular dealer in such supplies). The concern shall perform work for at least 50 percent of the cost of manufacturing the supplies, not including the cost of materials.

(c) General Construction. The concern will perform at least 15 percent of the cost of the contract, not including the cost of materials, with its own employees.

(d) Construction by Special Trade Contractors. The concern will perform at least 25 percent of the cost of the contract, not including the cost of materials, with its own employees.

7. PHYSICAL DATA (FAR 52.236-4) (APR 1984). Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and as shown on the drawings.

(b) Weather Conditions:

(1) Climate: The climate is continental and is characterized by abundant sunshine, low relative humidities and considerable ranges of annual and diurnal temperatures.

(2) Precipitation: The average annual precipitation is 13.42 inches. The maximum annual rainfall of 29.56 inches occurred in 1941. The maximum monthly rainfall of 8.66 inches occurred in September 1941. The maximum 24-hour rainfall of 4.35 inches also occurred in September 1941. The average annual snowfall is 13.6 inches. The highest average monthly snowfall is 3.5 inches and is in December.

(3) Temperature: Average monthly maximum temperatures range from 51.6 degrees F in January to 92.5 degrees in July. Average monthly minimum temperature range from 24.5 degrees in January to 66.9 degrees in July. Temperature extremes are minus 20.0 degrees and 110.0 degrees.

(4) Relative Humidity: Monthly average relative humidities at 4:00 p.m. range from 54 percent in January to 32 percent in June.

(5) Wind: Wind speeds are normally moderate although relatively strong winds often accompany frontal activity during late winter and spring months. Wind speeds that may exceed 30 m.p.h. are not uncommon.

(6) Frost Data: Frost free periods vary from 177 days to 229 days per year and average 205 days per year. The average date of the last killing frost in the spring is 11 April. The average date of the first killing frost in the autumn is 2 November.

#### 8. AVAILABILITY AND USE OF UTILITY SERVICES (FAR 52.236-14) (APR 1984).

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters and associated paraphernalia.

#### 9. LAYOUT OF WORK (1965 APR OCE):

(a) The Government has laid out the work on the drawings from existing physical features. The Contractor shall lay out the work under this contract using the same features.

10. INSURANCE - WORK ON A GOVERNMENT INSTALLATION (FAR 52.228-5) (APR 1984).  
See Contract Clause with above title.

Schedule of Insurance

<u>Type</u>	<u>Amount</u>
Employers' Liability Insurance	\$100,000.00
Comprehensive General Liability Insurance:	
Bodily Injury	\$500,000.00 per occurrence
Comprehensive Automobile Liability Insurance:	
Bodily Injury	\$200,000.00 per person
Bodily Injury	\$500,000.00 per occurrence
Property Damage	\$ 20,000.00 per occurrence

Workmen's Compensation in accordance with the laws of the State of New Mexico.

11. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (EFARS 31.105(d)(2)(i)(A)):

(a) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data when the Government can determine both ownership and operating costs for each piece of equipment or equipment groups of similar serial and series from the Contractor's accounting records. When both ownership and operating costs cannot be determined from the Contractor's accounting records, equipment costs shall be based upon the applicable provisions of EP 1110-1-8, "CONSTRUCTION EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE", Region VI. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

(b) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

(c) When actual equipment costs are proposed and the total amount of the pricing action is over \$25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet". By submitting cost

or pricing data, the Contractor grants to the Contracting Officer or an authorized representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement, the Contractor shall certify that the equipment costs or pricing data submitted are accurate, complete and current.

12. INCLUSION OF LABOR PROVISIONS IN SUBCONTRACTS (SWDOC, Ltr No. 86-3, 3 Sep 86). To show compliance with Contract Clause, "SUBCONTRACTS", the Contractor shall, within seven days after award of any subcontract either by himself or a subcontractor of any tier, deliver to the Contracting Officer a completed Standard Form 1413. Nothing contained in this clause or any other provision of this contract shall create any contractual relation between any subcontractor and the Government.

- END OF SPECIAL CLAUSES -

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SECTION 01000

GENERAL REQUIREMENTS

1. SUPERVISION BY THE CONTRACTOR. The following requirements, in addition to those contained in the Contract Clause entitled: SUPERINTENDENCE BY CONTRACTOR, shall be met by the Contractor:

1.1 Authority of Contractor Representative. The site representative appointed by the Contractor and approved by the Contracting Officer shall, as a minimum, have the following authority:

1.1.1 To negotiate and execute Supplemental Agreements having a value up to ~~[\$50,000]~~ [\$100,000].

2. AGE AND VALUE OF EQUIPMENT. If requested by the Contracting Officer, the Contractor shall provide documentation to establish the age and value of any equipment being utilized to perform work under this contract.

3. WORK SCHEDULE. If the Contractor intends to work outside the normal 40 hour Monday through Friday work week, he shall notify the Contracting Officer one full workday (Monday - Friday) in advance.

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## SECTION 01100

### ENVIRONMENTAL PROTECTION

1. SCOPE: The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution during and as the result of construction operations under this contract except for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, and land, and involves noise, solid waste-management and management of radiant energy and radioactive materials, as well as other pollutants.

2. APPLICABLE REGULATIONS: In order to prevent, and to provide for abatement and control of, any environmental pollution arising from the construction activities of the Contractor and his subcontractors in the performance of this contract, they shall comply with all applicable Federal, State, and local laws, and regulations concerning environmental pollution control and abatement, and all applicable provisions of the Corps of Engineers EM 385-1-1, entitled "Safety and Health Requirements Manual" as well as the specific requirements stated in this section and elsewhere in the contract specifications.

3. NOTIFICATION: The Contracting Officer will notify the Contractor in writing of any observed non-compliance with the foregoing provisions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it was later determined that the Contractor was in compliance.

4. SUBCONTRACTORS: Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

5. IMPLEMENTATION: Prior to commencement of the work the Contractor will:

(1) submit in writing his proposals for implementing the provisions of this section and other sections of these specifications for environmental pollution control;

(2) meet with representatives of the Contracting Officer to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.

## 6. PROTECTION OF LAND RESOURCES:

6.1 General: The land resources within the property of the Government but outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. Insofar as possible, the Contractor shall confine his construction activities to areas defined by the plans or specifications, to areas to be cleared for other operations, or to quarry, borrow or waste areas indicated on the plans. At the onset of borrow excavation, topsoil shall be saved for use in restoring the borrow area. Waste and borrow areas shall be leveled or trimmed to regular lines and shaped to provide a neat appearance. In all instances the restored area shall be well drained, so as to prevent the accumulation of stagnant water. The following additional requirements are intended to supplement and clarify the requirements of Contract Clauses entitled PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS; OPERATIONS AND STORAGE AREAS; and CLEANING UP.

6.2 Prevention of Landscape Defacement: Except in areas shown on the plans or specified to be cleared, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without special authority from the Contracting Officer. Trees designated to be saved shall be protected from either excavation or filling within the root zone closer than the normal drip line of the tree. No ropes, cables, or guys shall be fastened to or attached to any existing trees for anchorages unless specifically authorized by the Contracting Officer. Where such special emergency use is permitted, the Contractor shall first adequately wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use. Where, in the opinion of the Contracting Officer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting, dumping, or other operations, he may direct the Contractor to protect adequately such trees by placing boards, planks, or poles around them. When earthwork operations are liable, in the opinion of the Contracting Officer, to cause rock to roll or otherwise be displaced into uncleared areas, the Contractor shall construct barriers to protect the trees. Rocks that are displaced into uncleared areas shall be removed. Monuments, markers, and works of art shall be protected similarly before beginning operations near them.

6.3 Restoration of Landscape Damage: Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to original condition at the Contractor's expense. The Contracting Officer will decide what method of restoration shall be used, and whether damaged trees shall be treated or removed and disposed of under requirements for clearing and grubbing. All scars made on trees (not designated on the plans to be removed) by equipment, construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted. Where tree climbing is necessary, the use of climbing spurs will not be permitted. The use of climbing

ropes will be required by the Contracting Officer where deemed necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Contracting Officer, shall be immediately removed and replaced with nursery-grown trees of the same species and size approved by the Contracting Officer.

6.4 Location of Temporary Field Offices, Storage, and Other Construction Buildings: The location on Government property of the Contractor's temporary field office, storage, and other construction buildings, required temporarily in the performance of the work, shall be upon cleared portions of the job site or areas to be cleared, and shall require written approval of the Contracting Officer. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Plans showing temporary field office, storage, and other construction buildings shall be submitted for approval of the Contracting Officer. Where buildings or tent platforms are constructed on sidehills, the Contracting Officer may require cribbing to be used to obtain level foundations. Benching or leveling of earth may not be allowed, depending on the location of the proposed facility.

6.5 Temporary Excavation and Embankments: If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he shall submit the following for approval at least thirty (30) days prior to scheduled start of such temporary work.

6.5.1 A layout of all temporary roads, excavations, and embankments to be constructed within the work area.

6.5.2 Details of road construction.

6.5.3 Details of the completed quarry or borrow excavation.

6.5.4 Plans and cross sections of proposed embankments and their foundations, including a description of proposed materials.

6.5.5 A landscaping plan prepared by a competent landscape architect showing the proposed restoration of the area. Removal of any necessary trees and shrubs outside the limits of required clearing or quarry, borrow, or waste areas shall be indicated. The plan shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The plan shall provide for the obliteration of construction scars as such and shall provide for a reasonably natural appearing final condition of the area. Modification of the Contractor's plans shall be made only with the written approval of the Contracting Officer. No unauthorized road construction, excavation or embankment construction (including disposal areas) will be permitted.

6.6 Post-Construction Cleanup or Obliteration: The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction, as directed by the Contracting Officer. It is anticipated that excavation, filling, and plowing of

roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as required, sufficient topsoil shall be spread to provide a minimum depth of 4 inches of suitable soil for the growth of grass, and the entire area seeded. Restoration to original contours is not required.

#### 7. PROTECTION OF HISTORICAL AND ARCHEOLOGICAL RESOURCES:

7.1 Preservation of Existing Historical, Archeological, and Cultural Resources: Any known existing historical, archeological and cultural resources within the Contractor's work area are designated on the contract drawings. The Contractor shall take precautions during this contract to preserve all resources as they existed at the time of contract award. The Contractor shall install all protective devices such as off limits markings, fencing, barricades or other devices as designated on the contract drawings and shall be responsible for preservation of the sites during this contract.

7.2 Recording and Preserving Historical and Archeological Finds: All items having any apparent historical or archeological interest outside of designated areas which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archeological find undisturbed and shall flag an area of 50 feet radius around the find, and shall immediately report the find to the Contracting Officer so that the proper authorities may be notified. Any work required to preserve or protect these finds will be accomplished by change order under the clause entitled CHANGES of the CONTRACT CLAUSES.

#### 8. PROTECTION OF WATER RESOURCES:

8.1 General: The Contractor shall not pollute streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, construction wastes, or other harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable Federal, State, County, and Municipal laws concerning pollution of rivers and streams. All work under the contract shall be performed in such a manner that objectionable conditions will not be created in lakes, reservoirs, or streams through or adjacent to the project areas.

8.2 Erosion Control: Prior to start of construction the Contractor shall submit a plan for approval of the Contracting Officer showing his scheme for controlling erosion and disposing of wastes. Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds, or the areas shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures such as berms, dikes, drains, or sedimentation basins, if required to meet the above standards, shall be provided and maintained until permanent drainage and erosion control facilities are completed and operative. The area of bare soil exposed at any one time by construction operations shall be held to a minimum. Unless otherwise approved by the Contracting Officer, the Contractor shall apply as soon as practicable an approved temporary mulch on denuded ground. This shall apply to all areas not subject to appreciable traffic during

construction, including areas that are to receive some form of construction later, if ground is to be exposed 60 days or more. Stream crossings by fording with equipment shall be limited to control turbidity and in areas of frequent crossings temporary culverts or bridge structures shall be installed. Any temporary culverts or bridge structures shall be removed upon completion of the project. Fills and waste areas shall be constructed by selective placement to eliminate to the extent practicable silts or clays on the surface that will erode and contaminate adjacent streams or lakes.

8.3 Spillages: Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides and insecticides, and cement from entering streams, rivers, or lakes.

8.4 Disposal: Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to streams shall be subject to the approval of the Contracting Officer. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed of as directed by the Contracting Officer, and replaced with suitable fill material, compacted and finished with topsoil all at the expense of the Contractor.

9. PROTECTION OF FISH AND WILDLIFE: The Contractor shall at all times perform all work and take such steps required to prevent any interference or disturbance to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise disturb native habitat adjacent to the project area which, in the opinion of the Contracting Officer, are critical to fish or wildlife. Fouling or polluting of water will not be permitted. Wash waters and wastes shall be processed, filtered, ponded, or otherwise treated prior to their release into a river or other body of water.

10. CLEAN-UP: The Contractor shall furnish daily janitorial services for the temporary field office, storage, and other construction buildings on the project site and perform any required maintenance of facilities and grounds as deemed necessary by the Contracting Officer during the entire life of the contract. Toilet facilities shall be kept clean and sanitary at all times. Services shall be performed at such a time and in such a manner to least interfere with the operations but will be accomplished only when the buildings are occupied. Services shall be accomplished to the satisfaction of the Contracting Officer.

The Contractor shall also provide daily trash collection and cleanup of the buildings and adjacent outside areas and snow removal in season, and shall dispose of all discarded debris, aggregate samples and concrete test samples in a manner approved by the Contracting Officer.

11. BURNING: No material shall be burned at the project site unless otherwise specified in other sections of these specifications or authorized by the Contracting Officer.

12. DUST CONTROL: The Contractor will be required to maintain all excavations, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which would cause a hazard or nuisance to

others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be permitted to control dust. Sprinkling, to be approved, shall be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor shall have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

13. MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION: During the life of this contract the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. During the construction period the Contractor shall conduct frequent training courses for his maintenance personnel. The curricula shall include methods of detection of pollution, familiarity with pollution standards, and installation and care of vegetation covers, plants, and other facilities to prevent and correct environmental pollution.

14. PESTICIDES (INSECTICIDES, FUNGICIDES, HERBICIDES, ETC.): Application of all pesticides shall be accomplished by certified pest control personnel or under the supervision of a certified pest control operator. Delivery and storage of pesticides will be monitored by certified personnel to insure the adequacy of containers and the safe storage of toxic materials. Disposal of containers and chemicals will be monitored to prevent pollution of natural drainage systems.

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SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL: Within 10 days after receipt of notice to proceed, the Contractor shall complete and submit to the Contracting Officer, for approval, two computer printouts and one floppy disc of the submittal register listing all submittals and dates, if available. In addition to those items listed in the register, the Contractor will furnish submittals for any deviation from the plans or specifications. Scheduling shall be coordinated with the approved progress schedule. The Contractor's Quality Control representative shall review the listing with the Project Engineer at least every 30 days and take appropriate action to maintain an effective system.

1.2 The Government will make available to the Contractor a disc containing an IBM compatible data base management system for submittal of the original submittal register and 30 day updates. This system requires DBase III+ for operation. DBase III+ will not be made available by the Government. (Refer to DBase software for hardware requirements.) The documentation for the Government system will also be made available. The Contractor may propose an alternate computerized system for Government approval. This system must be menu driven, including a menu screen that guides the user through the options, an input screen that prompts the user for information and all screens should display instructions to assist the user. This system must be able to produce the following reports: 1. All disapproved submittals; 2. All submittals due within two weeks after any reference date; 3. All submittals currently due and not received; 4. All submittals that have been under review for less than 22 days; 5. All submittals that have been under review more than 21 days. In addition the system must be capable of displaying to the screen or printer specified criteria, i.e. a transmittal by specification section, by transmittal number and disapproved transmittals. A user's guide/instruction must be provided along with any required software. Printing the report from the Government data base management system requires a printer capable of printing a 14-inch wide report. Normally, technical specifications are organized into three parts:

- PART 1 - GENERAL
- PART 2 - PRODUCTS
- PART 3 - EXECUTION

\*\*\*\*\*  
NOTE: Delete the following paragraph if project does  
not include specific list of submittals.  
\*\*\*\*\*

1.2.1 A "Project Specific List of Submittals" listing equipment, material, and procedures for which submittals are required by the specifications, is attached at the end of this section. This listing is not considered to be all inclusive and shall not alleviate the Contractor from his responsibility to provide all submittals required in the technical sections. The Contracting Officer may also request submittals that are in addition to those covered in the technical

sections.

1.3 PART 1 normally relates to the overall general requirements for the products listed in PART 2. The submittal register should be organized on the basis of products used for the construction process. Sometimes the GENERAL part has items that are not product oriented. These include: instruction manuals, special skilled worker certification, coordination studies, special system drawings, and the listed shop drawing (SD) requirements. These should be separately submitted items. Products may be listed separately or as a group of products with one transmittal number. If a group of products are listed on an ENG Form 4025, each product should be given an item number. Then each product data sheet should be stamped with the same item number.

1.4 Columns entitled "SCHEDULED SUBMITTAL TO COE" of the register shall be fully completed for each submittal item to show the data called for thereon. Need dates are not required until the schedule is approved. Columns entitled "REVIEWER'S NAME" and "DATE APPROVED/SIGNED" shall be left blank, see Paragraph 1.6.

1.5 Submittals on component items forming a system or that are interrelated shall be scheduled to be correlated and submitted concurrently. A minimum of 30 calendar days, exclusive of mailing time, will be allowed on the register for review and approval of any items requiring Government approval. No delay damages or time extensions will be allowed for time lost due to late submission by the Contractor.

1.6 The Government will review the Submittal Register for approval action. The column designated "Reviewer's Name" will also be completed by the Government. The Government will designate those to be submitted "For Information Only". These will be identified by an "I" in the column entitled "Reviewer's Name". A copy of the Submittal Register (printout), so marked in the "Reviewer's Name" column, will be returned to the Contractor. Those items marked "For Information Only" submittal shall be subject to review action by the Contracting Officer. Any such "For Information Only" submittals found to contain errors or omissions shall be resubmitted. No adjustment for time or money will be allowed for corrective action required as a result of noncompliance with plans and specifications.

1.7 The approved register will become part of the contract and the Contractor will be subject to requirements therein. The Contractor shall revise and/or update the register every 30 days to take into account all changes in the contract and the current construction schedule. Copies of updated or corrected registers shall be submitted to the Contracting Officer at least every 60 days in the same format and copies required for the original register.

1.8 It is essential that submittals and current construction progress be thoroughly coordinated. The dates in columns under the heading "SCHEDULED SUBMITTAL TO COE" shall be realistic, and shall provide sufficient lead time for the respective construction activity (as indicated on the approved progress schedule). Failure to comply with this requirement will be cause for rejection of the Submittal Register.

1.9 The Contractor shall submit all items listed on the contract drawings and listed or specified in Section 02000 and beyond of these specifications. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weight and measurements used on all submittals shall be the same used in the contract drawings. Each submittal shall be complete and in sufficient detail for ready determination of compliance with the contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (C.Q.C.) Manager who shall certify by signature on the ENG Form 4025 that he has reviewed the submittal in detail and that it is correct and in strict conformance with the contract drawings and specifications except as may be otherwise explicitly stated. Submittals shall include such items as: Contractor's, manufacturer's or fabricator's drawings; HVAC control descriptions; descriptive literature including (but not limited to) catalogue cuts, diagrams, operation charts or curves; samples, O&M manuals including parts lists; certifications; warranties and other such required submittals. Submittals pertinent to materials and equipment which are specified to receive advance approval shall be scheduled and made prior to the acquisition or the delivery thereof. Each required submittal which is in the form of a drawing shall be submitted as one (1) reproducible and four (4) prints of the drawing for Division 15 and 16 submittals, and one (1) reproducible and three (3) prints for all others. Drawing prints shall be either blue or black line permanent-type prints on a white background. Reproducibles shall be brownline diazo or sepia and shall be of such quality that prints made therefrom are sufficiently clear for microfilm copying. A shop drawing submitted without a reproducible drawing will not be reviewed and will be automatically returned. All catalog and descriptive data shall be submitted in 4 copies. Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is proposed for approval. Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function as a unit. All submittals shall be mailed or delivered directly to the address shown below.

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Use the following for Cannon AFB Projects:

Resident Engineer  
U.S. Army, Corps of Engineers  
Cannon Resident Office  
Cannon Air Force Base, NM 88103

Use the following for all other Military projects and Civil Works projects:

Construction Branch  
Shop Drawings  
USAED Albuquerque  
P.O. Box 1580  
Albuquerque, NM 87103-1580

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1.9.1 All samples, except for those required to be submitted to the Division Lab, shall be submitted to the Resident Engineer. In addition to the copies specified above, one courtesy copy of each submittal sent to the Albuquerque District Office should be forwarded to the Resident Engineer.

1.10 The Transmittal Form (ENG 4025) attached to this Section shall be used for all submittals and shall be completed in strict accordance with the instructions on the reverse side thereof. This form shall be reproduced by the Contractor. (The instructions on the back need not be reproduced on the copies used by the Contractor in forwarding the submittals.) This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care should be exercised to insure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item. A separate submittal form (ENG 4025) shall be attached to each copy of the data being submitted. Only one specification section shall be addressed on a transmittal form except where required for system submittals. In addition, a Submittal Review Verification Sheet will accompany each copy of the submittal. The Submittal Review Verification Sheet is attached to this section and will be reproduced by the Contractor.

1.11 All proposed variations requested by the Contractor shall be checked in Column "g", and noted in the "Remarks" column of the ENG Form 4025. The Contractor shall set forth in writing the reason for any variation and annotate such variation on the shop drawing. The Government reserves the right to rescind inadvertent approval of shop drawings containing unnoted variations.

1.11.1 Approval by the Contractor shall be accomplished by stamping each shop drawing sheet and by inserting the required information with a stamp similar to the following:

CONTRACTOR (Firm Name)	
<input type="checkbox"/>	Approved.
<input type="checkbox"/>	Approved with corrections as noted on shop drawings and/or attached sheets.
SIGNATURE:	_____
TITLE:	_____
DATE:	_____

1.12 The approval of the submittals by the Contracting Officer or his authorized representative shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval will not relieve the Contractor of the responsibility for any undiscovered error because the Contractor, under the Contractor Quality Control requirements of this contract, is responsible for the dimensions and design of adequate connections, details and satisfactory construction of all

work. After submittals have been approved by the Contracting Officer or his authorized representative, no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an acceptable explanation as to why a substitution is necessary.

1.13 The Contractor shall make all corrections required by the Contracting Officer or his authorized representative and promptly furnish a corrected submittal in the form and number of copies as specified for initial submittals. (If a submittal requires extensive revisions, it will be returned to the Contractor with comments by serial letter for correction prior to approval.) If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the Contract Clause entitled "CHANGES" should promptly be given to the Contracting Officer.

1.14 Payment for materials incorporated into the work will not be made if required approvals have not been obtained.

1.15 Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in 4 copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the specific item trade name, and model number, if applicable. The certification shall contain the specification/test identification to which compliance is being certified. A general statement that item complies with all requirements is not acceptable. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

1.16 Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project shall (1) be clearly identified with the 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. Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review.

1.17 If the Contractor elects to install mechanical and/or electrical equipment of size, shape, or arrangement differing from those shown and specified in mechanical rooms with limited available space, he shall prepare and submit room plans for such mechanical rooms or similar areas.

1.17.1 Submittals describing the various mechanical and electrical equipment items which are to be installed in the above described area(s) shall be assembled and submitted concurrently and accompanied by the room plans. If some items have already been submitted, their transmittal number shall be identified.

1.17.2 Plans, consolidated for all trades, shall be to scale and shall show all pertinent structural features and other items such as doors, windows, and

cabinets required for installation and which will affect the available space. All mechanical and electrical equipment and accessories shall be shown to scale in plan and elevation and/or section in their installed positions. All duct work and piping shall be shown. All clear spaces required for equipment maintenance shall also be shown.

1.18 Performance Evaluation of Contractor. Since the Contractor's Quality Control personnel are required to review all submittals for contract compliance before forwarding to the Government, the Quality of Work and Effectiveness of Management performance elements of the final Performance Evaluation will be based in part on the number of submittals disapproved by the Government. An unsatisfactory rating in any element may adversely effect future awards of Department of Defense contracts to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- - o 0 o - -

\* CONTRACT NUMBER:

TITLE AND LOCATION: LANDFILL #5, CELL #3, SOIL CAP  
CANNON AFB

\* CONTRACTOR:  
\*

\* SPECIFICATION SECTION:  
\*

NAS CODE (a)	ITEM NO. (b)	SPECIFICATION PARAGRAPH NO. (c)	DESCRIPTION OF SUBMITTAL (d)	TYPE OF SUBMITTAL (e)*	CONTRACTOR SUBMITTAL DATES			CONTRACTOR ACTION		GOVERNMENT ACTION		REMARKS (o)
					CLASS (f)**	SUBMIT (g)	APPROVAL NEEDED BY (h)	MATERIALS NEEDED BY (i)	CODE (j)	DATE (k)	SUBMIT TO GOVT (l)	
		02050-1.4	RECORDS	SD-18								
		02110-1.04	PERMIT FOR DISPOSAL ON PRIVATE PROPERTY	SD-91								
		02210-1.05	TESTING LAB QUALIFICATIONS	SD-39								
		02210-1.05	DENSITY TESTS	SD-70								
		02210-1.05	MOISTURE-DEMSITY TESTS	SD-70								
		02210-1.05	SATISFACTORY MATERIAL SOURCE	SD-70								
		02210-1.05	BORROW PIT OPENING NOTICE	SD-91								
		02210-3.10	CALIBRATION CURVES	SD-70								

\* See SECTION 01300 for descriptions of the Types of Submittals.

\*\* CLASS = CLASSIFICATION where I indicates "Government Approved" submittals AND II indicates "For Information Only" submittals.

SECTION 01310

PROGRESS SCHEDULE

1. CONTRACTOR-PREPARED CONSTRUCTION SCHEDULE. Pursuant to the Contract Clause entitled "SCHEDULE FOR CONSTRUCTION CONTRACTS" the Contractor shall prepare a schedule of construction utilizing a construction progress chart as described herein.

1.1 Construction Progress Chart. Construction progress charts shall be prepared on ENG Form 2454. The Contractor shall submit three copies of the Construction Progress Chart for approval. No progress payments will be made without an approved progress chart.

1.1.1 The Contractor shall prepare the chart with the following considerations. The contract work shall be divided into definable contract features. The WT. column should indicate the percentage of the contract for which each principal contract feature accounts. The vertical lines shall be identified by specific time frames, (i.e., weekly, bi-weekly, monthly) with one space accounting for no more than one month. The Contractor shall identify the date which Notice to Proceed is acknowledged on the chart. The Contractor shall also identify the contract completion date on the chart.

1.1.2 The Contractor shall place bars on the chart to indicate scheduled progress for each feature of work. The Contractor shall note the anticipated percentage complete for each item at the end of each month and at the end of each scheduled block.

## SECTION 01400

### CONTRACTOR QUALITY CONTROL SYSTEM

#### 1. CONTRACTOR QUALITY CONTROL (ER 1180-1-6) (JUL 1986).

1.1 General. The Contractor shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled "INSPECTION OF CONSTRUCTION". The quality control system shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction and operations.

1.2 Coordination Meeting. Before start of construction, the Contractor shall meet with the Contracting Officer (CO) or his authorized representative (ACO) and discuss the Contractor's quality control system.

#### 1.3 Quality Control Plan:

1.3.1 General. The Government will consider an interim plan for the first 15 days of operation. However, the Contractor shall furnish for acceptance by the Government, not later than 10 days after receipt of Notice to Proceed, the final Contractor Quality Control (CQC) Plan with which he proposes to implement the requirements of Contract Clause entitled "Inspection of Construction". If the Contractor fails to submit an acceptable QC plan within the time herein prescribed, the CO or ACO may withhold funds from progress payments in accordance with the Contract Clause entitled "PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS" until such time as the Contractor submits an acceptable final plan.

1.3.2 The Quality Control Plan. This plan shall include as a minimum, the following:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgement that the CQC staff shall implement the three phase control systems for all aspects of the work specified and shall report to the project manager or someone higher in the Contractor's organization.

b. The name, qualifications, duties, responsibilities and authorities of each person assigned a QC function.

1.3.3 Acceptance of Plan. Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC plan, staffing and operations as necessary to obtain the quality specified.

1.3.4 Notification of Changes. After acceptance of the QC plan, the Contractor shall notify the CO in writing of any proposed change. Proposed changes require approval by the CO or ACO.

#### 1.4 Quality Control Organization.

1.4.1 CQC System Manager. The Contractor shall identify an individual within his organization at the site of the work, who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This individual shall provide inspection of the work to ensure compliance with the contract plans and specifications. This person shall be on the job site at all times that work is in progress. This person shall have as a minimum: three (3) years verifiable experience at the construction skilled-craft foreman level or above; at least three (3) years verifiable experience as a construction Contractor Quality Control Representative.

1.5 Submittals. Submittals shall be as specified in the Section 01300 entitled "SUBMITTALS".

1.6 Control. Contractor Quality Control is how the Contractor assures himself that his construction complies with the requirements of the contract plans and specifications. The controls shall be adequate to cover all construction operations, including both onsite and offsite fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control for all definitive features of work as follows:

1.6.1 Preparatory Phase. This shall be performed prior to beginning any work on any definable feature of work. It shall include a review of contract requirements; a check to assure that all materials and/or equipment have been tested, submitted and approved; a check to assure that provisions have been made to provide required control testing; examination of the work area to ascertain that all preliminary work has been completed; and a physical examination of materials and equipment. The Contractor shall attach copies of codes appropriately referenced in the Technical Provisions. The Contracting Officer's Authorized Representative (ACO) shall be notified at least 48 hours in advance of beginning of any of the required actions of the preparatory phase. The results of the preparatory phase actions shall be made a matter of record in the Contractor's Quality Control documentation as required below. Subsequent to the preparatory phase and prior to commencement of work, the Contractor shall instruct applicable workers as to the acceptable level of workmanship required in his CQC plan in order to meet contract specifications.

1.6.2 Initial Phase. This phase starts as soon as a representative portion of the particular feature of work has been accomplished. This phase shall include examination of the quality of workmanship and a review of control testing for compliance with contract requirements. The work shall be inspected for use of defective or damaged materials, omissions, and dimensional requirements. The Contracting Officer's Representative shall be notified at least 24 hours in advance of the inspection of the initial phase. The inspection results shall be made a matter of record in the CQC documentation as required below. The initial phase should be repeated for each new crew to work on site, or if acceptable standards of workmanship are not being met.

1.6.3 Follow-Up-Phase. Daily inspections shall be performed to assure continuing compliance with contract requirements. The inspections shall be made a matter of record in the CQC documentation as required below. Final follow-up inspections shall be conducted and all deficiencies corrected prior to the start of additional features of work.

## 2. DOCUMENTATION.

2.1 The Contractor shall maintain current records of quality control operations, activities, and tests performed including the work of the subcontractors. These records shall be on an acceptable form and indicate a description of trades working on the project, the numbers of personnel working, the weather conditions encountered, any delays encountered, and acknowledgement of deficiencies noted along with the corrective actions taken on current and previous deficiencies. In addition, these records shall include factual evidence that required activities or tests have been performed, including but not limited to the following:

- a. Type and number of control activities and tests involved.
- b. Results of control activities or tests.
- c. Nature of defects, causes for rejection, etc.
- d. Proposed remedial action.
- e. Corrective actions taken.

2.2 These records shall cover both conforming and defective or deficient features and shall include a statement that supplies and materials incorporated in the work comply with the contract. Legible copies of these records shall be furnished to the CO daily. Preparatory and initial inspections will be documented on an approved form and submitted in duplicate with the quality control report for the day of inspection.

2.3 Deficiency Log. The Contractor shall maintain at the site a deficiency log which includes entries of all deficiencies or departures from contract requirements in the work which the CQC and/or the Government Quality Assurance personnel have noted. The deficiency log shall include the following:

- a. Date deficiency noted.
- b. Name of person noting deficiency.
- c. CQC report number deficiency noted on.
- d. Brief description of deficiency.
- e. Date deficiency correction noted.

f. The Contractor shall submit for review the deficiency log to the Government at each monthly progress payment request and shall surrender permanently the deficiency log to the Government at completion of the work but prior to final inspection. The deficiency log shall be made available to the Government for review at all times during the life of the contract.

2.4 The Contractor shall establish and implement a serialized numbering system for letters sent to the Government. The numbering system shall identify the contract number and shall progress sequentially starting with the number one (1) and continuing thereafter without break in numbering. All letters sent to the Government shall include a subject heading, which identifies the Contract Clause Number, Special Clause Number, or Technical Provision Number, and the particular subject item addressed by the letter.

2.5 Notification of Noncompliance. The Contracting Officer will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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## SECTION 01420

### SAFETY

1. SAFETY. The Contractor shall comply with all applicable Federal laws and with such additional measures as the Contracting Officer may find necessary in accordance with the Contract Clause titled: ACCIDENT PREVENTION. Applicable provisions of the Corps of Engineers manual entitled Safety and Health Requirements Manual EM 385-1-1, dated April 1981, revised October 1987, will be applied to all work under this contract. The reference manual may be obtained from the Contracting Officer's Representative, at the job site. EM 385-1-1 is hereby changed in accordance with the paragraphs attached after this Section entitled "INTERIM CHANGE TO EM 385-1-1 - SAFETY AND HEALTH REQUIREMENTS MANUAL.

1.1 Accident Prevention Program. Within fifteen (15) calendar days after receipt of Notice to Proceed, and at least ten (10) calendar days prior to the Safety Prewrite Conference, four (4) copies of the Accident Prevention Program required by the Contract Clause titled: ACCIDENT PREVENTION shall be submitted for review by the Contracting Officer. The program shall be prepared in the following format:

1.1.1 SWA Form 705 "Accident Prevention Program" fully completed and signed by an officer of the company in Block No. 28.

1.1.2 SWA Form 704 "Job Hazard Analysis" fully completed and signed by an officer of the company. The job hazard analysis is a method in which those hazards most likely to cause a fatality or significant disability are analyzed. Corrective action is then planned in advance which will eliminate the hazards. A written analysis is required for each phase of work and shall be presented at the preparatory inspection (P/I) meeting. On large or complex jobs the first phases may be presented in detail with the submittal of the Accident Prevention Program rather than presenting the complete analysis initially. If the plan is to be presented in phases, a proposed outline for future phases must be submitted as a part of the initial Accident Prevention Program submittal. The Accident Prevention Program will be reviewed for timeliness and adequacy at least monthly by the Contractor and noted as such on the Contractor's Quality Control Report at that time.

1.1.3 Copy of company policy statement on accident prevention and any other guidance or indoctrination provided to new employees. In addition, a description of the employee and supervisor safety responsibilities and authorities from the working level up through each supervisory level of the Contractor's organization shall be provided.

1.1.4 In addition to those contained in EM 385-1-1, Appendix "Y", include the following items in the Accident Prevention Program:

1.1.4.1 Hard Hat Area. A statement that the job site is classified a "hard hat" area from start to finish.

1.1.4.2 Sanitation and Medical Requirements. Estimate of the greatest number of employees, supervisors, etc., to be working at peak construction period, including sub-contractor personnel. Include sanitation and medical facilities planned for the job site.

1.1.4.3 Equipment Inspection. What type of inspection program on cranes, trucks, and other types of construction equipment does the Contractor plan to implement. Who will be responsible for the inspection and how does the Contractor plan to control equipment of sub-contractors and equipment brought to the job site by rental companies. Types of records to be kept.

2. WORK SAFETY INCENTIVE AND OTHER ITEMS. The Contractor shall provide a plan to encourage all employees to work safely. This plan shall be directed at the individual employee and shall be so designed such that it motivates all employees toward a safe work attitude. The plan shall be designed to be a positive incentive plan and must include a tangible reward and benefit to the individual employee. The reward frequency shall be at least once a month. The "Work Safety Incentive Plan" must be integrated into the overall "Accident Prevention Plan" which must be approved prior to the start of construction.

3. ACCIDENT REPORTS. The Contractor shall immediately report all accidents by telephone to the Contracting Officer. The Contractor Initial Report of Accident form shall be submitted by the following day to the Contracting Officer (See Contractor Initial Report of Accident form, attached.) The Contractor shall complete and submit ENG Form 3394 for all lost time accidents within 3 days of the accident.

3.1 Monthly Exposure Report. The Contractor shall submit SWD Form 743-J, Monthly Exposure Report, to the Contracting Officer no later than the 5th of each month. This report is a compilation of manhours worked each month by the prime contractor and each subcontractor.

4. CLEANUP. The Contractor's accident prevention program shall identify the individuals responsible for cleanup and shall establish a regular cleanup procedure and schedule. If the Contracting Officer determines that cleanup is not being performed satisfactorily, the Contractor shall establish a work crew to perform the continuous cleanup required by the Contract Clause titled: CLEANING UP. The individual(s) appointed to the work crew to perform daily cleanup shall not perform any other duties under this contract, unless approved by the Contracting Officer. The number of individuals appointed to perform cleanup shall be increased as directed by the Contracting Officer until adequate cleanup is maintained.

5. SPECIAL REQUIREMENTS. The following requirements shall be met by the Contractor if applicable:

5.1 Electrical Work: Electrical work will not be performed on or near energized lines or equipment unless specified in the plans and specifications.

5.1.1 Upon request by the Contractor, arrangements will be made for deenergizing lines and equipment so that work may be performed. All outages shall be requested through the authorized representative of the Contracting

Officer a minimum of 14 days, unless otherwise specified, prior to the beginning of the requested outages. Dates and duration will be specified.

5.1.2 Upon approval of the Contracting Officer's representative, the following work may be performed with the lines energized using certified hot line equipment on lines above 700 volts, when the following conditions have been met.

5.1.2.1 Work below the conductors no closer than the clearance required in EM 385-1-1 from the energized conductors.

5.1.2.2 Setting and connection of new pretrimmed poles in energized lines which do not replace an existing pole.

5.1.2.3 Setting and removing transformers or other equipment on poles.

5.1.2.4 Installation or removal of hot line connectors, jumpers, dead-end insulators for temporary isolation, etc., which are accomplished with hot line equipment from an insulated bucket truck.

5.1.3 The Contractor shall submit a plan, in writing, describing his method of operation and the equipment to be used on energized lines. Proper certification from an approved source of the safe condition of all tools and equipment will be provided with the plan. The work will be planned and scheduled so that proper supervision is maintained. The Contractor will review his plan with the Contracting Officer's representative prior to being granted permission to perform the work.

5.1.4 No work on lines greater than 600 volts will be performed from the pole or without the use of an insulated bucket truck.

5.1.5 No work will be done on overbuilt lines while underbuilt lines are energized, except for temporary isolation and switching in accordance with 5.1.2.4 hereinbefore.

5.2 Electrical Tools: Hand held electric tools shall be used only on circuits protected by ground fault circuit interrupters for protection of personnel.

5.3 Grounding Generators and Arc Welders: Non-current carrying metal parts of all generators and arc welders shall be grounded.

5.4 Rollover Protective Structures:

5.4.1 R.O.P.S. for rollers and compactors will be certified to meet SAE requirement J1040C.

5.4.2 R.O.P.S., as required by paragraph 18.B.20, EM 385-1-1, includes self-propelled pulverizers.

5.5 Radiation Permits or Authorizations:

5.5.1 Contractors contemplating the use of radioactive materials or radiation producing equipment while performing work on this contract must obtain written

authorization from the Department of the Army or Department of the Air Force, as applicable.

5.5.2 A 45-day lead time should be programmed for obtaining this written authorization.

5.5.3 When requested, the Contracting Officer's Authorized Representative will assist Contractor in obtaining the required permit or authorization.

5.6 Self-Propelled Elevating Work Platforms: All self-propelled elevating work platforms will be designed, constructed, maintained, used, and operated in accordance with the guidance provided in American National Standard for Self-Propelled Elevating Work Platforms (ANSI A92.6-1990) together with any amendments which may be in force at time contract is awarded.

5.7 Language: For each work group that has employees that do not speak English the Contractor will provide a bilingual foreman that is fluent in the language of the workers. The Contractor will implement the requirements of EM 385-1-1, Para. 01.B.01, 01.B.02, and 01.C.02 through these foremen.

5.8 Guarding of Roofs and Open-Sided Floors: To supplement and emphasize the requirements of Contract Clause "Accident Prevention" and the safety manual, EM 385-1-1, the following is provided:

5.8.1 Perimeter guard rails will be installed on all open-sided floors on multistoried buildings, and on all roof perimeters. Guard rails will be installed as the decking crew completes an area and before any other work starts and will remain intact as long as construction work is in progress in the area.

5.8.2 The Contractor will submit his proposed method of fall protection to the Contracting Officer's Representative as part of his Job Hazard Analysis for approval before beginning roof operations.

6. The Contracting Officer will notify the Contractor of any noncompliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor. The Contractor shall be responsible for subcontractor compliance with this provision. The Contractor shall include the provisions of this clause in all subcontracts involving performance of work at the site. However such provision in the subcontractor's contract shall not relieve the Contractor of his obligation to assure compliance with the provisions of this clause for all aspects of the work.

INTERIM CHANGE TO EM 385-1-1 - SAFETY AND HEALTH REQUIREMENTS MANUAL

1. Page 21, Section 07.A.03, replace with the following:

"07.A.03 - Protective footwear, such as rubber boots, protective covers, ice clamp-ons, steel-toed safety boots, shall be worn by all persons exposed to hazards to the feet (including, but not limited to impact, puncture, slipping, electrical, or chemical hazards).

a. For all activities in which Corps or contractor personnel or official visitors are potentially exposed to foot hazards, the applicable job/activity hazard analysis, accident prevention plan, or project safety plan shall include an analysis of, and prescribe specific protective measures to be enforced for, foot hazards.

b. Footwear providing protection against impact and compressive forces, conduction hazards, electrical hazards, and sole puncture shall meet the applicable requirements of ANSI Z41."

2. Page 143, Section 18.C.05, replace with the following:

"18.C.05 - All load drums on loading-hoisting equipment shall be equipped with at least one positive holding device. This device should be applied directly to the motor shaft or some part of the gear train. It is not necessary that the positive holding device utilize shearing of metal to meet this requirement. Friction surfaces are acceptable."

3. Page 145, add Section 18.C.24 and 18.C.25 which will read:

"18.C.24 - During personnel handling operations load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs shall be engaged when the occupied platform is in a stationary working position."

"18.C.25 - During personnel handling operations the load hoist drum shall have a system or device on the power train other than the load hoist brake, which regulates the lowering rate of speed of the hoist mechanism (controlled load lowering). Free fall is prohibited."

4. Page 146, Section 18.D.09, replace with the following:

"18.D.09 - All telescopic boom cranes engaged in standard lift operations (including concrete bucket) should be equipped with a two-block warning feature(s), a two-block damage prevention feature, or an anti-two block device for all points of two-blocking (i.e., jibs, extension, etc.). In addition, all new telescopic boom cranes shall be equipped with a anti-two block device or a two-block damage prevention feature for all points of two-blocking. Cranes that are used exclusively as duty cycle machines (clamshell, dragline, grapple, pile driving operations) are exempt from this requirement but will meet the requirements of ANSI/ASME-B30.5-1989 (as revised). In all cases where cranes are utilized without these safeguards equivalent protection shall be established, documented and approved by the designated authority."

INTERIM CHANGE TO EM 385-1-1 (CONTINUED):

5. Page 146, add Sections 18.D.10 and 18.D.11, which will read:

"18.D.10 - All lattice boom cranes engaged in standard lift crane operations (including concrete bucket) should be equipped with a two-block warning feature which functions for all points of two-blocking. Cranes that are used exclusively as duty cycle machines (clamshell, dragline, grapple, pile driving operations) are exempt from this requirement but will meet the requirements of ANSI/ASME-B30.5-1989 (as revised). In all cases where cranes are utilized without these safeguards equivalent protection shall be established and documented and then approved by the designated authority."

"18.D.11 - During personnel handling operations all telescopic and lattice boom cranes shall be equipped with a device which when activated disengages all functions whose movement can cause contact between the load block or overhaul ball and the boom tip (anti-two block device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two-block damage prevention feature). The device or systems must be installed for all points of two-blocking (i.e., job or boom points) and in the case of the anti-two block device the crane must be equipped with automatic brakes on each hoist line; hoist lines not so equipped must be taken out of service while personnel lifts are being made."

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## TRACTORS ACCIDENT PREVENTION PROGRAM

Willingness to correct safety hazards detected by the Corps is commendable, but a poor substitute for a positive program that prevents or detects and corrects hazards.

Contractor 1	Contract Name & No. 2	Date 3
Project Superintendent 4	Shifts/day 5	Hour/shift 5a
Maximum employees/shift 5b		
Superintendent's training in Corps' safety requirements  6		
Major Units of Equipment  7		
Who will inspect equipment? 8	Inspector's qualifications 8a	Inspection frequency? 8b
Who is responsible for operators' physicals? 9	Location of all records 10	Day and hour weekly safety meeting 11
Who is responsible for employee training? 12	Who will orient new employees? 13	
Who is responsible for clean-up? 14	Where will drinking water be obtained? 15	
Who will investigate accidents? 16	Who is responsible for providing personal protective equipment? 17	
Name Doctors, Hospitals & Ambulance services with whom arrangements have been made for this contract.		
Doctor 18	Hospital 18a	Ambulance 18b
What form of communication will be used to summon ambulance?  18c		

CONTRACTOR INITIAL REPORT OF ACCIDENT

Date and Time of Accident \_\_\_\_\_ Lost Time \_\_\_\_\_ Property \_\_\_\_\_  
Injury \_\_\_\_\_ Damage \_\_\_\_\_

Contract No. \_\_\_\_\_ Prime \_\_\_\_\_ Sub \_\_\_\_\_

Name of Injured or Equipment Operator \_\_\_\_\_ Occupation \_\_\_\_\_

Social Security No. \_\_\_\_\_ Age \_\_\_\_\_

Extent of Injury \_\_\_\_\_

Equipment or tools involved (Include type, brand, model, age, damage if any)

Description of Accident \_\_\_\_\_

Corrective Action \_\_\_\_\_

Names of Witnesses \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Title \_\_\_\_\_

**JOB HAZARD ANALYSIS**

<b>CONTRACT NO.</b>		<b>PROJECT:</b>	<b>FACILITY:</b>
<b>DATE:</b>		<b>MAJOR PORTION OF WORK:</b>	<b>ESTIMATED START DATE:</b>
ITEM	PHASES OF WORK	SAFETY HAZARD	PRECAUTIONARY ACTION TAKEN
	<p>Break the job down into its basic steps, e.g., what is done first, what is done next, and so on. You can do this by 1) observing the job, 2) discussing it with the operator, 3) drawing on your knowledge of the job, or 4) a combination of the three. Record the job steps in their normal order of occurrence. Describe what is done, not the details of how it is done. Usually 3 or 4 words are sufficient to describe each basic job step.</p>	<p>For each job step, ask yourself what accidents could happen to the man doing the job step. You can get the answers by 1) observing the job, 2) discussing it with the operator, 3) recalling past accidents or 4) a combination of 3. Ask yourself: Can he be struck by or contacted by anything; can he strike against or come in contact with anything; can he fall, can he be caught in, or between something; can he overexert; is he exposed to gas, radiation, welding rays, etc; for example, acid burns or fumes.</p>	<p>For each potential accident or hazard ask yourself how should the man do the job step to avoid the potential accident, or what should he do or not do to avoid the accident. You can get your answers by 1) observing the job for lead 2) discussing precautions with the experienced job operators 3) drawing on your experience or 4) a combination of the three. Be sure to describe specifically the precaution a man must take. Don't leave out important details. Number each separate recommended precaution with the same number you gave the potential accident (See center column) that the precaution seeks to avoid. Use simple do or don't statements to explain recommended precautions as if you were talking to the man.</p> <p>For example, "Lift with your legs, not your back," Avoid such generalities as "Be Careful", "alert", "Take caution", etc.</p>
<b>CONTRACTOR (SIGNATURE &amp; DATE)</b>			
<b>REPORT DISCUSSED WITH CONTRACTOR/SUPERINTENDENT ON:</b>			<b>RESIDENT ENGINEER (SIGNATURE)</b>
<b>PROJECT ENGINEER (SIGNATURE):</b>			

<b>MONTHLY EXPOSURE REPORT OF OPERATIONS AND ACTIVITIES</b>	Reports Control Symbol DAEN-30-1 (R1)	Date:
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Read instructions below.

Monthly report of accident and exposure data as required by the Accident Prevention Article of contract shown below.

THRU: _____ ENGINEER	TO: District Engineer	Contractor:
		Contract Number:

		<u>Total Manhours</u>					
Prime-Contractor	<u>Administrative, Professional &amp; Supervisors</u>	MH					
	Date	( )	( )	( )	( )	( )	
	<u>Skilled &amp; Common Labor</u>	MH					
	Date	( )	( )	( )	( )	( )	
Sub-Contractor		MH					
	Date	( )	( )	( )	( )	( )	
"	"	MH					
	Date	( )	( )	( )	( )	( )	
"	"	MH					
	Date	( )	( )	( )	( )	( )	
"	"	MH					
	Date	( )	( )	( )	( )	( )	
	Date	( )	( )	( )	( )	( )	
Sub-total this page							
Sub-total reverse side							
Grand Total							

(Add additional names on reverse side)

ENG Form 3394, MISHAP REPORT, submitted this period: Disabling Injuries _____  Amount Property Damage (in excess of \$300) _____	Submitted by:  _____ (Contractor)
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Instructions:

1. This report to be submitted in duplicate by each prime contractor as directed by Contracting Officer, or Authorized Representative.
2. The above figures include all operations directly supporting the contract. They do not include offsite operations not on government property or under government supervision which supply projects other than this contract. Neither do they include materials supplied F.O.B. the job site.
3. Above figures include overtime, etc.
4. Figures will cover regular pay periods without allowing for calendar month. This method automatically corrects the log every three months as eight months will have four pay periods and four months will have five pay periods.

## SECTION 01510

### UTILITIES

1. AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984). All utilities required to complete tests of equipment or systems installed under this contract will be furnished to the Contractor without charge if connections to utility lines are installed under the contract.

2. WATER FOR CONSTRUCTION PURPOSES. The Government will furnish to the Contractor all water for construction purposes at no charge to the Contractor. The Contractor shall install and maintain necessary supply connections and piping for same, but only at such locations and in such manner as may be approved by the Contracting Officer. All water shall be carefully conserved. Before final acceptance, temporary connections and piping installed by the Contractor shall be removed in a manner satisfactory to the Contracting Officer.

3. ELECTRIC POWER. The Government will furnish electricity to the Contractor at no charge. The Contractor shall furnish, at his own expense, all backup power supply, temporary electric power lines and equipment required under this contract. All temporary electrical installations shall be subject to the approval of the Contracting Officer. All temporary lines shall be furnished, installed, connected, and maintained by the Contractor in a workmanlike manner satisfactory to the Contracting Officer and shall be removed by the Contractor in like manner at his expense prior to final acceptance of the construction. If additional electrical power is required for construction the Contractor shall provide the power using his own generators. The Contractor shall provide adequate protection for his equipment so that Contractor electrical equipment faults will not adversely affect the site electrical system or the utility system.

4. WASTE MATERIAL. Unless otherwise specified, waste material shall be disposed of by the Contractor at a licensed off site sanitary landfill or sewage disposal plant. Permission to use the off-site sanitary landfill or sewage disposal plant shall be obtained by the Contractor and any costs attendant thereto shall be borne by the Contractor.

5. TEMPORARY TELEPHONE SERVICE. The Contractor is required to determine line availability and to make arrangements for installation of telephone lines and instruments with the telephone company. All costs associated with telephone installation and service shall be the responsibility of the Contractor.

6. SEWAGE DISPOSAL FOR TEMPORARY FACILITIES. A sewage disposal location is not available at the site for use under this contract.

7. INTERRUPTION OF EXISTING UTILITIES SERVICES. The Contractor shall perform the work under this contract with a minimum of outage time for all utilities. Interruption shall be by approved Sections of the utility. In some cases, the Contractor may be required to perform the work while the existing utility is in service. The existing utilities services may be interrupted only when approved by the Contracting Officer. When it is necessary to interrupt the existing

utilities, the Contractor shall notify the Contracting Officer in writing at least 14 calendar days in advance of the time the Contractor desires the existing service to be interrupted. The interruption time shall be kept to a minimum. Depending upon the activities at the facility which require continuous service from the existing utility, an interruption may not be subject to schedule at the time desired by the Contractor. In such cases the interruption may have to be scheduled at a time of minimum requirement of demand for the utility. The amount of time requested by the Contractor for interruption of existing utility service shall be as approved by the Contracting Officer.

8. REQUIREMENTS CONCERNING EXISTING UNDERGROUND UTILITIES. The drawings indicate known, existing, underground utilities which are located in areas requiring work under this contract. The locations shown are approximate and the depths are not indicated. The Contractor shall contact the utility companies or agencies which furnish utilities in the area where the project is located to determine if there are other known, new, or suspected additional underground utilities in the work areas other than those shown on the drawings. Prior to commencement of any excavation in areas where there are known utilities, it shall be the responsibility of the Contractor to contact the owner of each known utility and request that the owner mark the location of the utility and also obtain information as to the depth of the utility. The Contractor shall submit proof to the Contracting Officer that the Contractor has contacted the owners of known utilities and has obtained the location, including depth below grade, for such utilities. The Contractor shall protect all existing utilities in accordance with the Contract Clause entitled, PROTECTION OF EXISTING VEGETATION, EQUIPMENT, STRUCTURES, UTILITIES, AND IMPROVEMENTS. In addition, the Contractor shall take all the necessary precautions to prevent harm to personnel and damage to equipment and existing construction from utilities which conduct electricity or transmit combustible gases.

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SECTION 01580

BULLETIN BOARD, PROJECT SIGN AND PROJECT SAFETY SIGN

1. SCOPE: This section covers a project bulletin board, a project sign, and a project safety sign, complete.

2. GENERAL: Immediately upon beginning of work under this contract, the Contractor shall accomplish the work covered under this section of the specifications. Locations of the bulletin board, the project sign, and the project safety sign shall be as determined by the Contracting Officer.

3. BULLETIN BOARD: Immediately upon beginning of work under this contract, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 x 48 inches in size, for displaying the Equal Employment Opportunity Poster, a copy of the wage decision contained in the contract, Wage Rate Information Poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the site of work in a conspicuous place easily accessible to all employees as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work under the contract is complete. Upon completion of work under this contract the bulletin board shall be removed by and remain the property of the Contractor.

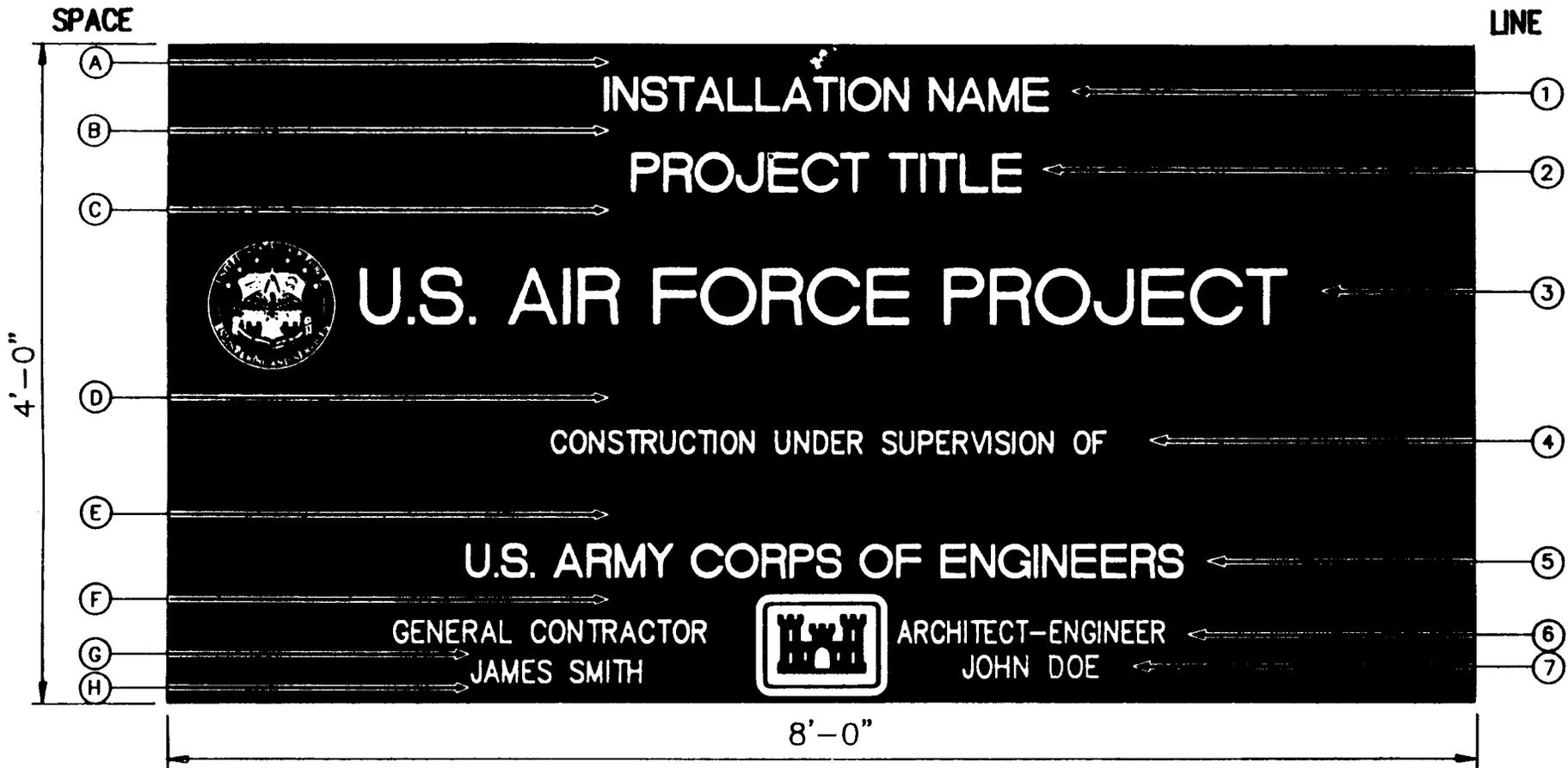
4. PROJECT SIGN: The Contractor shall furnish and erect a project sign in the location as hereinbefore specified. Details of construction shall be as shown on the drawings attached at the end of this section. The sign shall be constructed of 1/2-inch-thick, grade A-C, exterior type plywood. The sign shall receive 2 coats of dark blue, semigloss, exterior type enamel, color number 25053, as shown in Federal Standard 595a and Change Notice No. 1. Lettering shall be as shown on the drawings and shall be an approved white, semigloss, exterior type enamel. Upon completion of work under this contract, the project sign shall be removed from the job site and shall remain the property of the Contractor.

5. PROJECT SAFETY SIGN: The Contractor shall furnish and erect a project safety sign at the Contractor's field office. The safety sign shall be located in a conspicuous place easily within view of all employees and visitors as approved by the Contracting Officer. Details of construction shall be as shown on the drawings attached at the end of this section. The sign shall be constructed of 3/4-inch-thick, grade A-C, exterior-type plywood. The sign shall receive two coats of an approved white, semigloss, exterior type enamel. Lettering shall be as shown on the drawings and shall be semigloss, exterior type enamel of the colors noted on the drawings. The Contractor shall furnish and apply a red decal of the Corps of Engineers' Castle, or may use a stencil in lieu of a decal provided the dimensions are the same. The decal, if used, shall receive a thin coat of clear spar varnish after application. If a stencil is used, the castle shall be painted with an approved red, semigloss, exterior type, enamel. The Contractor shall furnish a sufficient number of sign numbers to cover the length of the contract period and to keep both numbered spaces up to date. The Contractor shall keep the safety sign current by posting the numbers daily in both slots (lines 5 and 6 of sign). Numbers shall be red and the size

indicated on the drawing and shall be of a weatherproof material. Upon completion of work under this contract, the project safety sign shall be removed from the Government-controlled land and remain the property of the Contractor.

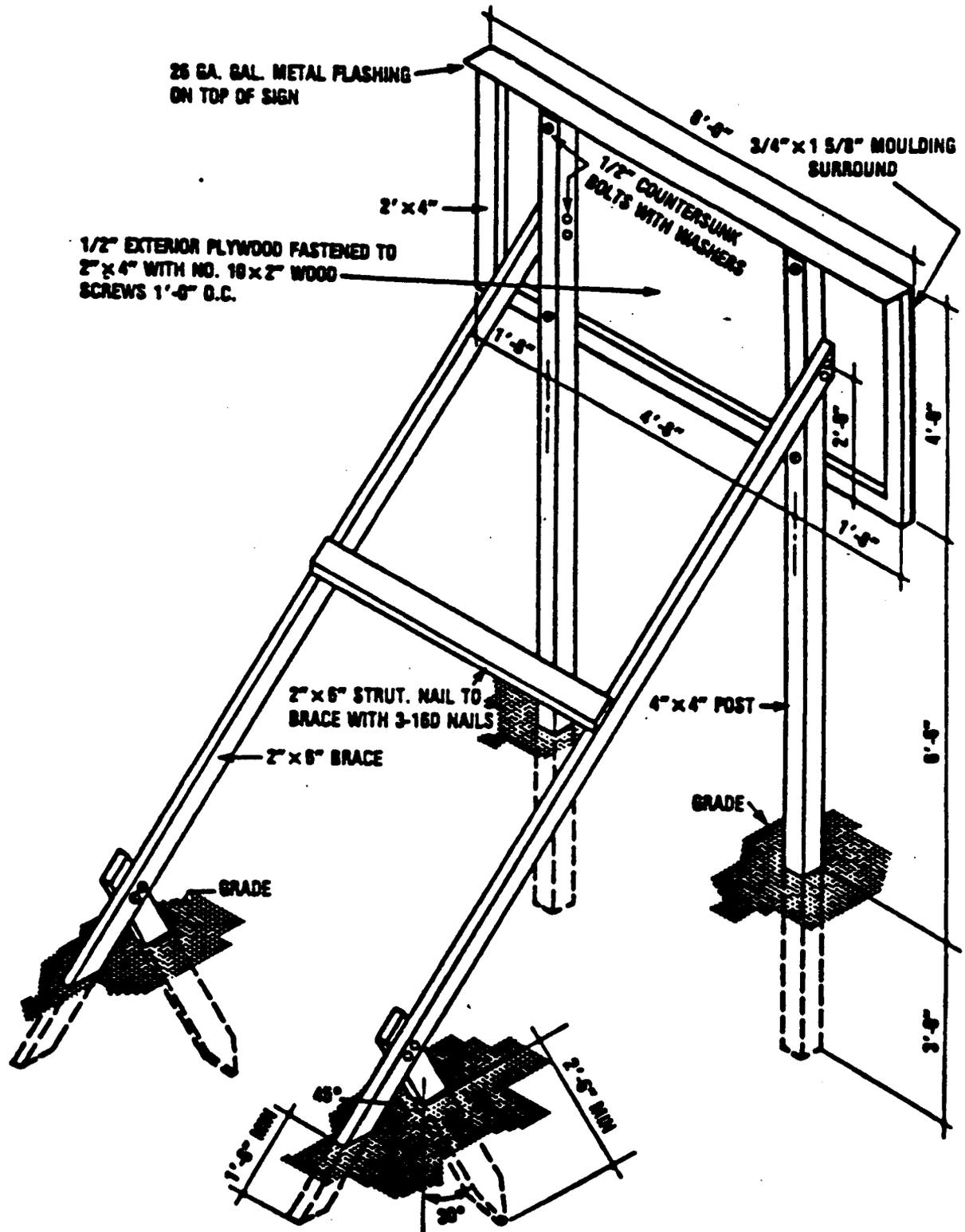
6. PAYMENT: No separate payment will be made for the work covered under this section of the specifications and all costs in connection therewith will be considered as a subsidiary obligation of the Contractor, covered by the contract prices in this contract.

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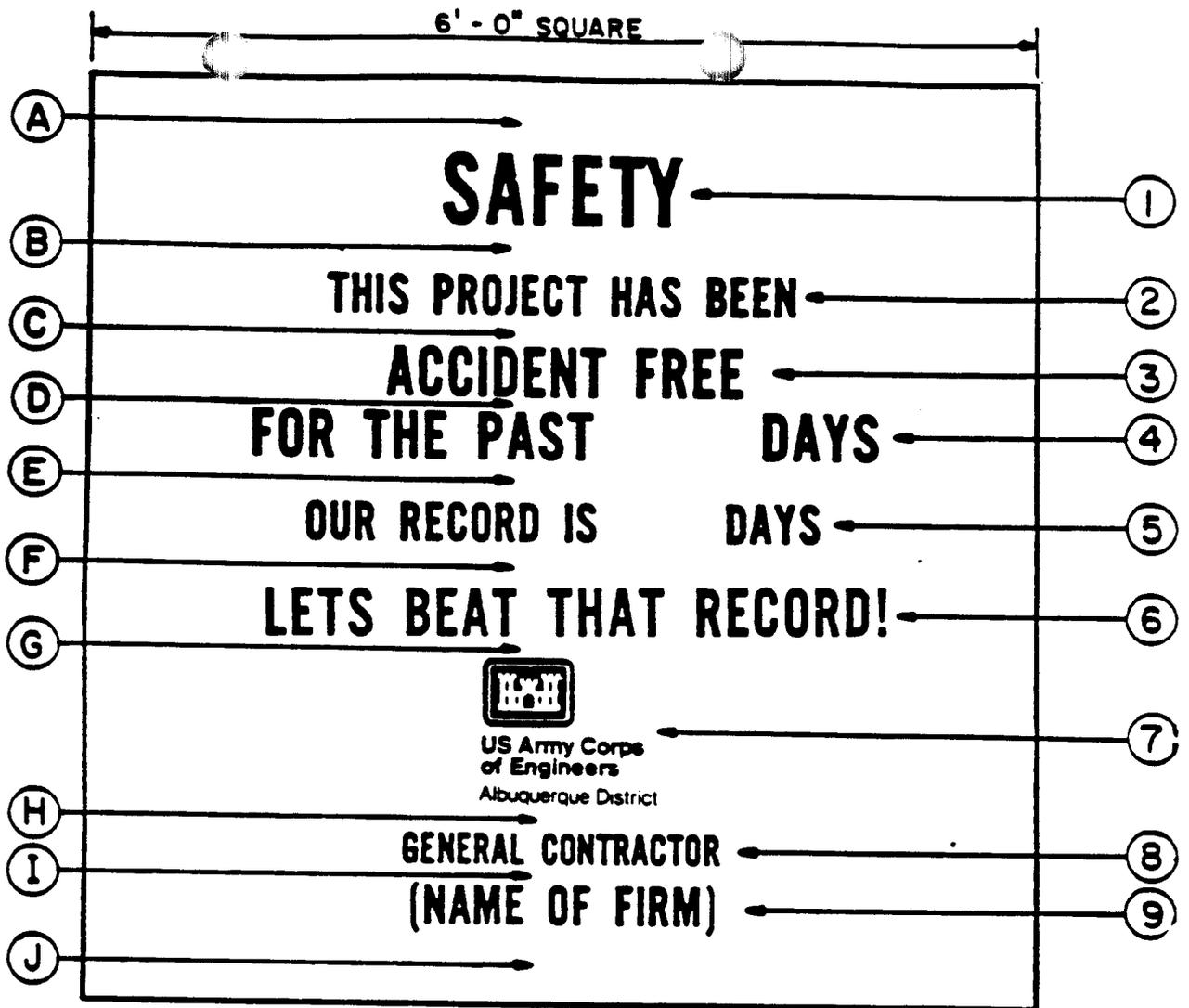


## SAMPLE CONSTRUCTION SIGN FOR MCP PROJECTS SCHEDULE

SPACE	HEIGHT	LINE	DESCRIPTION	LETTER HEIGHT	STROKE
A	2 1/2"	1	LOCATION*	2 3/8"	1/4"
B	2 5/8"	2	PROJECT NOMENCLATURE *	2 3/4"	3/8"
C	5 3/4"	3	U.S. AIR FORCE PROJECT	4"	1/2"
D	8"	4	CONSTRUCTION UNDER SUPERVISION OF	1 1/2"	1/8"
E	4"	5	CONSTRUCTION AGENCY*	2 3/8"	1/4"
F	4"	6	GENERAL CONTRACTOR *	1 3/8"	3/16"
G	1"	7	GENERAL CONTRACTOR *	1 3/8"	3/16"
H	4 3/8"		*WILL VARY TO SUIT PROJECT REQUIREMENTS		



**CONSTRUCTION SIGN ISOMETRIC  
ERECTION DETAILS**

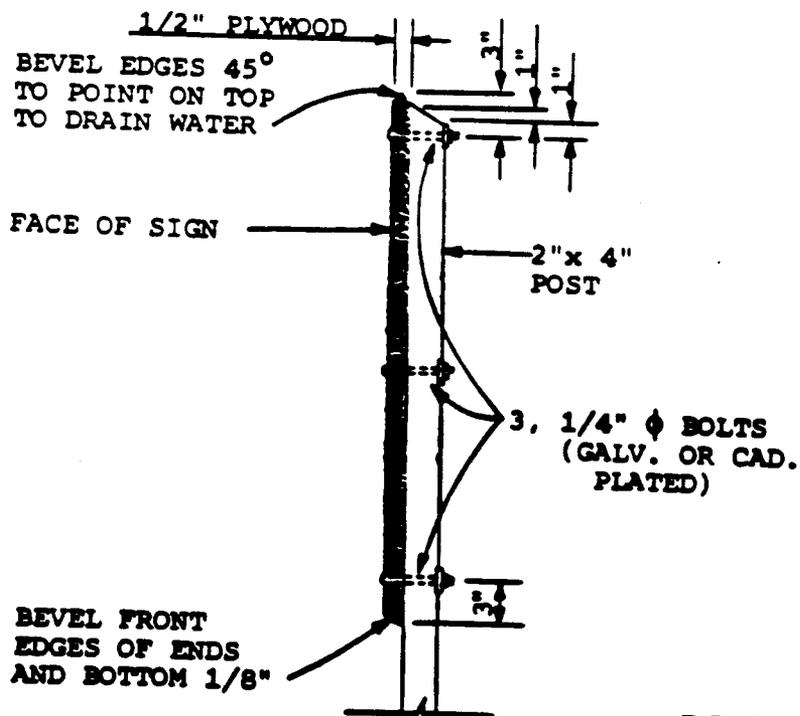
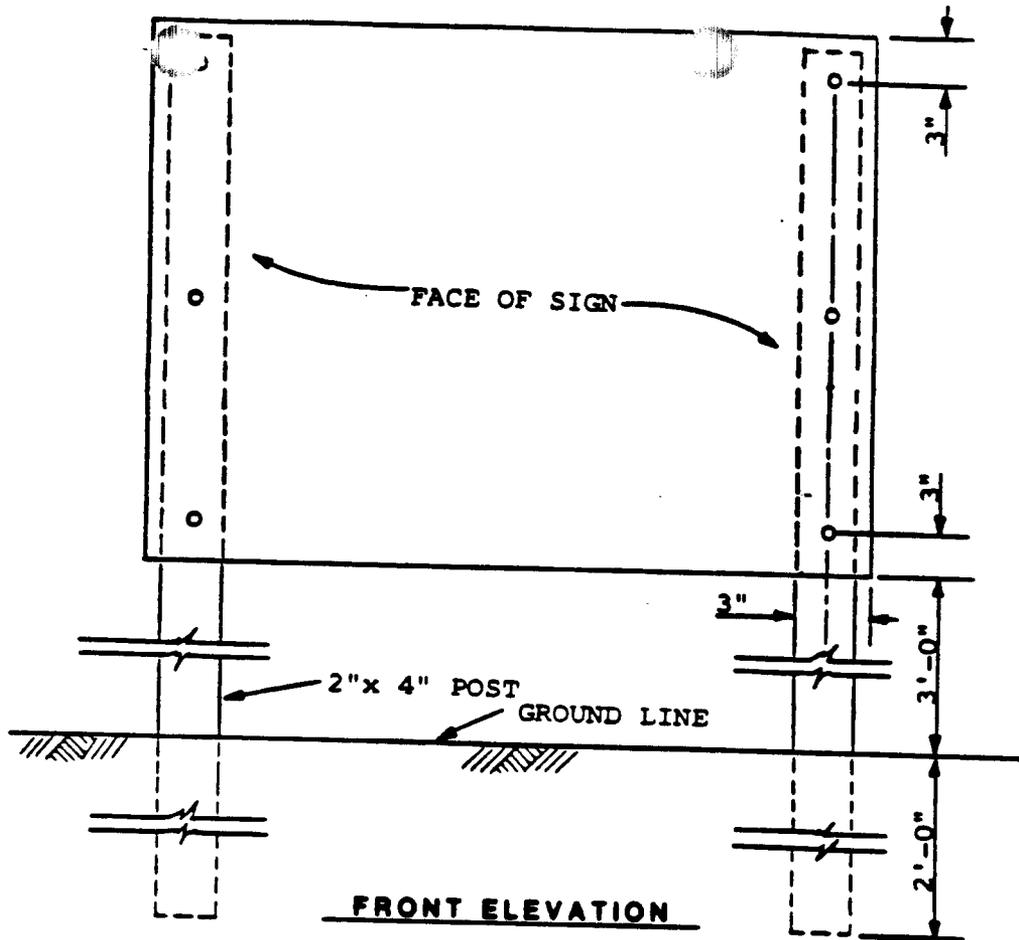


SCHEDULE

<u>SPACE</u>	<u>HEIGHT</u>	<u>LINE</u>	<u>LETTER HEIGHT</u>	<u>STROKE</u>	<u>COLOR</u>
Ⓐ	5 1/2"	①	5"	1 1/4"	RED
Ⓑ	4"	②	2 3/4"	1/2"	BLACK
Ⓒ	1 1/2"	③	3 1/2"	3/4"	RED
Ⓓ	1"	④	3 1/2"	3/4"	RED
Ⓔ	3"	⑤	2 3/4"	1/2"	BLACK
Ⓕ	3"	⑥	3 1/2"	3/4"	BLACK
Ⓖ	4"	⑦ (CASTLE)	(6"X10")		RED
1" SPACE BETWEEN CASTLE & LETTERING		US ARMY CORPS OF ENG FORT WORTH DISTRICT	2"	3/8"	BLACK
Ⓗ	4"	⑧	2"	1/4"	BLACK
Ⓘ	2 1/2"	⑨	2 1/2"	3/8"	BLACK
Ⓙ	3 1/2"				

NOTE: Lettering styles to be similar to those illustrated

**PROJECT SAFETY SIGN LAYOUT**



**SIDE ELEVATION**

**PROJECT SIGN  
DETAILS**

## SECTION 01720

### AS-BUILT DRAWINGS

1. SCOPE: This section covers as-built drawings, complete.

2. AS-BUILT DRAWINGS:

2.1 General: The Contractor shall furnish one full-size set of blue-line prints and one full-size set of reproducible drawings for use in preparation of as-built drawings. The as-built drawings shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In event the Contractor accomplishes additional work which changes the as-built conditions of the facility after submission of the as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submission.

2.2 Preliminary As-Built Drawings: The Contractor shall mark up one set of paper prints and an identical markup on the reproducible to show the as-built conditions. These as-built marked prints shall be kept current and available on the jobsite at all times. Subject to the approval of the Contracting Officer, a member of the Contractor's Quality Control Organization shall be assigned sole responsibility for the maintenance and currency of preliminary as-built drawings. Any reassignment of duties concerning the maintenance of the as-built drawings shall be promptly reported to the Contracting Officer. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. All changes and/or required additions to the paper prints shall be clearly identified in a color contrasting to blue, preferably red. The as-built marked prints will be jointly inspected for accuracy and completeness by the Contracting Officer's representative and the assigned representative of the Contractor's Quality Control Organization prior to submission of each monthly pay estimate. (See paragraph: Withholding for Preliminary As-Builts.) The as-built drawings shall show the following information, but not be limited thereto.

2.2.1 The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location of exterior utilities includes actual measured horizontal distances from utilities to permanent facilities/features. These measurements shall be within an accuracy range of six inches and shall be shown at sufficient points to permit easy location of utilities for future maintenance purposes. Measurements shall be shown for all change of direction points and all surface or underground components such as valves, manholes, drop inlets, clean outs, meter, etc. The general depth range of each underground utility line shall be shown (i.e., 3' to 4' depth). The description of exterior utilities includes the actual quantity,

size, and material of utility lines.

2.2.2 The location and dimensions or any changes within the building or structure.

2.2.3 Correct grade or alinement of roads, structures or utilities if any changes were made from contract plans.

2.2.4 Correct elevations if changes were made in site grading.

2.2.5 Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

2.2.6 The topography and grades of all drainage installed or affected as a part of the project construction.

2.2.7 Options: Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built drawings.

2.2.8 As part of the prefinal inspection, the preliminary as-built drawings will be reviewed. They must comply with this specification prior to scheduling the final inspection, and/or prior to substantial completion of the project.

2.2.9 Submittal to Contracting Officer for Review and Approval: One copy of the preliminary as-built marked prints and one copy of the preliminary as-built reproducibles shall be delivered to the Contracting Officer before the time of final inspection for his review and approval. Final inspection will not be scheduled by the Contracting Officer until preliminary as-built drawings have been approved. The review by Government personnel will be expedited to the maximum extent possible. Upon approval, one copy of the as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the drawings to the Contracting Officer within ten (10) calendar days.

2.2.9.1 Withholding for Preliminary As-Built: Failure by the Contractor to maintain current and satisfactory as-built drawings in accordance with these requirements will result in withholding from progress payments an amount equal to the value of the subject as-built drawings. The Contracting Officer will indicate an unearned balance on monthly payment estimates in accordance with the above, until the Contractor has fulfilled the contract requirements.

2.3 Final As-Built Drawings: The contract drawings were produced using Computer-Aided Drafting (CAD). The CAD software to be used by the Contractor for preparing the as-built drawings shall be AutoCAD, Release 10 by Autodesk Inc. The Contractor will be furnished 5-1/4 inch floppy diskettes containing the AutoCAD drawing files to be revised with the as-built drawings.

2.3.1 The Government will scan the diskettes for virus infections, and examine the drawing files for integrity before delivery to the Contractor. Upon receipt of the drawing files, the Contractor shall verify that the drawing files can be brought up using AutoCAD, and shall certify this to the Contracting Officer. Any drawing files that appear to be corrupt or otherwise unusable shall be identified immediately and returned to the Contracting Officer for replacement.

2.3.2 The Contractor shall revise the CAD drawings to reflect the as-built changes to match the approved marked set of blue-line prints. Some of the drawing changes, amendments prior to bid opening, and changes resulting from contract modification may have been added to the original mylars by hand drafting. The Contractor shall revise the CAD drawing to reflect the amendment/contract changes, in addition to all other as-built changes.

2.3.3 The Contractor shall certify that the media (floppy diskettes) containing the as-built drawing files have been scanned for known computer viruses before delivery to the Government. The name(s) and release date(s) of the virus scanning software used to analyze the delivered floppies shall be furnished to the Contracting Officer at the time of delivery. The release or revision date of the virus scanning software used shall be no older than ninety (90) days in age at the time of delivery of the media. If analysis of the delivered media by the Government finds evidence of virus infection, the media will be returned to the Contractor. The Contractor shall re-submit virus-free media at no cost to the Government.

2.3.4 Plotting: Each changed diskette shall be plotted on mylar and the diskette and the plot shall be returned to the Contracting Officer.

2.3.5 Drafting: Only personnel proficient in the preparation of engineering drawings shall be employed to modify the original contract drawings or prepare additional new drawings. All additions and corrections to the contract drawings shall match the adjacent existing linework and/or lettering being annotated in type, density, size, and style. All modifications and new drawings shall, in addition to the above, conform to applicable requirements of the Architect-Engineer Instruction Manual (AEIM), Chapter I - Drafting, and available from the Area or Resident Engineer's Office. The Contracting Officer will review all as-built drawings for accuracy and conformance to the above specified drafting standards. The Contractor will make all corrections, changes, additions, and deletions to meet these standards.

2.3.5.1 When final revisions have been completed, each drawing shall be lettered with the words "DRAWING OF WORK AS BUILT" in letters at least 3/16" high placed below the title block between the border and the trim line. The date of completion and the words "REVISED AS-BUILT" shall be placed in the revision block above the latest existing revision notation.

2.3.5.2 Title Blocks: The title block to be used for any new as-built drawings shall be similar to that used on the original drawings.

2.4 Submittal Requirements: After receipt of the approved as-built preliminary drawings, the Contractor shall submit to the Contracting Officer the following:

- a. The 5-1/4 inch revised diskette.
- b. One set of reproducible mylars produced from the revised diskette.
- c. The approved marked set of blueline prints.

All of the above shall become the property of the Government upon final approval and shall be complete in all details.

2.5 Final As-Built Drawings, Bid Item.

a. A special bid item entitled "Final As-Built Drawings" has been placed in the Bid Schedule for work on "As-Built Drawings". The amount of this item has been established by the Contracting Officer and entered in the Bid Schedule. This bid item becomes a part of the overall Contractor's bid, but payment of the amount shown in the bid schedule shall be withheld until the "Final As-Built Drawings" have been approved and accepted by the Contracting Officer.

b. The Contractor shall commence work on final as-built drawings upon his receipt of the approved preliminary as-built drawings. The Contractor shall have the number of calendar days specified in the Special Clause, COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK, to complete and return to the Contracting Officer all specified final as-built drawing work. In the event that the Contractor fails to complete as-built drawing work within the specified time, the Contracting Officer shall withhold payment due the Contractor for final as-built drawings under this contract.

\*\*\*\*\*  
 NOTE: Use [Proposal] for 8(a) projects only.  
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2.6 Payment for Final As-Built Drawings: Payment for the performance of the work outlined above will be made after its approval and acceptance by the Contracting Officer. This work is a subsidiary portion of the contract work; therefore an amount as specified in the [Bid] [Proposal] Schedule will be withheld from the Contractor's bid price until acceptable performance of the work.

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SECTION 01740

WARRANTY OF CONSTRUCTION

1. WARRANTY OF CONSTRUCTION (FAR 52.246-21) (APR 1984).

1.2 In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph 1.11 of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

1.3 This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

1.4 The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of-

1.4.1 The Contractor's failure to conform to contract requirements; or

1.4.2 Any defect of equipment, material, workmanship, or design furnished.

1.5 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

1.6 The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

1.7 If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

1.8 With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall-

1.8.1 Obtain all warranties that would be given in normal commercial practice;

1.8.2 Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

1.8.3 Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

1.9 In the event the Contractor's warranty under paragraph (b) of this clause

has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

1.10 Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

1.11 This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

1.12 Defects in design or manufacture of equipment specified by the Government on a "brand name and model" basis, shall not be included in this warranty. In this event, the Contractor shall require any subcontractors, manufacturers, or suppliers thereof to execute their warranties, in writing, directly to the Government.

2. PRE-WARRANTY CONFERENCE. Prior to contract completion and at a time designated by the Contracting Officer or his representative, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements specified herein. The Contracting Officer shall establish communication procedures for oral notification to the Contractor of warranty defects; establish reasonable time for Contractor responses; and other details deemed necessary by the Contracting Officer for the execution of the construction warranty. In connection with these requirements the Contractor will furnish the name, telephone number and address of representatives authorized to perform warranty repairs. If the Contractor is located outside the local service area, the name, telephone number and address of a licensed and bonded company which is authorized to initiate and maintain warranty work action on behalf of the Contractor shall be furnished. This point of contact will be located within the local service area of the warranty work and shall be an established company capable of performing the type of work under the warranty item. At this conference, the Contracting Officer shall furnish names and telephone numbers of the personnel authorized to notify the Contractor or his designated representative of any failure, defect or damage, and to request warranty repair work.

3. WARRANTY REPAIRS. Warranty repair work which threatens the health, safety, or well-being of personnel or the safety of property and/or equipment will be handled by the Contractor on an immediate basis as orally directed by the Contracting Officer or authorized representative, as established in subparagraph, Pre-Warranty Conference, above. Such items requiring immediate attention shall include but not be limited to: air conditioning, heating, and ventilating systems; sewage disposal facilities or components thereto; fire protection systems; water supply system or components thereto; and electrical power systems. Other warranty repair which does not threaten the health, safety, or well-being of personnel and/or safety of property or equipment will be handled by the Contractor within seventy two hours or the time frame established during the pre-warranty conference. Failure of the Contractor to respond as requested will be cause for the Contracting Officer to have the warranty repair work performed by

others and proceed against the Contractor as outlined in subparagraphs, Bid Item and Performance Bond, above. Any work required to correct a warranty item, accomplished by the Government under these paragraphs shall not void the warranty of the item. (SWD letter, dated 18 July 1988).

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## SECTION 02050 - DEMOLITION

### PART 1 - GENERAL

#### 1.1 SUMMARY (Not Applicable)

#### 1.2 REFERENCES (Not Applicable)

#### 1.3 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from Government property daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of conservation salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified.

#### 1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTALS:

SD-18, Records

Work Plan; "FIO".

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

#### 1.5 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

#### 1.6 PROTECTION

##### 1.6.1 Protection of Existing Property

Before beginning any demolition work, the Contractor shall carefully survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to avoid

damage to existing items to remain in place, to be reused, or to remain the property of the Government, and any damaged items shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall ensure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

#### 1.6.2 Environmental Protection

The work shall comply with the requirements of SECTION 1100.

#### 1.7 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

#### 1.8 USE OF EXPLOSIVES

Use of explosives will not be permitted.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

##### 3.1 FILLING

Holes and other hazardous openings shall be filled in accordance with SECTION: 02210 GRADING.

##### 3.2 DISPOSITION OF MATERIAL

Title to all materials and equipment to be demolished, excepting Government salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or damage to such property after notice to proceed.

###### 3.2.1 Salvageable Items and Materials

Contractor shall salvage items and materials to the maximum extent possible.

###### 3.2.1.1 Material Salvaged for the Contractor

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

###### 3.2.1.2 Historical Items

Historical items shall be removed in a manner to prevent damage. The following historical items shall be delivered to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

### 3.2.2 Unsalvageable Materials

Concrete, masonry, and other noncombustible materials, except concrete permitted to remain in place, shall be disposed outside the limits of government controlled land. The fill in the disposal area shall remain below elevation [REDACTED], and after disposal is completed, the disposal area shall be uniformly graded to drain. Combustible materials shall be disposed outside the limits of government controlled land .

### 3.3 CLEAN-UP

Debris and rubbish shall be removed and transported in a manner as to prevent spillage on streets or adjacent areas. Local regulations regarding hauling and disposal apply.

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SECTION 02110 - CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SUMMARY (Not Applicable)

1.2 REFERENCES (Not Applicable)

1.3 DEFINITIONS

1.3.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.3.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

1.4 SUBMITTALS

The following shall be submitted in accordance with SECTION: 01300 - SUBMITTALS:

SD-91, Records

Permission to dispose of cleared and grubbed materials on private property shall be in writing, and a copy of this permit shall be filed with the Contracting Officer.

1.5 MEASUREMENT

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from

damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

### 3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

### 3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph "GRUBBING." Trees shall be disposed of as specified in paragraph "DISPOSAL OF MATERIALS."

### 3.4 DISPOSAL OF MATERIALS

#### 3.4.1 Materials

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility

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## SECTION 02210 - GRADING

### PART 1 - GENERAL

#### 1.1 SUMMARY (Not Applicable)

#### 1.2 REFERENCES

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

##### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(R 1990) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb. (2.49-kg) Rammer and 12-in. (305-mm) Drop.
ASTM D 1556	(1982) Density of Soil In-Place by the Sand-Cone Method.
ASTM D 1557	(1978) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. (4.54-kg) Rammer and 18-in. (457-mm) Drop.
ASTM D 2216	(1980) Laboratory determination of Water (Moisture) Content of Soil by the Microwave Oven Method.
ASTM D 2487	(1985) Classification of Soils for Engineering Purposes.
ASTM D 2922	(1981) Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
ASTM D 3017	(1978) Moisture Content of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
ASTM D 4643	(1987) Determination of Water (moisture) Content of Soil, Rock, & Soil-Aggregate Mixtures.

#### 1.3 DEFINITIONS

##### 1.3.1 Satisfactory Materials

Materials classified in ASTM D 2487 as GW,GM, SC, SM, ML, and CL and free from roots and other organic matter, trash, debris, and frozen materials and stones larger than 6 inches in any dimension are satisfactory.

### 1.3.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Materials classified in ASTM D 2487 as GP, SW, SP, CH Pt, OH, OL, and MH are unsatisfactory. Unsatisfactory materials also include refuse.

### 1.3.3 Cohesionless and Cohesive Materials

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

### 1.3.4 Degree of Compaction

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 and/or ASTM D 1557, Method D and/or as directed by the Contracting Officer abbreviated below as a percent of laboratory maximum density.

### 1.3.5 Topsoil

Material obtained from off-site areas suitable for topsoils, is defined as natural, friable surface soil possessing the characteristics of representative soils in the vicinity that produce heavy growth of crops, grass, or other vegetation.

## 1.4 SUBMITTALS

The following shall be submitted in accordance with SECTION: 01300 - SUBMITTALS:

### SD-39, Qualifications

The Contractor shall furnish the qualifications of the commercial testing laboratory who will be performing all testing in accordance with the PART 3 paragraph FIELD TESTING CONTROL.

### SD-70, Test Reports

The Contractor shall furnish certified test reports and analysis certifying that the satisfactory materials proposed for use at the project site conform to the specified requirements, and for all tests conducted in accordance with the PART 3 paragraph FIELD TESTING CONTROL.

### SD-91, Records

The Contractor shall notify the Contracting Officer of the opening of excavation or borrow areas in accordance with PART 2 paragraph BORROW MATERIAL.

## PART 2 - PRODUCTS

### 2.1 BORROW MATERIAL

Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

#### 2.1.1 Selection

Borrow materials shall be obtained from sources outside the limits of Government-controlled land or sources within the limits of Government-controlled land, subject to approval. Borrow materials shall be subject to approval. The source of borrow material shall be the Contractor's responsibility. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling.

#### 2.1.2 Borrow Pits

Except as otherwise permitted, borrow pits shall be excavated to afford adequate drainage. Overburden and other spoil material shall be disposed of or used for special purposes. Borrow pits shall be neatly trimmed after the excavation is completed.

## PART 3 - EXECUTION

### 3.1 CONSERVATION OF TOPSOIL

Where indicated, topsoil shall be removed to a depth of 6 inches without contamination with subsoil and stockpiled convenient to areas for later application or at locations specified. Topsoil shall be removed to full depth and shall be stored separate from other excavated materials and piled free of roots, stones, and other undesirable materials. Any surplus of topsoil from excavations and grading shall be removed from the site.

### 3.2 EXCAVATION

After topsoil removal has been completed, excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated. Satisfactory excavation material shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory material including any soil which is disturbed by the Contractor's operations or softened due to exposure to the elements and water and surplus material shall be removed from site. In the event that it is necessary to remove unsatisfactory material to a depth greater than specified, the Contracting Officer shall be notified and an adjustment in the contract price will be considered in accordance with the contract. Excavations carried below the depths indicated, without specific directions, shall, except as otherwise specified, be filled to the proper grade with

satisfactory material as directed. All additional work of this nature shall be at the Contractor's expense. Excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. Excavations shall be kept free from water while construction therein is in progress. Material required for fills in excess of that produced by excavation within the grading limits shall be obtained from borrow areas.

### 3.3 BACKFILL ADJACENT TO STRUCTURES

Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Slopes bounding or within areas to be backfilled shall be stepped or serrated to prevent sliding of the fill. During backfilling operations and in the formation of embankments, equipment that will overload the structure in passing over and compacting these fills shall not be used.

### 3.4 PREPARATION OF GROUND SURFACE FOR FILL

All vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsatisfactory material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will unsatisfactory material remain in or under the fill area. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up, as directed, in such manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified moisture content and density.

### 3.5 FILLS AND EMBANKMENTS

Fills and embankments shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Satisfactory material obtained during excavation may be used in forming required fill. Fill shall be satisfactory material and shall be reasonably free from roots, other organic material, and trash and from stones having a maximum diameter greater than 6 inches. No frozen material will be permitted in the fill. Stones having a dimension greater than 4 inches shall not be permitted in the upper 6 inches of fill or embankment. The material shall be placed in successive horizontal layers of 8 inches in loose depth for the full width of the cross section and shall be compacted as specified. Each layer shall be compacted before the overlaying lift is placed. Moisture content of the fill or backfill material shall be adjusted by wetting or aerating, as required, to at least one (1) percent above optimum moisture content as determined from laboratory tests specified in paragraph "DEFINITIONS." Moisture content of the impervious soil layer material shall be adjusted in accordance with SECTION: 02224 - IMPERVIOUS SOIL CAP.

### 3.6 COMPACTION

Each layer of the landfill cap shall be compacted to at least percent of laboratory maximum density with the exception of the impervios soil cap layer which will be compacted in accordnace with SECTION: 02224 - IMPERVIOUS SOIL CAP.

### 3.7 FINISHED EXCAVATION, FILLS, AND EMBANKMENTS

All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from finish roller operations, except as otherwise specified. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials. Surfaces shall be finished not more than 0.15 foot above or below the established grade or approved cross section.

### 3.8 PLACING TOPSOIL

On areas to receive topsoil, the compacted subgrade soil shall be scarified to a 2-inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread evenly to a thickness of 8 inches and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry. Material required for topsoil in excess of that produced by excavation within the grading limits shall be obtained from off-site areas.

### 3.9 FIELD TESTING CONTROL

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Field density and moisture content tests shall be performed once or fraction there of on every lift placed. Field in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2922, method B. When ASTM D 2922, method B is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph "Calibration" of the ASTM publication. ASTM D 2922, method B results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

#### 3.10.1 Moisture-Density and Classification of Soil Tests

Laboratory tests for moisture-density relations and classification of soils shall be performed at the rate of not less than one compaction test and one Atterburg Limits and Gradation test for each type of soil or combination of materials.

### 3.10 PROTECTION

Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements of the contract.

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## SECTION 02215 - PLASTIC FILTER FABRIC

### 1. SCOPE

The work provided for herein consists of furnishing all plant, labor, material, and equipment and performing all operations required for furnishing, hauling, and placing the geotextile, complete, as specified herein and shown on the contract drawings, and maintaining the geotextile until placement of the geocomposite liner is completed and accepted.

### 1.2 REFERENCES

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

#### American Society for Testing and Materials (ASTM).

ASTM-D 123 REV A-90	Standard Terminology Relating to Textiles.
ASTM-D 1683-90	Failure in Sewn Seams of Woven Fabrics.
ASTM-D 3787-89	Bursting Strength of Knitted Goods: Constant-Rate-of-Traverse (CRT), Ball Burst Test.
ASTM-D 4491-89	Test Methods for Water Permeability of Geotextiles by Permittivity.
ASTM-D 4533-85	Trapezoid Tearing Strength of Geotextiles.
ASTM-D 4632-86	Breaking Load and Elongation of Geotextiles (Grab Method).

#### U.S. Army Corps of Engineers.

EM 1110-2-1906	Laboratory Soils Testing.
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### 2. MATERIALS.

#### 2.1 Geotextile (Plastic Filter Fabric)

The geotextile shall be a non-woven pervious sheet of plastic yarn as defined by ASTM D-123. The geotextile shall meet the physical requirements listed in Table No. 1 of the specifications. The geotextile fiber shall consist of a long chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, amide, or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the filaments resistant to deterioration due to ultra-violet and heat exposure. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

## 2.2 Seams

The seams of the geotextile shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn or shall be bonded by cementing or by heat. The sheets of geotextile shall be attached at the factory or another approved location, if necessary, to form sections not less than 6 feet wide. Seams shall be tested in accordance with method ASTM D 1683, using 1-inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90% of the required tensile strength (Table 1) of the unaged geotextile in any principal direction.

## 2.3 Acceptance Requirements

All brands of geotextile and all seams to be used shall be accepted on the following basis. The Contractor shall furnish the Contracting Officer, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification. If requested by the Contracting Officer, the Contractor shall provide to the Government geotextile samples for testing to determine compliance with any or all of the requirements in this specification. When samples are to be provided, they shall be submitted a minimum of 30 days prior to the beginning of installation of the same geotextile. All samples provided shall be from the same production lot as will be supplied for the contract, and shall be the full manufactured width of the geotextile by at least 10 ft. long, except that samples for seam strength may be a full width sample folded over and the edges stitched for a length of at least 5 ft. Samples submitted for testing shall be identified by manufacturers lot designation.

## 2.4 Securing Pins

Securing pins shall be 3/16 inch in diameter, of steel, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of no less than 1.5 inches. The lengths of the pins shall be no less than 18 inches.

Table No. 1 - Physical Requirements

<u>Physical Property</u>	<u>Test Procedure</u>	<u>Acceptable Values++</u>
Tensile Strength +(unaged geotextile)	ASTM D 4632 Grab Test using 1 inch square jaws and a 12 inches per minute constant rate of traverse.	100 pound minimum in any principal direction.
Breaking Elongation (unaged geotextile)	ASTM D 4632 Determine Apparent Breaking Elongation.	15 percent minimum in any principal direction.
Puncture Strength +(unaged geotextile)	ASTM D 3787 except polished steel ball replaced with a 5/16-inch diameter solid steel cylinder with a hemispherical tip centered within the ring clamp.	40 pound minimum.
Geotextile Permeability	ASTM D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity.	The permeability of the geotextile shall be greater than 0.1 cm/sec.
Equivalent Opening Size (EOS)	Specification Paragraph titled "Determination of Equivalent Opening Size (EOS)".	No coarser than the U.S. Standard Sieve No. 70.
Tear Strength	ASTM D 4533 Trapezoidal Tear Strength.	40 lbs. minimum in any principal direction.

+Unaged geotextile is defined as geotextile in the condition received from the manufacturer or distributor.

++All numerical values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the minimum in the table).

## 2.5 SHIPMENT AND STORAGE

During all periods of shipment and storage, the geotextile shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees fahrenheit, mud, dirt, dust and debris. To the extent possible, the fabric shall be maintained wrapped in a heavy duty protective covering.

### 3. INSTALLATION OF THE GEOTEXTILE

The geotextile shall be placed in the manner and at the locations shown on the drawings. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The surface to receive the geotextile shall be prepared to a relatively smooth condition free of obstructions, depressions, debris and soft or low density pockets of material. The geotextile shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. The strips shall be placed to provide a minimum width of 12 inches of overlap for each joint. Temporary pinning of the textile to help hold it in place until the geocomposite liner is installed shall be allowed. The geotextile shall be protected at all times during construction from contamination by surface runoff and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of the geocomposite liner shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 7 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of the geocomposite liner or other materials. Before placement of the geocomposite liner or other materials, the Contractor shall demonstrate that the placement technique will prevent damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

### 4. QUALITY CONTROL.

#### 4.1 General

The Contractor shall establish and maintain quality control for the work covered in this section of the Technical Provisions to assure compliance with contract requirements and maintain quality control records for all construction operations including but not limited to the following:

- (1) Field inspection of materials.
- (2) Placing of fabric and securing pins.
- (3) Protection of fabric.

Two (2) legible copies of these records, as well as the records of corrective action taken, shall be furnished the Government as directed by the Contracting Officer.

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SECTION 02224 - IMPERVIOUS SOIL CAP

PART 1 - GENERAL

1.1 SUMMARY

This section covers the source and placement of compacted soil to construct an impervious soil cap for the landfill.

1.2 REFERENCES

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

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM D 75	(1987) Sampling Aggregates.
ASTM C 136	(1984; Rev. a) Sieve Analysis of Fine and Coarse Aggregates.
ASTM D 422-63	Particle size Analysis of Soils
ASTM D 698-90	Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 5.5 lb (2.49 kg) Rammer and 12-Inch (305 mm) Drop.
ASTM D 1556	(1982) Density of Soil in Place by the Sand-Cone Method.
ASTM D 1557	(1978) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. (4.54-kg) Rammer and 18-in. (457-mm) Drop.
ASTM D 2167	(1984) Density and Unit Weight of Soil In-Place by the Rubber Balloon Method.
ASTM D 2216	(1980) Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
ASTM D 2487	(1985) Classification of Soils for Engineering Purposes.
ASTM D 2922	(1981) Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth).
ASTM D 4253-83	Maximum Index Density of Soils Using a Vibratory Table.

ASTM D 4318-87

Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

ASTM D 4643-87

Determination of Water (Moisture) Content of Soil by the Microwave Oven Method.

ASTM D 5093

(1990) Standard Test Method for Field Measurement of Infiltrating Rate Using a Double-Ring Infiltration with a Sealed Inner Ring.

### 1.3 DEFINITIONS

#### 1.3.1 Satisfactory Materials

Materials shall be classified in accordance with ASTM D 2487 and free from roots and other organic matter, trash, debris and frozen materials.

##### 1.3.1.1 Bedding Material

Satisfactory materials for the bedding materials shall comprise any materials classified as SP, SM, SC and CL.

##### 1.3.1.2 Impervious Soil Cap Materials

Satisfactory materials for the impervious soil cap shall comprise any materials classified as SC and CL with a plasticity index greater than 15 and must have a permeability equal to or less than  $1 \times 10^{-6}$  cm/sec. No more than 10 percent of the material by weight shall be gravel size particles.

##### 1.3.1.3 Biobarrier

Biobarrier material as used herein shall be well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

#### 1.3.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory for the impervious soil cap. MH, OH, ML, CH, OL and Pt are unsatisfactory materials for which to place impervious soil cap.

#### 1.3.3 Degree of Compaction

Degree of compaction is a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D 698, Method D, ASTM D 1557, Method D, and/or as directed by the Contracting Officer Representative abbreviated below as a percent of laboratory maximum density.

### 1.4 SUBMITTALS

The following shall be submitted in accordance with SECTION: 01300 - SUBMITTALS:

## SD-39 Qualifications

The Contractor shall furnish the qualifications of the commercial testing laboratory who will be performing testing in accordance with PART 3 paragraph, SAMPLING AND TESTING.

## SD-70 Test Reports

The Contractor shall furnish certified test reports and analysis certifying that the satisfactory materials proposed for the use at the project site conform to the specified requirements, and for all tests conducted in accordance with PART 3 paragraph, SAMPLING AND TESTING.

## SD-91 Records

The Contractor shall notify the Contracting Officer of the opening of excavation or borrow areas in accordance with Paragraph 2.

## 1.5 PLANT, EQUIPMENT, MACHINES, AND TOOLS

### 1.5.1 General Requirements

Plant, equipment, machines, and tools used in the work shall be subject to approval and shall be maintained in satisfactory working condition at all times. Other compacting equipment may be used in lieu of that specified, where it can be demonstrated that the results are equivalent. The equipment shall be adequate and have the capability of producing the results specified.

### 1.5.2 Steel-Wheeled Rollers

Steel-wheeled rollers shall be the self-propelled type weighing not less than 10 tons, with a minimum weight of 300 pounds per inch width of rear wheel. Wheels of the rollers shall be equipped with adjustable scrapers. The use of vibratory rollers is optional.

### 1.5.3 Pneumatic-Tired Rollers

Pneumatic-tired rollers shall have four or more tires, each loaded to a minimum of 30,000 pounds and inflated to a minimum pressure of 150 psi. The loading shall be equally distributed to all wheels, and the tires shall be uniformly inflated. Towing equipment shall also be pneumatic-tired.

### 1.5.4 Mechanical Spreader

Mechanical spreader shall be self-propelled or attached to a propelling unit capable of moving the spreader and material truck. The device shall be steerable and shall have variable speeds forward and reverse. The spreader and propelling unit shall be carried on tracks, rubber tires, or drum-type steel rollers that will not disturb the underlying material. The spreader shall contain a hopper, an adjustable screed, and outboard bumper rolls and be designed to have a uniform, steady flow of material from the hopper. The spreader shall be capable of laying material without segregation across the

full width of the lane to a uniform thickness and to a uniform loose density so that when compacted, the layer or layers shall conform to thickness and grade requirements indicated. The Contracting Officer may require a demonstration of the spreader prior to approving use in performance of the work.

#### 1.5.5 Sprinkling Equipment

Sprinkling equipment shall consist of tank trucks, pressure distributors, or other approved equipment designed to apply controlled quantities of water uniformly over variable widths of surface.

#### 1.5.6 Tampers

Tampers shall be of an approved mechanical type, operated by either pneumatic pressure or internal combustion, and shall have sufficient weight and striking power to produce the compaction required.

#### 1.5.7 Straightedge

The Contractor shall furnish and maintain at the site, in good condition, one 12-foot straightedge, for use in the testing of the finished surface. Straightedge shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement.

### 1.6 STOCKPILING MATERIALS

Materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at locations designated. Before stockpiling of material, storage sites shall be cleared, and sloped to drain. Materials obtained from different sources shall be stockpiled separately.

## PART 2 - PRODUCTS

### 2.1 BEDDING MATERIAL

Bedding material shall be selected to meet requirements and conditions of fill for the bedding layer. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

### 2.2 IMPERVIOUS SOIL

Impervious soil material shall be selected to meet requirements and conditions of fill for the impervious soil. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

### 2.2.1 Selection of Borrow Material

All materials for the cap shall be obtained from sources outside the limits of government-controlled land. Impervious soil materials shall be subject to approval. The sources for all impervious soil materials shall be the Contractor's responsibility. The Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling.

### 2.3 BIOBARRIER

The Biobarrier shall consist of crushed stone, crushed gravel, angular sand, or other approved materials. Aggregates shall be durable and sound, free from lumps of clay, organic matter, objectionable coatings, and other foreign material. Material retained on a No. 4 sieve shall be known as coarse aggregate and that passing the No. 4 sieve shall be known as binder material.

#### 2.3.1 Coarse Aggregate

Coarse aggregates, consisting of angular fragments of uniform density and quality. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3, and an elongated particle is one having a ratio of length to width greater than 3.

a. Crushed Gravel: Crushed gravel shall be manufactured from gravel particles 50 percent of which by weight are retained on the maximum size gradation sieve specified.

b. Crushed Stone: Crushed stone retained on each sieve specified shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are adjacent, the angle between the planes of the fractures must be at least 30 degrees to count as two fractured faces.

#### 2.3.2 Binder Material

Binder material shall consist of screenings, angular sand, or other finely divided mineral matter processed or naturally combined with the coarse aggregate. Liquid-limit and plasticity-index requirements shall apply to any component that is blended to meet the required gradation and shall also apply to the completed course. The portion of any component or of the completed course passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

#### 2.3.3 Gradation

Requirements for gradation specified shall apply to the completed biobarrier. The aggregates shall have a 6-inch maximum size and shall be continuously graded within the following limits:

<u>Sieve Designation</u>	<u>Percentage by Weight Passing</u>	
	<u>Square-mesh Sieve (a)</u>	<u>(b)</u>
6-inch	100	
3-inch	78-100	
2-inch	65-92	
1-1/2-inch	58-88	
1-inch	45-80	
1/2-inch	30-65	
No. 4	20-50	
No. 10	15-40	
No. 40	5-25	
No. 200.	0-15	

NOTES

(a) Particles having diameters less than 0.02 millimeter shall not be in excess of 3 percent by weight of the total sample tested.

(b) The values are based on aggregates of uniform specific gravity, and the percentages passing the various sieves are subject to appropriate correction in accordance with ASTM C 127 and ASTM C 128 when aggregates of varying specific gravities are used.

PART 3 - EXECUTION

3.1 GENERAL

No construction on the soil cap shall commence until the contractor has successfully constructed the test fill and performed all in-place and laboratory permeability tests for the test pad, in accordance with paragraph, TEST FILL.

3.2 PREPARATION OF GROUND SURFACE FOR FILL

All vegetation, trees and brush, rubbish, and other unsatisfactory material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up, as directed, in such manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified moisture content and density.

3.3 BEDDING MATERIAL

The bedding material fill shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Satisfactory material shall be used in forming required fill. Compacted fill shall be satisfactory material and shall be reasonably free of debris, roots, organic material, frozen materials and trash, and shall not

contain clods, rock or fractured stones larger than three inch. The material shall be placed in successive horizontal layers of 8 inches in loose depth for the full width of the cross section. Each layer shall be compacted before the overlaying lift is placed. Moisture content of the fill or backfill material shall be at a moisture content of optimum or greater. Moisture content adjustments shall be assisted by using a disk that will penetrate the full loose layer thickness and will scarify the upper two inches of the underlying lift. Disking shall continue until the specified moisture is obtained throughout the layer to be compacted.

### 3.3.1 Compaction

Each layer of bedding material shall be compacted. Water content shall be maintained at optimum. Density of compacted mixture shall be at least 90 percent of laboratory maximum density in accordance with ASTM D 1557, Method D. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. Areas inaccessible to the rollers shall be compacted with mechanical tampers, and shall be shaped and finished by hand methods.

### 3.3.2 Layer Thickness

Compacted thickness of the bedding material shall be as indicated. No layer shall be in excess of 8 inches nor less than 3 inches in compacted thickness.

### 3.3.3 Finishing

The surface of the top layer shall be finished to grade and cross section shown. Finished surface shall be of uniform texture. Light blading during compaction may be necessary (or the finished surface to conform to the lines, grades, and cross sections. Should the surface for any reason become rough, corrugated, uneven in texture, or traffic marked prior to completion, such unsatisfactory portion shall be scarified, reworked, recompacted, or replaced as directed.

### 3.3.4 Smoothness

Surface of the layer shall show no deviations in excess of 3/8-inch when tested with the 12-foot straightedge. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting, as directed.

### 3.3.5 Thickness Control

Compacted thickness of the layer shall be within 1/2-inch of the thickness indicated. Where the measured thickness is more than 1/2-inch deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured

thickness is more than 1/2-inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 1/4-inch of the thickness indicated.

### 3.4 IMPERVIOUS CAP

The impervious soil cap fill shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Satisfactory material shall be used in forming required fill. Compacted fill shall be satisfactory material and shall be reasonably free of debris, roots, organic material, frozen materials and trash, and shall not contain clods, rock or fractured stones larger than one inch. The material shall be placed in successive horizontal layers of 8 inches in loose depth for the full width of the cross section. Each layer shall be compacted before the overlaying lift is placed. Moisture content of the fill or backfill material shall be at a moisture content of optimum or greater as determined from the test fill results. Moisture content adjustments shall be assisted by using a disk that will penetrate the full loose layer thickness and will scarify the upper two inches of the underlying lift. Disking shall continue until the specified moisture is obtained throughout the layer to be compacted. Care shall be taken to insure that no shrinkage or drying cracks occur in the impervious layer between lifts and upon its completion. If shrinkage or drying cracks do occur, the impervious soil layer shall be scarified to a depth as necessary to eliminate the cracking and then recompacted at no additional cost to the government.

#### 3.4.1 Compaction

Each layer of the impervious soil cap shall be compacted to the density as determined in paragraph, SAMPLING AND TESTING OF IMPERVIOUS SOIL PRIOR TO CONSTRUCTION. Compaction of the impervious soil shall be achieved by using a pad foot roller that will fully penetrate the loose lift thickness. A sheepsfoot roller is not acceptable. The effectiveness of the roller to achieve the specified density and the ability to break down clods must be proven on the test fill. At the completion of placement of the impervious soil cap, all grade stakes shall be removed and accounted for in a manner acceptable to the contracting officer. Voids left by grade stake removal shall be filled with suitable impervious soil material cap is maintained. The surface of the impervious soil shall be sealed with 2 complete passes of a rubber-tired roller. Moisture shall be applied to the impervious soil surface as required to prevent the formation of shrinkage cracks.

#### 3.4.2 Layer Thickness

Compacted thickness of the bedding material shall be as indicated. No layer shall be in excess of 8 inches nor less than 3 inches in compacted thickness.

### 3.4.3 Finishing

The surface of the impervious soil layer shall be finished to grade and cross section shown. Finished surface shall be of uniform texture, reasonably smooth and free from irregular surface changes. Light blading during compaction may be necessary (or the finished surface to conform to the lines, grades, and cross sections. Should the surface for any reason become rough, corrugated, uneven in texture, or traffic marked prior to completion, such unsatisfactory portion shall be scarified, reworked, recompacted, or replaced as directed.

### 3.4.4 Smoothness

Surface of the layer shall show no deviations in excess of 3/8-inch when tested with the 12-foot straightedge. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting, as directed.

### 3.4.5 Thickness Control

Compacted thickness of the layer shall be within 1/4-inch of the thickness indicated. Where the measured thickness is more than 1/4-inch deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/4-inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 1/4-inch of the thickness indicated.

## 3.5 BIOBARRIER

The biobarrier shall be constructed at the locations and to the lines, grades and cross sections indicated on the drawings, unless otherwise directed by the Contracting Officer. Biobarrier material shall be placed or spread in lifts not more than 8 inches in thickness prior to compaction.

### 3.5.1 Mixing and Placing

Materials shall be mixed by the stationary plant, traveling plant, or road mix method and placed in such a manner as to obtain uniformity of the biobarrier material and at a uniform optimum water content for compaction. The Contractor shall make such adjustments in mixing or placing procedures or in equipment to obtain the true grades, to minimize segregation and degradation, to reduce or accelerate loss or increase of water, and to insure a satisfactory material.

### 3.5.2 Moisture Control

In general, it is the intent of these specifications to secure a fill having the maximum density obtainable with the natural moisture content of the fill materials. However, if in the opinion of the Contracting Officer, the material is too dry for proper compaction, the Contractor will be required to

distribute sufficient moisture in each lift before rolling to permit the desired compaction. Material, when placed, shall contain sufficient moisture so that a sample when taken in the hand and squeezed, shall remain intact when released.

### 3.5.3 Compaction

When moisture content and conditions of the spread layers are satisfactory, each lift shall be compacted by six complete passes are made over the entire surface area of each lift by a 30-ton vibratory smooth drum roller.

### 3.6 SAMPLING AND TESTING

Sampling and testing shall be performed by an government approved commercial testing laboratory or may be tested by the Contractor subject to approval, with the exception that all laboratory permeability testing shall be performed by the US Army Corps of Engineers, Southwestern Division Laboratory. No work requiring testing shall be permitted until the facilities have been inspected and approved. If the Contractor elects to establish testing facilities, no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost incurred for any subsequent inspections required because of failure of the first inspection will be charged to the Contractor. Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Field in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2922, Method B. When ASTM D 2922, Method B is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. ASTM D 2922, Method B results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017, the calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and in intervals as directed by the Contracting Officer. Within 24 hours of conclusion of physical tests, 2 copies of test results, including calibration curves and results of calibration tests, shall be furnished to the Contracting Officer. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements, at no additional expense to the Government. Tests on recompacted areas shall be performed to determine conformance with specification requirements. Inspections and test results shall be certified by a registered professional civil engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

### 3.6.1 Test Results

A coordinate system (x,y,z) shall be established to report sample locations. All tests including failures shall be reported and submitted to the Contracting Officer within 24 hours of the time of sampling. Only passing tests are acceptable. In the event of a failing moisture or density test a minimum of two passing tests of the suspect area of the fill shall be run. Results shall verify that materials comply with this specification. When a material source is changed, the new material will be tested for compliance. When deficiencies are found, the initial analysis shall be repeated and the material already placed shall be retested to determine the extent of unacceptable material. All in-place unacceptable material shall be replaced or modified as directed by the Contracting Officer.

### 3.6.2 Sampling

Aggregate samples for laboratory tests shall be taken in accordance with ASTM D 75.

### 3.6.3 Sieve Analysis

Before starting work, at least one sample of material to be placed shall be tested in accordance with ASTM C 136 and ASTM D 422 on sieves conforming to ASTM E 11. After the initial test, a minimum of one analysis shall be performed for each 1000 tons of material placed, with a minimum of three analyses for each day's run until the layer is completed.

### 3.6.4 Liquid Limit and Plasticity Index

One liquid limit and plasticity index shall be performed for each sieve analysis. Liquid limit and plasticity index shall be in accordance with ASTM D 4318.

### 3.6.5 Density Control

The Contractor shall adequately control his compaction operations by tests made in accordance with ASTM D 1556 or ASTM D 2167 or ASTM D 2922, method B. One in-place density and one in-place moisture test shall be performed per 12,000 square feet, or fraction thereof, of each lift. Moisture content shall be in accordance with ASTM D 2216 or ASTM D 4643 for determining density. When ASTM D 4643 is utilized, the moisture content should be checked using ASTM D 2216. The density test hole shall be backfilled and compacted to the required moisture and density of the adjacent fill. Additional tests shall be made as necessary. All test results shall be made available to the Contracting Officer. Acceptance tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such test for his control of operations. Deficiencies in construction shall be corrected by the contractor at no additional cost to the Government.

### 3.6.6 Density-Moisture Determinations for Bedding Materials

Test for determination of maximum density and optimum moisture content shall be performed by the contractor in accordance with the requirements of ASTM D 698 and/or ASTM D 1557. Density-Moisture Tests shall be run on the same sample on which the in-place density test is run. The percent compaction of the fill sample is then calculated from the results of the field and laboratory density tests. The above testing shall include Atterberg limits and grain size determinations and shall be made on the same material as the in-place density and moisture test.

### 3.7 SAMPLING AND TESTING OF IMPERVIOUS SOIL PRIOR TO CONSTRUCTION

#### 3.7.1 Impervious Soil Permeability-Moisture/Density Determination

The relationship between compacted moisture-density and permeability shall be established for each type of impervious material that will be used by the Contractor prior to its placement. The test shall be conducted by the US Army Corps of Engineers Southwestern Division Laboratory. 90 days prior to any construction, the contractor shall deliver a minimum of 200 lbs for each soil type the contractor plans to utilize in the impervious soil layer. The contractor shall Deliver these soil samples to the US ARMY CORPS OF ENGINEERS, Southwestern Division Laboratory, 4815 Cass Street, Dallas Texas, 75235. Permeability tests shall be conducted on compacted samples in accordance with EM 1110-2-1906, Appendix VII, "Permeability Tests with Back Pressure" method. At least eight specimens shall be compacted and tested for permeability. These specimens should represent the least plastic material (lowest liquid limit) to be used in the borrow. Specimens selected for testing shall be made from materials which exhibit the lowest liquid limit. The moisture content of the selected samples shall be -1, +1, +3, and +5 percent of optimum compacted to both modified (ASTM D 1557) and standard (ASTM D 698) density. (i.e. a total of eight laboratory permeability tests). These results shall be submitted for review 30 days prior to construction of the test fill. The permeability-moisture/density test results shall be used by the contractor officer to select the moisture-density range for test fill compaction to achieve the required in-place permeability, K, of  $1.0 \times 10^{-6}$  cm/sec or less.

### 3.8 TEST FILL

Prior to any construction of the soil cap, the contractor shall construct a representative test fill using the proposed bedding material, impervious soil material, biobarrier material, random fill material, equipment, and procedures to be used in construction of the compacted soil cap as specified in this document.

#### 3.8.1 Procedure

The test fill shall be located in an area approved by the contracting officer which closely approximates the foundation conditions for the actual landfill cover. The test fill shall be constructed at least four times wider than the widest piece of construction equipment to be used on the full scale compacted impervious soil cap, and be long enough to allow this equipment to achieve

normal operating speed before reaching the area within the test fill that will be used for testing. The minimum size for the test fill shall be 50-feet by 50-feet. The test fill shall consist of 6-inches of bedding materials, 24-inches of impervious soil, 12-inches of biobarrier, and 12-inches of random fill compacted to the required moisture contents, densities, and permeabilities as required in the plans and specifications. Following the collection of samples for testing of the compacted cap material, the methodology for repairing holes shall be evaluated and refined. Additional test fills should be constructed for each borrow source and whenever significant changes occur in the cover material, equipment, or procedures used to construct the compacted material.

### 3.8.2 Sampling and Testing

All quality control sampling and testing shall be performed by the contractor as specified in paragraph SAMPLING AND TESTING and as indicated herein. Tests shall be performed on the test fill to determine the in-place permeability of the compacted impervious cap. The in-place permeability shall be determined by in situ field permeability testing and by laboratory testing. A minimum of one in situ field permeability testing shall be conducted using a Sealed Double Ring Infiltrometer (SDRI) ASTM D 5093. Laboratory permeability testing shall be conducted by using six, 6-inch minimum diameter, undisturbed samples. The undisturbed samples shall be delivered to the US ARMY CORPS OF ENGINEERS, Southwestern Division Laboratory, 4815 Cass Street, Dallas Texas, 75235, subjecting them to permeability testing using a flexible walled permeameter in accordance with EM 1110-2-1906, Appendix VII, "Permeability Tests with Back Pressure" method. A minimum of 6 laboratory permeability tests shall be performed on the undisturbed samples. The location of these tests shall also be determined by the Contracting Officer. The permeability-moisture/density test results, described in paragraph 3.7, along with the test results of the test fill shall be used by the contractor officer to select the moisture-density range for field compaction to achieve the required in-place permeability,  $K$ , of  $1.0 \times 10^{-6}$  cm/sec or less.

### 3.9 PROTECTION

Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements or the contract.

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## SECTION 02245

### GEOCOMPOSITE MEMBRANE LINER

#### PART 1 - GENERAL

##### 1.1 SCOPE

This section covers the furnishing and installation of a geocomposite membrane liner. All work shall be performed in strict accordance with the liner manufacturer's recommendations, as shown on the drawings, and as described in the specifications. The term "geocomposite membrane liner" will be abbreviated "GML" in the remainder of this section.

##### 1.2 APPLICABLE PUBLICATIONS

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

###### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 413	(1982) Rubber Property--Adhesion to Flexible Substrate.
ASTM D 638	(1989) Tensile Properties of Plastics.
ASTM D 746	(1979; R 1987) Brittleness Temperature of Elastomers by Impact.
ASTM D 751	(1979) Method of Tested Coated Fabrics.
ASTM D 792	(1986) Specific Gravity (Relative Density) and Density of Plastics by Displacement.
ASTM D 882	(1988) Tensile Properties of Thin Plastic Sheeting.
ASTM D 1004	(1966; R 1988) Initial Tear Resistance of Plastic Film and Sheeting.
ASTM D 1203	(1967) Volatile Loss from Plastics Using Activated Carbon Methods.
ASTM D 1204	(1984) Linear Dimensional changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
ASTM D 1238	(1988) Flow Rates of Thermoplastics by Extrusion Plastometer.

ASTM D 1505	(1985) Density of Plastics by the Density-Gradient Technique.
ASTM D 1593	(1981; R 1988) Nonrigid Vinyl Chloride Plastic Sheeting.
ASTM D 1603	(1976; R 1988) Carbon Black in Olefin Plastics.
ASTM D 1693	(1979; R 1988) Environmental Stress - Cracking of Ethylene Plastics.
ASTM D 1790	(1983) Test Method for Brittleness Temperature of Plastic Film by Impact.
ASTM D 3015	(1972; R 1985) Microscopical Examination of Pigment Dispersion in Plastic Compounds.
ASTM D 3083	(1976; R 1983) Specification for Flexible Poly (Vinyl Chloride) Plastic Sheeting for Pond, Canal, and Reservoir Lining.
ASTM D 3895	(1980; R 1986) Copper - Induced Oxidative Induction Time of Polyolefins by Thermal Analysis.

#### FEDERAL TEST METHOD STANDARDS (FTMS)

101 C 2065.1 Puncture Resistance and Elongation Test.

#### 1.3 SUBMITTALS

Submit copies of laboratory and field test reports presenting data on GML materials and seams.

Submit shop drawings for GML installation, including anchorage details, penetration details, and layout plan.

#### 1.4 STORAGE OF GML

Until installed, factory-fabricated panels shall be stored in their original unopened crates; if outdoors, they shall be stored on pallets and shall be protected from the direct rays of the sun under a light-colored, heat-reflective, opaque cover in a manner that provides a free-flowing air space between the crate and cover. The Contractor shall be responsible for providing all required care and see that the GML is kept in good condition prior to its installation. Any GML materials found to be damaged shall be replaced with new at the Contractor's expense.

## PART 2 - PRODUCTS

### 2.1 GENERAL

The manufacturer shall have produced, and have in service in similar applications for a period of not less than one (1) year, at least five (5) million square feet of GML meeting these specifications. The GML manufacturer shall furnish to the Government, evidence of this prior to the start of work. This evidence shall include names of contacts and phone numbers.

The Contractor shall provide GML products meeting the following specifications for Gundseal materials from Gundlelizing Systems, Inc., 19103 Gundle Road, Houston, Texas 77073; 1-800-435-2008. If the Contractor proposed to provide other type materials, complete laboratory and descriptive information shall be submitted for evaluation by the Contracting Officer.

## PART 3 - EXECUTION

### 3.1 PREPARATION OF SUBGRADE FOR GML

The subgrade for the GML shall be prepared as specified in SECTION 02224 - IMPERVIOUS SOIL CAP. An authorized representative of the GML manufacturer shall certify in writing that the surface on which the GML is to be placed is acceptable, prior to start of GML placement.

### 3.2 PLACEMENT OF GML

#### 3.2.1 General

The Contractor shall require the GML manufacturer to furnish the services of a competent, factory trained, field technical representative to supervise installation of the GML. The GML shall be placed over the prepared surfaces to be lined in such a manner as to assure minimum handling. Any portion of GML damaged during installation shall be removed or repaired by using an additional piece of GML, as specified hereinafter.

All equipment, tools, and machines used in performance of the work shall be subject to approval prior to commencement of work. This equipment shall be maintained in satisfactory working conditions at all times.

#### 3.2.2 Weather Limitations

GML shall be placed only when the temperature is above 45 degrees F.

#### 3.2.3 Field Procedures

Field procedures shall be specifically suitable for the type of GML selected by the Contractor. Procedures for alternative material shall be submitted for evaluation by the Contracting Officer.

### 3.2.4 Quality of Workmanship

All joints, on completion of the work, shall be properly overlaid. Any lining surface showing injury due to scuffing, penetration by foreign objects, or distress from rough subgrade shall, as directed by the Contracting Officer, be replaced or repaired at no additional cost to the Government.

### 3.3 SAMPLING AND TESTING

#### 3.3.1 Sampling and Testing at Factory

Prior to shipment of each fabricated GML panel, random samples shall be cut from the panel at the rate of three samples per 20,000 square feet of membrane. These samples shall be approximately 8-1/2" x 11" in size and cut across the factory seam such that each sample includes the full width of the seam. Each sample shall be tagged to identify: (a) date cut; (b) panel from which cut; (c) location in panel; (d) visually inspected by and date; (e) visual inspection comments. One sample for each 100,000 square feet of job lot material shall be tested by the manufacturer. Certified test results on each sample shall be submitted for each of the physical properties as shown in paragraph [REDACTED]. The remaining sample specimens, along with suitable identification, shall be turned over to the Government for further testing and permanent record of actual furnished material. All holes resulting from sampling shall be patched with similar GML material using the specified seaming methods.

#### 3.3.2 Sampling and Testing at Jobsite

##### 3.3.2.1 Inspection of Sheet Installation

The Contractor shall conduct a visual inspection of each panel or sheet as it is unrolled. The Contracting Officer shall be notified of any damage. All faulty areas shall be repaired as specified in paragraph, PLACEMENT OF GML.

##### 3.3.3 Approval of Materials

Source of all materials shall be selected well in advance of the time that materials will be required in the work. Test results from samples shall be submitted for approval not less than 30 days before the material is required for the work.

##### 3.3.4 Friction Testing

Where geomembrane is to be placed on slopes greater than or equal to 4:Horizontal on 1:Vertical, the Contractor shall perform laboratory friction tests using a direct shear test method as approved by the Contracting Officer to assure a minimum friction angle of 17° can be obtained between all cover system components. Friction testing shall be performed with a direct shear box with minimum dimensions of 12 inches by 12 inches and applied normal stresses of 1.0, 2.0, and 4.0 psi for each cover system interface. A displacement rate of 0.005 inches per minute shall be used. All cover system soil components shall be compacted to the density and moisture content

required for full scale placement and then tested in a saturated condition. All geotextile shall be oriented such that the shear force is parallel to the downslope orientation of the geotextiles in the field. These tests shall be performed and the results approved by the Contracting Officer prior to delivery of the cover system components.

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SECTION 02935 - TURF

PART 1 GENERAL

1.1 SUMMARY (Not Applicable)

1.2 REFERENCES

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

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01 (Sep 1977; Amended Oct 29, 1986) Federal Seed Act Regulations (Part 20): Certified Seed Regulations

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 977 (1986) Emulsified Asphalt

ASTM D 2028 (1976; R 1986) Cutback Asphalt (Rapid-Curing Type)

ASTM D 2607 (1969) Peats, Mosses, Humus, and Related Products

FEDERAL SPECIFICATIONS (FS)

FS O-F-241 (Rev D) Fertilizers, Mixed, Commercial

FS JJJ-S-181 (Rev B) Seeds, Agricultural

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

SD-17, Manufacturer's Catalog Data

Manufacturer's literature discussing physical characteristics, application and installation instructions for erosion control material, and for chemical treatment material shall be submitted.

### SD-43, Construction Equipment List

A list of proposed seeding and mulching equipment to be used in performance of turfing operation, including descriptive data and calibration tests.

### SD-62, Work Plan

- a. Delivery Schedule. Submittal of the delivery schedule shall be at least 10 days prior to the intended date of the first delivery.
- b. Maintenance Report. Written record of maintenance work performed shall be furnished.
- c. Turf Establishment Period. Written calendar time period for the turf establishment period shall be furnished. When there is more than one turf establishment period, describe the boundaries of the turfed area covered for each period.

### SD-76, Certificates of Compliance

Prior to the delivery of materials, certificates of compliance shall be submitted certifying that materials meet the requirements specified. Certified copies of the reports for the following materials shall be submitted.

- a. Seed: For mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested and state certification.
- b. Fertilizer: For chemical analysis, composition percent.
- c. Agricultural Limestone: For calcium carbonate equivalent and sieve analysis.
- d. Peat: For compliance with ASTM D 2607.
- e. Topsoil: For pH, particle size, chemical analysis and mechanical analysis.

517 Gold Ave S.W. 1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

#### 1.4.1 Delivery

##### 1.4.1.1 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.

#### 1.4.2 Inspection

Seeds shall be inspected upon arrival at the job site by the Contracting Officer for conformity to type and quality in accordance with paragraph MATERIALS. Other materials shall be inspected for meeting specified requirements and unacceptable materials shall be removed from the job site.

#### 1.4.3 Storage

Materials shall be stored in areas designated by the Contracting Officer. Seed, lime and fertilizer shall be stored in cool, dry locations away from contaminations.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

##### 2.1.1 Seed

##### 2.1.1.1 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-01 and applicable state seed laws.

##### 2.1.1.2 Seed Mixtures

Seed mixtures shall be proportioned by weight as follows:

Botanical Name	Common Name	Mixture Percent by Weight	Percent Pure Live Seed
<i>Bouteloua gracilis</i> 'Lovington' or 'Hachita'	BLUE GRAMA	17	98
<i>Bouteloua curtipendula</i> 'El Reno'	SIDE-OATS GRAMA	35	98
<i>Buchloe dactyloides</i> 'Texoka'	BUFFALO GRASS	35	98
<i>Agropyron smithii</i>	WESTERN WHEAT GRASS	9	98
<i>Sporobolus airoides</i>	ALKALI SACATON	4	98

##### 2.1.1.3 Quality

Seed shall conform to FS JJJ-S-181. Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected.

#### 2.1.1.4 Seed Mixing

The field mixing of seed shall be performed on site in the presence of the Contracting Officer.

#### 2.1.2 Soil Amendments

Soil amendments shall consist of lime, fertilizer, organic soil amendments and soil conditioners meeting the following requirements.

##### 2.1.2.1 Lime

Lime shall be agricultural limestone and shall have a minimum calcium carbonate equivalent of 90 percent and shall be ground to such a fineness that at least 90 percent will pass a 10-mesh sieve and at least 50 percent will pass a 60-mesh sieve.

##### 2.1.2.2 Fertilizer

Fertilizer shall be commercial grade, free flowing, uniform in composition and conforming to FS O-F-241. Granular Fertilizer: As recommended by the soil test.

##### 2.1.2.3 Organic Soil Amendments

a. Topsoil: The existing surface soil shall be stripped and stockpiled on the site in accordance with Section 02210 GRADING. When required beyond that available from stripping, the topsoil shall be delivered. Delivered topsoil shall conform to topsoil requirements specified in Section 02210 GRADING, and shall be amended as recommended by soil test.

b. Peat: Peat moss derived from a bog, swampland or marsh shall conform to ASTM D 2607.

c. Sand: Clean, free of toxic materials; 95 percent by weight shall pass a 10-mesh sieve and 10 percent by weight shall pass a 16-mesh sieve.

d. Rotted Manure: Well rotted, horse or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials, free of stones, sticks, soil and containing no chemicals or ingredients harmful to plants.

e. Decomposed Wood Derivatives: Ground bark, sawdust, or other wood waste material free of stones, sticks, soil, and toxic substances harmful to plants, stabilized with nitrogen and having the following properties:

Particle Size: Minimum percent by weight passing:

Screen Size	Percent
No. 4 mesh Screen	95
No. 8 mesh screen	80

Nitrogen Content: Minimum percent based on dry weight:

Material	Percent
Redwood Sawdust	0.5
Fir Sawdust	0.7
Fir or Pine Bark	1.0

f. Calcined Clay: Granular particles produced from montmorillonite clay calcined to minimum temperature of 1200 degrees F to the following gradation: minimum 90 percent passing 8-mesh screen, 99 percent retained on 60-mesh screen and maximum 2 percent passing 100-mesh screen. Bulk density: maximum 40 pounds per cubic foot.

#### 2.1.2.4 Soil Conditioner

Soil conditioner shall be for single use or in combination to meet requirements for topsoil. Gypsum shall be commercially packaged, free flowing, minimum 95 percent calcium sulfate by volume.

#### 2.1.3 Mulch

Mulch shall be free from weeds, mold, and other deleterious materials.

##### 2.1.3.1 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.

##### 2.1.3.2 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.

##### 2.1.3.3 Wood Cellulose Fiber

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

##### 2.1.3.4 Wood Chips

Wood chips shall be chips or shredded bark with maximum particle size of 3/16 inch.

##### 2.1.3.5 Paper Fiber Mulch

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

#### 2.1.4 Water

Water shall not contain elements toxic to plant life.

#### 2.1.5 Erosion Control Material

Soil erosion control shall conform to the following:

##### 2.1.5.1 Soil Erosion Control Blanket

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

##### 2.1.5.2 Soil Erosion Control Fabric

Knitted construction of polypropylene yarn with uniform mesh openings  $\frac{3}{4}$  to 1 inch square with strips of biodegradable paper. Filler paper strips shall last 6 to 8 months.

##### 2.1.5.3 Soil Erosion Control Net

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

##### 2.1.5.4 Soil Erosion Control Chemicals

High-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

##### 2.1.5.5 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 must resist mold growth.

##### 2.1.5.6 Anchors

Erosion control anchor material shall be as recommended by the manufacturer.

### PART 3 EXECUTION

#### 3.1 SEEDING TIMES AND CONDITIONS

##### 3.1.1 Seeding Time

Seed shall be sown from March to May for spring planting and from June to August for fall planting.

### 3.1.2 Turfing Conditions

Turf 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 turf operations, proposed times shall be submitted to and approved by the Contracting Officer.

## 3.2 SITE PREPARATION

### 3.2.1 Grading

The Contracting Officer shall verify that finished grades are as indicated on drawings, and the placing of topsoil and the smooth grading has been completed in accordance with Section 02210 GRADING.

### 3.2.2 Application of Soil Amendments

#### 3.2.2.1 Soil Test

A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

#### 3.2.2.2 Lime

Lime shall be applied at the rate recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.

#### 3.2.2.3 Fertilizer

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

#### 3.2.2.4 Soil Conditioner

Soil Conditioner shall be spread uniformly over the soil to a minimum depth of 1/2 inches and thoroughly incorporated by tillage into the soil to a minimum depth of 4 inches.

### 3.2.3 Tillage

#### 3.2.3.1 Minimum Depth

Soil on slopes gentler than 3-horizontal-to-1-vertical shall be tilled to a minimum depth of 4 inches. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum depth of 2 inches 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.

### 3.2.4 Finished Grading

#### 3.2.4.1 Preparation

Turf areas shall be filled as needed or have surplus soil removed to attain the finished grade. Drainage patterns shall be maintained as indicated on drawings. Turf areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of erosion or grade deficiencies shall conform to topsoil requirements specified in Section 02210 GRADING. Finished grade shall be 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas.

#### 3.2.4.2 Field Area Debris

Field areas shall have debris and stones larger than 3 inches in any dimension removed from the surface.

#### 3.2.4.3 Protection

Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

### 3.3 SEEDING

#### 3.3.1 General

Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rain, traffic or other cause, shall be reworked to restore the ground condition previously specified. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

#### 3.3.2 Equipment Calibration

The equipment to be used and the methods of turfing shall be subject to the inspection and approval of the Contracting Officer prior to commencement of turfing operations. Immediately prior to the commencement of turfing operations, the Contractor shall conduct turfing equipment calibration tests in the presence of the Contracting Officer.

#### 3.3.3 Applying Seed

##### 3.3.3.1 Drill Seeding

Seed shall be uniformly drilled to an average depth of 1/2 inch and at the rate of 9 pounds per 1000 square feet using equipment having drills not more than 6-1/2 inches apart. Row markers shall be used with the drill seeder.

##### 3.3.3.2 Rolling

Immediately after seeding, except for slopes 3-horizontal-to-1 vertical and greater, the entire area shall be firmed with a roller not exceeding 90 pounds

for each foot of roller width. Areas seeded with seed drills equipped with rollers shall not be rolled.

#### 3.3.4 Hydroseeding

Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Wood cellulose fiber mulch 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.

#### 3.3.5 Mulch

##### 3.3.5.1 Straw or Hay Mulch

Straw or hay 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 a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched. All seeded areas shall be mulched on the same day as the seeding.

##### 3.3.5.2 Mechanically Anchoring

Immediately following spreading, the mulch shall be anchored to the soil by a V-type-wheel land packer, a scalloped-disk land packer designed to force mulch into the soil surface, or other suitable equipment.

##### 3.3.5.3 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at rate recommended by manufacturer. Apply with hydraulic equipment suitable for mixing and applying uniform mixture of tackifier.

##### 3.3.5.4 Wood Cellulose Fiber

Wood cellulose fiber mulch for use with the hydraulic application of seed and fertilizer shall be applied as part of the hydroseeding operation.

#### 3.3.6 Water

Watering shall be started within 7 days after completing the seeded area. Water shall be applied at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. Run-off and puddling shall be prevented.

### 3.4 EROSION CONTROL

#### 3.4.1 Erosion Control Material

Erosion control material, where indicated or required, shall be installed in accordance with manufacturer's instructions. Placement of the erosion control

material shall be accomplished without damage to installed material or without deviation to finished grade.

### 3.4.2 Temporary Turf Cover

#### 3.4.2.1 General

When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed as directed by the Contracting Officer.

#### 3.4.2.2 Application

When no other turfing materials have been applied, the quantity of one half of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. Seed shall be uniformly broadcast and applied at the rate of 9 pounds per 1000 square feet. The area shall be watered as required.

### 3.5 RESTORATION AND CLEAN UP

#### 3.5.1 Restoration

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

#### 3.5.2 Clean Up

Excess and waste material shall be removed from the planting operation and shall be disposed of off the site. Adjacent paved areas shall be cleaned.

### 3.6 PROTECTION OF TURFED AREAS

Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed by the Contracting Officer.

### 3.7 TURF ESTABLISHMENT PERIOD

#### 3.7.1 Commencement

The Turf Establishment Period for establishing a healthy stand of turf shall begin on the first day of work under this contract and shall end three (3) months after the last day of turfing operations required by this contract. Written calendar time period shall be furnished to the Contracting Officer for the Turf Establishment Period. When there is more than one turf establishment period, describe the boundaries of the turfed area covered for each period.

### 3.7.2 Satisfactory Stand of Turf

#### 3.7.2.1 Seeded Area

a. Field Area: A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 10 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.

### 3.7.3 Maintenance During Establishment Period

#### 3.7.3.1 General

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

#### 3.7.3.2 Watering

Watering shall be at intervals to obtain a moist soil condition to a minimum depth of 1 inch. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Run-off, puddling and wilting shall be prevented.

#### 3.7.3.3 Post-Fertilization

Nitrogen carrier fertilizer shall be applied at the rate of 1 pound per 1000 square feet after the first month and again in 3 months. The application shall be timed prior to the advent of winter dormancy and shall avoid excessively high nitrogen levels.

#### 3.7.3.4 Repair

The Contractor shall re-establish as specified herein, eroded, damaged or barren areas. Mulch shall also be repaired or replaced as required.

#### 3.7.3.5 Maintenance Report

A written record shall be furnished to the Contracting Officer of the maintenance work performed.

### 3.8 FINAL ACCEPTANCE

#### 3.8.1 Preliminary Inspection

Prior to the completion of the Turf Establishment Period, a preliminary inspection shall be held by the Contracting Officer. Time for the inspection shall be established in writing. The acceptability of the turf in accordance with the Turf Establishment Period shall be determined. An unacceptable stand of turf shall be repaired as soon as turfing conditions permit.