



DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH, GEORGIA 31402-0889

REPLY TO
ATTENTION OF:

August 10, 2004

Contracting Division
A-E and Construction Branch

SUBJECT: DACA21-03-D-0014, Multiple Award Task Order Contract Construction and Design/Build for North Carolina (and SAD)

The Clement Group, LLC
913 South Perry Street, Suite 201
Montgomery, Alabama 36104

Gentlemen:

You are requested to submit a price proposal for work detailed in the scope of work, drawings and specifications posted on our website. The Task Order Request Number is TONC07-03-D-0014. The title of the task order is Repair/Replace Bridges at Camp MacKall – Package B, Fort Bragg, North Carolina. The period of performance is 240 calendar days. Liquidated damages are \$517.70 per day.

This is a high priority requirement as defined in Army Federal Acquisition Regulation – AFAR Supplement 5101.602-2. Subject to availability of funds, the accounting classification will be: 21 4 2050 408 8021 P7000 3230 S09133. This project is also included in the financial plan for FY-05 at which time the accounting classification will be 21 5 2050 508 8021 P7000 3230 S09133. This statement is not a commitment of funds. Funds are not presently available for this acquisition. No contract award will be made until appropriated funds are made available from which payment for contract purposes can be made.

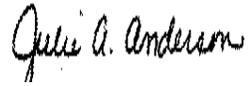
You are reminded that this project is being completed among your firm, GSC Construction, Inc., and TMS Contracting, LLC. Award will be made based on price.

To access the scope of work and specifications, and drawings go to <http://ebs.sas.usce.army.mil>. Scroll down the page to you come to the “blue” label that reads Construction – Simplified Acquisition. Select the project Number pertaining to your Solicitation/Contract TONC07-03-D-0014.

Your proposal should be signed by a duly authorized official of your company and is required no later than 2:00 P.M. local time August 24, 2004 to the above address ATTN: CT-C/Linda Elliott.

If you have any questions, please contact Linda Elliott at (912) 652-5076 or Catherine Applegate at (912) 652-5755.

Sincerely,

A handwritten signature in black ink that reads "Julie A. Anderson". The signature is written in a cursive style with a large initial "J" and a long, sweeping underline.

Julie A. Anderson
Contracting Officer

Enclosures

SCOPE OF WORK
REVISED 13 SEPTEMBER 2004

REPAIR/REPLACE BRIDGES AT CAMP MACKALL, FORT BRAGG, N.C.

1. DESCRIPTION OF WORK: Furnish all labor, equipment, incidentals, supervision and transportation for work necessary to complete the Repair/Replace Bridges at Fort Bragg. All work shall be performed in accordance with the MATOC contract specifications, manufacturer's recommendations, and state building codes.

2. PERFORMANCE PERIOD:

Base Bid: 180 calendar days after Notice to Proceed on Base Bid

Option 1: Additional 20 calendar days to Performance Period

Option 2 and Option 3: Additional 20 calendar days to Performance Period

Option 4 and Option 5: Additional 20 calendar days to Performance Period

Options 2 and 3 will be exercised concurrently with a performance period of 20 days. Options 4 and 5 will be exercised concurrently with a performance period of 20 days. The options will be executed within 180 days after the task order award.

3. CONTRACTOR REQUIREMENTS:

A. Project Involves Handling of Asbestos: No

B. Occupancy During Construction: No

C. Phasing of Work: Yes. Bridges T-8511 (Moss Gill) and T-8512 (RR Bridge) shall not be closed at the same time.

D. Construction Schedule: Bar Chart

E. CQC System Requirements: CQC Manager

4. PRE-BID CONFERENCE: No

5. CONTRACT REQUIREMENTS:

A. After task order award:

FRP0001 - Site Safety and Health Plan

FRP0002 - Quality Control Program

FRP0004 - Price Proposal

FRP0006 - Work Schedule

FRP0007 - Weekly Progress Report

FRP0016 - As-Built/In Progress Drawings

B. After construction completion, prior to final payment:

FRP0010 - Operation and Maintenance Manuals
FRP0012 - Equipment and Construction Warranties
FRP0017 - As-Built/Final Drawings

6. GOVERNMENT FURNISHED ITEMS/WORK: N/A

7. INTERFACE WITH GOVERNMENT PERSONNEL: Access to and from the site shall be coordinated through the SOF Resident Office, POC Vernon Crudop, at telephone number 910/432-8121.

8. WAGE DETERMINATION: NC030009 Heavy and NC0300100 Highway

9. LIQUIDATED DAMAGES: The contractor shall be assessed the amount of \$517.70 liquidated damages per calendar day for failure to complete the prescribed work within the performance period stated in paragraph 2, above.

10. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER: COMPLETED BY CT

11. PAYMENT OFFICE:

North Carolina Air Force & Special
Projects Area Office
P.O. Box 70069
FT. Bragg, North Carolina 28307-0069

North Carolina Air Force & Special
Projects Area Office
Building 8-2804
Ft. Bragg, North Carolina 28307

12. ENCLOSURES:

A. Specifications: Listed in the Index of Specifications

B. Drawings: Provide by index of drawings.

13. PRE BID SITE VISIT: Prior to the submission of any bids, all bidders are required to visit the project site location to become familiar with the project requirements. Failure to visit the project site will not disqualify a bid; however, the bidder is required to comply with the terms and conditions of any resultant contract by reason of such failure. In no event will a failure to inspect the site constitute grounds for a claim after award of the task order.

14. EXCAVATION PERMIT: The contractor shall have a completed and approved PWBC Excavation Permit prior to any excavation, to include sign or fence-post holes. The Contractor shall schedule an appointment to locate utility lines at least 5 days prior to any excavation with the PWBC Facilities Maintenance Division at telephone number 396-0321. A copy of the PWBC Excavation Permit will be provided at the Prewrite Conference. The Contractor shall be responsible for coordination with the Information Technology Business Center (ITBC), Outside Plant Branch, for locating communication lines prior to any excavation.

15. DISPOSAL AND BORROW PERMITS:

- a. Disposal Permits: A permit is required to use the installation land clearing and inert debris and demolition landfills. Landfill permits shall be processed with the Environmental Compliance Branch of the PWBC Environmental & Natural Resources Division. Permits are issued for the life of the specific contract only. Only materials produced on the project for which the permits are issued may be disposed of in the land clearing and inert debris and demolition landfills. The Contractor shall keep a copy of the completed permit with the vehicle throughout the contract disposal operation. Copies of the disposal permit forms will be provided at the Prewrite Conference.
- b. Borrow Permits: A permit is required to use the Fort Bragg borrow material pits. Borrow pit permits shall be processed with the Environmental Compliance Branch of the PWBC Environmental & Natural Resources Division. Permits are issued for the life of the specific contract only. Borrow materials may only be used on the project for which the permits are issued. The Contractor shall keep a copy of the completed permit with the vehicle throughout the contract borrow operation

16. HAUL ROUTES: The Contractor is required to obtain approval from the Resident Office for the routes he intends to use for transportation of borrow materials, construction debris, or demolition materials unless otherwise permitted in writing by the Resident. The axle load of earth-hauling equipment operating on paved streets shall not exceed 12,000 pounds.

17. UTILITY OUTAGES AND ROAD CLOSURES: Utility, road and railroad closures require a minimum 10 working days advance written notice and will be subject to Resident Office approval. In the case of a road closures, a sketch shall be provided showing the closure location and all necessary signs and barricades. Necessary signage, barricades, flag persons, lights (including temporary traffic control lights), and markings for the safe movement of the public during construction shall be in accordance with the Manual on Uniform Traffic Control Devices, and shall be provided at no additional expense to the Government.

18. AVAILABILITY AND USE OF UTILITY SERVICES: Utility services required on the job site for the accomplishment of the work will be furnished at no cost to the Contractor; however, the Government will make no connections or alterations to the existing utility systems for the Contractor. Utilities for offices and/or storage buildings or areas will be billed to the Contractor monthly and will not be furnished free of charge. The Contractor shall be responsible for installing meters or other connections at no cost to the Government. At the conclusion of the contract, the Contractor shall remove all temporary connections, distribution lines, meters and associated paraphernalia unless otherwise directed by the Resident Office. Prior to installing any utility connections at an office/storage site, the plan will be approved by the Resident Office. When utility meters are installed, the Contractor shall notify the Resident Office for the initial meter reading. Failure to obtain this initial reading will result in the Contractor being charged for the entire amount shown on the meter.

- 19. CONTRACTOR STORAGE AND TRAILERS:** The Contractor shall place or paint a sign on all of his storage trailer(s) and building(s) used on this contract. At a minimum, the sign shall contain the name of the Contractor and a telephone number at which the contractor can be reached. The trailer(s) and building(s) shall be completed with gates and/or doors which can be locked. Only material for this project shall be stored in the trailer(s) or building(s). The Contractor shall remove the storage trailer(s) or building(s) within 30 days after completion of the contract and prior to submitting his final invoice. The area around the storage trailer(s) and building(s) shall be kept clean.
- 20. SAFETY:** Safety will be in compliance with the Corps of Engineers Safety Manual EM 185-11-1. Use of appropriate safety equipment is mandatory and not limited to hard hats and steel-toed shoes. Contractor is responsible for daily clean up and complete restoration of the area once the contract is complete.
- 21. HOURS OF WORK:** Work shall be accomplished between the hours of 0730 thru 1630 hours daily, Monday through Friday on non-Government holidays. Legal holidays falling on Saturday are observed on the preceding Friday and those falling on Sunday are observed on the following Monday. Work schedule and facility security to be coordinated with the Resident Office for facility access and security maintenance during duration of work. Contractor shall not work outside of the stated hours of work, without first obtaining approval from the Resident Office.
- 23. WARRANTY:** The contractor shall provide a minimum of one (1) year warranty on all materials and workmanship from the date of the Government's acceptance of the work.

END OF SCOPE

**SUPPLIES OR SERVICES AND PRICES/COST
SCHEDULE
REPLACE/REPAIR BRIDGES AT CAMP MACKALL
FT. BRAGG, NORTH CAROLINA**

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001	BASE BID	1.00	Lump Sum	\$_____	\$_____

Replace Bridge T-8511, Moss Gill (FA20001-4P), as specified in Contract Drawings and Technical Specifications, excluding the installation of Steel H Piles.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002	BASE BID	900	LF	\$_____	\$_____

Install Steel H Piles for Replacement Bridge T-8511.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003	OPTION 1	1.00	Lump Sum	\$_____	\$_____

Repair/Maintain Bridge T-8512, Railroad (FA20003-4P) as specified in the Contract Drawings and Technical Specifications, complete.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004	OPTION 2	1.00	Lump Sum	\$_____	\$_____

Replace Bridge T-8517, Little Muddy (FA20014-4P) as specified in the Contract Drawings and Technical Specifications, excluding excepting the installation of Steel H Piles.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005	OPTION 3	650	LF	\$_____	\$_____

Install Steel H Piles for Replacement Bridge T-8517.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006	OPTION 4	1.00	Lump Sum	\$_____	\$_____

Replace Bridge T-8518, Tucker Road (FA20004-4P) as specified in Contract Drawings and Technical Specifications , excluding excepting the installation of Steel H Piles.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007	OPTION 5	740	LF	\$_____	\$_____

Install Steel H Piles for Replacement Bridge T-8518.

TOTAL BID ITEMS 0001 THROUGH 0007 \$_____.

Tractor	5.49
Trenching	6.58
Well Drillers	6.50
TRUCK DRIVERS	5.15
TV & GROUTING TECHNICIANS	9.21

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

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

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

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

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

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

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

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

END OF GENERAL DECISION

Superseded General Decision No. NC020010

State: North Carolina

Construction Type:
HIGHWAY

County(ies):

ALLEGHANY	GRANVILLE	PASQUOTANK
ANSON	GREENE	PENDER
ASHE	HALIFAX	PERQUIMANS
AVERY	HARNETT	PERSON
BEAUFORT	HAYWOOD	PITT
BERTIE	HENDERSON	POLK
BLADEN	HERTFORD	RICHMOND
BRUNSWICK	HOKE	ROBESON
CALDWELL	HYDE	ROCKINGHAM
CAMDEN	IREDELL	RUTHERFORD
CARTERET	JACKSON	SAMPSON
CASWELL	JOHNSTON	SCOTLAND
CHATHAM	JONES	STANLY
CHEROKEE	LEE	SURRY
CHOWAN	LENOIR	SWAIN
CLAY	MACON	TRANSYLVANIA
CLEVELAND	MADISON	TYRRELL
COLUMBUS	MARTIN	VANCE
CRAVEN	MCDOWELL	WARREN
CURRITUCK	MITCHELL	WASHINGTON
DARE	MONTGOMERY	WATAUGA
DUPLIN	MOORE	WAYNE
EDGECOMBE	NASH	WILKES
GATES	NORTHAMPTON	WILSON
GRAHAM	PAMLICO	YANCEY

HIGHWAY CONSTRUCTION PROJECTS (does not include Tunnels, Building Structures in rest area projects, Railroad Construction, and Bascule/Suspension/Spandrel Arch Bridges, Bridges designed for Commercial Navigation, and Bridges involving marine construction and other major bridges).

Modification Number	Publication Date
0	06/13/2003

COUNTY(ies):

ALLEGHANY	GRANVILLE	PASQUOTANK
ANSON	GREENE	PENDER
ASHE	HALIFAX	PERQUIMANS
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CHATHAM	JONES	STANLY
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SUNC3001A 02/12/1990

	Rates	Fringes
CARPENTER	7.71	
CONCRETE FINISHER	7.64	
IRONWORKER (Reinforcing)	9.27	
LABORER		
Comman	5.42	
Asphalt Raker	6.32	
Form Setter (Road)	6.90	
Mason (Brick, Block, Stone)	7.76	
Pipe Layer	5.90	
Power Tool Operator	6.53	
POWER EQUIPMENT OPERATORS:		
Asphalt Distributor	6.57	
Asphalt Paver	7.00	
Bulldozer	7.21	
Bulldozer (utility)	6.00	
Concrete Finishing Machine	9.48	
Concrete Grinder	8.13	
Crane, Backhoe, Shovel, & Dragline (Over 1 yd.)	8.53	
Crane, Backhoe, Shovel, & Dragline (1 yd. & under)	6.91	
Drill Operator	7.65	
Grade Checker	5.15	
Greaseman	6.43	
Hydroseeder	7.00	
Loader	6.85	
Mechanic	8.27	
Milling Machine	8.00	
Motor Grader (Fine Grade)	8.01	
Motor Grader (Rough Grade)	7.42	
Oiler	5.80	
Piledriver	11.00	
Roller (Finish)	6.32	
Roller (Rough)	5.43	
Scraper	6.41	

Screed Asphalt	6.33
Stone Spreader	5.88
Stripping Machine Operator	6.00
Subgrade Machine	9.00
Sweeper	5.64
Tractor (utility)	6.15

TRUCK DRIVERS:

Single Rear Axle Trucks	5.15
Multi Rear Axle Trucks	5.48
Heavy Duty trucks	5.50
Welder	9.07

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

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END OF GENERAL DECISION

Replace/Repair Bridges at Camp Mackall

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-- End of Project Table of Contents --

SECTION 01005

GENERAL AND SPECIAL PROVISIONS

1. **SCOPE OF WORK:** The work consists of furnishing all labor, equipment, transportation, and materials necessary to perform all work in strict accordance with these specifications, schedules, applicable PWBC Drawings, and other contract documents. The scope of work of this contract includes, but is not limited to, the following specific items of work:

1.1 Civil Work.

1.1.1 Bridge Construction

1.1.2 Paving Construction

1.2 Architectural Work. None.

1.3 Mechanical Work. None.

1.4 Electrical Work. None.

1.5 Landscaping and Grounds Restoration Work.

1.5.1 Minor Grading

1.5.2 Seed and mulch and fertilize

2. **PROJECT REQUIREMENTS:**

2.1 **Certificates of Compliance and Material Submittals.** The Contractor shall submit for approval all certificates of compliance and material submittals required in these technical provisions. Required submittals shall be submitted for approval not later than 30 days prior to the approval date needed to achieve compliance with the approved project schedule. Approval must be received from the Contracting Officer or his representative before incorporating the materials into the work. The Contractor shall provide a Submittal Register listing all required submittals in the contract to the COR at the time of the first submittal. Submittal forms (form 59-2-R) and a sample Submittal Register (Form 4288) will be provided at the Prewrite Conference.

2.2 **Safety and Environmental Plans.** ~~Omitted~~ The Contractor shall submit a proposed safety plan in accordance with the current Corps of Engineers Safety Manual,

EM-385-1-1, and shall submit an environmental protection plan in accordance with specifications section 01355A, Environmental Protection. A sample safety plan form will be provided at the Prewrite Conference.

2.3 Quality Control. The Contractor shall provide the job superintendent's name and telephone number to the Construction Management Division of the PWBC; building 3-1933, Butner Road; (910) 396-2308, prior to commencement of work. The Contractor shall furnish a daily Contractor Quality Control (CQC)/Superintendent's work report to the Contracting Officer's Representative (COR). A sample CQC report form will be provided at the Prewrite Conference.

2.4 Excavation Permit. The Contractor shall have a completed and approved PWBC Excavation Permit in his possession prior to any excavation, to include sign or fence-post holes. The Contractor shall schedule an appointment to locate utility lines ~~at least 24 hours~~ prior to any excavation with the PWBC Facilities Maintenance Division, building 3-1634, Butner Road. ***Utilities are usually located within 5-10 workdays from the date of request but, due to weather conditions, construction workloads, etc., longer periods of time for these utility locates may be experienced.*** This will be accomplished by submitting a Facilities Maintenance Division Service Order. Service Orders are obtained by calling (910) 396-0321, or making the request on-line at <http://www/bragg/army/mil/pwbc/>. Service Order status can also be checked on-line at the same web address. A copy of the PWBC Excavation Permit form will be provided at the Prewrite Conference. The Contractor shall be responsible for coordination with the Information Technology Business Center (ITBC), Outside Plant Branch; building 1-1434, Scott Street; (910) 396-8200, for locating government-owned communication lines prior to any excavation. The Contractor shall also be responsible for coordination with any known or suspected non-governmental utilities such as Sprint telecommunications or cable television.

2.5 Disposal and Borrow Permits.

2.5.1 Disposal Permits. A permit is required to use the installation land clearing and inert debris and demolition landfills. Landfill permits shall be processed with the Environmental Compliance Branch of the PWBC Environmental & Natural Resources Division; building 3-1333, Butner Road; (910) 432-6336/-6352. Permits are issued for 60 days duration and for the specific contract only. Only materials produced on the project for which the permits are issued may be disposed of in the land clearing and inert debris and demolition landfills. ***The Contractor shall sort the debris for like materials, such as construction and debris materials, inert debris, etc. All metal products should be brought to the landfill separately and placed in the applicable container.*** The Contractor shall keep a copy of the completed permit with the vehicle throughout the contract disposal operation. Copies of the disposal permit forms will be provided at the Prewrite Conference. The land clearing and inert debris and demolition debris disposal site locations are shown on the drawings. Landfills and transfer site are open for customer service from 0730 to 1500 Monday through Friday except Federal holidays. When directed by the Contracting Officer the landfills may be available on an as-required basis for 2 to 6 hours approximately 12 weekends per year (Saturday, Sunday & Holiday).

2.5.2 Borrow Permits. A permit is required to use the Fort Bragg borrow material pits. Borrow pit permits shall be processed with the PWBC Facilities Maintenance Division, **Roads and Equipment Branch; Building O-3454, Lamont Road, 396-6873**. Permits are issued for the life of the specific contract only. Borrow materials may only be used on the project for which the permits are issued. The Contractor shall keep a copy of the completed permit with the vehicle throughout the contract borrow operation. Copies of the borrow permit forms will be provided at the Prewrite Conference. The borrow pit location is shown on the drawings.

2.6 Haul Routes. The Contractor is required to use the haul routes shown on the contract drawings for transportation of borrow materials, construction debris, or demolition materials unless otherwise permitted in writing by the COR. When haul routes are not designated in the contract, the Contractor must obtain approval from the COR for the routes he intends to use. The axle load of earth-hauling equipment operating on paved streets shall not exceed 12,000 pounds.

2.7 Utility Outages and Road Closures. Utility, road, and railroad closures require minimum 10 working days advance written notice and will be subject to COR approval. A sample utility outage/road closure request form will be provided at the Prewrite Conference. Utility outages will be held on normal work days, after hours or on weekend/holidays as coordinated with the Contracting Officer, Ft. Bragg PWBC and the utility provider. The decision on when to have an outage (normal work hours, weekend, etc) will be based on the length of the outage and the normal business hours/hours of maximum usage for the facilities affected by the outage. Outages will be limited to a duration of 4 hours unless extenuating circumstances dictate otherwise. In the case of road closures, a sketch shall be provided showing the closure location and all necessary signs and barricades. Necessary signage, barricades, flagpersons, lights (including temporary traffic control lights), and markings for the safe movement of the public during construction shall be in accordance with the Manual on Uniform Traffic Control Devices, and shall be provided at no additional expense to the Government.

2.8 Availability and Use of Utility Services.

2.8.1 Payment for Utility Services

The Government will make all reasonably required 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 and paid for by the Contractor at the prevailing rates. The rates listed below are current as of January 1, 2003 and are subject to change. The Contractor shall carefully conserve all utilities furnished.

2.8.2 Meters and Temporary Connections

The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines, and meters required to

measure the amount of each utility used for the purpose of determining charges. The Contractor shall notify the Contracting Officer's Representative, in writing, no less than 10 working days before the temporary connection is made. The Contracting Officers Representative will then provide the contractor with the name and phone number of the utility provider. The contractor will be responsible for contacting the utility provider and making arrangements for connections and billing. For temporary electrical connections the Government or applicable utility provider will provide the meter (meter base provided by contractor) and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor shall not make the final electrical connection. For temporary water and sewer connections the contractor will provide the meter and after inspection/approval by the Contracting Officer's Representative make the final connection at the contractor's expense.

2.8.3 Use of Permanent Building Utility Connections

Utilities consumed by the contractor from permanent building utility connections shall also be metered and paid for by the contractor. When the permanent system is activated the initial meter reading shall be recorded and reported as specified below. On building renovation projects the initial meter reading shall be recorded when the contractor is given possession of the building to perform the work. The contractor shall pay for utilities consumed through the permanent building connection until the work has been completed or the government has occupied the facility, which ever occurs first.

2.8.4 Initial Meter Readings

Upon installation of the meter, the initial reading shall be recorded (in the presence of the Contracting Officer's Representative) and forwarded to the point of contact for utility service with a copy to the Contracting Officer's Representative.

2.8.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, the Contractor shall notify the Contracting Officer and the applicable utility provider, in writing, 10 working days before termination is desired. The Government or applicable utility provider will take a final meter reading. Electric service will be disconnected by the provider. Water and sewer connections will be disconnected by the contractor, at his expenses and by a method approved by the Contracting Officer's Representative. The Contractor shall then remove all the temporary distribution lines, meters, meter bases, and associated paraphernalia. The Contractor shall pay all outstanding utility bills before final acceptance of the work by the Government.

2.8.6 Requirement for backflow prevention on temporary/permanent potable water connections

The contractor shall install a backflow prevention device on all connections to the potable water system. The backflow prevention device shall be a reduced pressure or double check type, meeting all the State code requirements for backflow preventers on potable water. If the contractor request the use of a fire hydrant and receives approval from the Contracting Officer's Representative a backflow prevention device and meter shall be installed prior to each use.

2.8.7 Utilities Charge Rates

Water ----- \$1.9585 per 1,000 gallons

Electricity ----- \$0.0752 per KW hour

Sewer ----- \$10.00/month for each connected trailer up to single wide size.

The rate for larger trailers will be determined by the utility provider, however, this rate will not exceed \$20.00/month per trailer.

2.9 As-Built Record Drawings. The Contractor shall be responsible for maintaining one set of master prints at the job-site on which he shall keep a careful and neat record of all deviations from the original contract drawings as the work progresses. The Contractor shall note all changes and corrections on these record drawings promptly as the changes occur, but in no case less often than a weekly basis. In addition to incorporated modifications, these record drawings shall also include the actual location of all subsurface utility lines installed or encountered, and the type of materials used. Contractor will receive a copy of the contract documents in an electronic format (CD) at the time of award, the Contractor shall be responsible for transferring any as-built changes and plan sheet annotations described above onto the electronic format documents. The marked-up/annotated prints, or the annotated electronic drawings if applicable, shall be certified as to their correctness by an authorized representative of the Contractor and turned-over to the COR not later than 10 days after acceptance of the work by the Government.

2.10 Color Boards. Omitted.

3. SPECIAL PROVISIONS:

3.1 Occupancy. The bridges can be closed during the accomplishment of work, however, Bridges T-8511 and T-8512 shall not be closed at the same time. The Contractor shall provide not less than 30 days prior notice to the COR to allow evacuation of the affected area(s). Interference with and inconvenience to the occupants or routine use of the facility shall be held to an absolute minimum. The Contractor is responsible for providing such covering, shields, and barricades as are required to protect the facility, equipment, supplies, etc., from dust, debris, weather intrusion, or other cause of damage resulting from construction.

3.2 Contractor Vehicle/Equipment Access to Fort Bragg. Fort Bragg is a closed installation and vehicular access is controlled. Contractors are required to register each vehicle that will be traveling installation roads or streets under its own power. Each such vehicle shall have a registration decal. Registration may be accomplished at the Main Vehicle Registration Center, building 8-1078 on Randolph Street near Bragg Boulevard, 0800-1700 hours Monday through Friday. Unregistered vehicles should expect to be stopped and delayed at all access control points. Contractors and all commercially registered vehicles shall use the Knox Street access control point off Bragg Boulevard for all access to Fort Bragg. Camp MacKall is an open area where vehicular access is not controlled.

3.3 Special Work Constraints.

3.3.1 Phasing. (order of work by area, etc.)

3.3.1.1 Bridge T-8511 (Moss Gill) and Bridge T-8512 (Railroad) shall not be closed at the same the same time.

3.3.1.2 Contracting Officer may alter phasing priorities based on Government needs.

3.3.2 Time Constraints. (limitation on time-of-day, specific dates, etc.)

3.3.2.1 Work shall be accomplished between ~~8:00~~7:30 am and ~~5:00~~4:30 pm Monday through Friday, ~~however, w~~Weekend and other times are authorized and anticipated~~must be coordinated with the Contracting Officer's representative.~~

3.3.2.2 ~~Work on Holidays and at night is authorized and anticipated~~Deleted.

3.3.3 Special Access Requirements.

3.3.3.1 None

3.3.4 Utility Relocations prior to construction

3.3.4.1 Electrical lines will be relocated by others. Specifically, electrical lines in the vicinity of T-8511 (Moss Gill) and T-8517 (Little Muddy) will be relocated by Sandhills Utility Service per attached sketches (for information only). Please contact Mr. Daryl McLellan at (910) 497-7399 to coordinate this action prior to construction.

3.3.4.2 Communication lines will be relocated by others. Specifically, communication lines in the vicinity of T-8511 (Moss Gill) and T-8517 (Little Muddy) will be relocated by Fort Bragg ITBC. Please contact Mr. Frank Galvin at (910) 396-4475 to coordinate this action prior to construction.

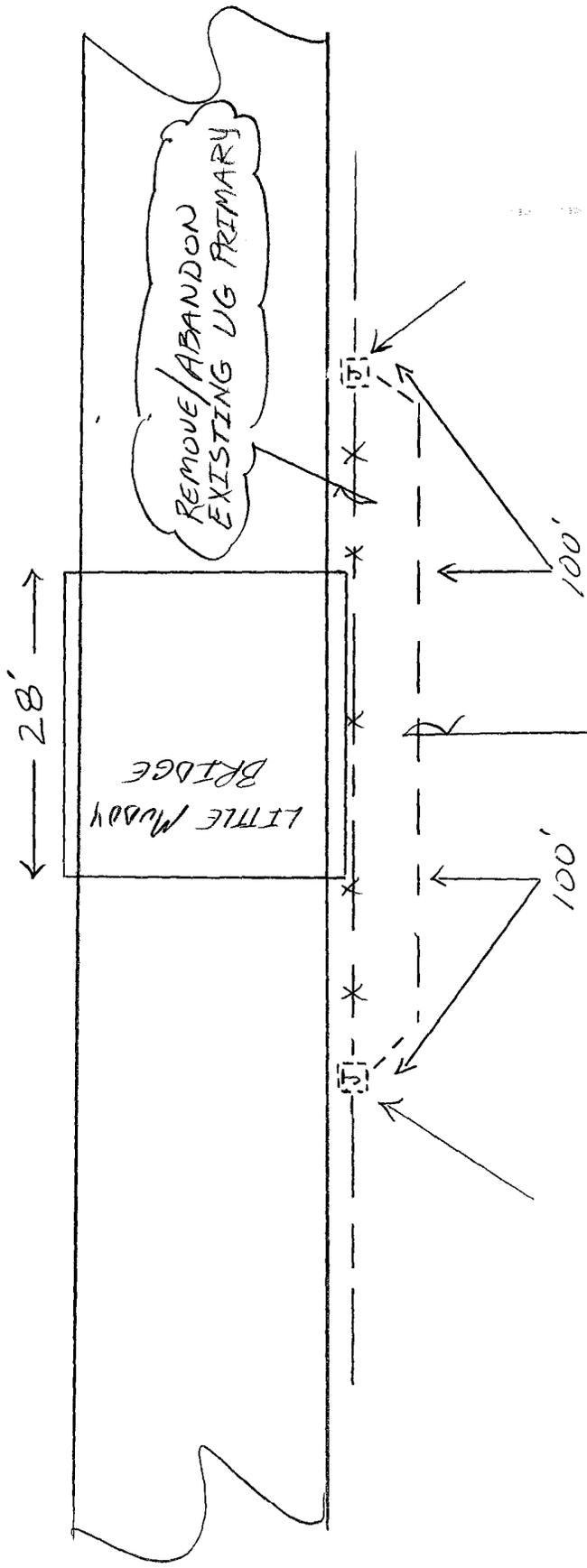
3.3.4.3 An 8" water main runs parallel to Bridge T-8512 (RR). This water main should not be affected by the construction, however, care should be taken to protect the water main from any damage.

3.3.5 Construction Limits

3.3.5.1 The Contractor shall field stake the construction limits in accordance with Sheet C-03A Construction Limits. All activities including construction staging areas, demolition stockpile areas, unsuitable material stockpile areas and clearing/grubbing must be contained within these boundaries. Any activity, temporary or permanent, that occurs outside of these limits would

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Revised 8/20/04

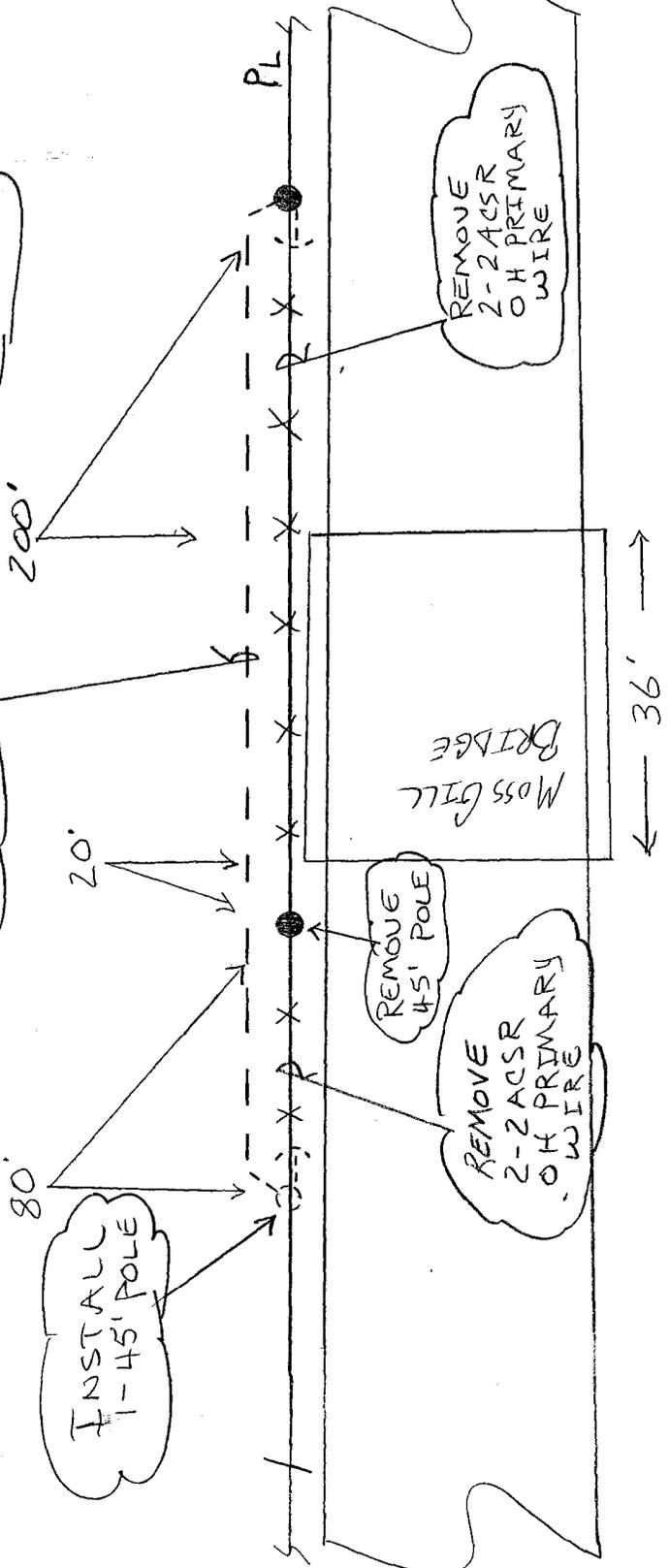
violate the Installation's NEPA provisions, which preclude such activities without a Section 404 permit.



INSTALL 1-1/2 UG 15KV
PRIMARY IN 2" CONDUIT.
DIRECTIONAL BORE @ BRIDGE

W/0#SFB04-101-0260

INSTALL 1-1/8 UG 15KV
PRIMARY IN 2" CONDUIT,
DIRECTIONAL BORE @ BRIDGE



w/o# SFB04-101-0259

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SECTION 01330

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SECTION 01330

SUBMITTAL PROCEDURES
09/01

PART 1 GENERAL

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SD-03 Product Data

SD-04 Samples

SD-06 Test Reports

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SD-10 Operation and Maintenance Data

SD-11 Closeout Submittals

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an

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explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

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

PART 2 PRODUCTS (Not applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is a submittal is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register files, containing the computerized ENG Form 4288 and instructions on the use of the files. These submittal register files will be furnished on a separate diskette. Columns "d" through "r" have been completed by the Government; the Contractor shall complete columns "a" and "s" through "u" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The Contractor shall keep this diskette up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling

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document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 21 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

3.5.1 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Two copies of the submittal will be retained by the Contracting Officer and three copies of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans

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and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR (Firm Name)
 _____ Approved
 _____ Approved with corrections as noted on submittal data and/or attached sheets(s).
 SIGNATURE: _____
 TITLE: _____
 DATE: _____

-- End of Section --

SUBMITTAL REGISTER

(ER 415 1-10)

TITLE AND LOCATION		CONTRACTOR										SPECIFICATION SECTION														
												CONTRACTOR ACTION		GOVERNMENT ACTION												
ACTIVITY	TRANS-MITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	CONTRACTOR SCHEDULE DATES										REVISIONS	REMARKS										
					APPROVAL NEEDED BY	MATERIAL NEEDED BY	DATE	SUBMIT TO GOVERNMENT	DATE	GOVERNMENT ACTION	DATE	SUBMIT TO GOVERNMENT	DATE	GOVERNMENT ACTION												
					TYPE OF SUBMITTAL	CLASSIFICATION																				
					INSTRUMENTS	TESTING	DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE	REPAIR	RECONSTRUCTION	REMOVAL	DEMOLITION	ENVIRONMENTAL	ARCHITECTURAL	MECHANICAL	ELECTRICAL	PLUMBING	PAINTING	LANDSCAPING	OTHER	DATE	REVISIONS	REMARKS	
			1.3	Pile Splices																						
			3.2.3	Pile Placement																						
			1.3	Templates																						
			1.3	Materials																						
			3.1	Pile Driving Equipment																						
			3.2.2	Pile Driving Records																						
			3.3.3	Wave Equation Analysis																						
			1.3	Pile Driving																						
			1.3	Pile Driving Analyzer																						
			3.3.3	Dynamic Testing of Piles																						

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UFGS-01355A (February 2002)

Superseding

UFGS-01355 (October 2000)

SECTION 01355A

ENVIRONMENTAL PROTECTION

02/02

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY (DA)

AR 200-5 Pest Management

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

33 CFR 328 Definitions

40 CFR 68 Chemical Accident Prevention Provisions

40 CFR 152 - 186 Pesticide Programs

40 CFR 260 Hazardous Waste Management System: General

40 CFR 261 Identification and Listing of Hazardous Waste

40 CFR 262 Standards Applicable to Generators of Hazardous Waste

40 CFR 279 Standards for the Management of Used Oil

40 CFR 302 Designation, Reportable Quantities, and Notification

40 CFR 355 Emergency Planning and Notification

49 CFR 171 - 178 Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

WETLAND MANUAL Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

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1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.4 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual that resides at a Civil Works Project office and that is responsible for oversight of pesticide application on Project grounds.

1.2.5 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.6 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

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1.2.7 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.8 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.9 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.10 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

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1.6 SUBMITTALS

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

SD-01 Preconstruction Submittals

Environmental Protection Plan; G,R/E.

Within 10 calendar days after the date of Notice of Award, the Contractor shall submit in writing an Environmental Protection Plan which must be approved by the Contracting Officer with input from the DPWE Environmental/Natural Resources Division prior to construction.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.1.1 Permits Obtained by the Contracting Officer

The Contractor shall comply with the following requirements prescribed by the NEPA REC completed by the installation.

No dredge or fill material will be placed (temporarily or permanently) in any waters or wetlands.

All concrete shall be placed in tightly sealed forms (no live concrete will be placed in any waters or wetlands).

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All equipment and construction debris is to be kept out of any waters or wetlands.

The Contractor shall not remove any trees greater than or equal to 4" dbh, pine or otherwise.

1.7.1.2 Subcontractors

Assurance that subcontractors comply with the environmental protection requirements of this section will be the responsibility of the prime Contractor.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.
- f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.
- g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.
- h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.
- i. Drawing showing the location of borrow areas.
- j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or

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regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and Facility Environmental Office in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.
 2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.
 3. Training requirements for Contractor's personnel and methods of accomplishing the training.
 4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
 5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
 6. The methods and procedures to be used for expeditious contaminant cleanup.
- k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic yards or tons along with the percent that was diverted.
- l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.
- m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

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n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

q. A pesticide treatment plan shall be included and updated, as information becomes available. The plan shall include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation Project Office specific requirements. The Contractor shall follow AR 200-5 Pest Management, Chapter 2, Section III "Pest Management Records and Reports" for data required to be reported to the Installation .

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached, as an appendix, to the Environmental Protection

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Plan.

1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.9 OMITTED

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

The Contractor shall be responsible for obtaining and complying with all

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environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as indicated on the drawings. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices shall also be in accordance with the National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan (SWPPP) which may be reviewed at the Fort Bragg Environmental Management Office. Any temporary measures shall be removed after the area has been stabilized.

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3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.2.5 Protection of Wildlife and Wildlife Habitat

3.2.5.1 Endangered Species Act

The Federal Endangered Species Act of 1973, as amended in 1982, requires that Federal lands be assessed for impacts upon endangered species and that such species be managed and protected. Although there are a number of rare, threatened, or endangered plant and animal species on Fort Bragg which are listed by either the Federal or State Government, the species most often of concern are an endangered bird, the red-cockaded woodpecker (RCW) (*Picoides borealis*) and two endangered plants, the rough-leaf loosestrife (RLLS) (*Lysimachia asperulaefolia*) and Michaux's sumac (MS) (*Rhus michauxii*). Species proposed for listing under the provisions of the Federal Endangered Species Act are entitled to the same protection as those actually listed.

3.2.5.2 Red-Cockaded Woodpecker

The RCW is dependent upon large numbers of mature pine trees for its survival. The birds are not tolerant of disturbance. Their habitat is managed by the DPWE Environmental/Natural Resources Division, Endangered Species Branch. The habitat of the RCW is marked in the following manner: (1) cavity trees which are used by the birds for roosting and nesting are marked with two broad bands of red paint and (2) each colony site is protected by a buffer area at least 200 feet in diameter around the cavity trees. Trees on the edge of the buffer area are marked with a single broad band of red paint. Fixed activity such as storage of construction materials, operation of concrete batch plants, or parking vehicles is not authorized inside the buffer area. Molesting the birds or damaging their habitat is a violation of the Endangered Species Act. Conviction can subject the violator to severe civil and criminal penalties.

3.2.5.3 Endangered Plants

Endangered plants are dependent for their survival upon specific environmental conditions such as soil type, slope aspect, moisture, and light. They are not tolerant of disturbance. Their habitat is managed by the DPWE Environmental/Natural Resources Division, Endangered Species Branch. Each colony site is protected by a buffer area at least 200 feet in diameter. Trees on the edge of the buffer area are marked with a single broad band of white paint. Fixed activity such as storage of construction materials, operation of concrete batch plants, or parking vehicles is prohibited inside the buffer area. Damaging the habitat of endangered plants is a violation of the Endangered Species Act. Conviction can subject the violator to severe civil and criminal penalties.

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3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.3.1 Cofferdams, Diversions, and Dewatering Operations

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. The Contractor shall comply with the State of North Carolina water quality standards and anti-degradation provisions and the Clean Water Act Section 404.

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of North Carolina rules.

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3.4.4 Burning

Burning will not be allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning shall be subject to approval.

3.5 OMITTED

3.6 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.6.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate.] Waste materials shall be hauled to the Government landfill site. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.6.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.6.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262 and shall manage and store hazardous waste in accordance with the Installation hazardous waste management plan. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within 60 days

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in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer and the Facility Environmental Office. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility. The Contractor shall coordinate the disposition of hazardous waste with the Facility's Hazardous Waste Manager and the Contracting Officer.

3.6.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the project site shall be accordance with all Federal, State, and local laws and regulations.

3.6.5 Waste Water

Disposal of waste water shall be as specified below.

- a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.
- b. For discharge of ground water, the Contractor shall surface discharge in accordance with all Federal, State, and local laws and regulations.
- c. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing shall be discharged into the sanitary sewer with prior approval and/or notification to the Waste Water Treatment Plant's Operator.

3.7 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. .

3.8 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. The Contractor shall submit a report to the Fort Bragg Environmental Management Office through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

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- a. Construction and Demolition (C&D) Debris Disposed in cubic yards or tons, as appropriate.
- b. Construction and Demolition (C&D) Debris Recycled in cubic yards or tons, as appropriate.
- c. Total C&D Debris Generated in cubic yards or tons, as appropriate.
- d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) in cubic yards or tons, as appropriate.

3.9 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area are shown on the drawings. The Contractor shall protect these resources and shall be responsible for their preservation during the life of the Contract. If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.10 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.11 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor, through the Contracting Officer, shall coordinate with the Installation Pest Management Coordinator (IPMC) Project Pesticide Coordinator (PPC) at the earliest possible time prior to pesticide application. The Contractor shall discuss integrated pest management strategies with the IPMC and receive concurrence from the IPMC through the COR prior to the application of any pesticide associated with these specifications. Installation Project Office Pest Management personnel shall be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. For termiticide requirements see Section 02364 TERMITICIDE TREATMENT MEASURES FOR SUBTERRANEAN TERMITE CONTROL. The use and management of pesticides are regulated under 40 CFR 152 - 186.

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3.11.1 Pesticide Delivery and Storage

Pesticides shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Pesticides shall be stored according to manufacturer's instructions and under lock and key when unattended.

3.11.2 Qualifications

For the application of pesticides, the Contractor shall use the services of a subcontractor whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

3.11.3 Pesticide Handling Requirements

The Contractor shall formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and shall use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Material Safety Data Sheets (MSDS) shall be available for all pesticide products.

3.11.4 Application

Pesticides shall be applied by a State Certified Pesticide Applicator in accordance with EPA label restrictions and recommendation. The Certified Applicator shall wear clothing and personal protective equipment as specified on the pesticide label. Water used for formulating shall only come from locations designated by the Contracting Officer. The Contractor shall not allow the equipment to overflow. Prior to application of pesticide, all equipment shall be inspected for leaks, clogging, wear, or damage and shall be repaired prior to being used.

3.12 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.13 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.14 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

3.15 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor

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personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.16 OMITTED

3.17 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

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SECTION 01451A

CONTRACTOR QUALITY CONTROL
01/03

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 3740	(2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

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3.2 QUALITY CONTROL PLAN

3.2.1 General

The contractor shall furnish for review by the Government, not later than 14 days after receipt of notice of proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 60 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of the interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of the CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer shall be used.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from

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identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

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

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete

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authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of ~~10~~5 years construction experience on construction similar to this contract or a construction person with a minimum of 8 years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime contractor. The CQC System Manager shall be assigned ~~no other duties~~as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: civil. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

Experience Matrix

<u>Area</u>	<u>Qualifications</u>
a. Civil	Graduate Civil Engineer with 3 years experience in the type of work being performed on this project or a technician with 6 yrs related experience

3.5 SUBMITTALS

Submittals, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable

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feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance.

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Verify required control inspection and testing.

- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and

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comply with testing standards.

- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$100.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b.

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

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3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected.

Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.

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- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

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

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-- End of Section --

SECTION 02037

NCDOT STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES

1. SCOPE OF WORK

The work covered under this section is adopted from NCDOT Standard Specifications for Roads and Bridge dated January 2002. This referenced specification becomes portion of the contract documents. Hereafter, the above referenced specifications are referred as NCDOT Standard Specifications. The following general exceptions to the provisions of the NCDOT Standard Specifications apply to this contract i.e. whenever reference is made to “The State”, “The Board”, “The Department” or “The Director” it shall be understood to mean “The Contracting Officer of the U. S. Army Corps of Engineers, Savannah District”. This contract is a lump sum ~~contract and there are no separate unit prices for bid items with unit prices for the H piles as noted on the bid schedule.~~ Any reference construed by NCDOT Standard Specifications regarding any separate unit prices for bid items must be deleted or assumed as a lump sum bid item. There are some Corps of Engineers guide specifications that relate to piles and roadway items and they are also part of contract documents. In case of conflict between the NCDOT Standard Specifications and Corps of Engineers specification, the latter shall govern. The other special provisions as adopted by NCDOT Standard Specifications are also in this project and they include Pre Stressed cored slab bridges, pre cast concrete barrier rail, elastomeric bearings, guardrails, posts and offset blocks and substructure.

2. SUBMITTALS: The following submission is required for engineering review and approval.

- I. Concrete design mix (certificate verifying concrete strength, aggregate type & gradation, and class of cement from manufacturer).
- II. P/S Box Beams shop drawings.
- III. Shop drawings of pre cast concrete barrier.
- IV. Bar placement drawings for end bents, approach slabs, and concrete barrier.
- V. Advance written notice of 3 weeks before casting of P/S beams so that the engineer of record can be present at casting of P/S concrete including de-tensioning of P/S strands.

3. SPECIAL PROVISIONS

3.1 Prestressed Cored Slab Bridges

- a. Grout For Transverse Strands

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All recesses at the ends of transverse strands shall be filled completely with a non-shrink, non-metallic grout. All recesses shall be filled in a neat and workmanlike manner and the grout shall match the neat lines of the cored slabs.

b. Epoxy Protective Coating

3.1.2 Description

This work shall consist of preparing the concrete surface and furnishing and applying an epoxy protective coating to the surfaces described in this special provision.

3.1.3 Materials

The epoxy coating shall meet the most recently published NCDOT Specification in force on the date of advertisement. The epoxy coating shall meet NCDOT-Type 4A Flexible, epoxy coating, moisture insensitive.

A certification will be required for the epoxy proposed for use showing that the epoxy coating meets NCDOT-Type 4A.

The following companies have epoxies that have met Type 4A specifications:

1. E-Bond Epoxy, Inc.
Fort Lauderdale, Florida 33307
2. Permagile Industries
Plainview, NY 11803
3. Poly-Carb
Cleveland, OH 44139
4. Tamms, Inc.
Mentor, OH 44060
5. Adhesive Engineering
Cleveland, OH 44122-5554
6. Kaufman Products
Baltimore, MD 21226-1131
7. Prime Resins
Lithonia, GA 30058

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8. Sika Corporation
Lyndhurst, NY 07071

3.1.4 Surfaces

The epoxy protective coating shall be applied to the ends of prestressed concrete members as noted on the plans.

Concrete surfaces shall be free of all laitance and shall be thoroughly cleaned of any dust, dirt, grease, oil or other material the Engineer determines is objectionable. All surfaces shall be air-blast cleaned immediately prior to the application of the protective coating.

Cleaning agents shall meet the approval of the Engineer before they are used.

3.1.5 Application

Materials furnished under this item shall be applied only where the air temperature is at least 40 degrees F. and rising, but less than 95 degrees F. and surface temperature of the area to be coated is at least 40 degrees F. Surfaces must not have excessive or free standing water before application. The surface shall be given one coat of epoxy protective coating. The coating shall be applied at a rate such that coverage obtained shall be between 100 and 200 square feet per gallon.

Note: Under certain circumstances the cured epoxy protective coating may develop "oily" condition on the surface due to amine blush. This condition is not detrimental to the applied system.

Care shall be taken so that the entire designated surface of the concrete is covered and all pores filled. The Contractor shall also use only one manufacturer's materials on all surfaces visible from one location in order to provide a uniform appearance.

3.1.6 Tolerances for Placing Rail Anchorage Bars

The exterior cored slab sections shall be manufactured with the rail anchorage bars (#8b1) placed to meet the following tolerances:

Deviation from plan position of an individual bar $\pm 1/4''$

Horizontal alignment (deviation from a straight line which coincides with the plan center line of bars $\pm 1/4''$

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Projection of bars above top of cored slab (deviation from plan dimension) $\pm 1/4''$

3.2. MATCHMARKING

In order to be assured of a good, neat field fit, spans shall be assembled by manufacturer in his yard and pieces match-marked. Pieces must fit together neatly and in a workmanlike manner.

3.3. ERECTION OF PRESTRESSED CONCRETE CORED SLABS

The transverse strands shall be greased and then placed in a non-corrosive 1/2" diameter, 1/16" wall thickness black polyethylene pipe meeting the requirements of ASTM D 2239. The grease and pipe shall not be applied in the areas of the recesses at the ends of the tensioning strands where grout is to be applied.

In erecting the prestressed cored slabs, the 1/2" transverse post tensioning strands shall be placed and tensioned to 30,980 pounds in each span. After the 1/2" transverse strand has been tensioned in a span and before any equipment, material or barrier rail is placed on the span, the shear keys and dowel holes shall be filled with the mix or grout as specified else where in these special provisions, except as noted in the next four paragraphs:

- (1) The Contractor will be allowed with the approval of the Engineer, to place material and equipment on the cored slab spans on mats after the transverse strands have been tensioned to 30,980 pounds.
- (2) The Contractor must submit a detailed drawing for approval to the Engineer for the mats he intends to place on the cored slabs for his material and equipment. This drawing should give a complete description of the material and equipment that the Contractor intends to place on the mats.
- (3) In the event the Contractor uses mats and places material and equipment on the cored slabs, the transverse strands shall be retensioned to 30,980 pounds after the material and equipment is removed from the spans. The shear keys shall be grouted after the transverse strands have been retensioned.
- (4) In the event the Contractor uses mats and places material and equipment on the cored slabs, the shear keys shall be grouted after the material and equipment is removed from the spans.

3.4. GROUTING OF PRESTRESSED CORED SLABS

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After all erection work has been completed the shear keys shall be grouted by the Contractor with a non-shrink, non-metallic grout.

The non-shrink, non-metallic grout shall be on the Department's approval list and shall meet the approval of the Engineer. The minimum strength for this grout shall be 3000 pounds per square inch and until cure for 3 days minimum.

3.5. SURFACE FINISH

Top surface of slab sections shall be given a broom finish. No surface finish will be required for sides and bottom of slab sections.

3.6. CHAMFERS

Bottom corners on ends and sides of all slab sections and top outside corner of exterior slab sections shall be chamfered $\frac{3}{4}$ ". Vertical corners at ends of slab sections shall not be chamfered except acute corners of skew slabs shall be chamfered $\frac{3}{4}$ ".

3.7 PRECAST CONCRETE BARRIER RAIL

The precast concrete barrier rail sections shall be in accordance with the applicable parts of the Standard Specifications with the following exceptions and additions:

Concrete shall be CLASS "AA"

Steel forms shall be used in casting to insure uniformity of the precast concrete barrier rail sections. No surface finish will be required for the bottom of the precast barrier rail sections.

Precast concrete barrier rail sections shall be manufactured within the tolerances indicated as followings:

Depth (overall)	$\pm 1/4$ "
Width (top or bottom)	$\pm 1/4$ "
Length (any one rail section)	$\pm 1/8$ "
Dowel Holes (deviation from plan position)	$\pm 1/4$ "
Square ends (deviation from square)	$\pm 1/4$ "
Horizontal alignment (deviation from a straight line parallel to centerline of rail section)	$\pm 1/8$ ' per 10ft.

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3.7.1 Erection of Precast Concrete Barrier Rail

The contractor shall erect the precast concrete barrier rail including placement of the grout bed and grouting of the rail anchorage bar voids.

3.7.2 Grout Bed and Grouting of Rail Anchorage Bar Voids

A non-shrink, non-metallic grout shall be used for the grout bed and for grouting the rail anchorage bar voids. The non-shrink, non-metallic grout shall be on the Department's approved list and shall meet the approval of the Engineer. The minimum strength for this grout shall be 3000 pounds per square inch after curing for 3 days minimum.

3.8 ELASTOMERIC BEARINGS

Use elastomeric bearings in accordance with Article 1079-2 of the Standard Specifications except as follows:

TABLE 1079-2
NATURAL RUBBER ELASTOMER REQUIREMENTS

Grade (durameter)	50	60
PHYSICAL PROPERTIES	50 + 5	60 +5
Hardness ASTM D2240	-5	-5

3.8.1 ~~Basis of Payment Deleted~~

~~The work covered by this provision for above sections II, III and IV will be included in the contract lump sum price for each bridge. The above prices and payments will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.~~

4. GUARDRAIL

4.1 Guardrail Anchor Units, Type 350

4.1.1 Description

The Contractor shall furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the Standard Specifications, and at locations shown in the plans. The following Roadway Standard

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Drawings NCDOT dated January 2002 and the latest revisions thereto are applicable and considered a part of this contract:

<u>Standard No.</u>	<u>Title</u>
862.01	Standard guardrail placement sheet 3, 5
862.02	Standard guardrail installation sheets 3, 4, 5,6, 7
862.03	Standard of structure anchor units sheets 2, 3, 4 (Roadway standard drawings dated July 1995)
1261.01	Standard guardrail & barrier delineator spacing sheet 1
1261.02	Standard guardrail & barrier delineator types sheet 1
1262.01	Standard guardrail end delineation sheet 1

4.1.2 Materials

The Contractor may, at his option, furnish any one of the guardrail anchor units.

Guardrail anchor unit (ET-2000) as manufactured by:

TRINITY INDUSTRIES, INC.
2525 N. STEMMONS FREEWAY
DALLAS, TEXAS 75207
TELEPHONE: 1-800-644-7976

The guardrail anchor unit (SKT 350) as manufactured by:

ROAD SYSTEMS, INC.
3616 OLD HOWARD COUNTY AIRPORT
BIG SPRING, TEXAS 79720
TELEPHONE: 915-263-2435

Prior to installation the Contractor shall submit to the Engineer:

1. FHWA acceptance letter for each guardrail anchor unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Section 106-2 of the Standard Specifications.
2. Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Section 105-2 of the Specifications.

No modifications shall be made to the guardrail anchor unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

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4.1.3 Construction

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Section 1088-3 of the Standard Specifications and is incidental to the cost of the guardrail anchor unit.

4.1.4 Measurement and Payment

Payment will be included in the lump sum bid price for each bridge. This price shall be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work. The cost of guardrail delineators shall be included in the lump sum bid price.

4.2 GUARDRAIL POSTS AND OFFSET BLOCKS

10-21-03

Revise the 2002 Standard Specifications as follows:

Page 10-69, Subarticle 1046-3

Delete this sub-article in its entirety and replace with the following:

1046-3 POSTS AND OFFSET BLOCKS.

4.2.1 General

The Contractor may, at his option, furnish either of the following types of steel guardrail posts. Only one type of post will be permitted at any one continuous installation.

1. Steel W6 x 8.5 or W6 x 9.0 posts.
2. Steel 4.5" x 6.0" "C" shape posts. (C150 x12.2kg/m)

4.2.2 Structural Steel Posts

Fabricate steel posts for guardrail of the size and weight shown on the plans from structural steel complying with the requirements of Section 1072, except that the metal from which C shape posts are fabricated must meet the requirements of ASTM A570 for any grade of steel other than mechanical requirements which must meet the requirements

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of ASTM A36. Punch or drill the holes for connecting bolts. Burning will not be permitted. After fabrication, the posts must be galvanized in accordance with Section 1076.

Use structural steel posts, throughout the project, unless otherwise directed in the plans.

4.2.3 Offset Blocks

Use recycled plastic or recycled composite offset blocks with steel beam guardrail. The use of steel offset blocks with steel beam guardrail is not allowed.

Provide all offset blocks in the shape and dimensions as detailed for wood offset blocks (sheet 4 of 7, std. 862.02) in the standard drawings and/or plans.

Recycled plastic or composite offset blocks must be made from a minimum of 50% recycled plastic or composite and meet the following minimum requirements:

- Specific Gravity:.....0.950
- Compressive Strength in Lateral Direction:.....1600 psi (11 MPa)
- Maximum Water Absorption:.....10% by weight
- Maximum Termite and Ant Infestation.....10%
- Testing:.....Must pass NCHRP Report
350, Test Level 3 by CRASH
TESTING
- Approval:.....Must be approved for use by
the FHWA

Revise the 2002 Standard Roadway Drawings as follows:

Sheet 4 of 6, Standard 862.03, delete the note and substitute the following:

Note: The midpost and offset block of the WTR section will require special bolt hole drilling in the thrie beam offset block and line post.

SP8R57

5. SUBSTRUCTURE

5.1 Description

The work covered by this special provision consists of furnishing all necessary labor, equipment, materials, and incidental work to complete the construction of the

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substructure as is defined in Article 101-83 of the January 2002 Standard Specifications for Roads and Structures.

5.2 Materials

All material shall conform to the Specifications or any applicable contract special provision.

5.3 Construction Methods

All work shall be performed in accordance with the Specifications or any applicable contract special provision.

5.4 ~~Basis of Payment.~~Deleted

~~All work covered by this section will be paid for at the contract lump sum price for each bridge.~~

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SECTION 02220

DEMOLITION

05/02

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.6 (1990) Safety Requirements for Demolition Operations

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

40 CFR 61-SUBPART M National Emission Standard for Asbestos

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

1.2 GENERAL REQUIREMENTS

Do not begin demolition until authorization is received from the Contracting Officer. 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 occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible.

1.3 SUBMITTALS

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

SD-03 Product Data

Work Plan; G, RO

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The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1.

SD-07 Certificates

Demolition plan; G, RO

Notifications; G, RO

Notification of Demolition and Renovation forms; G, RO

Submit proposed salvage, demolition and removal procedures to the Contracting Officer for approval before work is started.

SD-11 Closeout Submittals

Receipts

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with Federal, State, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," safety requirements shall conform with ANSI A10.6.

1.4.1 Notifications

Furnish timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61-SUBPART M. Notify the the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61-SUBPART M.

Complete and submit Notification of Demolition and Renovation forms to Contracting Officer, postmarked or delievered at least 10 working days prior to commencement of work, in accordance with 40 CFR 61-SUBPART M. Complete paragraphs I, II, III.B, III.C (if applicable), VIII, and IX thru XIX of form. Copy of form is attached at end of this section.

1.4.2 Receipts

Submit a shipping receipt or bill of lading for all containers of ozone depleting substance (ODS) shipped to the Contracting Officer.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

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1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.6.2 Existing Work

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.6.3 Omitted

1.6.4 Trees

Trees within the project site which might be damaged during demolition, and which are indicated to be left in place, shall be protected as shown on the drawings. The fence shall be securely erected. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

1.6.5 Omitted

1.6.6 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.7 BURNING

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

1.8 OMITTED

1.9 RELOCATIONS

Utility relocations will be performed by others. The Contractor shall be responsible for timely notification to Sandhill Utility Service (electric) 910-497-7399; ITBC (communication), Frank Galvin 910-396-4475; or PWBC (water/sewer) Ted Kientz 910-432-5093. Relocation services require a minimum 21-day advance notice for utilities relocation.

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1.10 REQUIRED DATA

Demolition plan shall include procedures for careful removal and disposition of materials specified to be salvaged.

1.11 OMITTED

1.12 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Omitted

3.1.2 Omitted

3.1.3 Paving and Slabs

Remove ground and/or sawcut concrete and asphaltic concrete paving and slabs as indicated on the drawings. Provide neat sawcuts at limits of pavement removal as indicated.

3.2 OMITTED

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award.

Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.4 CLEANUP

Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

-- End of Section --

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SECTION 02231

CLEARING AND GRUBBING

07/02

PART 1 GENERAL

1.1 SUBMITTALS

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

SD-03 Product Data

Materials Other Than Salable Timber

Written permission to dispose of such products on private property shall be filed with the Contracting Officer.

SD-04 Samples

Tree wound paint

Herbicide

Submit samples in cans with manufacturer's label.

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to, store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 TREE WOUND PAINT

Bituminous based paint of standard manufacture specially formulated for tree wounds.

2.2 HERBICIDE

Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on contractor's licensing, certification and record keeping. Contact the command Pest Control Coordinator prior to starting work.

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PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

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.

3.1.3 Utility Lines

Protect existing utility lines that are to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the cost of the repairs of damage to existing utility lines.

3.2 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 downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. 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.

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 PRUNING

Trim trees designated to be left standing within the cleared areas of dead branches 1 1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 1-1/4 inches in diameter with an approved tree wound paint.

3.5 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. Material to be grubbed, together with logs and other organic or

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

3.6 DISPOSAL OF MATERIALS

3.6.1 Saleable Timber

All timber on the project site noted for clearing and grubbing shall become the property of the Contractor and shall be removed from the project site.

3.6.2 Nonsaleable Materials

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of in the designated waste disposal area, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed. Items designated for disposal shall be chipped and/or ground and stockpiled in disposal area.

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-- End of Section Table of Contents --

SECTION 02300

EARTHWORK

12/97

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1140	(2000) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 OMITTED

1.3 OMITTED

1.4 DEFINITIONS

1.4.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, and CL-ML. Satisfactory materials for grading shall be free from roots and other organic matter, trash, debris, frozen material, and stones larger than 3 inches in any dimension.

1.4.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory

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materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; demolition debris; and material classified as satisfactory which contains root and other organic matter or frozen material. The Contracting Officer shall be notified of any contaminated materials.

1.4.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, GP-GC, GM-GC, SC, SW-SC, SP-SC, ML, CL, CL-ML, MH, and CH and the unsatisfactory organic materials Pt, OL, and OH. Materials classified as GM, GP-GM, GW-GM, SM, SW-SM, and SP-SM will be identified as cohesionless only when the fines are nonplastic. Testing required for classifying materials shall be in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.

1.4.4 Degree of Compaction

Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 abbreviated as a percent of laboratory maximum density.

1.4.5 Omitted

1.4.6 Topsoil

Material suitable for topsoil shall be obtained from required stripping of the project site and/or areas off the installation. Material obtained from off-installation areas suitable for topsoil shall meet the requirements specified for topsoil in Section 02922 SODDING.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having an "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-03 Product Data

Earthwork; G, RO.

Procedure and location for disposal of unused satisfactory material. Blasting plan when blasting is permitted. Proposed source of borrow material.

Notification of Earthwork.

Notification of encountering rock in the project. Advance notice on the opening of excavation or borrow areas. Advance notice on shoulder construction for rigid pavements.

SD-06 Test Reports

Testing.

Within 24 hours of conclusion of physical tests, three copies of test results.

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SD-07 Certificates

Testing; G, RO.

Qualifications of the commercial testing laboratory.

1.6 SUBSURFACE DATA

Logs of soil test borings and soil test data are shown on the drawings. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations. The water level data indicate only the conditions at the particular time or times the information was obtained and may not indicate variations such as those caused by periods of drought or increased rainfall, seasonal fluctuations in rainfall, changes in the surface drainage pattern, or application of irrigation water.

1.7 CLASSIFICATION OF EXCAVATION

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.8 BLASTING

Blasting will not be permitted.

1.9 UTILIZATION OF EXCAVATED MATERIALS

Unsatisfactory materials removed from excavations shall be disposed of in designated waste disposal areas as directed. Satisfactory material removed from excavations shall be used, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. No satisfactory excavated material shall be wasted without specific written authorization. Satisfactory material authorized to be wasted shall be disposed of in designated areas approved for surplus material storage or designated waste disposal areas as directed. No excavated material shall be disposed of to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

Within areas to be excavated or to receive fill, topsoil shall be stripped to full depth. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Topsoil shall be kept separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in maximum dimension, and other materials that would interfere with planting and maintenance operations. Any surplus of topsoil from excavations and grading shall be removed from the site and disposed of in designated areas approved for surplus material storage or designated waste disposal areas as directed.

3.2 GENERAL EXCAVATION

The Contractor shall perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Grading shall be in conformity with the typical sections shown and the tolerances specified in paragraph FINISHING. Satisfactory excavated materials shall be transported to and placed in fill or embankment within the limits of the work. Unsatisfactory materials encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials as directed. Such excavated material and the satisfactory material ordered as replacement shall be included in excavation. Surplus satisfactory excavated material not required for fill or embankment shall be disposed of in designated areas approved for surplus material storage or designated waste disposal areas as directed. Unsatisfactory excavated material shall be disposed of in designated waste disposal areas as directed. During construction, excavation and fill placement shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be excavated from the borrow areas indicated, or if no borrow areas are indicated, from approved areas off the installation selected by the Contractor.

3.2.1 Ditches, Gutters, and Channel Changes

Excavation of ditches, gutters, and channel changes shall be accomplished by cutting accurately to the cross sections, grades, and elevations shown. Ditches and gutters shall not be excavated below grades shown. Excessive open ditch or gutter excavation shall be backfilled with satisfactory, thoroughly compacted, material to grades shown. Material excavated shall be disposed of as shown or as directed, except that in no case shall material be deposited less than 4 feet from the edge of a ditch. The Contractor shall maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.2.2 Drainage Structures

Excavations shall be made to the lines, grades, and elevations shown, or as directed. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock or other hard foundation material shall be cleaned of loose debris and cut to a firm, level, stepped, or serrated surface. Loose disintegrated rock and thin strata shall be removed. When concrete or masonry is to be placed in an excavated area, the bottom of the excavation shall not be disturbed. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.3 SELECTION OF BORROW MATERIAL

Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be obtained from the borrow areas shown, or if no borrow areas are shown, from approved private sources, selected by the Contractor.

Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling. Borrow material from approved sources on

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Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval. Necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon shall be considered related operations to the borrow excavation.

3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

Except as otherwise permitted, borrow pits and other excavation areas shall be excavated providing adequate drainage. Overburden and other spoil material shall be transported to the designated waste disposal areas. Borrow pits shall be neatly trimmed and drained after the excavation is completed. The Contractor shall ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.5 GRADING AREAS

Where indicated, work will be divided into grading areas within which satisfactory excavated material shall be placed in embankments, fills, and required backfills. The Contractor shall not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing.

3.6 BACKFILL

Backfill adjacent to any and all types of structures shall be placed and compacted to at least 90 percent laboratory maximum density to prevent wedging action or eccentric loading upon or against the structure. Ground surface on which backfill is to be placed shall be prepared as specified in paragraph PREPARATION OF GROUND SURFACE FOR EMBANKMENTS. Compaction requirements for backfill materials shall also conform to the applicable portions of paragraphs PREPARATION OF GROUND SURFACE FOR EMBANKMENTS, EMBANKMENTS, and SUBGRADE PREPARATION, and Section 02630 STORM-DRAINAGE SYSTEM; and Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.7 PREPARATION OF GROUND SURFACE FOR EMBANKMENTS

3.7.1 General Requirements

Ground surface on which fill is to be placed shall be stripped of live, dead, or decayed vegetation, rubbish, debris, and other unsatisfactory material; plowed, disked, or otherwise broken up to a depth of 8 inches; pulverized; moistened or aerated as necessary to plus or minus 2.5 percent of optimum moisture; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. The prepared ground surface shall be scarified and moistened or aerated as required just prior to placement of embankment materials to assure adequate bond between embankment material and the prepared ground surface.

3.7.2 Frozen Material

Embankment shall not be placed on a foundation which contains frozen

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material, or which has been subjected to freeze-thaw action. This prohibition encompasses all foundation types, including the natural ground, all prepared subgrades (whether in an excavation or on an embankment) and all layers of previously placed and compacted earth fill which become the foundations for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to, nights, holidays, weekends, winter shutdowns, or earthwork operations, shall be removed to a depth that is acceptable to the Contracting Officer and replaced with new material. Alternatively, the material shall be thawed, dried, reworked, and recompact to the specified criteria before additional material is placed. The Contracting Officer will determine when placement of fill shall cease due to cold weather. The Contracting Officer may elect to use average daily air temperatures, and/or physical observation of the soils for his determination. Embankment material shall not contain frozen clumps of soil, snow, or ice.

3.8 EMBANKMENTS

3.8.1 Earth Embankments

Earth embankments shall be constructed from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches. The material shall be placed in successive horizontal layers of loose material not more than 8 inches in depth. Each layer shall be spread uniformly on a soil surface that has been moistened or aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, each layer shall be plowed, disked, or otherwise broken up; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density. Compaction requirements for the upper portion of earth embankments forming subgrade for pavements shall be identical with those requirements specified in paragraph SUBGRADE PREPARATION. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.8.2 Moisture Content

Satisfactory materials in each layer of fill shall contain the amount of moisture within the limits specified below. Materials that are not within the specified limits after compaction shall be reworked regardless of density. The moisture content after compaction shall be as uniform as practicable throughout any one layer and shall be within the limits of 2.5 percentage points above optimum moisture content and 2.5 percentage points below optimum moisture content. Materials which are too wet shall be disced, harrowed, plowed, bladed, or otherwise manipulated to reduce the moisture content to within the specified limits. Materials which are too dry shall be broken up, sprinkled, and thoroughly mixed to bring the moisture content uniformly up to within specified limits. In the event that materials reach the fill which are not within the limits of moisture content specified above, the Contractor shall either adjust the moisture content to bring it within the specified limits or remove it from the fill.

3.9 SUBGRADE PREPARATION

3.9.1 Construction

Subgrade shall be shaped to line, grade, and cross section, and compacted as specified. This operation shall include plowing, disking, and any

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moistening or aerating required to obtain specified compaction. Materials shall be moistened or aerated as necessary to plus or minus 2.0 percent of optimum moisture. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Low areas resulting from removal of unsatisfactory material or excavation of rock shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified. When the subgrade is in cut, the top 8 inches of subgrade shall be scarified, windrowed, moistened or aerated as necessary to plus or minus 2.0 percent of optimum moisture, thoroughly blended, reshaped, and compacted. The elevation of the finish subgrade shall not vary more than 0.05 foot from the established grade and cross section.

3.9.2 Moisture Content

Satisfactory materials in the subgrade shall contain the amount of moisture within the limits specified below. Materials that are not within the specified limits after compaction shall be reworked regardless of density. The moisture content after compaction shall be as uniform as practicable throughout the subgrade and shall be within the limits of 2.0 percentage points above optimum moisture content and 2.0 percentage points below optimum moisture content. Materials which are too wet shall be disced, harrowed, plowed, bladed, or otherwise manipulated to reduce the moisture content to within the specified limits. Materials which are too dry shall be broken up, sprinkled, and thoroughly mixed to bring the moisture content uniformly up to within specified limits.

3.9.3 Compaction

Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.9.3.1 Omitted

3.9.3.2 Subgrade for Pavements

Subgrade for pavements shall be compacted to at least 95 percent laboratory maximum density for a depth below the subgrade of 12 inches in fill or backfill and 8 inches in undisturbed native soil or cut.

3.9.3.3 Subgrade for Shoulders

Subgrade for shoulders shall be compacted to at least 95 percent laboratory maximum density for a depth of 8 inches below finish grade. In areas where the shoulder is to be grassed the top 8 inches shall be compacted to a density of at least 90 percent laboratory maximum density.

3.10 SHOULDER CONSTRUCTION

Shoulders shall be constructed of satisfactory excavated or borrow material or as otherwise shown or specified. Shoulders shall be constructed as soon as possible after adjacent paving is complete, but in the case of rigid pavements, shoulders shall not be constructed until permission of the Contracting Officer has been obtained. The entire shoulder area shall be compacted to at least the percentage of maximum density as specified in paragraph SUBGRADE PREPARATION above. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers,

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vibratory compactors, or other approved equipment. Shoulder construction shall be done in proper sequence in such a manner that adjacent ditches will be drained effectively and that no damage of any kind is done to the adjacent completed pavement. The completed shoulders shall be true to alignment and grade and shaped to drain in conformity with the cross section shown.

3.11 FINISHING

The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. The degree of finish for graded areas shall be within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades shall be specified in paragraph SUBGRADE PREPARATION. Gutters and ditches shall be finished in a manner that will result in effective drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials.

3.12 PLACING TOPSOIL

On areas to receive topsoil, the surface shall be free of materials that would hinder planting or maintenance operations. The compacted subgrade soil shall be scarified to a depth of 2 inches by disking or plowing for the bonding of topsoil with the subsoil. Topsoil shall then be uniformly spread to a thickness of 4 inches, and graded to the elevations and slopes shown and left free of surface irregularities. Topsoil shall be compacted by one pass of a cultipacker, roller, or other approved equipment weighing 100 to 160 pounds per linear foot of roller. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading.

3.13 TESTING

Testing shall be performed by an approved commercial testing laboratory. Field in-place density shall be determined in accordance with ASTM D 1556. When test results indicate that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements. 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.

3.13.1 Fill and Backfill Material Gradation, Classification, and Moisture Content

One test per 200 cubic yards stockpiled or in-place source material. Gradation of fill and backfill material shall be determined in accordance with ASTM D 422 and ASTM D 1140 (wash No. 200, without hydrometer). Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318. Classification of soils shall be in accordance with ASTM D 2487. Moisture content shall be determined in accordance with ASTM D 2216.

3.13.2 In-Place Densities

- a. One test per 5000 square feet, or fraction thereof, of each lift

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of fill or backfill areas compacted by other than hand-operated machines.

- b. One test per 100 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.
- c. One test per 100 linear feet, or fraction thereof, of each lift of embankment or backfill for roads.
- d. One test per 5000 square feet, or fraction thereof, of subgrade in native soil or cut in all areas, excluding roads.
- e. One test per 50 linear feet, or fraction thereof, of subgrade in embankment or backfill, and in native soil or cut in roads.

3.13.3 Moisture Content

In the stockpile(s), excavation, or borrow areas, a minimum of two tests, each with a one-point or two-point compaction test, shall be performed per day per type of material or source of material being placed during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions to ensure the moisture content of the placed materials are within the specified limits.

3.13.4 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material including borrow material and material to be excavated to determine the optimum moisture and laboratory maximum density values. Test procedures and frequency shall be as specified in paragraph TESTING of Section 02315 EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS.

3.13.5 Compaction Control

The tests required on materials prior to placement, and the compaction control procedures and methods specified in Section 02315 EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS, paragraph TESTING (with exception of paragraph 3.14.3.1 Field Density Tests) in regard to compaction control of soils, and utilizing the one-point or two-point compaction methods to relate field density data to laboratory test values, shall fully apply to and be considered a part of this specification section.

3.13.6 Tolerance Tests for Subgrades

Continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION shall be made during construction of the subgrades.

3.14 SUBGRADE AND EMBANKMENT PROTECTION

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained to drain effectively at all times. The finished subgrade shall not be disturbed by traffic or other operation and shall be protected and maintained by the Contractor in a satisfactory condition until ballast, subbase, base, or pavement is placed. The storage or stockpiling of materials on the finished subgrade will not be permitted. No subbase, base course, ballast, or pavement shall be laid until the subgrade has been checked and approved, and in no case shall subbase, base, surfacing, pavement, or ballast be placed on a muddy, spongy, or frozen subgrade.

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SECTION 02315

EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS

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PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	(2001a) Concrete Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1140	(2000) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 DEFINITIONS

1.2.1 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 abbreviated as percent laboratory maximum density.

1.2.2 Maximum Dry Density

The maximum dry density is expressed as the maximum density obtained when the soil is compacted in accordance with ASTM D 1557, abbreviated as laboratory maximum dry density.

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1.2.3 Optimum Moisture Content

The optimum moisture content is the moisture content corresponding to the maximum dry density obtained by the test procedure presented in ASTM D 1557.

1.2.4 Subsurface Data

Logs of soil test borings and soil test data are shown on the drawings. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations. The water level data indicate only the conditions at the particular time or times the information was obtained and may not indicate variations such as those caused by periods of drought or increased rainfall, seasonal fluctuations in rainfall, changes in the surface drainage pattern, or application of irrigation water.

1.2.5 Related Work

1.2.5.1 Site Grading and Excavation and Backfilling for Utilities

Site grading and excavation and backfilling for utilities beyond the 5-foot building line are covered under Section 02300 EARTHWORK and Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

1.2.5.2 Termite Protection

Termite protection is specified under Section 02364 TERMITICIDE TREATMENT MEASURES FOR SUBTERRANEAN TERMITE CONTROL.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Field Density Tests
Testing of Fill and Backfill Materials

Copies of all laboratory and field test reports within 24 hours of the completion of the test. Each report shall be properly identified. Test methods used and compliance with specified test standards shall be described. Summary sheets specified herein shall be submitted as indicated.

Inspection, Equipment and Corrective Action Reports

Copies of inspection reports, equipment specifications, and records of corrective action taken shall be submitted.

SD-07 Certificates

Certificates of Compliance

Certificates of compliance indicating conformance with specified requirements shall be furnished for capillary water barrier materials.

Testing; G, RO.

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Testing facilities for the performance of laboratory soil tests must be approved by the Contracting Officer prior to work being performed.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

2.1.1.1 Natural Insitu Soil

Satisfactory materials for natural insitu soil supporting building foundations and/or slabs shall be limited to materials classified in ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, CH, MH, and shall be free of trash, debris, roots or other organic matter, frozen material, and stones larger than 3 inches in any dimension.

2.1.1.2 Foundation Fill or Backfill

Satisfactory material for fill or backfill supporting building foundations and/or slabs shall be limited to materials classified in ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, and shall be free of trash, debris, roots or other organic matter, frozen material, and stones larger than 3 inches in any dimension.

2.1.1.3 Fill or Backfill Adjacent to Walls

Satisfactory materials for fill or backfill adjacent to walls shall be limited to cohesionless, free draining materials classified in ASTM D 2487 as GW, GP, GM, SW, SP, SM, and SP-SM, and shall be free of trash, debris, roots or other organic matter, frozen material, and stones larger than 3 inches in any dimension.

2.1.2 Unsatisfactory Materials

2.1.2.1 Natural Insitu Soil

Unsatisfactory materials for fill or backfill supporting building foundations and/or slabs shall be materials classified in ASTM D 2487 as Pt, OH and OL and any other materials not defined as satisfactory. The Contracting Officer shall be notified of any contaminated materials.

2.1.2.2 Foundation Fill or Backfill

Unsatisfactory material for fill or backfill supporting building foundations and/or slabs shall be materials classified in ASTM D 2487 as Pt, OH, OL, CH and MH.

2.1.2.3 Fill or Backfill Adjacent to Walls

Unsatisfactory materials for fill or backfill adjacent to walls shall be materials classified in accordance with ASTM D 2487 as Pt, OH, OL, GC, SC, CL, CH, ML and MH, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW-SM, SC, SW-SC, SP-SC, CL, ML, CL-ML.

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2.1.2.4 Wet or Soft Materials

Materials determined by the Contracting Officer as too wet or too soft to provide a stable subgrade, foundation, or fill will be classified as unsatisfactory regardless of classification. However, if such materials do meet the appropriate ASTM D 2487 classification, the Contractor shall at no additional cost to the Government, recondition the materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, GP-GC, GM-GC, SW-SC, SP-SC, SC, ML, CL, CL-ML, MH, and CH and the unsatisfactory organic materials Pt, OL and OH. Materials classified as GM, GP-GM, GW-GM, SM, SW-SM, and SP-SM will be identified as cohesionless only when the fines have a plasticity index of zero; otherwise they will be considered cohesive.

2.2 CAPILLARY WATER BARRIER

Capillary water barrier shall consist of clean, crushed, nonporous stone, crushed gravel, or uncrushed gravel conforming to the requirements of ASTM C 33 for coarse aggregate grading size 57, 67, 7, or 78.

PART 3 EXECUTION

3.1 Omitted

3.2 TOPSOIL

Topsoil shall be stripped to full depth below existing grade within the designated excavations and grading lines. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive topsoil later, or at locations indicated or specified. Excess topsoil shall be disposed of as specified for excess excavated material.

3.3 EXCAVATION

Excavation shall conform to the dimensions and elevations indicated for each building, structure, and footing except as specified, and shall include trenching for utility and foundation drainage systems to a point 5 feet beyond the building line of each building and structure, excavation for outside grease interceptors and all work incidental thereof. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed and replaced with satisfactory material; and payment will be made in conformance with the CHANGES clause of the CONTRACT CLAUSES. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced, at no additional cost to the Government, with satisfactory materials to the indicated excavation grade. Satisfactory material shall be placed and compacted as specified in paragraph FILLING AND BACKFILLING. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

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3.4 DRAINAGE AND DEWATERING

3.4.1 Drainage

Surface water shall be directed away from excavation and construction sites to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.4.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 2 feet below the working level. The Contractor shall provide drainage and dewatering as required to ensure that all footing excavations are accomplished with the subgrade soils remaining dry and firm until after the footings are placed and backfilled.

3.5 SHORING

Shoring, including sheet piling, shall be furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled, in a manner to prevent caving.

3.6 CLASSIFICATION OF EXCAVATION

Excavation will be unclassified regardless of the nature of material encountered.

3.7 BLASTING

Blasting will not be permitted.

3.8 UTILITY AND DRAIN TRENCHES

Trenches for underground utilities systems and drain lines shall be excavated to the required alignments and depths. The bottoms of trenches shall be graded to secure the required slope and shall be tamped if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length.

3.9 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, approved materials shall be obtained as specified in Section 02300 EARTHWORK.

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3.10 EXCAVATED MATERIALS

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required under this section or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Section 02300 EARTHWORK. No satisfactory material shall be wasted or used for the convenience of the Contractor unless so authorized. Stockpiles and wasted materials shall be placed, graded, and shaped for proper drainage, giving due consideration to drainage from adjacent properties.

3.11 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Excavation to final grade shall not be made until just before the capillary water barrier or concrete is to be placed. All surfaces shall be protected from erosion resulting from ponding or flow of water.

3.12 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to plus or minus 2.5 percent of optimum moisture. Minimum subgrade density shall be as specified in paragraph FILLING AND BACKFILLING.

3.13 FILLING AND BACKFILLING

3.13.1 General

Filling and backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed and the excavation cleaned of trash and debris. Backfill shall not be placed in areas that are wet, muddy, contain organic materials or are otherwise unacceptable to the Contracting Officer.

Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Satisfactory material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 3 inches in any dimension. Where pipe and or utility lines are coated or wrapped for protection against corrosion, the backfill material up to an elevation of 2 feet above sewer lines and 1 foot above other utility lines shall be free from stones larger than 2 inches in any dimension.

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3.13.2 Placement

Satisfactory materials shall be placed in horizontal layers not exceeding 8 inches in loose thickness, or 4 inches in loose thickness where hand-operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as specified. Backfill shall be brought to the indicated finish grade. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in loose thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes or tanks to avoid damage to coatings, wrappings, or tanks. Backfill shall not be placed against foundation walls prior to 7 days after completion of each side of the wall and sloped to drain away from the wall. Prior to compaction, each layer shall be thoroughly and uniformly blended throughout its entire thickness by discing.

3.13.3 Moisture Content

Satisfactory materials in each layer of fill or backfill shall contain the amount of moisture within the limits specified below. Materials that are not within the specified limits after compaction shall be reworked regardless of density. The moisture content after compaction shall be as uniform as practicable throughout any one layer and shall be within the limits of 2.5 percentage points above optimum moisture content and 2.5 percentage points below optimum moisture content. Materials which are too wet shall be disced, harrowed, plowed, bladed, or otherwise manipulated to reduce the moisture content to within the specified limits. Materials which are too dry shall be broken up, sprinkled, and thoroughly mixed to bring the moisture content uniformly up to within specified limits. In the event that materials reach the fill which are not within the limits of moisture content specified above, the Contractor shall either adjust the moisture content to bring it within the specified limits or remove it from the fill.

3.13.4 Compaction

Compaction shall be accomplished by sheepsfoot roller, pneumatic-tired rollers, smooth-drum vibratory rollers or other approved equipment well suited to the soil being compacted. Generally, sheepsfoot rollers are best suited for compacting cohesive material while smooth-drum vibratory rollers are best suited for compacting cohesionless materials. In areas inaccessible to heavy equipment, or where in the opinion of the Contracting Officer, use of heavy equipment may cause damage to pipes, conduits, or structures, approved power-driven hand tampers suitable for the material being compacted shall be used. Each layer of fill and backfill shall be compacted to not less than the percentage of maximum density specified below.

Percent Laboratory
Maximum Density

Fill, Embankment, and Backfill

Under structures, building slabs, steps,

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	Percent Laboratory Maximum Density
paved areas, and in trenches	90
Beside structures, footings, and walls	90
Under sidewalks and grassed areas	85
<hr/> Subgrade (Top of Fill, Embankment, and Backfill)	
Under building slabs, steps, and paved areas, top 12 inches	90
Under footings, top 12 inches	90
Under sidewalks and grassed areas, top 6 inches	85
<hr/> Subgrade (Undisturbed Native Soil or Cut)	
Under building slabs, steps, and paved areas, top 8 inches	90
Under footings, top 8 inches	90
Under sidewalks and grassed areas, top 6 inches	85

Approved compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and recompact to the required density prior to further construction thereon. Recompaction over underground utilities and heating lines shall be by hand tamping. For compacted subgrades and/or any lift of fill or backfill that fails to meet the specified density and/or moisture requirements, the entire subgrade and/or entire lift of fill shall be broken up to a minimum depth of 8 inches, pulverized, the moisture content adjusted as necessary, and recompact to the specified density, even if this action requires the removal and replacement of subsequently placed satisfactory lifts of fill. Tests on recompact areas shall be performed to determine conformance with specification requirements. Lifts of fill placed without being field density tested will not be accepted as satisfactory under any circumstances.

3.14 TESTING

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory at no additional cost to the Government. Three copies of test results shall be included with the Contractor's daily construction quality control reports. 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.

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3.14.1 Types of Tests

3.14.1.1 Classification Tests

Classification of soils shall be determined in accordance with ASTM D 2487.

- a. Liquid Limit and Plasticity Index: Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.
- b. Sieve Analysis: Sieve analysis (wash No. 200, without hydrometer) shall be performed in accordance with ASTM D 422 and ASTM D 1140.

3.14.1.2 Moisture Content

Moisture content shall be determined in accordance with ASTM D 2216.

3.14.1.3 Compaction Tests

Compaction tests shall be performed by the test procedure presented in ASTM D 1557. Adequate testing shall be conducted to establish at least five points with at least one point falling within plus or minus 1.5 percentage points of the plotted optimum moisture content.

3.14.1.4 Field Density Tests

Field in-place densities shall be determined by the sand displacement method in accordance with ASTM D 1556. The Contracting Officer reserves the right to direct the locations where field density tests are to be performed. SAS Form 865 shall be used for recording results of field density tests and submitted with the daily construction quality control reports. Results of density tests shall be maintained on CESAS Form 1177 - Summary of Field Density Tests and an updated copy submitted each week. The Contracting Officer will furnish Government forms to the Contractor.

3.14.2 Tests Required on Material Prior to Placement

3.14.2.1 General

All material from required excavations and borrow shall be tested prior to incorporation into the permanent work. The tests shall be performed on samples representative of the various materials to be utilized. Samples shall be carefully selected to represent the full range of materials to be used as fill and/or backfill. The following minimum number of tests shall be performed on the materials prior to the placement of the materials in the work. Additional tests of these types shall be performed when materials of different classification or compaction characteristics are encountered to determine the properties of the materials. The Contracting Officer reserves the right to direct additional testing as required.

3.14.2.2 Classification Tests

Classification tests shall be performed to determine the acceptability of materials in accordance with paragraph MATERIALS. Such tests on materials proposed for use as fill and/or backfill shall be performed prior to their use. Sufficient classification tests shall be performed to define the full range of all materials proposed for use. A minimum of two classification tests shall be performed on each material classified as satisfactory for use. The Contracting Officer may at any time require additional classification tests to confirm material acceptability.

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3.14.2.3 Compaction Tests

Compaction tests shall be performed prior to commencement of construction in order to determine the moisture-density relationships of all satisfactory materials proposed for use as fill and/or backfill. For each compaction test performed, an associated or companion classification test and moisture content test shall be performed. Compaction tests shall be performed in sufficient number to establish the full range of maximum dry density and optimum water content. A minimum of 8 compaction tests shall be performed on materials classified as satisfactory for use. Samples for these tests shall not be obtained from the same locations. The Contracting Officer reserves the right to direct where samples for additional compaction tests are obtained. In the event that the compaction characteristics of materials having the same classification vary appreciably, additional compaction tests shall be performed.

3.14.2.4 Moisture Content Tests

Moisture content tests shall be performed on all materials proposed for use as fill and/or backfill to determine their suitability for use in accordance with paragraph Moisture Content. Moisture content tests shall be performed in sufficient number to determine the full range of moisture contents. Moisture content test shall be performed for each compaction test and as required to determine acceptability of material prior to placement. Not less than two moisture content tests shall be performed on each material classified as satisfactory for use.

3.14.3 Tests Required During Placement

3.14.3.1 Field Density Tests

Acceptance of the compacted materials shall be determined by the results of field in-place density tests. Density tests in randomly selected locations shall be performed in the material and at the minimum frequency specified below:

Material Type	Location of Material	Minimum Test Frequency
Fill, embankment and backfill	Beneath structures, to the 5-foot building line	One test per lift per each increment or fraction of 4000 square feet
Fill and backfill	Areas beside structures, footings, walls, and areas enclosed by grade beams that are compacted by hand operated compaction equipment	One test per foot of depth per each increment or fraction of 200 square feet, or for each 50 linear feet of long narrow (less than 3 feet wide) fills 50 linear feet or more in length

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Material Type	Location of Material	Minimum Test Frequency
Subgrade	Under building slabs on grade and paved areas	One test per each increment or fraction of 2500 square feet
Subgrade	Under footings	One test per every fifth column footing and for each increment or fraction of 75 linear feet of wall footings

3.14.3.2 Moisture Content

In the stockpile(s), excavation, or borrow areas, a minimum of two tests, each with a one-point or two-point compaction test, shall be performed per day per type of material or source of material being placed during stable weather conditions. During unstable weather, tests shall be made as dictated by the local conditions to ensure the moisture content of the placed materials are within the specified limits.

3.14.3.3 Optimum Moisture and Laboratory Maximum Density

One representative test shall be performed per 250 cubic yards of fill, embankment and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.14.3.4 Time and Location of Tests

The Government reserves the right to specify the location of any test. Whenever there is doubt as to the adequacy of the testing or validity of results, the Contracting Officer may direct that additional tests be performed, at no additional cost to the Government. The field density tests shall be performed at times and locations which will assure the specified compaction is being obtained throughout each lift for all materials placed. Additional field density tests shall be performed in areas where the Contracting Officer determines there is reason to doubt the adequacy of the natural subgrade.

3.14.3.5 Field Density Control

The results of field density tests shall be compared to results of compaction tests performed as required elsewhere in these specifications by the use of the appropriate procedures described in the following paragraphs.

3.14.4 Compaction Control

For fine grained (clayey and silty) soils and for sands with appreciable fines such that normal shaped compaction curves are obtained, results of all compaction tests shall be plotted on a common plot as a family of curves. For each field density test performed, a one-point compaction test, with additional points as needed, shall be performed on the same

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material on which the field density test was conducted. The one-point compaction test shall be performed on the dry side of the optimum moisture content. For comparison of field density data to the proper laboratory compaction test results, the procedures for the one-point and/or two-point compaction control methods as described in paragraph Compaction Procedure, shall be used. Compaction curves plotted on the family of curves shall be of such a scale that the optimum moisture content can be interpreted to the nearest 0.1 percent and the maximum dry density can be interpreted to the nearest 0.1 pcf. When a one-point test plots outside the range of the family of curves, an additional five-point compaction test shall be performed.

3.14.5 Compaction Procedure

3.14.5.1 General

The following paragraphs describe methods of relating field density data to desired or specified values. Compaction control of soils requires comparison of fill water content and/or dry density values obtained in field density tests with optimum water content and/or maximum dry density. At a minimum, control shall be in accordance with the One-Point Compaction Method. Where conditions require, the Two-Point Compaction Method shall be used.

3.14.5.2 One-Point Compaction Method

The material from the field density test is allowed to dry to a water content on the dry side of estimated optimum, and then compacted using the same equipment and procedures used in the five-point compaction test. Thorough mixing is required to obtain uniform drying; otherwise, results obtained may be erroneous. The water content and dry density of the compacted sample are determined and then used to estimate its optimum water content and maximum dry density as illustrated in Figure 1 at the end of this section. In Figure 1, the line of optimums is well defined and the compaction curves are approximately parallel to each other, consequently, the one-point compaction method could be used with a relatively high degree of confidence. However, in Figure 2 at the end of this section, the curves are not parallel to each other and in several instances will cross if extended on the dry side. Consequently, the correct curve cannot be determined from the one-point method; therefore, the two-point compaction method should be used. The one-point method should be used only when the data define a relatively good line of optimums.

3.14.5.3 Two-Point Compaction Method

In the two-point test, one sample of material from the location of the field density test is compacted at the fill water content if thought to be at or on the dry side of optimum water content (otherwise, reduced by drying to this condition) using the same equipment and procedures used in the five-point compaction test. A second sample of material is allowed to dry back about 2 to 3 percentage points dry of the water content of the first sample and then compacted in the same manner. At least one point shall fall within 3 percent of the line of optimums. After compaction, the water contents and dry densities for the two samples are determined. The results are used to identify the appropriate compaction curve for the material being tested as shown in Figure 2 at the end of this section. The data shown in Figure 2 warrant the use of the two-point compaction test because the five-point compaction curves are not parallel. Using point A only, as in the one-point test method, would result in appreciable error as

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the shape of the curve would not be defined. The estimated compaction curve can be more accurately defined by two compaction points.

3.15 CAPILLARY WATER BARRIER

Capillary water barrier under concrete floor and area-way slabs on grade shall be placed directly on the subgrade and shall be compacted with a minimum of two passes of a hand-operated plate-type vibratory compactor.

3.16 GRADING

Areas within 5 feet outside of each building and structure line shall be constructed true-to-grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

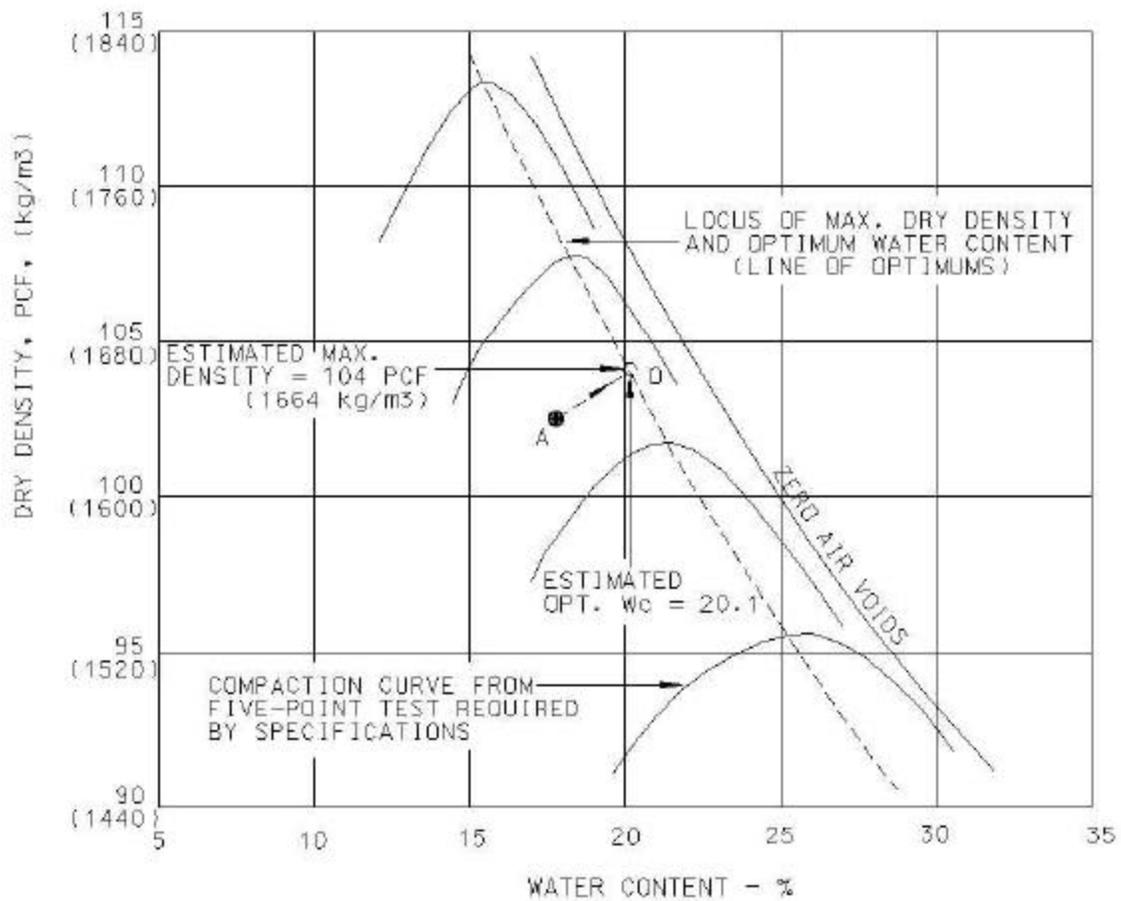
3.17 SPREADING TOPSOIL

Areas outside the building lines from which topsoil has been removed shall be topsoiled. The surface shall be free of materials that would hinder planting or maintenance operations. The compacted subgrade soil shall be scarified to a depth of 2 inches by disking or plowing for the bonding of topsoil with the subsoil. Topsoil shall then be uniformly spread to a thickness of 4 inches and graded to the elevations and slopes shown and left free of surface irregularities. Topsoil shall be compacted by one pass of a cultipacker, roller, or other approved equipment weighing 100 to 160 pounds per linear foot of roller. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading.

3.18 PROTECTION

Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work, shall be repaired and grades reestablished to the required elevations and slopes.

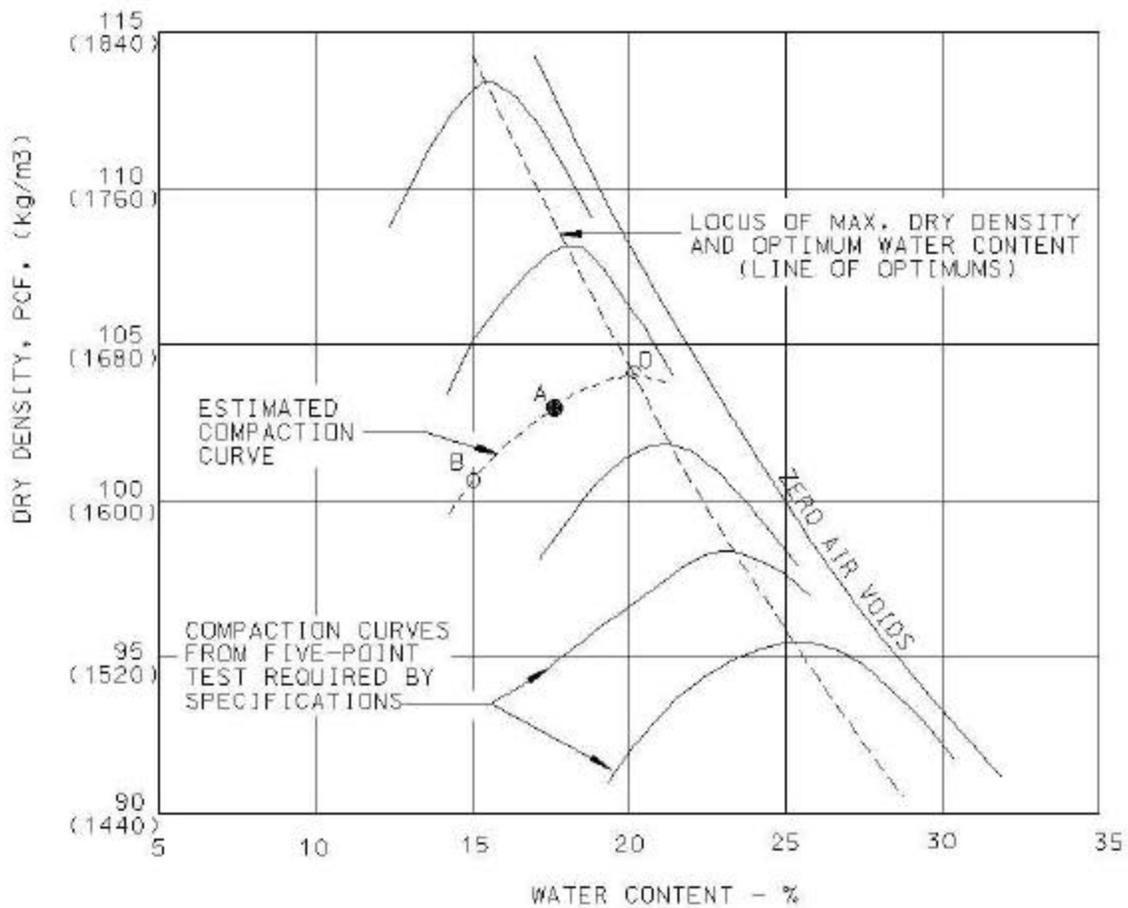
-- End of Section --



PROCEDURE:

1. Point A is the result of a one-point compaction test on material from field density test. This point must be on the dry side of optimum water content.
2. Point O is the estimated optimum water content and maximum density of the fill material based on a projection of point A approximately parallel to the adjacent compaction curves.
3. Point A must plot within 3 percent of the line of optimums.

Figure 1. Illustration of one-point compaction method.



PROCEDURE:

1. Points A and B are results of a two-point compaction test on material from field density test. Points A and B must be on the dry side of optimum water content.
2. The estimated compaction curve based on Points A and B establishes Point O on the locus, which is the estimated maximum dry density and optimum water content of the fill material.
3. One point must plot within 3 percent of the line of optimums.

Figure 2. Illustration of two-point compaction method.

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SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

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PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1140	(2000) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.2 OMITTED

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Tracer Wire; G, RO

Sample of tracer wire, including manufacturer's descriptive technical literature, specifications, and installation instructions. Sample and information shall be submitted at least 60 days prior to the initial installation of any tracer wire.

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SD-06 Test Reports

Field Density Tests
Testing of Fill and Backfill Materials

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

SD-07 Certificates

Testing; G, RO

Qualifications of the commercial testing laboratory.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, and CL-ML.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, GP-GC, GM-GC, SW-SC, SP-SC, SC, ML, CL, CL-MH, MH, and CH and the unsatisfactory organic materials Pt, OL and OH. Materials classified as GM, GP-GM, GW-GM, SM, SW-SM, and SP-SM will be identified as cohesionless only when the fines have a plasticity index of zero; otherwise they will be considered cohesive.

2.1.4 Omitted

2.1.5 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.6 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

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2.1.7 Select Granular Material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 2 inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.8 Initial Backfill Material

Initial backfill shall consist of select granular material or satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 1 inch in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

2.2 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

2.3 TRACER WIRE

Tracer wire shall be insulated No. 12 AWG solid copper and of a type specifically manufactured for locating underground utilities. Insulation shall be solid yellow in color. Tracer wire shall be subject to approval by the Contracting Officer.

PART 3 EXECUTION

3.1 EXCAVATION

Excavation of every description, regardless of material encountered, shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be disposed of as specified in Section 02300 EARTHWORK. Grading shall be done as may be

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necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

3.1.1 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical, except that trench construction shall be in accordance with OHSA. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.1.2 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed 4 inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members and of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to

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disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.1.1.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.1.2 Stockpiles

Stockpiles of satisfactory and unsatisfactory and waste materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment. Excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. Locations of stockpiles shall be subject to prior approval of the Contracting Officer.

3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 90 percent maximum density, unless otherwise specified.

3.2.1 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test. The trench shall not be backfilled until all specified tests are performed.

3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

3.2.1.3 Initial Backfill

Initial backfill material shall be placed and compacted with approved tampers to a height of at least 1 foot above the utility pipe or conduit.

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The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.2.1.4 Final Backfill

The remainder of the trench, except for special materials for roadways, railroads and airfields, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

- a. Roadways, Railroads, and Airfields: Backfill shall be placed up to the elevation at which the requirements in Section 02300 EARTHWORK control. Water flooding or jetting methods of compaction will not be permitted.
- b. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12 inches loose thickness, and compacted to 85 percent maximum density. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

3.2.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed, and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.3 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.3.1 Omitted

3.3.2 Water Lines

Trenches shall be of a depth to provide a minimum cover of 30 inches in unpaved areas and 36 inches in paved areas from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.3.3 Heat Distribution System

Initial backfill material shall be free of stones larger than 1/4 inch in any dimension.

3.3.4 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 24 inches from the finished grade, unless otherwise indicated. Special trenching requirements for direct-burial electrical cables and conduits are specified in Section 16375 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND.

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3.3.5 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 18 inches below finished grade unless otherwise shown.

3.3.6 Tracer Wire

In addition to the plastic marking tape, tracer wire shall also be provided for the underground utilities. Tracer wire shall be provided for all pipe lines, including force mains and sprinkler system lines, but excluding storm drain and sanitary sewer lines. Tracer wire shall be provided for all electrical and communication conduits and direct buried cables. Tracer wire shall be installed on the bottom of the trench just to one side of where the pipe, conduit, or cable contacts the trench bottom. The wire shall run continuously between and terminate at valve boxes on water and gas lines, regulator stub-ups on gas lines, sprinkler heads and valve boxes on sprinkler system lines, panel boxes on electrical lines, and other such aboveground appurtenances. Each end of the wire shall have an additional length of at least 2 feet coiled up in the appurtenance.

3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. 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.

3.4.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory. No work requiring testing will be permitted until the facilities have been approved by the Contracting Officer.

3.4.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 1557. Grain size of bedding and backfill materials shall be determined in accordance with ASTM C 136 or ASTM D 422 and ASTM D 1140 (wash No. 200, without hydrometer), as appropriate. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.4.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 150 linear feet, or fraction thereof, of installation shall be performed. One moisture density relationship shall be determined for every 250 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 1556. Copies of field and laboratory tests shall be furnished to the Contracting Officer. When test results indicate that compaction is not as specified, the material shall be removed, replaced and recompact to meet specification requirements. Tests on recompact areas shall be performed to determine conformance with

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specification requirements, at no additional cost to the Government.

3.4.3.1 Compaction Control

The tests required on materials prior to placement and the compaction control procedures and methods specified in Section 02315 EXCAVATION, FILLING, AND BACKFILLING FOR BUILDINGS, Paragraph TESTING (with the exception of paragraph 3.14.3.1 Field Density Tests) in regard to compaction control of soils, and utilizing the one-point or two-point compaction methods to relate field density data to laboratory test values, shall fully apply to and be considered a part of this specification section.

3.4.4 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to the finished grade surface, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 36 inches shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

-- End of Section --

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SECTION 02463A

STEEL H-PILES (BATTER PILES)

10/01

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(2000) Carbon Structural Steel
ASTM A 572/A 572M	(2000) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 690/A 690M	(2000) High-Strength Low-Alloy Steel H-Piles and Sheet Piling for Use in Marine Environments
ASTM D 4945	(2000) Method for High-Strain Dynamic Testing of Piles

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel
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1.2 UNIT PRICES

1.2.1 Omitted

1.2.2 Driving Steel H-Piles

1.2.2.1 Payment

Payment will be made for costs associated with driving permanent piles, which includes costs of furnishing and delivering the required lengths of piles to the work site, coating, handling, driving, and splicing piles, cutting off piles at the cutoff elevation and removing cutoffs from the work site, compiling and submitting pile driving records, backfilling voids around piles, and any other items incidental to driving piles to the required elevation. No payment will be made for misplaced piles or piles exceeding the maximum limits for rotation, lateral deviation, and variation in alignment. No payment will be made for piles impaired during driving to the extent that they are determined by the Contracting Officer to be unsuitable for the work.

1.2.2.2 Measurement

Permanent piles will be measured for payment for driving on the basis of lengths, to the nearest tenth of a linear foot along the axis of each pile

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acceptably in place below the cutoff elevation shown.

1.2.2.3 Unit of Measure

Unit of measure: linear foot.

1.2.3 Omitted

1.2.4 ~~Steel H Pile Driving Tests Deleted~~

~~1.2.4.1 Payment~~

~~Payment will be made for costs associated with furnishing, delivering, driving, including pile splices; conducting pile driving tests; backfilling voids around piles; compiling pile driving test records; and furnishing, installing, and operating a pile driving analyzer and reducing its data and preparing reports. Where a driving test pile is left in place as a permanent pile it shall be paid for only as a driving test pile. Any build ups necessary to continue driving the pile for test purposes, as directed by the Contracting Officer, shall be paid for only as a driving test pile. Other build ups made to incorporate the pile into the structure as a permanent pile shall be included in the quantities of regular piling and shall not be paid for as driving test piles.~~

~~1.2.4.2 Measurement~~

~~Steel H Pile driving tests will be measured for payment on the basis of the applicable contract unit price per pile driving test.~~

~~1.2.4.3 Unit of Measure~~

~~Unit of measure: each.~~

1.2.5 Omitted

1.2.6 Omitted

1.2.7 Omitted

1.2.8 Omitted

1.2.9 Omitted

1.2.10 Omitted

1.2.11 Omitted

1.2.12 Omitted

1.2.13 Omitted

1.2.14 Basis for Bid

The bid price for piling shall be based on TABLE 1 having a total aggregate length of 2290 feet.

TABLE 1. PILE SCHEDULE FOR BIDDING

Location	Number	Size	Ultimate Capacity	Length (each)
Bridge 8511				
Piles	20	H12x53	150 kips	40 feet
Test Piles	2	H12x53	150 kips	50 feet
Bridge 8517				
Piles	16	H12x53	150 kips	35 feet

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TABLE 1. PILE SCHEDULE FOR BIDDING

Location	Number	Size	Ultimate Capacity	Length (each)
Bridge 8511				
Piles	20	H12x53	150 kips	40 feet
Test Piles	2	H12x53	150 kips	45 feet
Bridge 8518				
Piles	16	H12x53	150 kips	40 feet
Test Piles	2	H12x53	150 kips	50 feet

1.2.14.1 Variations in Pile Quantities

The Contracting Officer reserves the right to increase or decrease the aggregate length of piles to be furnished and installed by changing the pile locations or elevations, requiring the installation of additional piles, or directing the omission of piles from the requirements shown and specified. Should the total pile length installed vary from that specified as the basis for bidding because of added or omitted piles or variations in the pile length the principal sum shall be adjusted by the amount bid per foot for "Additional Pile Length" or "Omitted Pile Length" multiplied by the actual length added or omitted.

1.3 SUBMITTALS

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

SD-02 Shop Drawings

Pile Splices; G, ED

Submit detail drawings of pile splices prior to fabrication.

Pile Placement; G, ED

Submit pile placement plan at least 30 days prior to delivery of piles to the job site.

Templates; G, ED

Detailed drawings of templates to be employed in the work at least 30 days prior to commencement of any pile installation.

SD-03 Product Data

Materials; G, ED

Certified copies of mill test reports for structural steel prior to commencement of pile installations.

Pile Driving Equipment; G, ED

Descriptions of all pile driving equipment to be employed in the

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work, at least 30 days prior to commencement of any pile installations, including details of the pile hammer, power plant, leads, cushion material, and helmet.

Pile Driving Records; G, ED

Submit the proposed form for compiling pile driving records 30 days prior to commencement of work.

Wave Equation Analysis; G, ED

Submit wave equation analysis for review at 15 days prior to driving of test piles.

SD-06 Test Reports

Pile Driving; G, ED

A complete and accurate record of each driven pile, within 3 days of completion of driving. The record shall indicate the pile location (as driven), size, driven length, embedded length, final elevations of tip and top, pile weight, number of splices and locations, blows required for each foot of penetration throughout the entire length of the pile and for the final 6 inches of penetration, and the total driving time. The record shall also include the type and size of the hammer used, the rate of operation, and the type and dimensions of driving helmet and cushion block used. Any unusual conditions, encountered during pile installation shall be recorded and immediately reported to the Contracting Officer.

The format for driving records shall be subject to the approval of the Contracting Officer. Approval shall be obtained prior to commencing pile driving.

Pile Driving Analyzer; G, ED

Submit pile driving analyzer data within one (1) week after each test is completed.

Dynamic Testing of Piles; G, ED

Submit reports of the dynamic testing of piles within one (1) week after dynamic testing is completed.

1.4 DELIVERY, STORAGE, AND HANDLING

Delivery, storage, and handling of materials shall conform to the requirements specified herein. Plans for the delivery, storage, and handling of piles shall be developed and submitted in accordance with paragraph SUBMITTALS.

1.4.1 Delivery and Storage

Piles shall be stacked during delivery and storage so that each pile is maintained in a straight position and is supported every 10 feet or less along its length (ends inclusive) to prevent exceeding the maximum camber or sweep. Piles shall not be stacked more than 5 feet high.

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1.4.2 Handling

Piles shall be lifted using a cradle or multiple points pick-up to ensure that the maximum permissible camber or sweep is not exceeded due to insufficient support, except that a one-point pick-up may be used for lifting piles that are not extremely long into the driving leads. Point pick-up devices shall be of the type that clamp to both pile flanges at each pick-up point. Holes may be burned in the flanges or webs of piles above the cutoff length for lifting piles into the leads. Piles shall not be dragged across the ground. The Contractor shall inspect piles for excessive camber and sweep and for damages before transporting them from the storage area to the driving area and immediately prior to placement in the driving leads. Camber, curvature in the pile in the direction normal to the pile flanges, shall be measured with the pile flange base laying on a flat surface and shall be the distance between the flange base at the mid-length of the pile and the flat surface. Sweep, curvature in the pile in the direction parallel to the pile flanges, shall be measured with the pile flange tips laying on a flat surface and shall be the distance between the flange tips at the mid-length of the pile and the flat surface. The maximum permissible camber and/or sweep shall be 2 inches over the length of the pile. Piles having excessive camber or sweep will be rejected.

1.5 EXPERIENCE

The work shall be performed by a general contractor or a specialty subcontractor specializing in the specified foundation system and having experience installing the specified foundation system under similar subsurface conditions.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Steel

Steel for H-piles and splice plates shall conform to ASTM A 36/A 36M, ASTM A 572/A 572M, or ASTM A 690/A 690M.

2.1.2 H-Piles

H-piles shall be of the shape and sections shown and shall have standard square ends unless otherwise directed. Lengths of piles shall be determined as specified in paragraph INSTALLATION, subparagraph LENGTHS OF PERMANENT PILES and paragraph PILE TESTS, subparagraph TEST PILES.

PART 3 EXECUTION

3.1 PILE DRIVING EQUIPMENT

Select the proposed pile driving equipment, including hammers and other required items, and submit complete descriptions of the proposed equipment in accordance with paragraph SUBMITTALS. Changes in the selected pile driving equipment will not be allowed after the equipment has been approved except as directed. No additional contract time will be allowed for Contractor proposed changes in the equipment.

3.1.1 Pile Driving Hammers

Pile driving hammers shall be of the impact and/or vibratory type.

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3.1.1.1 Impact Hammers

Impact hammers shall be steam, air, or diesel hammers of the single acting, double-acting, or differential acting type. The rated energy of hammers shall be limited to a minimum of 32,000 foot-pounds. Hammers shall be capable of, and so demonstrated during the development of refusal criteria, hard driving in excess of 20 blows per inch. Boiler, compressor, or engine capacity shall be sufficient to operate hammers continuously at the full rated speed. Hammers shall have a gage to monitor hammer bounce chamber pressure for diesel hammers or pressure at the hammer for air and steam hammers. This gage shall be operational during the driving of piles and shall be mounted in an accessible location for monitoring by the Contractor and the Contracting Officer. The Contractor shall provide bounce chamber pressure gage correction tables and charts for the type and length of hose to be used with the pressure gage to the Contracting Officer. In accordance with paragraph SUBMITTALS, submit the following information for each impact hammer proposed:

- a. Make and model and all modifications.
- b. Ram weight (pounds).
- c. Anvil weight (pounds).
- d. Rated stroke (inches).
- e. Rated energy range (foot-pounds).
- f. Rated speed (blows per minute).
- g. Steam or air pressure, hammer, and boiler or compressor (psi).
- h. Rated bounce chamber pressure curves or charts, including pressure correction chart for type and length of hose used with pressure gage (pounds per square inch).
- i. Pile driving cap, make, dimensions and weight (pounds).
- j. Cushion block dimensions, thickness, and material type(s).
- k. Power pack description.

3.1.1.2 Vibratory Hammers

The use of vibratory hammers is dependent upon satisfactory driving and dynamic testing of piles. Final approval of the proposed hammer and other driving equipment is subject to the satisfactory completion and approval of the pile tests. The size or capacity of hammers shall be as recommended by the manufacturer for the pile weight and soil formation to be penetrated. The hammer shall provide for maintaining a rigid connection between the hammer and the pile. In accordance with paragraph SUBMITTALS, submit the following information for each vibratory hammer proposed:

- a. Make and model.
- b. Eccentric moment (inch-pounds).
- c. Dynamic force (tons).

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- d. Steady state frequency or frequency range (cycles per minute).
- e. Vibrating weight (pounds).
- f. Amplitude (inches).
- g. Maximum pull capacity (tons).
- h. Nonvibrating weight (pounds).
- i. Power pack description.

3.1.2 Pile Driving Leads

Hammers shall be supported and guided with fixed extended leads or fixed underhung leads. For driving battered piles, impact hammers shall be supported and guided with three-axis, fixed-extended leads capable of 1 H and 2-1/2 V fore and aft batter and 1 H on 6 V side batter, with 30 degree rotation each side of an axis running along the center line of rotation of the crane through the center line of the leads. For driving battered piles, vibratory hammers shall be supported and guided with fixed extended leads or templates. Two intermediate supports for the pile in the leads shall be provided to reduce the unbraced length of the pile during driving and pulling.

3.1.3 Pile Extractors

Pile extractors may be vibratory or impact pile driving hammers. Impact hammers are required for pulling piles not extractable with vibratory hammers.

3.1.4 Jetting

Jetting will not be permitted.

3.1.5 Driving Helmets and Hammer Cushions

A driving helmet or cap including a hammer cushion shall be used between the top of the pile and the ram to prevent impact damage to the pile. The driving helmet or cap and hammer cushion combination shall be capable of protecting the head of the pile, minimizing energy absorption and dissipation, and transmitting hammer energy uniformly over the top of the pile. The driving helmet or cap shall fit loosely around the top of the pile so that the pile is not restrained by the driving cap if the pile tends to rotate during driving. The hammer cushion (also called the capblock cushion) shall generally be as recommended by the hammer manufacturer. The cushion shall be constructed of durable manmade materials, with uniform known properties. Wood chips, wood blocks, rope, cable, or other materials which permit excessive loss of hammer energy shall not be used. Cushion constructed of asbestos materials shall not be used. All proposed cushion materials and proposed thicknesses for use require approval by the Contracting Officer and shall be subject to satisfactory performance in the field. Cushions shall be maintained in good condition and changed when charred, melted, or otherwise deteriorated. The cushion shall be inspected before driving begins and weekly or at appropriate intervals determined by the Contracting Officer based on field trial. Any hammer cushion which loses more than 25 percent of its original thickness shall be replaced or repaired, in accordance with the manufacturer's instructions, by the Contractor before driving is permitted.

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3.2 INSTALLATION

3.2.1 Lengths of Permanent Piles

The estimated quantities of piles listed in the unit price schedule are given for bidding purposes only. The Contracting Officer will determine the actual lengths of piles required to be driven below cutoff elevation for the various locations in the work and will furnish the Contractor a quantities list indicating lengths and locations of all piles to be installed. Where required bearings capacities are attainable with piles of lesser length than those specified, shorter piles may be used subject to prior written approval.

3.2.2 Pile Driving Records

Develop a form for compiling pile driving records which must be approved. Complete and accurate records of the pile driving operations shall be compiled on the approved form and submitted in accordance with paragraph SUBMITTALS. Driving records for each pile shall include date driven, pile identification number, pile dimensions, location, top elevation, tip elevation, batter alignment, description of hammer used, number of blows required for each foot of penetration throughout the entire length of the pile and for each inch of penetration in the last foot of penetration, total driving time in minutes and seconds, and any other pertinent information as required or requested such as unusual driving conditions, interruptions or delays during driving, damage to pile resulting from driving, heave in adjacent piles, and depth and description of voids formed adjacent to the pile. Additional data required to be recorded for impact hammers include the rate of hammer operation and the length of the bounce hose. Additional data required to be recorded for vibratory hammers include hammer power pack description, horsepower applied to pile, and hammer operating frequency.

3.2.3 Pile Placement

A pile placement plan which shows the installation sequence and the methods proposed for controlling the location and alignment of piles shall be developed and submitted in accordance with paragraph SUBMITTALS. Foundation preparation and temporary removal of stone material shall be completed as necessary prior to the placement of piles for driving. Piles shall be placed accurately in the correct location and alignments, both laterally and longitudinally, and to the vertical or batter lines indicated. The Contractor shall establish a permanent base line to provide for inspection of pile placement by the Contracting Officer during pile driving operations. The base line shall be established prior to driving permanent piles and shall be maintained during the installation of the permanent piles. A final lateral deviation from the correct location at the cutoff elevation of not more than 3 inches will be permitted for vertical and battered piles. A final variation in alignment of not more than 1/4 if of longitudinal axis will be permitted. A final variation in rotation of the pile about the center line of the web of not more than 7.5 degrees will be permitted. A vertical deviation of not more than 2 inches from the correct cut off elevations shown will be permitted. The correct relative position of all piles shall be maintained by the use of templates or by other approved means. Piles not located properly or exceeding the maximum limits for rotation, lateral deviation, or variation in alignment shall be pulled and redriven at as location directed at no additional cost to the Government.

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3.2.4 Pile Penetration Criteria

The controlling final depth of penetrations and refusal blow count (number of blows required to attain the final inch of penetration) for permanent piles will be determined by the Contracting Officer. The required depth of penetration and refusal blow count will be established subsequent to the analysis of pile tests as specified in paragraph PILE TESTS.

3.2.5 Pile Driving

The Contracting Officer shall be notified 30 days prior to the date pile driving is to begin. Piles shall not be driven within 100 feet of concrete less than 7 days old. Permanent and test piles shall be driven with hammers of the same model and manufacturer, same energy and efficiency, and using the same driving system. Hammers shall be operated at all times at the speed and under the conditions recommended by the manufacturer. Prior to driving and with the pile head seated in the hammer, each pile shall be checked to ensure that it has been aligned correctly and that the orientation of the web about the centerline is as shown. Once pile driving has begun, conditions such as alignment and batter shall be kept constant. The alignment of battered piles shall be checked and monitored during driving with an accurate batter board level and surveying instrument. Each pile shall be driven continuously and without interruption until the required minimum depth of penetration and refusal blow count has been attained. Deviation from this procedure will be permitted only when driving is stopped by causes that reasonably could not have been anticipated. A pile that can not be driven to the required depth because of an obstruction, as indicated by a sudden unexplained change in blow count and drifting, shall be pulled and redriven or shall be cut off and abandoned, whichever is directed. After piles are driven, they shall be cutoff square as required at the indicated cutoff elevation. Any voids around piles or abandoned holes for pulled piles shall be backfilled using bedding layer stone.

3.2.5.1 Splicing Piles

When approved, provide splices of the full penetration butt weld type. Use only one splice per length of pile. Avoid field splices for lengths under 80 feet. Construct splices to maintain the true alignment and position of the pile sections. Splices shall develop the full strength of the pile in both bearing and bending. Shop and field welding, qualification of welding procedures, welders, and welding operators shall be in accordance with AWS D1.1.

3.2.5.2 Jetting

Jetting of piles will not be permitted.

3.2.5.3 Heaved Piles

When driving piles in clusters or under conditions of relatively close spacing, observations shall be made to detect heave of adjacent piles. Heaved piles shall be back driven to original depth of penetration without additional cost to the Government.

3.2.5.4 Pulled Piles

Piles damaged or impaired for use during driving shall be pulled and

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replaced with new piles, or shall be cut off and abandoned and new piles driven as directed without additional cost to the Government. The Contracting Officer may require that any pile be pulled for inspection. Piles pulled as directed and found to be in suitable condition shall be redriven at another location as directed. Piles pulled as directed and found to be damaged shall be replaced by new piles at the Contractor's expense.

3.3 PILE TESTS

Pile Tests - Pile driving tests shall be performed as specified or as directed. The Contracting Officer will develop the correlation between pile driving resistance, pile length and pile capacity during the pile driving tests for the selected pile driving system. Based on the correlations developed, the Contracting Officer will determine the refusal blow count and/or minimum tip elevation for the permanent piles. Changes in the approved pile driving system during or after completion of tests will not be allowed unless additional tests are performed as directed to establish the correlation between driving resistance, length and pile capacity for the proposed changed system. For changes in the approved pile driving system proposed by the Contractor, required additional pile driving tests shall be performed at the Contractor's expense and no additional contract time will be allowed.

3.3.1 Test Piles

The driving test piles shall have a length of 10 feet greater than the indicated pile, unless otherwise directed and shall be placed at the indicated and/or directed locations. Test piles shall be driven with the same equipment specified in paragraph EQUIPMENT and in the same manner specified in paragraph INSTALLATION, for permanent piles. The driving record data shall be recorded for each test pile driven. A pile driving analyzer shall be provided and operated as specified in paragraph PILE DRIVING TEST during the driving of each test pile if an impact hammer is utilized. The stresses in the piles will be monitored with the dynamic test equipment during driving to ensure that the allowable stresses are not exceeded. If necessary, the Contractor shall add additional cushioning, replace the cushions, or reduce the hammer stroke to maintain stresses below the maximum allowable. If non-axial driving is indicated by dynamic test equipment measurements, the Contractor shall immediately realign the driving system. If the cushion is compressed to the point that a change in alignment of the hammer will not correct the problem, the Contractor shall add cushioning or change the cushion as directed by the Contracting Officer. The Contractor shall drive the piles to the required penetration and/or resistance as directed by the Contracting Officer.

3.3.2 Pile Driving Tests

Four pile driving tests shall be performed, one at each row of piles supporting an end bent. The Contracting Officer will be present during each pile driving test. Pile driving tests shall be carried to completion without interruption. Any pile driving test not accomplished in accordance with this specification shall be redone at no additional cost to the Government.

3.3.3 Dynamic Testing of Piles

The Contractor shall provide a specialty engineering firm to perform dynamic testing of piles to determine velocity of stress wave propagation,

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acceleration, monitor hammer and drive system performance, assess pile installation stresses and integrity, and to evaluate pile capacity. Personnel experienced in performing wave equation analysis, dynamic testing, and interpretation of results shall be furnished to install and operate the testing equipment, and to furnished to install and operate the testing equipment, and to interpret its results. Equipment to obtain dynamic measurements, record, reduce and display its data shall be furnished and meet the requirement of ASTM D 4945. The equipment shall have been calibrated within the past 12 months. All power requirements for operating the equipment shall be supplied by the Contractor. Prior to commencing pile driving, a wave equation analysis shall be performed and the results submitted in accordance with paragraph SUBMITTALS.

3.3.3.1 Test Piles

Dynamic testing shall be performed on the test piles as indicated. Testing shall be performed during the full length of pile driving if an impact hammer is utilized. If a vibratory hammer is used, then testing shall be performed only during the restriking of the pile; however, the restriking of the pile shall be performed using an approved impact hammer. Piles installed as part of pile driving test shall be restruck after a minimum waiting period of 7 days. The hammer shall be warmed up prior to restriking. Restriking shall consist of restriking the pile for 50 blows or until the pile penetrates an additional 3 inches, whichever occurs first. In the event the pile movement is less than 1/4 inch during restrike, the restrike may be terminated after 20 blows.

3.3.3.2 Omitted

3.3.3.3 Reports

A summary report of dynamic test results for test piles shall be prepared and submitted in accordance with paragraph SUBMITTALS. The report shall discuss pile capacity obtained from dynamic testing and also include velocity of stress wave propagation, acceleration, evaluation of hammer and driving system performance, driving stress levels, and pile integrity. A CAPWAPC, or similar, analysis of the dynamic test data shall be performed on data obtained from the end of initial driving in the case of an impact hammer, and the beginning of restrike for test piles as directed. The analysis shall be used to predict pile capacity, establish resistance distribution, and predict quake and damping factors. Refined wave equation analyses incorporating the results of dynamic testing and analysis shall be included. The report for the test piles shall include the pile driving record as an attachment and also address the items listed in paragraph "7.1.5 Dynamic Testing" of ASTM D 4945.

-- End of Section --

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SECTION 02464A

METAL SHEET PILING

05/92

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 6/A 6M (2000) General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

ASTM A 328/A 328M (200) Steel Sheet Piling

1.2 ~~UNIT PRICES~~DELETED

~~1.2.1 Steel Sheet Piling, Type PZ27~~

~~ASTM A 328.~~

~~1.2.1.1 Payment~~

~~Payment for sheet piling quantities will be made at the applicable contract price per linear foot for furnished and installed sheet piling. Payment shall cover all cost of furnishing, handling, storing and installing piling including placing, driving, cutting holes and other materials and work incident thereto.~~

~~1.2.1.2 Measurement~~

~~The length of sheet piling installed will be measured to the nearest tenth of a linear foot. For installed pilings directed to be cut off before reaching the penetration depth shown, the portion cut off will be measured for payment as the difference between the total length of piling shown on the plans for that location and the length of piling installed below the point of cut off.~~

~~1.2.1.3 Unit of Measure~~

~~Unit of measure: linear foot.~~

~~1.2.2 Steel Sheet Piling Fabricated Sections, Type PZ27~~

~~ASTM A 328.~~

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~~1.2.2.1 — Payment~~

~~Payment for sheet piling quantities will be made at the applicable contract price per linear foot for furnished and installed sheet piling. Payment shall cover all cost of furnishing, handling, storing and installing piling including placing, driving, cutting holes and other materials and work incident thereto.~~

~~1.2.2.2 — Measurement~~

~~The length of sheet piling installed will be measured to the nearest tenth of a linear foot. For installed pilings directed to be cut off before reaching the penetration depth shown, the portion cut off will be measured for payment as the difference between the total length of piling shown on the plans for that location and the length of piling installed below the point of cut off.~~

~~1.2.2.3 — Unit of Measure~~

~~Unit of measure: linear foot.~~

- 1.2.1 Omitted
- 1.2.2 Omitted
- 1.2.3 Omitted
- 1.2.4 Omitted

~~1.2.7 — Cut Offs~~

~~1.2.7.1 — Payment~~

~~When pilings which have not been driven to penetration depths shown are directed to be cut off except for cut offs due to excessive battering no separate payment shall be made for the cut off. Their cost should as incidental item be included in paragraph 1.2.1.1 Payment.~~

~~1.2.8 — Splices~~

~~1.2.8.1 — Payment~~

~~Payment will be made for each piling spliced at the direction of the Contracting Officer to drive the piling to a depth greater than shown and extend it up to the required top elevation. An additional sum will be paid for each linear foot of the piling extension at the applicable contract unit price.~~

~~1.2.8.2 — Measurement~~

~~Splices will be measured for payment for each piling spliced.~~

~~1.2.8.3 — Unit of Measure~~

~~Unit of measure: each.~~

~~1.2.9 — Pulled Pilings~~

~~1.2.9.1 — Payment~~

~~The Contractor furnished pilings which have been installed and are pulled at the direction of the Contracting Officer and found to be in good~~

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~~condition will be paid for at the applicable contract unit price for furnishing and installing the pilings in their initial position plus an equal amount for the cost of pulling.~~

~~1.2.9.2 Measurement~~

~~When such pulled pilings are re-driven, an additional amount equal to 50 percent of the applicable contract unit price for furnishing and driving the pilings will be paid for re-driving the pilings. This additional price constitutes payment for re-driving only. The cost of furnishing, initial driving, and pulling the pilings is to be paid for as specified.~~

~~When pilings are pulled and found to be damaged no payment will be made for the initial furnishing and driving or for the pulling of such pilings. Pilings replacing damaged pilings will be paid for at the applicable contract unit prices.~~

~~1.2.9.3 Unit of Measure~~

~~Unit of measure: each.~~

~~1.2.10 Removal of Sheet Pilings~~

~~1.2.10.1 Payment~~

~~Payment will be made for costs associated with removal of sheet pilings. Payment shall cover cost of pulling, cleaning the interlock, sorting, inventorying and storing.~~

~~1.2.10.2 Measurement~~

~~Removal of sheet piling will be made at the applicable contract price per linear foot for the removal of sheet pilings.~~

~~1.2.10.3 Unit of Measure~~

~~Unit of measure: linear foot.~~

1.3 SUBMITTALS

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

SD-02 Shop Drawings

Metal Sheet Piling; G, ED

Detail drawings for sheet piling including fabricated sections shall show complete piling dimensions and details, driving sequence and location of installed piling. Detail drawings shall include details and dimensions of templates and other temporary guide structures for installing piling. Detail drawings shall provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

Driving; G, ED

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Records of the sheet piling driving operations shall be submitted after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling. The format for driving records shall be as directed.

SD-03 Product Data

Pile Driving Equipment; G, ED

Complete descriptions of sheet piling driving equipment including hammers, jetting equipment, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.

Pulling and Redriving; G, RE

The proposed method of pulling sheet piling shall be submitted and approved prior to pulling any piling.

SD-06 Test Reports

Materials Tests; G, ED

Certified materials tests reports showing that sheet piling and appurtenant metal materials meet the specified requirements shall be submitted for each shipment and identified with specific lots prior to installing materials. Material test reports shall meet the requirements of ASTM A 6/A 6M.

1.4 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling as required by the referenced specifications. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of sheet piling should also facilitate required inspection activities. Sheet piling over 80 feet in length shall be handled using a minimum of two pickup points.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

Metal sheet piling shall be hot-rolled steel sections conforming to ASTM A 328/A 328M. The interlocks of sheet piling shall be free-sliding, provide a swing angle suitable for the intended installation but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed. Sheet piling including special fabricated sections shall be full-length sections of the dimensions shown. Sheet piling shall be provided with standard pulling holes.

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PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving Equipment

Pile driving equipment shall conform to the following requirements.

3.1.1.1 Driving Hammers

Hammers shall be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type. The driving energy of the hammers shall be between 8,750 and 16,000 foot-pounds as recommended by the manufacturer for the piling weights and subsurface materials to be encountered.

3.1.2 Placing and Driving

3.1.2.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be carefully located as shown or directed. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Temporary wales, templates, or guide structures shall be provided to insure that the pilings are placed and driven to the correct alignment. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

3.1.2.2 Driving

Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths. Driving hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. Caution shall be taken in the sustained use of vibratory hammers when a hard driving condition is encountered to avoid interlock-melt or damages. The use of vibratory hammers should be discontinued and impact hammers employed when the penetration rate due to vibratory loading is one foot or less per minute. A protecting cap shall be employed in driving when using impact hammers to prevent damage to the tops of pilings. Pilings damaged during driving or driven out of interlock shall be removed and replaced at the Contractor's expense. Pilings shall be driven without the aid of a water jet. Adequate precautions shall be taken to insure that pilings are driven plumb. If at any time the forward or leading edge of the piling wall is found to be out-of-plumb in the plane of the wall the piling being driven shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures shall be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1/8 inch per foot of length. Pilings in each run or continuous length of piling wall shall be driven alternately in increments of depth to the required depth or elevation. No piling shall be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. If the piling next to the one being driven tends to follow below final elevation it may be pinned to the next adjacent piling. If obstructions restrict driving a piling to the specified penetration the

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obstructions shall be removed or penetrated with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical the Contractor shall make changes in the design alignment of the piling structure as directed to insure the adequacy and stability of the structure. Pilings shall be driven to depths shown and shall extend up to the elevation indicated for the top of pilings. A tolerance of 1 inch above the indicated top elevation will be permitted. Pilings shall not be driven within 100 feet of concrete less than 7 days old.

3.1.3 Cutting-Off and Splicing

Pilings driven to refusal or to the point where additional penetration cannot be attained and are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation. Pilings driven below the required top elevation and pilings damaged by driving and cut off to permit further driving shall be extended as required to reach the top elevation by splicing when directed at no additional cost to the Government. If directed pilings shall be spliced as required to drive them to depths greater than shown and extend them up to the required top elevation. Pilings adjoining spliced pilings shall be full length unless otherwise approved. If splices are allowed in adjoining pilings the splices must be spaced at least 5 feet apart in elevation. Ends of pilings to be spliced shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips or camber at the abutting interlocks. Spliced pilings shall be free sliding and able to obtain the maximum swing with contiguous pilings. The tops of pilings excessively battered during driving shall be trimmed when directed at no cost to the Government. Piling cut-offs shall become the property of the Contractor and shall be removed from the site. The Contractor shall cut holes in pilings for bolts, rods, drains or utilities as shown or as directed. All cutting shall be done in a neat and workmanlike manner. A straight edge shall be used in cuts made by burning to avoid abrupt nicks. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods which will not damage the surrounding metal. Holes other than bolt holes shall be reasonably smooth and the proper size for rods and other items to be inserted.

3.1.4 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.1.5 Pulling and Redriving

In the pulling and redriving of piles as directed, the Contractor shall pull selected pilings after driving to determine the condition of the underground portions of pilings. Any piling so pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed and replaced at the Contractor's expense. Pilings pulled and found to be in satisfactory condition shall be redriven when directed.

3.2 REMOVAL

The removal of sheet pilings shall consist of pulling, sorting, cleaning the interlocks, inventorying and storing previously installed sheet pilings as shown and directed.

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3.2.1 Pulling

The method of pulling piling must be approved. Pulling holes shall be provided in pilings as required. Extractors shall be of suitable type and size. Care shall be exercised during pulling of pilings to avoid damaging piling interlocks and adjacent construction. If the Contracting Officer determines that adjacent permanent construction has been damaged during pulling the Contractor will be required to repair this construction at no cost to the Government. Pilings shall be pulled one sheet at a time. Pilings fused together shall be separated prior to pulling unless the Contractor demonstrates to the satisfaction of the Contracting Officer that the pilings cannot be separated. The Contractor will not be paid for the removal of pilings damaged beyond structural use due to proper care not being exercised during pulling.

3.2.2 Sorting, Cleaning, Inventorying and Storing

Pulled pilings shall be sorted, cleaned, inventoried and stored by type into groups as:

- a. Piling usable without reconditioning.
- b. Piling requiring reconditioning.
- c. Piling damaged beyond structural use.

3.3 QUANTITIES

The estimated quantities of sheet piling listed in the unit price schedule of the contract as to be furnished by the Contractor are given for bidding purposes only. Sheet piling quantities for payment shall consist of the linear feet of piling acceptably installed and removed. Installed quantities shall consist of all piling including fabricated sections driven between the required top and bottom elevations of pilings plus any additions thereto resulting from changes in design or alignment as provided in paragraph DRIVING. Removed quantities shall consist of the lengths of piling pulled from below the ground level.

-- End of Section --

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SECTION 02547

BITUMINOUS PAVEMENT WITH BASE COURSE

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-- End of Section Table of Contents --

Includes changes through Notice 5 (June 1995)

SECTION 02547

BITUMINOUS PAVEMENT WITH BASE COURSE
(Modified North Carolina Department of Transportation Specifications)
(For less than 1,000 tons)
01/98

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 88	(1990) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 140	(1993) Sampling Bituminous Materials

1.2 DESCRIPTION OF WORK

The work covered by this section consists of the construction of a bituminous pavement consisting of a base course, bituminous prime and tack coats and a bituminous surface course and/or courses on a properly prepared subgrade and in conformity with the lines, grades, thicknesses and typical section and/or sections shown on the plans. The construction of the bituminous pavement shall conform to the requirements of the "North Carolina Department of Transportation Standard Specifications for Roads and Structures," except for the modifications or revisions specified herein.

1.3 DESCRIPTION OF TERMS

Wherever in the North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures, hereinafter referred to as the "Standard Specifications," the following terms are used, the intent shall be as follows:

- "State" ----- U.S. Government
- "Commission" ----- Corps of Engineers, Party of the First Part
- "Engineer" ----- Contracting Officer, Corps of Engineers

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1.4 APPLICABLE SPECIFICATIONS

The following sections of NCDOT Standard Specifications form a part of this section of the specifications, except as hereinafter modified:

Section	Section Title
101	Definition of Terms
520	Aggregate Base Course, (Type - A Aggregate)
600	Prime Coat
605	Tack Coat
610	Bituminous Plant Mix Pavements - General
620	Asphalt Cement for Plant Mix
640	Bituminous Concrete Binder Course, Type H
645	Bituminous Concrete Surface Course, Type I-1
1020	Bituminous Materials

All sections referenced in the designated sections above shall also form a part of these Technical Provisions.

1.5 OMITTED

1.6 OMITTED

1.7 SUBMITTALS

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

SD-04 Samples

Pavement Samples and Plant Mixtures

Provide pavement samples and plant mixture samples as described in paragraph 3.2.2 and 3.5

SD-06 Test Reports

Tests

Copies of pavement job mix formula and test data results, within 24 hours after completion of each test.

SD-07 Certificates

Waybills and Delivery Tickets

Copies of waybills and delivery tickets shall be submitted during progress of the work.

1.8 SAFETY PRECAUTIONS

No smoking, or open flames shall be permitted within 25 feet of heating, distributing, or transferring operations of bituminous materials other than bituminous emulsions. When tar is used, a full-face, organic, vapor-type respirator and protective creams shall be used by personnel exposed to fumes. Protective creams shall not substitute for cover clothing.

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1.9 EQUIPMENT, TOOLS, AND MACHINES

1.9.1 Bituminous Distributors

The distributors shall have pneumatic tires of such width and number that the load produced on the base surface does not exceed 650 pounds per inch of tire width. Distributors shall be designed and equipped to distribute bituminous material uniformly at even heat on various widths of surface at readily determined and controlled rates ranging from 0.05 to 2.00 gallons per square yard, with a pressure range of 25 to 75 psi. The allowable variation from any specified rate shall not exceed 5 percent. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, a thermometer for reading the temperature of tank contents, and a hose attachment suitable for applying bituminous material to areas not accessible with distributor spray bar. The distributor shall be equipped for circulation and agitation of bituminous material during the heating process.

1.9.2 Single-Pass, Surface-Treatment Machines

The machines shall be capable of spraying bituminous material and spreading aggregate in one pass. Bituminous spraying equipment shall conform to the requirements given above for a bituminous distributor. The machine shall be capable of spreading aggregates at controlled amounts per square yard as specified. In addition, the single-pass, surface-treatment machine shall be capable of placing a surface treatment adjacent to an existing surface treatment, forming a joint of the same thickness and uniformity as other portions of the surface treatment. Ridges or blank spaces will not be permitted. Joints in the second application shall be formed at least 1 foot from those formed in the first application.

1.9.3 Heating Equipment for Storage Tanks

The equipment shall consist of coils and equipment for producing steam or hot oil and be designed to prevent the introduction of steam or hot oil into the material. An armored thermometer with a range of 100 to 400 degrees F shall be affixed to the tank so the temperature of the bituminous material may be determined at all times.

1.9.4 Power Rollers

Power rollers shall be steel-wheeled or pneumatic-tired type, conforming to the following requirements:

- a. Steel-wheeled rollers shall have at least one steel drum and weigh a minimum of 5 tons. Steel wheels of the rollers shall be equipped with adjustable scrapers.
- b. Pneumatic-tired rollers shall be self-propelled and have wheels mounted on two axles in such manner that the rear tires will not follow in the tracks of the forward group. Tires shall be uniformly inflated to not less than 60 psi nor more than 80 psi pressure. The pneumatic-tired rollers shall be equipped with boxes or platforms for ballast loading and shall be loaded so that the tire print width of each wheel is not less than the clear distance between tire prints.

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1.9.5 Mechanical Spreaders

The spreaders shall be adjustable and capable of spreading aggregate at controlled amounts per square yard, as specified.

1.9.6 Brooms and Blowers

The machines shall be of the power type, capable of cleaning surfaces to be treated.

1.9.7 Scales

The scales shall be standard truck scales of the beam type equipped with a weight-recording device. The scales shall be sufficient in size and capacity to accommodate the trucks used in hauling aggregates. The scales shall be tested and approved by an inspector of the State Inspection Bureau charged with scale inspection within the state in which the project is located. If an official of the inspection bureau is not available, the scales shall be tested in accordance with state specifications by the Contractor in the presence of the Contracting Officer. The Contractor shall have the necessary number of standard weights on hand at all times for testing the scales.

1.9.8 Weighhouse

The house shall be weatherproof and shall be constructed in a manner to afford adequate protection for the indicating and recording devices of the scales.

1.10 SAMPLING AND TESTING

The sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by an approved commercial testing laboratory, or by the Contractor, subject to approval. Sampling shall be in accordance with ASTM D 75 for aggregates and ASTM D 140 for bituminous material, unless otherwise directed. Tests shall be performed in sufficient number to insure that materials meet specified requirements.

1.10.1 Wear Test

The wear test shall be performed in accordance with ASTM C 131 to ensure that aggregates have a percentage of wear not exceeding 40 percent after 500 revolutions. One test shall be performed for every 200 cubic yards of aggregates in stockpiles or at the source.

1.10.2 Soundness Test

The soundness test shall be performed as specified by ASTM C 88 to ensure that aggregates have a weight loss not greater than 15 percent when subjected to five cycles of the magnesium sulfate test. One test shall be performed for every 200 cubic yards of aggregates in stockpiles or at the source.

1.11 WEATHER LIMITATIONS

Bituminous surface treatment shall be applied only when the existing surface or base course is dry. Bituminous surface treatment shall not be applied when either the atmospheric temperature, in the shade, is below 50 degrees F or the pavement surface to be treated is below 70 degrees F

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unless otherwise directed.

PART 2 PRODUCTS

2.1 MATERIALS

Mineral aggregate and bituminous material of the following types, gradations, grades, and consistencies that meet the requirements of stripping, wear, and soundness tests as specified by NCDOT and in paragraph SAMPLING AND TESTING shall be used.

2.1.1 Aggregate Base Coat

Aggregate base course, Type A, per NCDOT Sec 520.

2.1.2 Primer Coat

Primer coat per NCDOT Sec 600.

2.1.3 Tack Coat

Tack coat per NCDOT Sec 605.

2.1.4 Bituminous Plant Mix Pavement

Bituminous plant mix pavement per NCDOT Sec 610.

2.1.5 Asphalt Cement for Plant Mix

Asphalt cement for plant mix per NCDOT Sec 620.

2.1.6 Bituminous Concrete Binder Course

Bituminous concrete binder course, Type H, per NCDOT 640.

2.1.7 Bituminous Concrete Surface Course

Bituminous concrete surface course, Type I-1, per NCDOT Sec 645.

2.1.8 Bituminous Materials

Bituminous materials per NCDOT Section 1020.

PART 3 EXECUTION

3.1 ESTABLISHMENT OF JOB-MIX FORMULA, INCLUDING SAMPLING AND TESTING

The bituminous plant mix surface course shall be applied in accordance with the Standard Specifications using asphaltic concrete "I-1." If a bituminous concrete binder course is specified, it shall be Type "H."

3.1.1 Establishment

The job-mix formula together with all pertinent laboratory and field test data shall be furnished the Contracting Officer for review and approval at least 45 days prior to beginning paving operations.

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3.1.2 Sampling and Testing

The above mentioned samples and test data concerning the satisfactoriness of all materials in the mixture to be used in this work, including the Marshall test properties, shall be furnished for approval by the Contracting Officer as specified above. The Contractor shall perform the necessary density tests of the compacted base course and the compacted bituminous surface course as directed at no additional cost to the Government.

-- End of Section --

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SECTION 02763A

PAVEMENT MARKINGS

04/01

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 247 (1981; R 1996) Glass Beads Used in Traffic
Paint

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS TT-B-1325 (Rev C; Notice 1; Canc. Notice 2) Beads
(Glass Spheres) Retro-Reflective (Metric)

FS TT-P-1952 (Rev D; Canc. Notice 1) Paint, Traffic and
Airfield Marking, Waterborne (Metric)

1.2 OMITTED

1.3 SUBMITTALS

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

SD-03 Product Data

Equipment; G, RO

Lists of proposed equipment, including descriptive data, and notifications of proposed Contractor actions as specified in this section. List of removal equipment shall include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation.

Composition Requirements; G, RO

Manufacturer's current printed product description and Material Safety Data Sheets (MSDS) for each type paint/color proposed for use.

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Qualifications; G, RO

Document certifying that personnel are qualified for equipment operation and handling of chemicals.

SD-06 Test Reports

Sampling and Testing; G, RO

Certified copies of the test reports, prior to the use of the materials at the jobsite. Testing shall be performed in an approved independent laboratory.

SD-07 Certificates

Volatile Organic Compound (VOC); G, RO

Certificate stating that the proposed pavement marking paint meets the VOC regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which the project is located.

1.4 DELIVERY AND STORAGE

All materials shall be delivered and stored in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's name, and directions, all of which shall be plainly legible at time of use.

1.5 EQUIPMENT

All machines, tools and equipment used in the performance of the work shall be approved and maintained in satisfactory operating condition. Equipment operating on roads and runways shall display low speed traffic markings and traffic warning lights.

1.5.1 Paint Application Equipment

The equipment to apply paint to pavements shall be a self-propelled or mobile-drawn pneumatic spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. The machine shall have a speed during application not less than 5 mph, and shall be capable of applying the stripe widths indicated, at the paint coverage rate specified in paragraph APPLICATION, and of even uniform thickness with clear-cut edges. Equipment used for marking streets and highways shall be capable of placing the prescribed number of lines at a single pass as solid lines, intermittent lines or a combination of solid and intermittent lines using a maximum of two different colors of paint as specified. The paint applicator shall have paint reservoirs or tanks of sufficient capacity and suitable gauges to apply paint in accordance with requirements specified. Tanks shall be equipped with suitable air-driven mechanical agitators. The spray mechanism shall be equipped with quick-action valves conveniently located, and shall include necessary pressure regulators and gauges in full view and reach of the operator. Paint strainers shall be installed in paint supply lines to ensure freedom from residue and foreign matter that may cause malfunction of the spray guns. The paint applicator shall be readily adaptable for attachment of an air-actuated dispenser for the reflective media approved for use. Pneumatic spray guns shall be provided for hand application of paint in

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areas where the mobile paint applicator cannot be used.

1.5.2 Omitted

1.5.3 Reflective Media Dispenser

The dispenser for applying the reflective media shall be attached to the paint dispenser and shall operate automatically and simultaneously with the applicator through the same control mechanism. The dispenser shall be capable of adjustment and designed to provide uniform flow of reflective media over the full length and width of the stripe at the rate of coverage specified in paragraph APPLICATION, at all operating speeds of the applicator to which it is attached.

1.5.4 Omitted

1.5.5 Surface Preparation Equipment

1.5.5.1 Sandblasting Equipment

Sandblasting equipment shall include an air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be painted. The compressor shall be capable of furnishing not less than 150 cfm of air at a pressure of not less than 90 psi at each nozzle used, and shall be equipped with traps that will maintain the compressed air free of oil and water.

1.5.5.2 Waterblast Equipment

The water pressure shall be specified at 2600 psi at 140 degrees F in order to adequately clean the surfaces to be marked.

1.5.6 Marking Removal Equipment

Equipment shall be mounted on rubber tires and shall be capable of removing markings from the pavement without damaging the pavement surface or joint sealant. Waterblasting equipment shall be capable of producing an adjustable, pressurized stream of water. Sandblasting equipment shall include an air compressor, hoses, and nozzles. The compressor shall be equipped with traps to maintain the air free of oil and water.

1.5.6.1 Shotblasting Equipment

Shotblasting equipment shall be capable of producing an adjustable depth of removal of marking and pavement. Each unit shall be self-cleaning and self-contained, shall be able to confine dust and debris from the operation, and shall be capable of recycling the abrasive for reuse.

1.5.6.2 Chemical Equipment

Chemical equipment shall be capable of application and removal of chemicals from the pavement surface, and shall leave only non-toxic biodegradable residue.

1.5.7 Traffic Controls

Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines or

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freshly placed raised markers to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Painting equipment shall be marked with large warning signs indicating slow-moving painting equipment in operation.

1.6 HAND-OPERATED, PUSH-TYPE MACHINES

All machines, tools, and equipment used in performance of the work shall be approved and maintained in satisfactory operating condition. Hand-operated push-type machines of a type commonly used for application of paint to pavement surfaces will be acceptable for marking small streets and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of applying paint uniformly at coverage specified. Sandblasting equipment shall be provided as required for cleaning surfaces to be painted. Hand-operated spray guns shall be provided for use in areas where push-type machines cannot be used.

1.7 MAINTENANCE OF TRAFFIC

1.7.1 Omitted

1.7.2 Roads, Streets, and Parking Areas

When traffic must be rerouted or controlled to accomplish the work, the necessary warning signs, flagpersons, and related equipment for the safe passage of vehicles shall be provided.

1.8 WEATHER LIMITATIONS FOR REMOVAL

Pavement surface shall be free of snow, ice, or slush. Surface temperature shall be at least 40 degrees F and rising at the beginning of operations, except those involving shot or sand blasting. Operation shall cease during thunderstorms. Operation shall cease during rainfall, except for waterblasting and removal of previously applied chemicals. Waterblasting shall cease where surface water accumulation alters the effectiveness of material removal.

PART 2 PRODUCTS

2.1 PAINT

The paint shall be homogeneous, easily stirred to smooth consistency, and shall show no hard settlement or other objectionable characteristics during a storage period of 6 months. Paints for roads and streets shall conform to FS TT-P-1952, color as indicated. Pavement marking paints shall comply with applicable state and local laws enacted to ensure compliance with Federal Clean Air Standards. Paint materials shall conform to the restrictions of the local Air Pollution Control District.

2.2 OMITTED

2.3 OMITTED

2.4 OMITTED

2.5 REFLECTIVE MEDIA

Reflective media for roads and streets shall conform to FS TT-B-1325, Type I, Gradation A or AASHTO M 247, Type I.

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2.6 SAMPLING AND TESTING

Materials proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at source of supply, sufficiently in advance of needs to allow 60 days for testing. Upon notification by the Contractor that the material is at the site or source of supply, a sample shall be taken by random selection from sealed containers by the Contractor in the presence of a representative of the Contracting Officer. Samples shall be clearly identified by designated name, specification number, batch number, manufacturer's formulation number, project contract number, intended use, and quantity involved. Testing shall be performed in an approved independent laboratory. If materials are approved based on reports furnished by the Contractor, samples will be retained by the Government for possible future testing should the material appear defective during or after application.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surfaces to be marked shall be thoroughly cleaned before application of the pavement marking material. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion as directed. Areas of old pavement affected with oil or grease shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint. Pavement surfaces shall be allowed to dry, when water is used for cleaning, prior to striping or marking. Surfaces shall be recleaned, when work has been stopped due to rain.

3.1.1 Pretreatment for Early Painting

Where early painting is required on rigid pavements, a pretreatment with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride shall be applied to prepared pavement areas prior to painting.

3.1.2 Cleaning Existing Pavement Markings

In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings, which are in good condition but interfere or conflict with the newly applied marking patterns, shall be removed. Deteriorated or obscured markings that are not misleading or confusing or interfere with the adhesion of the new marking material do not require removal. Whenever grinding, scraping, sandblasting or other operations are performed the work must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed the pavement surface shall be blown off with compressed air to remove residue and debris resulting from the cleaning work.

3.1.3 Cleaning Concrete Curing Compounds

On new Portland cement concrete pavements, cleaning operations shall not begin until a minimum of 30 days after the placement of concrete. All new

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concrete pavements shall be cleaned by either sandblasting or water blasting. When water blasting is performed, thermoplastic and preformed markings shall be applied no sooner than 24 hours after the blasting has been completed. The extent of the blasting work shall be to clean and prepare the concrete surface as follows:

a. There is no visible evidence of curing compound on the peaks of the textured concrete surface.

b. There are no heavy puddled deposits of curing compound in the valleys of the textured concrete surface.

c. All remaining curing compound is intact; all loose and flaking material is removed.

d. The peaks of the textured pavement surface are rounded in profile and free of sharp edges and irregularities.

e. The surface to be marked is dry.

3.2 APPLICATION

All pavement markings and patterns shall be placed as shown on the plans.

3.2.1 Paint

Paint shall be applied to clean, dry surfaces, and only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F. Paint temperature shall be maintained within these same limits. New asphalt pavement surfaces and new Portland concrete cement shall be allowed to cure for a period of not less than 30 days before applications of paint.

Paint shall be applied pneumatically with approved equipment at rate of coverage specified. The Contractor shall provide guide lines and templates as necessary to control paint application. Special precautions shall be taken in marking numbers, letters, and symbols. Edges of markings shall be sharply outlined.

3.2.1.1 Rate of Application

a. Reflective Markings: Pigmented binder shall be applied evenly to the pavement area to be coated at a rate of 105 plus or minus 5 square feet per gallon. Glass spheres shall be applied uniformly to the wet paint on road and street pavement at a rate of 6 plus or minus 0.5 pounds of glass spheres per gallon of paint.

b. Nonreflective Markings: Paint shall be applied evenly to the pavement surface to be coated at a rate of 105 plus or minus 5 square feet per gallon.

3.2.1.2 Drying

The maximum drying time requirements of the paint specifications will be strictly enforced to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. If there is a delay in drying of the markings, painting operations shall be discontinued until cause of the slow drying is determined and corrected.

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- 3.2.2 Omitted
- 3.2.3 Omitted
- 3.2.4 Omitted

3.2.5 Reflective Media

Application of reflective media shall immediately follow application of pigmented binder. Drop-on application of glass spheres shall be accomplished to insure that reflective media is evenly distributed at the specified rate of coverage. Should there be malfunction of either paint applicator or reflective media dispenser, operations shall be discontinued immediately until deficiency is corrected.

3.3 MARKING REMOVAL

Pavement marking, including plastic tape, shall be removed in the areas shown on the drawings. Removal of marking shall be as complete as possible without damage to the surface. Aggregate shall not be exposed by the removal process. After the markings are removed, the cleaned pavement surfaces shall exhibit adequate texture for remarking as specified in paragraph SURFACE PREPARATION. Contractor shall demonstrate removal of pavement marking in an area designated by the Contracting Officer. The demonstration area will become the standard for the remainder of the work.

3.3.1 Equipment Operation

Equipment shall be controlled and operated to remove markings from the pavement surface, prevent dilution or removal of binder from underlying pavement, and prevent emission of blue smoke from asphalt or tar surfaces.

3.3.2 Cleanup and Waste Disposal

The worksite shall be kept clean of debris and waste from the removal operations. Cleanup shall immediately follow removal operations in areas subject to air traffic. Debris shall be disposed of at approved sites.

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SECTION 02921A

SEEDING
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PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602	(1995a) Agricultural Liming Materials
ASTM D 2028	(1976; R 1997) Cutback Asphalt (Rapid-Curing Type)
ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996e1) Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes
ASTM D 977	(1998) Emulsified Asphalt

U.S. DEPARTMENT OF AGRICULTURE (USDA)

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

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

SD-03 Product Data

Equipment
Surface Erosion Control Material
Chemical Treatment Material

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

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

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Delivery

Delivery schedule.

Finished Grade and Topsoil

Finished grade status.

Topsoil

Availability of topsoil from the stripping and stock piling operation.

Quantity Check

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

Seed Establishment Period

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

Maintenance Record

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

Application of Pesticide

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

SD-04 Samples

Delivered Topsoil

Samples taken from several locations at the source.

Soil Amendments

A 10 pound sample.

Mulch

A 10 pound sample.

SD-06 Test Reports

Equipment Calibration

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

Soil Test

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

SD-07 Certificates

Seed
Topsoil
pH Adjuster
Fertilizer
Organic Material
Soil Conditioner
Mulch
Asphalt Adhesive
Pesticide

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

- a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.
- b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.
- c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.
- d. Fertilizer. Chemical analysis and composition percent.
- e. Organic Material: Composition and source.
- f. Soil Conditioner: Composition and source.
- g. Mulch: Composition and source.
- h. Asphalt Adhesive: Composition.
- i. Pesticide. EPA registration number and registered uses.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to

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the first day of delivery.

1.4.1.1 Delivered Topsoil

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

1.4.1.2 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.4.1.3 Pesticides

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

1.4.2 Inspection

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

1.4.3 Storage

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

1.4.4 Handling

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

1.4.5 Time Limitation

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

PART 2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-approved 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,

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and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

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

Botanical Name	Common Name	Application Rate (lb/acre)
_____	_____	_____
<u>Sept 30 - Mar 1</u>		
Paspalum notatum (not in cantonment area)	Pensacola Bahiagrass	50
Cynodon Dactylon	Bermuda Grass (hulled)	5
Cynodon Dactylon	Bermuda Grass (unhulled)	5
Lespedeza striata	Kobe Lespedeza	5
Abruzzi	Rye Grain	25
Lime: ground agricultural limestone		2,000
Fertilizer: 10-20-20		800
Mulch: grain straw mulch		4,000
	tack with emulsified asphalt unless applied by hydroseeder	
<u>Mar 1 - Sept 30</u>		
Paspalum notatum (not in cantonment area)	Pensacola Bahiagrass	50
Cynodon Dactylon	Bermuda Grass (hulled)	10
Lespedeza striata	Kobe Lespedeza	5
Setaria italica	German Millet	25
Lime: ground agricultural limestone		2,000
Fertilizer: 10-20-20		800
Mulch: grain straw mulch		4,000
	tack with emulsified asphalt unless applied by hydroseeder	

Calculations:

Note: 5 lb/1,000 SF (50/50 mix of hulled & unhulled)

43.56 MSF/acre:

5 lb * 43.56 = 217.8 lb/acre; round off to 200 lb/acre

Add 20% (40 lb) per acre of rye grass as nurse crop

2.1.3 Temporary Seed Species

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

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<u>Botanical Name</u>	<u>Common Name</u>	<u>Application Rate (lb/acre)</u>
<u>Mar 1 - Sept 30</u>		
Setaria italica	German Millet	50
Lime: ground agricultural limestone		2,000
Fertilizer: 10-20-20		800
Mulch: grain straw mulch		4,000
tack with asphalt unless applied by hydroseeder		
<u>Sept 30 - Mar 1</u>		
Abruzzi	Rye Grain	25
Lime: ground agricultural limestone		2,000
Fertilizer: 10-20-20		800
Mulch: grain straw mulch		4,000
tack with asphalt unless applied by hydroseeder		

2.1.4 Quality

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

2.1.5 Seed Mixing

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

2.1.6 Substitutions

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

2.2 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with Section 02300 EARTHWORK. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the seed specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.3 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material and soil conditioners meeting the following requirements. Vermiculite shall not be used.

2.3.1 pH Adjuster

The pH adjuster shall be an agricultural liming material in accordance with ASTM C 602. These materials may be burnt lime, hydrated lime, ground limestone, sulfur, or shells. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

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2.3.1.1 Limestone

Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.

2.3.1.2 Hydrated Lime

Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. Gradation: A minimum 100 percent shall pass through a No. 8 sieve and a minimum 97 percent shall pass through a No. 60 sieve.

2.3.1.3 Burnt Lime

Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 35 percent shall pass through a No. 60 sieve.

2.3.2 Fertilizer

It shall be as recommended by the soil test. Fertilizer shall be controlled release commercial grade, free flowing, uniform in composition, and consist of a nitrogen-phosphorus-potassium ratio. The fertilizer shall be derived from sulphur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients.

2.3.3 Nitrogen Carrier Fertilizer

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

2.3.4 Organic Material

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

2.3.4.1 Bonemeal

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

2.3.4.2 Rotted Manure

Rotted manure shall be unleached horse, chicken or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials. It shall contain no chemicals or ingredients harmful to plants.

The manure shall be heat treated to kill weed seeds and be free of stones, sticks, and soil.

2.3.4.3 Decomposed Wood Derivatives

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

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2.3.4.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost shall be derived from food; agricultural or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have a moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length.

2.3.4.5 Worm Castings

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

2.3.5 Soil Conditioner

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

2.3.5.1 Sand

Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Greensand shall be balanced with the inclusion of trace minerals and nutrients.

2.3.5.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the manufacturer's recommendations. Polymers shall be added as a soil amendment and be cross-linked polyacrylamide, with an absorption capacity of 250-400 times its weight. Polymers shall also be added to the seed and be a starch grafted polyacrylonitrile, with graphite added as a tacky sticker. It shall have an absorption capacity of 100 plus times its weight.

2.3.5.3 Calcined Clay

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

2.3.5.4 Gypsum

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

2.3.5.5 Expanded Shale, Clay, or Slate (ESCS)

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

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2.4 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region.

2.4.1 Straw

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

2.4.2 Hay

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

2.4.3 Wood Cellulose Fiber

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

2.4.4 Paper Fiber

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

2.5 ASPHALT ADHESIVE

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

2.6 WATER

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

2.7 PESTICIDE

Pesticide shall be insecticide, herbicide, fungicide, nematocide, rodenticide or miticide. For the purpose of this specification, a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved.

2.8 SURFACE EROSION CONTROL MATERIAL

Surface erosion control material shall conform to the following:

2.8.1 Surface Erosion Control Blanket

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

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2.8.2 Surface Erosion Control Fabric

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

2.8.3 Surface Erosion Control Net

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

2.8.4 Surface Erosion Control Chemicals

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

2.8.5 Hydrophilic Colloids

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

2.8.6 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 INSTALLING SEED TIME AND CONDITIONS

3.1.1 Seeding Time

Seeding for Permanent and Temporary Seeding shall be from the dates indicated in Paragraphs 2.1.2 and 2.1.3.

3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed.

When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

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

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, and stockpiled topsoil shall be tested in accordance with ASTM D 5268 and ASTM D 4972 for

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determining the particle size, pH, organic matter content, textural class, chemical analysis, soluble salts analysis, and mechanical analysis. Sample collection on site shall be random over the entire site. Sample collection for stockpiled topsoil shall be at different levels in the stockpile. The soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test shall determine the quantities and type of soil amendments required to meet local growing conditions for the seed species specified.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

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

3.2.2 Application of Soil Amendments

3.2.2.1 Applying pH Adjuster

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

3.2.2.2 Applying Fertilizer

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

3.2.2.3 Applying Soil Conditioner

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

3.2.2.4 Applying Super Absorbent Polymers

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

3.2.3 Tillage

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

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3.2.4 Prepared Surface

3.2.4.1 Preparation

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

3.2.4.2 Lawn Area Debris

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

3.2.4.3 Field Area Debris

Debris and stones over a minimum 3 inch in any dimension shall be removed from the surface.

3.2.4.4 Protection

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

3.3 INSTALLATION

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

3.3.1 Installing Seed

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

3.3.1.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of 0.36 pounds per 1000 square feet using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.1.2 Omitted

3.3.1.3 Rolling

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

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3.3.2 Omitted

3.3.3 Mulching

3.3.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre.

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

3.3.3.2 Mechanical Anchor

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

3.3.3.3 Asphalt Adhesive Tackifier

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

3.3.3.4 Non-Asphaltic Tackifier

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

3.3.3.5 Asphalt Adhesive Coated Mulch

Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 10 to 13 gallons per 1000 square feet, using power mulch equipment which shall be equipped with suitable asphalt pump and nozzle. The adhesive-coated mulch shall be applied evenly over the surface. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.3.3.6 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

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

3.3.4 Watering Seed

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

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3.4 SURFACE EROSION CONTROL

3.4.1 Surface Erosion Control Material

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

3.4.2 Temporary Seeding

The application rate shall be 36 pounds per 1000 square yards. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with temporary seed species listed under Paragraph SEED.

3.4.2.1 Soil Amendments

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

3.4.2.2 Remaining Soil Amendments

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

3.5 QUANTITY CHECK

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

3.6 APPLICATION OF PESTICIDE

When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted and coordinated with the installation pest management program.

3.6.1 Technical Representative

The certified installation pest management coordinator shall be the technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.

3.6.2 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a

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backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately. A pesticide plan shall be submitted.

3.7 RESTORATION AND CLEAN UP

3.7.1 Restoration

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

3.7.2 Clean Up

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

3.8 OMITTED

3.9 SEED ESTABLISHMENT PERIOD

3.9.1 Commencement

The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of seeding work under this contract and shall continue through the remaining life of the contract and end 6 months after the last day of the seeding operation required by this contract. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.9.2 Satisfactory Stand of Grass Plants

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

3.9.2.1 Lawn Area

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

3.9.2.2 Field Area

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

3.9.3 Maintenance During Establishment Period

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

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3.9.3.1 Mowing

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

3.9.3.2 Post-Fertilization

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

3.9.3.3 Pesticide Treatment

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

3.9.3.4 Repair or Reinstall

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

3.9.3.5 Maintenance Record

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

-- End of Section --

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03/98

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SECTION 02964A

COLD MILLING OF BITUMINOUS PAVEMENTS
03/98

PART 1 GENERAL

1.1 OMITTED

1.2 EQUIPMENT, TOOLS, AND MACHINES

Equipment, tools, and machines used in the performance of the work shall be maintained in a satisfactory working condition.

1.2.1 Cold-Milling Machine

The cold-milling machine shall be a self-propelled machine capable of milling the pavement to a specified depth and smoothness. Pavement milling machine shall be capable of establishing grade control; shall have means of controlling transverse slope; and shall have effective means of controlling dust produced during the pavement milling operation. The machine shall have the ability to remove the millings or cuttings from the pavement and load them into a truck. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed.

1.2.2 Cleaning Equipment

Cleaning equipment shall be suitable for removing and cleaning loose material from the pavement surface.

1.2.3 Straightedge

The Contractor shall furnish and maintain at the site, in good condition, one 12-foot straightedge or other suitable device for each milling machine, for testing 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 on the pavement.

1.3 WEATHER LIMITATIONS

Milling shall not be performed when there is accumulation of snow or ice on the pavement surface.

1.4 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

1.4.1 Grade

The finished milled surfaces shall conform to the lines, grades, and cross sections indicated. The finished milled-pavement surfaces shall vary not more than 0.04 foot from the established plan grade line and elevation. Finished surfaces at a juncture with other pavements shall coincide with the finished surfaces of the abutting pavements. The deviations from the plan grade line and elevation will not be permitted in areas of pavements

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where closer conformance with planned grade and elevation is required for the proper functioning of appurtenant structures involved.

1.4.2 Surface Smoothness

Finished surfaces shall not deviate from the testing edge of a straightedge more than 1/4 inch in the transverse or longitudinal direction.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

The pavement surface shall be cleaned of excessive dirt, clay, or other foreign material immediately prior to milling the pavement.

3.2 MILLING OPERATION

Sufficient passes shall be made so that the designated area is milled to the grades and cross sections indicated. The milling shall proceed with care and in depth increments that will not damage the pavement below the designated finished grade. Items damaged during milling, such as manholes, valve boxes, utility lines, pavement that is torn, cracked, gouged, broken, or undercut, shall be repaired or replaced as directed.

3.3 GRADE AND SURFACE-SMOOTHNESS TESTING

3.3.1 Grade-Conformance Tests

The finished milled surface of the pavement shall be tested for conformance with the plan-grade requirements and will be tested for acceptance by the Contracting Officer by running lines of levels at intervals of 12 feet longitudinally and 100 feet transversely to determine the elevation of the completed pavement. The Contractor shall correct variations from the designated grade line and elevation in excess of the plan-grade requirements as directed. Skin patching for correcting low areas will not be permitted. The Contractor shall remove and replace the deficient low area. Sufficient material shall be removed to allow at least 1 inch of asphalt concrete to be placed.

3.3.2 Surface-Smoothness Tests

After completion of the final milling, the finished milled surface will be tested by the Government with a straightedge. Other approved devices may be used, provided that when satisfactorily and properly operated, such devices reveal all surface irregularities exceeding the tolerances specified. Surface irregularities that depart from the testing edge by more than 1/4 inch shall be corrected.

3.4 REMOVAL OF MILLED MATERIAL

Material that is removed shall be placed in the disposal area and stockpiled in accordance with the Contracting Officer and in such a manner to prevent segregation or contamination.

-- End of Section --