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SECTION 01000

GENERAL CONTRACT REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

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

CODE OF FEDERAL REGULATIONS (CFR)

19 CFR 24.24	Harbor Maintenance Fee
33 CFR 156	Oil and Hazardous Material Transfer Operations

ENGINEERING MANUALS (EM)

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

a. The rights-of-way for the work to be constructed under this contract, within the limits indicated on the drawings, will be provided by the Government without cost to the Contractor. If these rights-of-way are used by the Contractor, he shall, at his own expense, do all work necessary to make such rights-of-way suitable for traveling to and from the worksite. Upon completion of the Contractor's work, any such rights-of-way furnished by the Government shall be left in a condition satisfactory to the Contracting Officer.

b. When so directed by the Contracting Officer, the Contractor shall, without expense to the Government and at any time during the progress of the work when it is not being actively used for contract operations, promptly vacate and clean up any part of the Government grounds or rights-of-way that have been allotted to or have been in use by the Contractor.

c. The Contractor shall not obstruct any existing roads on lands controlled by the United States except with written permission of the Contracting Officer and shall maintain such roads in as good condition as exists at the time of commencement of work under this contract.

d. The Contractor shall procure, without expense to the Government, all additional lands, access roads, or rights-of-way necessary for his use in the performance of the work or as required by his method of operation. The Contractor shall submit written evidence to the Contracting Officer that he has obtained the rights-of-way from the property owners. The written evidence shall consist of an authenticated copy of the conveyance under which the Contractor acquired such rights-of-way, prepared and executed in accordance with the laws of the State in which the land is located. The Contractor

shall also obtain from the owners a release for the Government for any damages which may result from his use of such rights-of-way. The written conveyance and release shall be provided to the Government prior to use of Contractor obtained additional lands, access roads, or rights-of-way. If temporary rights-of-way are obtained by the Contractor the period of time for those rights shall coincide with Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK, plus a reasonable time for any extension granted for the completion of the work. Any agreements or permits with levee boards, counties, parishes, municipalities, or other political subdivisions for moving material and equipment will be the responsibility of the Contractor and will be obtained at no expense to the Government. Any delays to the Contractor resulting from delays in procuring such additional lands, access roads, rights-of-way, or permits for moving material and equipment for his work under this contract will not be a basis for any claim for increase in the cost of this contract. The Contractor shall make his own investigations to determine the conditions, restrictions and difficulties which may be encountered in acquiring such rights-of-way and in the transportation of material and equipment. In addition, the Contractor shall be solely liable for any and all damages and claims of any nature whatsoever arising from or growing out of the acquisition and use of rights-of-way, etc. other than those furnished by the Government.

e. Notwithstanding any language or drawings to the contrary in this contract, the United States will not provide access or rights-of-way over any public lands and will not be responsible for acquiring such.

f. The Contractor shall repair at no expense to the Government, any and all damage to any existing roads when such damage is a result of his operations under this contract. (CEMVK-OC, 1989)

### 1.3 PRECONSTRUCTION CONFERENCE

a. A preconstruction conference will be arranged by the Area Engineer as soon after contract award as possible, and the conference will be conducted before work is allowed to commence. The Area Engineer will notify the Contractor of the time, date, and location for the meeting. At this conference, the Contractor will be oriented with respect to contract administration procedures, lines of authority, and construction matters. All known subcontractors performing at least 20 percent of the contract are required to attend this conference. Additional conferences may be established by the Area Engineer for any major subcontractors unknown at the time of the initial conference.

b. Submission by the Contractor of the items listed below will determine the date of the conference. The following items shall be submitted to the Area Engineer for review at least seven (7) calendar days prior to the preconstruction conference:

- (1) Accident Prevention Plan
- (2) Environmental Protection Plan
- (3) Quality Control Plan

c. The Contractor shall bring to this conference, in completed form the following:

- (1) Letter of superintendent appointment and authority
- (2) List of subcontractors

d. The Contractor should bring to this conference, or at least be prepared to discuss, the following:

- (1) Submittal register
- (2) Progress chart or Network Analysis System (as applicable)

e. Minutes of this conference will be taken and prepared by the Area Engineer and sent to the Contractor for his concurrence and signature.

#### 1.4 NOTIFICATION OF AREA ENGINEER BEFORE BEGINNING WORK

At least 7 days before beginning work, the Contractor shall notify Mr. Gordon O. Inman, Area Engineer, Greenwood Area Office, P.O. Box 946, Greenwood, Mississippi 38935-0946, Telephone (601) 453-5531.

#### 1.5 ORDER OF WORK

The work shall be carried on in accordance with the Progress Chart (schedule) required by paragraph (a) of the Contract Clause SCHEDULES FOR CONSTRUCTION CONTRACTS.

#### 1.6 PROGRESS CHART

The progress chart required by provisions of paragraph (a) of the Contract Clause SCHEDULES FOR CONSTRUCTION CONTRACTS shall be prepared on ENG FORM 2454, copies of which will be furnished to the Contractor by the Government. SIX (6) COPIES OF THE SCHEDULE WILL BE REQUIRED.

#### 1.7 DESIGNATED BILLING OFFICE

The designated billing office for this contract shall be the U.S. Army Corps of Engineers, Greenwood Area Office, P.O. Box 946, Greenwood, Mississippi 38935-0946.

#### 1.8 PAYMENT INVOICES

a. The Federal Acquisition Regulation requires that the "REMIT TO" address on the invoice match the "REMIT TO" address on the contract or a proper notice of assignment. The Payment Office will verify a match of the "REMIT TO" address in the contract and Contractor's invoice prior to payment. If the addresses do not match, the invoice will be determined improper and returned to the Contractor for correction and resubmission. If an invoice is improperly returned, the original invoice receipt date shall be used as the basis for determining interest to be paid in accordance with the PROMPT PAYMENT ACT.

b. Among other things, the Contract Clause PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS requires that a proper invoice for payment include substantiation of the amounts requested. As required in Office of Management and Budget, Circular A-125 (Rev.), PROMPT PAYMENT, dated December 12, 1989, substantiation of the amount requested for progress payments under construction contracts includes the following:

- (1) An itemization of the amounts requested related to the

various elements of work required by the contract covered by the payment request;

(2) A listing of the amount included for work performed by each subcontractor under the contract;

(3) A listing of the total amount of each subcontract under the contract;

(4) A listing of the amounts previously paid to each such subcontractor under the contract; and,

(5) Additional supporting data in a form and detail required by the contracting officer.

c. Failure to include the above information in a Contractor's invoice will result in the invoice being considered defective under the provisions of the PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS clause of the contract, and it will be returned to the Contractor for correction and resubmission. (CEMVK-OC, 1997)

#### 1.9 TEMPORARY PROJECT FENCING

Temporary project fencing as required by Section 4, "Temporary Facilities", paragraph 04.A.04 of EM 385-1-1, "Safety and Health Requirements Manual", dated 3 September 1996, is not required on this project.

#### 1.10 PROJECT SIGN (APR 1991)

The Contractor shall fabricate, erect and maintain one sign for project identification. The sign shall be displayed and positioned for reading by passing viewers. The exact location is subject to Contracting Officer's approval. Information for the right side of the project sign shall be as follows:

Title: BOX CULVERT GRADE CONTROL STRUCTURE  
TRIBUTARY A - SITE NO. 1  
BC-97-09

Project: FC/MR&T, YAZOO BASIN  
DEMONSTRATION EROSION CONTROL PROJECT  
YALOBUSHA RIVER WATERSHED

Contract No: DACW38-99-C-0XXX

Contractor: (Contractor's name and city)

The project identification sign shall meet the requirements specified in the U.S. Army Corps of Engineers Sign (USACES) Standards Manual, EP 310-1-6a and EP 310-1-6b. A copy of the sign standards manual is available for review at the office of the Vicksburg District Sign Program Manager and questions concerning manufacture and installation of the project identification sign may be addressed to:

Vicksburg District Sign Program Manager (Lawran Richter)  
ATTN: CEMVK-OD-MN  
4155 Clay Street  
Vicksburg, MS 39183-3435

Telephone: (601) 631-5287

#### 1.11 MINIMUM REQUIRED INSURANCE

The following paragraph is applicable if the services involved are performed on a Government Installation. Government Installation is defined as property where the Government holds by fee simple title, by construction rights-of-way, or perpetual easement, etc., an interest in real property. See Contract Clause INSURANCE-WORK ON A GOVERNMENT INSTALLATION.

a. Workmen's Compensation and Employer's Liability Insurance. The Contractor shall comply with all applicable workmen's compensation Statutes of the State of Mississippi and shall furnish evidence of Employer's Liability Insurance in an amount of not less than \$100,000.

b. General Liability Insurance. Bodily injury liability insurance in the minimum limits of \$500,000 per occurrence on the comprehensive form of policy.

c. Automobile Liability Insurance. Minimum limits of \$200,000 per person and \$500,000 per occurrence for bodily injury and \$20,000 per occurrence for property damage. This insurance shall be on the comprehensive form of policy and shall cover the operation of all automobiles used in performance of the contract.

#### 1.12 WORK IN QUARANTINED AREA

The work called for by this contract involves activities in counties quarantined by the Department of Agriculture to prevent the spread of certain plant pests which may be present in the soil. The Contractor agrees that all construction equipment and tools to be moved from such counties shall be thoroughly cleaned of all soil residues at the construction site with water under pressure and that hand tools shall be thoroughly cleaned by brushing or other means to remove all soil. In addition, if this contract involves the identification, shipping, storage, testing, or disposal of soils from such quarantined area, the Contractor agrees to comply with the provisions of ER 1110-1-5, "Plant Pest Quarantined Areas and Foreign Soil Samples" attachments, a copy of which will be made available by the Contracting Officer upon request. The Contractor agrees to assure compliance with this obligation by all subcontractors.

#### 1.13 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of material with specification requirements shall be executed in three (3) copies. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

#### 1.14 SAFETY

This contract is subject to the requirements of EM 385-1-1, "U.S. Army Corps of Engineers Safety and Health Requirements Manual", dated 3 September 1996. No separate payment will be made for compliance with the requirements thereof.

#### 1.15 SAFETY SIGN

The Contractor shall fabricate, erect and maintain a safety sign at the site, as located by the Contracting Officer. The sign shall be erected as soon as practicable, but not later than 15 calendar days after the date established for commencement of work. The data required shall be current. The safety sign shall meet the requirements specified in the U.S. Army Corps of Engineers Sign (USACES) Standards Manual, EP 310-1-6a and EP 310-1-6b. A copy of the sign standards manual is available for review at the office of the Vicksburg District Sign Program Manager and questions concerning manufacture and installation of the safety sign may be addressed to:

Vicksburg District Sign Program Manager (Lawran Richter)  
ATTN: CEMVK-OD-MN  
4155 Clay Street  
Vicksburg, MS 39183-3435  
Telephone: (601) 631-5287

#### 1.16 ACCIDENT PREVENTION PLAN

Refer to Contract Clause ACCIDENT PREVENTION (Alternate I). Within 15 days after receipt of award of the contract, an Accident Prevention Plan shall be submitted to the Contracting Officer for review and acceptance. The plan shall be prepared in the following format:

- a. An executed LMV FORM 358-R, "Administrative Plan" (available upon request), see Appendix A, "Minimum Basic Outline for Accident Prevention Plan" of EM 385-1-1.
- b. An executed LMV FORM 359-R, "Activity Hazard Analysis" (available upon request), see paragraph 01.A.09 and figure 1-1 of EM 385-1-1.
- c. A copy of company policy statement regarding accident prevention.
- d. When marine plant and equipment are in use under a contract, the method of fuel oil transfer shall be submitted on LMV Form 414R Fuel Oil Transfer, (available upon request). (Refer to 33 CFR 156.)
- e. The Contractor shall not commence physical work at the site until the plan has been accepted by the Contracting Officer, or his authorized representative. At the Contracting Officer's discretion, the Contractor may submit his Activity Hazard Analysis only for the first phase of construction provided that it is accompanied by an outline of the remaining phases of construction. All remaining phases shall be submitted and accepted prior to the beginning of work in each phase. Also, refer to Section 1, "Program Management", paragraph 01.B, "Indoctrination and Training" of EM 385-1-1.

#### 1.17 DAILY INSPECTIONS

Refer to Contract Clause INSPECTION OF CONSTRUCTION. The Contractor shall perform daily safety inspections and record them on the forms approved by the Contracting Officer. Reports of daily inspections shall be maintained

at the job site. The reports shall be records of the daily inspections and resulting actions. As a minimum each report shall include the following:

- a. Phase(s) of construction underway during the inspection
- b. Locations or areas inspections were made.
- c. Results of inspection, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

#### 1.18 ACCIDENT INVESTIGATIONS AND REPORTING

Refer to EM 385-1-1, Section 1, "Program Management", paragraph 01.D, "Accident Reporting and Recordkeeping". Accidents shall be investigated and reports completed by the immediate supervisor of the employee(s) involved and reported in writing to the Contracting Officer or his representative within one working day after the accident occurs.

#### 1.19 ACCOMMODATIONS FOR GOVERNMENT REPRESENTATIVES

a. Accommodations. The Contractor shall furnish and maintain a temporary building for the exclusive use of the Government Representatives. The building shall be of light, but weatherproof construction, approximately 11.1 square meters in size with not less than 2.1 meters of headroom. It shall have a substantial workbench along one side and sufficient number of windows to admit ample working light. Windows shall be arranged to open and to be securely fastened from the inside. The door shall be of wood panel or solid core construction and be equipped with a padlock and heavy duty hasp bolted to the door. Insect screens shall be provided for windows. Glass panels in windows shall be equipped with bars or heavy mesh screens which will prevent easy access to the building through these panels. The Contractor shall heat the building by means of heaters and shall cool the building by means of an air conditioning unit. Electric current shall also be provided for operation of lights, appliances, and electric calculators at 115 volts AC. Electric current may be provided by use of a portable generator. A minimum of two wall outlets and two ceiling drops shall be provided in the building. One office desk and a minimum of two chairs shall be provided in the building. Telephone service with an exclusive line solely for Government use shall be furnished to the Government Representative building. Toilet facilities shall be provided in the building or adjacent thereto. The building shall remain the property of the Contractor and upon completion of all work under the contract shall be removed as provided in the Contract Clause OPERATIONS AND STORAGE AREAS. An office trailer meeting the above requirements will be acceptable.

b. Janitor Services. The Contractor shall furnish daily janitorial services for the above offices and perform any required maintenance of subject facility and adjacent grounds during the entire life of the contract. Toilet facilities shall be clean and sanitary at all times. Services shall be performed at such a time and in such a manner to least interfere with the operations but will be accomplished only when the facility is in daily use. The Contractor shall also provide daily trash collection and cleanup of the building and adjacent outside areas, and shall dispose of all discarded debris in a manner approved.

c. Should the Contractor refuse, neglect, or delay compliance with the

above requirements, the specific facilities may be furnished and maintained by the Contracting Officer, and the cost thereof will be deducted from any amount due or to become due the Contractor.

#### 1.20 MACHINERY AND MECHANIZED EQUIPMENT

Machinery and mechanized equipment used under this contract shall comply with the following:

a. When a rubber-tired front-end loader, bulldozer, etc., is operated on floating plant, either a bumper or curb with a minimum height of one-third of the outside diameter of the largest tire on the equipment, a barge tied alongside, or other means acceptable to the Contracting Officer shall be used to prevent equipment from moving or falling into the water.

b. The stability of crawler, truck, and wheel-mounted cranes shall be assured.

(1) The manufacturer's load-rating chart may be used to determine the maximum allowable working load for each particular crane's boom angle provided a test load, with a boom angle of 0.35 rads, confirms the manufacturer's load-rating table.

(2) Stability tests are required if:

(i) there is no manufacturer's load-rating chart securely fixed to the operator's cab;

(ii) there has been a change in boom or other structural member or,

(iii) there has been a change in the counterweight. The test shall consist of lifting a load with the boom in the least stable undercarriage position and at an angle of 0.35 rads above the horizontal. The test shall be conducted under close supervision on a firm, level surface. The load that tilts the machine shall be identified as the test load. The test load moment (N-m) shall then be calculated by multiplying the horizontal distance (in meters) from the center of rotation of the machine to the test load, times the test load (in N). Three-fourths of this test-load moment shall then be used to compute the maximum allowable operating loads for the boom at 0.35, 0.70, 1.05 and 1.40 rads above horizontal. From these maximum allowable operating loads, curve shall be plotted and posted in the cab of the machine in sight of the operator. These values shall not be exceeded except in the performance test described below. The test load shall never exceed 100 percent of the manufacturer's maximum rated capacity.

(3) In lieu of the test and computations above, the crane may be load tested for stability at each of the four boom positions listed above.

c. Performance tests shall be performed in accordance with Section 16, "Machinery and Mechanized Equipment" of EM 385-1-1, "Safety and Health Requirements Manual", except as specified below. Performance tests shall be conducted after each stability test, when the crane is placed in service on a project, and at least every 12 months.

(1) When conducting a performance load test which is required of a new crane or a crane in which load sustaining parts have been altered, replaced, or repaired (excluding replacement of the rope), the test load shall be as specified in ASME/ANSI B30 Series. That is, for overhead, gantry, portal, pillar, tower, monorail, and underhung cranes, the test load shall not exceed 125 percent of the manufacturer's load rating capacity chart at the configuration of the test; and for hammerhead tower, mobile, and floating cranes and boom trucks, the test load shall not exceed 110 percent of the manufacturer's load rating capacity chart at the configuration of the test.

(2) When conducting a performance load test which is required because a crane is reconfigured, or reassembled after disassembly, or because the crane requires an annual load test, the test loads shall not exceed 100 percent of the manufacturer's load rating capacity chart at the configuration of the test.

(3) All load tests are required to be conducted in accordance with the manufacturer's recommendations.

d. Inspections shall be made which will ensure a safe and economical operation of both cranes and draglines with inspection documented. Copies of the inspections and tests shall be available at the job site for review. All stability and performance tests on cranes and all complete dragline inspections shall be witnessed by the Contracting Officer or his authorized representative.

e. A complete dragline inspection shall be made:

(1) at least annually;

(2) prior to the dragline being placed in operation; and

(3) after the dragline has been out of service for more than 6 months.

f. All heavy equipment moved onto the worksite shall be inspected for compliance with this contract. Some LMV Inspection forms are attached at the end of this section. All completed forms, including abatement schedule of any violations, shall be maintained at the job site for continued review and update as needed.

#### 1.21 VEHICLE WEIGHT LIMITATIONS

Vehicle weight limitations for operation on rural roads and bridges may affect the prosecution of work in this contract. The Contractor will be responsible for obtaining all necessary licenses and permits in accordance with the Contract Clause PERMITS AND RESPONSIBILITIES. Current information regarding road and bridge weight limits may be obtained by contacting the Mississippi Department of Transportation and the president of the county Board of Supervisors for the counties through which equipment and materials will be transported as a result of this contract.

#### 1.22 PUBLIC UTILITIES

a. The locations, if any, shown on the contract drawings for public utilities are approximate only. The exact locations of such facilities

shall be determined in the field by the Contractor prior to commencing construction operations.

b. Prior to performing work in the proximity of any utility, the Contractor shall contact the utility owner.

c. The Contractor's attention is directed to the possibility that he may encounter public utilities within the project limits which may be buried and the existence of which are not presently known. Should any such utilities be encountered, the Contractor shall immediately notify the Contracting Officer, or his field representative, for a determination of whether the utilities shall be removed, relocated or altered.

d. Unless otherwise noted or determined, the Contractor shall make his own arrangements with the owners of public utilities for relocating or altering utility facilities as may be necessary to permit construction of the work under this contract. The Contractor shall also be responsible for the replacement, if necessary, of the facilities to their permanent location after the completion of the construction work. An equitable adjustment to this contract for necessary utility relocation or alteration activities will be made in accordance with the Contract Clause CHANGES. However, prior to the implementation of any such relocation or alteration activities, the Contractor shall obtain the approval of the Contracting Officer or his field representative.

e. In the event the Contracting Officer chooses to arrange for such removals, relocations or alterations to be done by others, the Contractor shall cooperate fully in accordance with the Contract Clause OTHER CONTRACTS.

#### 1.23 DAMAGE TO WORK

a. The responsibility for damage to any part of the permanent work shall be as set forth in the Contract Clause PERMITS AND RESPONSIBILITIES. However, if, in the judgement of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood (see Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph PHYSICAL DATA, subparagraph FLOODS) or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor shall make repairs as ordered by the Contracting Officer and full compensation for such repairs to permanent work will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, for any part of such damaged permanent work, there is no applicable contract unit or lump sum price, then an equitable adjustment pursuant to the Contract Clause CHANGES will be made as full compensation for the repairs for that part of the permanent work for which there is no applicable contract unit or lump sum price.

b. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment, and plant shall be repaired to the satisfaction of the Contracting Officer, at the Contractor's expense, regardless of the cause of such damage.

#### 1.24 ENERGY CONSERVATION

The Contractor shall ensure that construction operations are conducted efficiently and with the minimum use of energy.

1.25 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

a. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with Contract Clause DEFAULT (FIXED PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this paragraph, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY  
WORK DAYS BASED ON FIVE (5) DAY WORK WEEK

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

c. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the contracting officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with Contract Clause DEFAULT (FIXED PRICE CONSTRUCTION).

1.26 CONTROL OF ACCESS TO CONSTRUCTION AREAS

a. This paragraph supplements the Contract Clauses PERMITS AND RESPONSIBILITIES and OPERATIONS AND STORAGE AREAS.

b. It shall be the responsibility of the Contractor to prevent possible injury to visitors to the project site. Only personnel engaged in contract work and others authorized by the Contracting

Officer shall be permitted to enter into the construction areas. Suitable barriers, warning signs and directives shall be placed by the Contractor to direct persons not engaged in the work away from the areas of danger. The Contractor shall be responsible for effective enforcement of this paragraph during the period of this contract.

1.27 MAINTENANCE OF TRAFFIC

a. The Contractor shall conduct his operations in such manner as to offer the least possible obstruction to the safe and satisfactory movement of traffic over the existing county road during the life of the contract.

b. The Contractor shall be responsible for providing, erecting, maintaining, and removal of all traffic signs, barricades, and other traffic control devices necessary for maintenance of traffic. See also paragraph entitled ACCIDENT PREVENTION PLAN and the Contract Clause entitled ACCIDENT PREVENTION.

c. All barricades, warning signs, lights, temporary signals, other devices, flag men, and signaling devices shall meet or exceed the minimum requirements of Mississippi DOTD, Standard Specifications for Road and Bridge Construction (See the Contract Clause entitled PERMITS AND RESPONSIBILITIES). The Contractor is responsible for the protection, maintenance, and replacement of all existing signs, route markers, traffic control signals, and other traffic control features during the life of this contract.

d. Prior to the commencement of construction operations the Contractor shall submit for the acceptance of the Contracting Officer, complete details of his proposed plans for the maintenance of traffic and access through the construction area.

e. The requirements of this paragraph shall be met by the Contractor at no additional expense to the Government.

1.28 HARBOR MAINTENANCE FEE

a. Offerors or bidders contemplating use of U.S. ports in the performance of contract are subject to paying a harbor maintenance fee on cargo. Federal law establishes an ad valorem port use fee on commercial cargo imported into or exported from various U.S. ports. The fee is 0.125 percent (0.00125). Cargo to be used in performing work under contracts with the U.S. Government is not exempt from the fee, although certain exemptions do exist. Offerors are responsible for ensuring that the applicable fee and associated costs are taken into consideration in the preparation of their offers. Failure to pay the harbor maintenance fee may result in assessment of penalties by the Customs Service.

b. The statute is at Title 26 U.S. Code section 4461 and 4462. Department of Treasury Customs Service regulations implementing the statute, including a list of ports subject to the fee, are found at 19 CFR 24.24, Harbor Maintenance Fee. Additional information may be obtained from local U.S. Customs Service Offices or by writing to the Director, Budget Division, Office of Finance, Room 6328, U.S. Customs Service, 1301 Constitution Avenue, N.W., Washington, D.C. 20229.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley		Date of Inspection		
Contractor or Unit		Contract No. or Activity		
Inspected by (Signature)		Approved by (Signature)		
Activity Inspected:				
<b>NIGHT OPERATIONS</b>				
<b>NOTE:</b> Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.		Yes	No	Not App
1. General:				
a. On construction contracts, is there a designated Contractor's representative on duty during night operations?*				
b. Does the contractor have an approved Activity Hazard Analysis for night operations? (01.A.09)				
c. Has Activity Hazard Analysis been reviewed by all employees prior to start of operation and documented? (01.B.03)				
d. Is each new employee provided with initial safety orientation? (01.B.01)				
e. Are emergency phone numbers posted and at least 2 qualified first aid and CPR attendants on duty? (03.A.01, 03.A.02)				
f. Are weekly safety meetings being held for night shift employees, by field supervisors or foremen?				
g. Are regularly scheduled safety meetings being held, at least once a month, for night shift supervisors? (03.B.03)				
h. Are outlines of each safety meeting being maintained at project site? (01.B.03)				
2. Lighting:				
a. Is there adequate lighting in work areas? (07.A.01, Table 7-1, 16.A.11)				
b. Is there adequate lighting on decks, walkways and floating plant? (07.A.01, Table 7-1)				
c. Is there adequate lighting at crew boat loading dock and unloading areas? (07.A.01, Table 7-1)				
d. Are semi-portable equipment, floodlights, and work lights provided with protective grounding, if not exempted by NEC? (11.C.01)				
3. Transportation to and from floating plant:				
a. Is boat equipped with sufficient number of life preservers? (05.I.01)				
b. Is weather deck of boat coated with non-skid material? (19.B.01)				
c. Do guardrails meet requirements of EM 385-1-1? (19.B.01, 21.B.01, 21.B.07)				
d. If boat is more than 26 feet in length, does operator hold a current Coast Guard license? (19.A.02)				
e. If more than 6 passengers are carried, or boat length is greater than 26 feet in length, is vessel Coast Guard certified and operator licensed? (19.A.02)				
f. Does motor boats and skiffs meet minimum flotation requirements of Coast Guard? (19.C.02)				
g. Does boat have running lights as required by 33 CFR 81 APPA and 33 CFR 84 ANNEX 1 (regardless of length)?				
h. Is the capacity of boat and maximum no. of passengers posted in accordance with EM-385-1-1? (19.C.03)				
j. Is there safe, easy access from boat to landing? (19.B.01, 19.B.02)				
4. Miscellaneous:				
a. Are haul roads properly marked for night work?				
b. Are necessary access and haul roads provided to work area? (21.I.01)				
c. Are all employees dressed suitable for night operations? Minimum shall be short sleeve shirt, long trousers and leather or other protective work shoes.				
d. Are all vehicles and construction equipment properly lighted for night work? (18.A.04, 16.A.11)				
e. Does flag or signal person have reflectorized warning garments? (08.B.08)				
f. Are all spotters or signal personnel adequately trained for operation? (08.B.10)				
5. REMARKS:				
* (Ref. Contract General Provisions).				

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley		Date of Inspection		
Contractor or Unit		Contract Number - Job Description		
Type of Equipment & Boom Length		Make, Model No., Identification		
Inspected by (Signature)		Approved by (Signature)		
<b>CRANES AND DERRICKS</b>				
<b>NOTE:</b> Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.		Yes	No	Not App
1. Is a list of the required clearances from overhead power lines posted? If necessary to work near power lines, boom shall have insulating cage guard and load line shall have insulating link. (11.E.04, 11.E.07)				
2. Are load rating charts with the machine? (16.C.01, 16.C.13)				
3. Is a list of standard hand signals posted in cab? (16.C.10, 08.B.01, 08.B.02)				
4. Are shock absorbing boom stops installed on machine? (16.D.02)				
5. Has the manufacturer certified the boom stops? (16.D.02)				
6. Does the boom angle, levelness, and other indicators operate accurately? (16.D.01)				
7. Does the unit have a suitable fire extinguisher? (16.A.26)				
8. Are moving parts, gears, drums, shafts, belts adequately screened or guarded? (16.B.03)				
9. Is there adequate protection from hot pipes, etc? (16.B.03)				
10. Are steps, ladders, guard rails, provided for safe footing and access? (16.B.03, 21.A.01)				
11. Can lubrication and greasing be done safely? (16.B.13)				
12. Is the cab equipped with unbroken distortion free safety glass? (16.B.10)				
13. Is fuel tank located so that overflow and spills will not run into cab or come in contact with exhaust ? (16.B.04)				
14. Is the unit shut down for fueling, servicing, etc? (16.A.14)				
15. Are slings, fastenings, fittings inspected daily by a qualified person? * Is wire rope inspected by a competent person frequently? (Section 15)				
16. When wedge socket type fasteners are used, has the dead end been made secure against loosening? (15.B.04)				
17. Have the air tanks been tested and certified? (20.A.02)				
18. Are test and inspection records kept available as a part of the official project file? (16.A.01)				
19. Is there evidence of deformed, cracked, or corroded members in the crane structure or boom? * (ANSI)				
20. Do the drums have proper pawls or positive locking devices? (16.B.14)				
21. Is there sufficient cable available so as to allow three full wraps on the drum at all working positions? (16.C.09)				
22. Are daily inspections being made of all control mechanisms to assure that there is no maladjustment interfering with proper operation? *				
23. Are inspections being made, at least monthly, of control mechanisms for excessive wear of components, and contamination by lubricants, or other foreign matter? *				
24. Are frequent (daily to monthly) inspections being made of all safety devices? *				
25. Are daily inspections for deterioration, or leakage in air or hydraulic systems being made? *				
26. Are crane hook inspections being made frequently (daily to monthly) to assure that there are no cracks or that the normal hook throat opening has not increased more than 15% *				
27. Is there evidence of loose bolts or rivets? * (ANSI)				
28. Is there evidence of cracked or worn sheaves or drums? (15.F.04)				
29. Are parts such as pins, bearings, shafts, gears, rollers, and locking devices worn, cracked, or distorted?				
* (Ref Contract Special Clauses)		(Continued on reverse)		

CRANES AND DERRICKS		Yes	No	Not App
30.	Is there evidence of excessive wear on brake and clutch system parts? *			
31.	Is there evidence of excessively worn or damaged tires? *			
32.	Is the power plant in good mechanical condition? *			
33.	Are accessible areas within the swing radius of the rear barricaded? (16.C.08)			
34.	Has a boom hoist disengaging device been installed on cranes with cable supported booms? (16.D.02)			
35.	Is there a current set of operator's manuals available? (16.C.01)			
36.	Are cranes and derricks operated by qualified operators? (16.C.04)			
37.	Have lattice and Hydraulic cranes been equipped with a device to stop the load hoisting before the load block contacts the boom tip? (16.D.01)			

38. Crane Stability Test:

Amount of counterweight: \_\_\_\_\_ lb.

Boom Angle	Distance from Center Pin to Load Line R (ft)	Tipping Load I (lb)		Moment R x I		Maximum Allowable Load L=0.75 I	
		With Outriggers	Without Outriggers	With Outriggers	Without Outriggers	With Outriggers	Without Outriggers
20°	_____	_____	_____	_____	_____	_____	_____
40°	_____	_____	_____	_____	_____	_____	_____
60°	_____	_____	_____	_____	_____	_____	_____
80°	_____	_____	_____	_____	_____	_____	_____

39. Performance Test:

- a. Complete items 1-32 on this form.
- b. Determine performance test load (PTL) from the stability test above with the boom at the 80° position.  
PTL=(1.25)(L)
- c. Position the boom in the 80° position and allow the crane to lift, lower, and hold the performance test load.

40. Remarks

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley		Date of Inspection		
Contractor or Unit		Contract Number - Job Description		
Type of Equipment		Identification		
Inspected by (Signature)		Approved by (Signature)		
<b>CRAWLER TRACTORS - DOZERS</b>				
<b>NOTE:</b> Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.		Yes	No	Not App
1. Is protection, (grills, canopies, screens) provided to shield operator from falling or flying objects? (16.B.10, 16.B.11)				
2. Is adequate roll over protection provided? (16.B.12)				
3. Are seat belts provided? (16.B.08, 16.b.12)				
4. Is the operator physically qualified? (01.C.01)				
5. Does the unit have a suitable fire extinguisher? (16.A.26)				
6. Is there an effective, working reverse alarm? (16.B.01)				
7. Are moving parts, shafts, sprockets, belts, etc. guarded? (16.B.03, 16.B.07)				
8. Is protection against contact with hot surfaces, exhaust, etc. provided? (16.B.03)				
9. Are all screens, guards, shields in place and effective? (16.B.03)				
10. Is the unit shut down for fueling, servicing, etc? (16.A.14)				
11. Is the dozer blade lowered when not in use? (16.A.09)				
12. Are sufficient lights provided for night operations? (16.A.11)				
13. Are there initial inspections and scheduled inspections of the equipment at regular intervals? (16.A.01, 16.A.02)				
14. Are fuel tanks located in a manner to prevent spills or overflows from running onto engine, exhaust, or electrical equipment? (16.B.04)				
15. Are exhaust discharges from equipment so directed that they do not endanger persons or obstruct the view of the operator? (16.B.05)				
16. Are inspection records kept available as a part of the official project file? (16.A.01)				
28. REMARKS:				

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley		Date of Inspection		
Contractor or Unit		Contract Number - Job Description		
Type of Equipment & Boom Length		Make, Model No., Identification		
Inspected by (Signature)		Approved by (Signature)		
Equipment Inspected:				
<b>DRAGLINES</b>				
<b>NOTE:</b> Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.		Yes	No	Not App
1. Is a list of the required clearances from overhead power lines posted? If necessary to work near power lines, boom shall have insulating cage guard and load line shall have insulating link. (11.E.04, 11.E.07)				
2. Does the unit have a suitable fire extinguisher? (16.A.26)				
3. Are moving parts, gears, drums, shafts, belts adequately screened or guarded? (16.B.03)				
4. Is there adequate protection from hot pipes, etc? (16.B.03)				
5. Are steps, ladders, guardrails, provided for safe footing and access? (16.B.03)				
6. Can lubrication and greasing be done safely? (16.A.08, 16.B.13)				
7. Is the cab equipped with unbroken safety glass? (16.B.10)(18.A.07)				
8. Is the fuel tank located so that overflow and spills will not run into cab or come in contact with exhaust? (16.B.04)				
9. Is the unit shut down for fueling, servicing, etc? (16.A.14)				
10. Is wire rope being inspected by a competent person frequently? (Daily to Monthly) (15.A.02)				
11. When wedge socket type fasteners are used, has the dead end been made secure against loosening? (15.B.04)				
12. Have the air tanks been tested and certified? (20.A.02,20.A.03)				
13. Are test records kept available as part of the official project file? (16.A.01)				
14. Is there evidence of deformed, cracked, or corroded members in the crane structure or boom?				
15. Do the drums have proper pawls or positive locking devices? (16.B.14)				
16. Is there sufficient cable available so as to allow three full wraps on the drum at all working positions? (16.C.09)				
17. Are daily inspections being made of all control mechanisms to assure that there is no maladjustment interfering with proper operation? (16.A.01,.02,.05)				
18. Are inspections being made, at least monthly, of control mechanisms for excessive wear of components, and contamination by lubricants, or other foreign matter? (16.A.01,.02,.05)				
19. Are frequent (daily to monthly) inspections being made of all safety devices? (16.A.01,.02,.05)				
20. Are daily inspections for deterioration, or leakage in air or hydraulic systems being made? (16.A.01,.02,.05)				
21. Is there evidence of loose bolts or rivets?				
22. Is there evidence of cracked or worn sheaves or drums?				
23. Are parts such as pins, bearings, shafts, gears, rollers, and locking devices worn, cracked, or distorted?				
24. Is there evidence of excessive wear on brake and clutch system parts?				
25. Is there evidence of excessively worn or damaged tires?				
26. Is the power plant in good mechanical condition?				
27. Is there evidence that the operator(s) are physically and emotionally qualified? (01.C.01)				
28. REMARKS:				

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PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS

1.1.1 General

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.1.2 Lump Sum Items

- a. "Box Culvert Grade Control Structure Repair, Tributary A, Site No. 1"

- (1) Payment will be made for costs associated with constructing the box culvert grade control structure repair including all work required at the site and all work incidental thereto.

- (2) Unit of measure: lump sum.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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-- End of Section Table of Contents --

## SECTION 01090

### SOURCES FOR REFERENCE PUBLICATIONS

#### PART 1 GENERAL

##### 1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the sponsoring organization, e.g. UL 1 (1993; Rev thru Jan 1995) Flexible Metal Conduit. However, when the sponsoring organization has not assigned a number to a document, an identifying number has been assigned for convenience, e.g. UL's unnumbered 1995 edition of their Building Materials Directory is identified as UL-01 (1995) Building Materials Directory. The sponsoring organization number (UL 1) can be distinguished from an assigned identifying number (UL-01) by the lack of a dash mark (-) in the sponsoring organization assigned number.

##### 1.2 ORDERING INFORMATION

The addresses of the organizations whose publications are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the sponsoring organization should be ordered from the source by title rather than by number.

ACI INTERNATIONAL (ACI)  
P.O. Box 9094  
Farmington Hills, MI 48333-9094  
Ph: 248-848-3700  
Fax: 248-848-3701  
Internet: <http://www.aci-int.inter.net>

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)  
444 N. Capital St., NW, Suite 249  
Washington, DC 20001  
Ph: 888-227-4860 or 202-624-5800  
Fax: 202-624-5806

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959  
Ph: 610-832-9500  
Fax: 610-832-9555  
E-mail: [cservice@astm.org](mailto:cservice@astm.org)

AMERICAN WELDING SOCIETY (AWS)  
550 N.W. LeJeune Road  
Miami, FL 33126  
Ph: 305-443-9353

Fax: 305-443-7559

CODE OF FEDERAL REGULATIONS (CFR)

Order from:

Government Printing Office

Washington, DC 20402

Ph: 202-512-1800

Fax: 202-275-7703

Internet: <http://www.pls.com:8001/his/cfr.html>

CORPS OF ENGINEERS (COE)

Order from:

U.S. Army Engineer Waterways Experiment Station

ATTN: Technical Report Distribution Section, Services  
Branch, TIC

3909 Halls Ferry Rd.

Vicksburg, MS 39180-6199

Ph: 601-634-2355

Fax: 601-634-2506

ENGINEERING MANUALS (EM)

USACE Publications Depot

Attn: CEIM-SP-D

2803 52nd Avenue

Hyattsville, MD 20781-1102

Ph: 301-394-0081

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01130

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 DEFINITIONS

Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of importance to life; or degrade the environment for aesthetic, cultural or historical purposes. Environmental protection is the prevention and/or control of pollution that develops during normal construction practice. The control of environmental pollution and damage requires consideration of air, water, soil, and land resources; and includes management of visual aesthetics; noise; solid, chemical, and liquid waste; radiant energy and radioactive materials; and other pollutants.

1.2 ENVIRONMENTAL PROTECTION REQUIREMENTS

A plan shall be developed to provide for environmental protective measures to prevent and/or control pollution that may develop during construction. The plan shall contain protective measures required to prevent or correct conditions that may develop during the construction. The liability for environmental noncompliance shall be borne by the Contractor.

1.2.1 Environmental Protection Plan

Within 15 days after receipt of Notice of Award of the contract and at least 7 days prior to the Preconstruction Conference, the Contractor shall submit in writing an Environmental Protection Plan. No physical work at the site shall begin until the Contracting Officer has approved the plan and provided specific authorization to start a phase of the work. Preparation and submittal of supplemental plan(s) may be necessary for later phases of work. A copy of the complete Environmental Protection Plan shall be maintained on-site at all times during the life of the contract. The environmental protection plan shall include but not be limited to the following.

1.2.1.1 Protection of Features

In accordance with Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS, the Contractor shall develop methods for the protection of features to be preserved within authorized work areas. The Contracting Officer will prepare a list of resources needing protection and preservation (i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air quality, noise levels, surface and ground water quality, fish and wildlife, soil, historic, archaeological and cultural resources). The Contractor's plan shall identify methods to protect these and other resources present and specify measures to protect the environment should an accident, natural causes of pollution, or failure to follow the environmental protection plan occur during construction. The Contractor's plan shall specify how the quality and protective measures of these resources shall be monitored. Furthermore the Contractor's plan shall specify how and where waste shall be disposed.

#### 1.2.1.2 Procedures

The Contractor shall implement procedures to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

#### 1.2.1.3 Drawings

The Contractor shall include drawings identifying the areas of limited use or nonuse and show locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, stockpiles of earth materials, and disposal areas for excess earth material and unsuitable earth materials.

#### 1.2.1.4 Recycling and Waste Prevention Plan

The Contractor shall submit as a part of the Environmental Protection Plan, a Recycling and Waste Prevention Plan.

#### 1.2.1.5 Environmental Monitoring Plans

The Contractor shall include environmental monitoring plans for the job site which incorporate land, water, air and noise monitoring.

#### 1.2.1.6 Traffic Control Plan

The Contractor shall include a traffic control plan for the job site. This plan shall focus on reducing erosion of temporary roadbeds by construction traffic, especially during wet weather, and reducing the amount of mud transported onto paved public roads by motor vehicles or runoff.

#### 1.2.1.7 Surface and Ground Water

The Contractor shall establish methods of protecting surface and ground water during construction activities. These water courses shall be protected from pollutants such as petroleum products, fuels, oils, lubricants, bentonite, bitumens, calcium chloride, acids, waste washings, sewage, chlorinated solutions, herbicides, insecticides, lime, wet concrete, cement, silt, or organic or other deleterious material. Chemical emulsifiers, dispersants, coagulants, or other cleanup compounds shall not be used without prior written approval from the Contracting Officer. Waters used to wash equipment shall be disposed to prevent entry into a waterway until treated to an acceptable quality. Fuels, oils, greases, bitumens, chemicals, and other nonbiodegradable materials shall be contained with total containment systems and removed from the site for disposal in an approved manner.

#### 1.2.1.8 Noise Intrusion

The Contractor shall exercise controls to minimize damage to the environment by noise from construction activities. All Contractor's, subcontractors', and suppliers' equipment used on or in the vicinity of the job site shall be equipped with noise suppression devices. Equipment not so suppressed and properly maintained must be approved for use in writing by the Contracting Officer. Areas that have noise levels greater than 85

dB continuous or 140 dB peak (unweighted) impulse must be designated as noise hazardous areas. These work areas must have caution signs displayed at the perimeter of the noise area indicating the presence of hazardous noise levels and requiring the use of hearing protection devices.

#### 1.2.1.9 Work Area Plan

The Contractor shall include a work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. The plan shall include measures for marking the limits of use areas.

#### 1.2.1.10 Plan of Borrow Area(s)

The Contractor shall include a plan of borrow area(s) for the project.

#### 1.2.1.11 Contaminant Prevention Plan

The Contractor shall identify hazardous and potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, water or ground. The Contractor shall detail provisions to be taken regarding the storage and handling of these materials. The plan shall include, but not be limited to, plans for preventing polluted runoff from plants, parked equipment, and maintenance areas from entering local surface and ground water sources.

### 1.3 ENVIRONMENTAL LITIGATION

a. If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor, or a Subcontractor at any tier, not required by the terms of the contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor, or a Subcontractor at any tier, other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the SUSPENSION OF WORK clause of this contract. The period of such suspension, delay, or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

b. The term "Environmental Litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

## PART 2 PRODUCTS (Not Applicable)

## PART 3 EXECUTION

### 3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The Contractor shall protect the environmental resources (such as, but not

limited to, historic, archaeological and cultural resources; land, water, and air resources; and fish and wildlife resources) within the project boundaries and those affected outside the limits of permanent work under this contract.

### 3.1.1 Protection of Land Resources

In accordance with Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS, the land resources within the project boundaries and those affected outside the limits of work under this contract shall be preserved in their present condition or be restored to an equivalent condition upon completion of the work. Prior to initiating any construction, the Contractor shall identify all land resources to be preserved within the work area, including those identified by the Contracting Officer. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and landforms without permission from the Contracting Officer unless otherwise specified. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times and shall be responsible for any subsequent damage as defined in the following subparagraphs.

#### 3.1.1.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas within the designated work areas that are not required to accomplish work to be performed under this contract and which are to be protected. Isolated areas within the general work area which are to be saved and protected shall be marked or fenced. Monuments and markers shall be protected during construction. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of marking and protecting all necessary objects.

#### 3.1.1.2 Protection of Landscape

Trees, shrubs, vines, grasses, landforms and other landscape features, indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

#### 3.1.1.3 USDA Quarantined Considerations

See Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph WORK IN QUARANTINED AREA.

#### 3.1.1.4 Location of Contractor On-Site Facilities

The Contractor's on-site field offices, staging areas, stockpile storage, and temporary buildings shall be placed in approved areas. Temporary movement or relocation of Contractor on-site facilities shall be only on approval by the Contracting Officer.

#### 3.1.1.5 Borrow Areas

Borrow areas off Government right-of-way shall be managed by the Contractor to minimize erosion and to prevent sediment from entering nearby water courses or lakes, or affecting known or discovered cultural resource

properties. All borrow areas outside the construction limits that are operated by the Contractor shall be reclaimed to provide for the protection and subsequent beneficial use of the mined and reclaimed land. Before obtaining material from any borrow source located outside the project limits, whether operated by the Contractor or by an independent supplier, the Contracting Officer shall be informed in writing of the location of such source(s), the names of the owner and operator, and the types and estimated quantities of materials to be obtained from each source.

#### 3.1.1.6 Disposal of Solid Wastes

Solid wastes (not including clearing debris) shall be any waste excavated or generated by the Contractor. Solid waste shall be placed in containers and disposed on a regular schedule. All handling and disposal shall be conducted to prevent spillage and contamination. The Contractor shall transport all solid waste off government property and dispose properly. The Contractor shall participate in any State or local recycling programs to reduce the volume of solid waste materials at the source whenever practical.

#### 3.1.1.7 Disposal of Hazardous Wastes

Hazardous waste shall be stored, removed from the work area, and disposed of in accordance with all applicable State and Federal laws and regulations. Hazardous waste shall not be dumped onto the ground, into storm sewers or open water courses, or into the sanitary sewer system. Fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation.

#### 3.1.1.8 Disposal of Discarded Materials

Discarded materials that cannot be included in the solid waste category shall be handled as approved.

#### 3.1.1.9 Disposal of Waste Oils

Waste oils and/or lubricants shall be disposed of in accordance with all Federal, State, and local laws and regulations. The Contractor shall collect waste oil and/or lubricants in leak-tight containers, ensure that all openings on the containers are tightly sealed (including the drum ring and bung closures), and label the containers to clearly indicate contents. Disposal through a waste oil recycler is required. The Contractor shall ensure that the recycler has all appropriate State and Federal permits.

#### 3.1.2 Historical, Archaeological and Cultural Resources

The Contractor shall take precautions to preserve existing historical, archaeological and cultural resources. The Contractor shall install protection for these resources and shall be responsible for their preservation during this contract. If during construction activities the Contractor observes items that may have archaeological or historic value (e.g., when Native American human remains and associated objects are discovered), the Contractor shall stop work in the area, leave the items undisturbed, and immediately report the find to the Contracting Officer. Such items may include historic artifacts of glass, metal and ceramics, or prehistoric artifacts such as stone tools, ceramics, bone, and shell. The Contractor shall not judge the potential significance of any suspected cultural material, but shall report all findings to the Contracting Officer.

### 3.1.3 Protection of Water Resources

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Discharges of any pollutant into the water courses is strictly prohibited, unless excepted by the Contracting Officer.

#### 3.1.3.1 Waste Water

Waste water directly derived from washing equipment, curing concrete, cleaning joints, or any other construction activities shall not be discharged into natural water areas.

#### 3.1.3.2 Monitoring of Water Areas Affected by Construction Activities

The Contractor shall be responsible for monitoring all water areas affected by construction activities. In the event that water quality violations result from the Contractor's operation, the Contractor shall suspend the operation or operations causing the pollution, and such suspension shall not form the basis for a claim against the Federal government.

### 3.1.4 Protection of Aquatic and Wildlife Resources

The Contractor shall keep construction activities under surveillance, management, and control to prevent interference with, disturbance to, and damage to aquatic resources and/or wildlife. Species that require specific attention as defined by law or specified by the Contracting Officer, along with measures for their protection, shall be listed by the Contractor prior to beginning of construction operations.

### 3.1.5 Protection of Air Resources

The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. Special management techniques as set out below shall be implemented to control air pollution by the construction activities.

#### 3.1.5.1 Particulates

Dust particles, aerosols, and gaseous by-products from all construction activities, disturbed areas, and/or 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 all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause air pollution standards specified in paragraph PROTECTION OF AIR RESOURCES to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling shall be repeated at such intervals as to keep the disturbed area damp at all times.

#### 3.1.5.2 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal, State, and local allowable limits at all times.

### 3.1.5.3 Volatile Organic Compound (VOC)

The Contractor shall comply with Federal, State, and local laws and regulations pertaining to emission of VOC vapors at all times.

### 3.1.5.4 Odors

Odors shall be controlled at all times for all construction activities, including processing and preparation of materials.

### 3.1.5.5 Monitoring Air Quality

Monitoring of air quality at the construction site(s) shall be the responsibility of the Contractor.

## 3.2 NONCOMPLIANCE

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall take all necessary action to correct the noncompliance. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions will be granted or costs or damage allowed to the Contractor for any such suspension. (See also the Contract Clause PERMITS AND RESPONSIBILITIES.)

## 3.3 CONTAINMENT AND CLEANUP OF CONTAMINANT RELEASES

The Contractor shall provide the Contracting Officer for approval, a contaminant containment and cleanup plan including the procedures, instructions, and reports to be used in the event of an unforeseen substance release. This plan shall include as a minimum:

- a. The name of the individual who will be responsible for implementing and supervising the containment and cleanup.
- b. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
- c. 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.
- d. The methods and procedures to be used for expeditious contaminant cleanup.
- e. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer in addition to the legally required reporting channels when a reportable quantity spill of oil or hazardous substance occurs.

## 3.4 POST CONSTRUCTION CLEANUP

The Contractor shall clean up areas used for construction and remove all

signs of temporary construction facilities; Contractor office, storage and staging areas; quarry and borrow areas, and all other areas used by the Contractor during construction. Furthermore, the disturbed areas shall be graded and filled as approved by Contracting Officer. Restoration of original contours is not required unless specified in another section. (See also the Contract Clause CLEANING UP.)

### 3.5 RESTORATION OF LANDSCAPE DAMAGE

All landscape features damaged or destroyed during construction operations that were not identified for removal shall be restored. Any vegetation or landscape feature damaged shall be restored as nearly as possible to its original condition. (See also the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS.)

### 3.6 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for the length of time construction activities create the particular pollutant.

### 3.7 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

Contractor personnel shall be trained in environmental protection and conduct environmental protection meetings monthly. The training and meeting agenda shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities (vegetative covers, and instruments required for monitoring purposes) to insure adequate and continuous environmental pollution control. Personnel are to be informed of provisions for hazardous and toxic materials container labeling and for managing Material Safety Data Sheets (MSDS). Anticipated hazardous or toxic chemicals shall also be reviewed. Other items to be discussed shall include recognition and protection of archaeological sites and artifacts. The Contractor shall include training topics discussed and attendance as a part of his daily CQC Report.

-- End of Section --

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL DESCRIPTIONS

The submittals described below are those required and further described in other sections of the specifications. Submittals required by the CONTRACT CLAUSES and other non-technical parts of the contract are not included in this section.

SD-01 Data

Submittals which provide calculations, descriptions, or other documentation regarding the work.

SD-07 Schedules

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

SD-08 Statements

A document, required of the Contractor, or through the Contractor, by way of a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

SD-09 Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Test methods used and compliance with recognized test standards shall be described.

SD-13 Certificates

Statement signed by responsible official of a manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address.

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause, SPECIFICATIONS AND DRAWINGS FOR

CONSTRUCTION, they are considered to be "shop drawings."

#### 1.2.2 Information Only

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

#### 1.3 APPROVED SUBMITTALS

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

#### 1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with 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) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples

remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

### 3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. Columns "d" through "q" have been completed by the Government; the Contractor shall complete columns "a" and "s" through "u" and submit the forms to the Contracting Officer for approval within 10 calendar days after Notice to Proceed. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

### 3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

### 3.4 TRANSMITTAL FORM (ENG FORM 4025-R)

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

### 3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

#### 3.5.1 Procedures

Submittals shall be prepared, as specified, with four (4) copies and the original delivered to the Contracting Officer.

#### 3.5.2 Deviations

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

### 3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure

that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

### 3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Three (3) copies of the submittal will be retained by the Contracting Officer and one (1) copy of the submittal will be returned to the Contractor.

### 3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

### 3.9 STAMPS

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

CONTRACTOR

(Firm Name)

\_\_\_\_\_ Approved

\_\_\_\_\_ Approved with corrections as noted on submittal data and/or  
attached sheets(s).

SIGNATURE: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

-- End of Section --

<b>TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE</b> <i>(Read instructions on the reverse side prior to initiating this form)</i>	DATE	TRANSMITTAL NO.
---	------	-----------------

**SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS** *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: <input type="checkbox"/> THIS IS A NEW TRANSMITTAL <input type="checkbox"/> THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO. <i>(Cover only one section with each transmittal)</i>	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR <input type="checkbox"/> FIO <input type="checkbox"/> GOV'T. APPROVAL

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED <i>(Type size, model number/etc.)</i>	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. <i>(See instruction no. 8)</i>	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION <i>(See instruction No. 6)</i>	FOR CE USE CODE
				SPEC. PARA. NO. <i>e.</i>	DRAWING SHEET NO. <i>f.</i>			
<i>a.</i>	<i>b.</i>	<i>c.</i>	<i>d.</i>	<i>e.</i>	<i>f.</i>	<i>g.</i>	<i>h.</i>	<i>i.</i>

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated.  <hr style="width: 80%; margin-left: auto; margin-right: 0;"/> NAME AND SIGNATURE OF CONTRACTOR
---------	--

**SECTION II - APPROVAL ACTION**

ENCLOSURES RETURNED <i>(List by Item No.)</i>	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE
---	--	------

## INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

### THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	--	Approved as submitted.	E	--	Disapproved (See attached).
B	--	Approved, except as noted on drawings.	F	--	Receipt acknowledged.
C	--	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	--	Receipt acknowledged, does not comply as noted with contract requirements.
D	--	Will be returned by separate correspondence.	G	--	Other ( <i>Specify</i> )

10. Approval of items does not relieve the contractor from complying with all the requirements of the contact plans and specifications.

*(Reverse of ENG Form 4025-R)*









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SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(1995c) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause INSPECTION OF CONSTRUCTION. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 15 days after receipt of Notice of Award of the contract and at least 7 days prior to the Preconstruction Conference, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause INSPECTION OF CONSTRUCTION. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

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

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC system manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.
- 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 will also be furnished to the Government.
- d. Procedures for laying out the work, verifying that the work has been constructed as required, and documenting the results of these quality control activities.
- e. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- f. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved.)
- g. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- h. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
- i. Reporting procedures, including proposed reporting formats.
- j. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section.

This list will be agreed upon during the coordination meeting.

### 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 a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

## 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the Contractor's Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The Contractor shall contact the Government to mutually schedule the Coordination Meeting at least 48 hours in advance of conducting the meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site 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

The Contractor shall identify an individual within his organization at the worksite who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be on the site at all times during construction and will be employed by the Contractor, except as noted in the following. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. Period of absence may not exceed 2 weeks at any one time, and not more than 30 workdays during a calendar year. The requirements for the alternate will be the same as for the designated CQC Manager.

### 3.4.1 CQC Organizational Staffing

The Contractor shall provide a CQC staff which shall be at the worksite at all times during progress, with complete authority to take any action necessary to ensure compliance with the contract.

#### 3.4.1.1 CQC Staff

Following are the minimum requirements for the CQC staff. These minimum requirements will not necessarily assure an adequate staff to meet the CQC requirements at all times during construction. The actual strength of the CQC staff may vary during any specific work period to cover the needs of the work period. When necessary for a proper CQC organization, the Contractor will add additional staff at no cost to the Government. This listing of minimum staff in no way relieves the Contractor of meeting the basic requirements of quality construction in accordance with contract requirements. All CQC staff members shall be subject to acceptance by the Contracting Officer.

#### 3.4.1.2 CQC System Manager

The CQC System Manager shall be an experienced construction person with a minimum of 5 years experience in related work. The CQC System Manager, and alternate when serving as System Manager, shall perform no other duties in addition to quality control, except that he may also be project superintendent. The CQC System Manager and alternate shall have successfully completed the course, "Construction Quality Management for Contractors". This course is periodically offered at Vicksburg, MS. (The POC for this course is Mr. James Waddle, CEMVK-CD-MQ, at (601) 631-5501.)

#### 3.4.1.3 Supplemental Personnel

A staff shall be maintained under the direction of the CQC System Manager to perform all CQC activities. The staff must be of sufficient size to ensure adequate CQC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned CQC responsibilities and must be allowed sufficient time to carry out these responsibilities. The CQC Plan will clearly state the duties and responsibilities of each staff member.

#### 3.4.2 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

#### 3.5 SUBMITTALS

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

#### 3.6 CONTROL

The controls shall include at least three phases of control to be conducted by the CQC System Manager for all definable features of work, as follows:

##### 3.6.1 Preparatory Phase

This phase shall be performed prior to beginning each definable feature of work, after all required plans/documents are approved/accepted, and after all 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 equipment have been tested, submitted, and approved.
- d. A check to assure that provisions 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 constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that phase 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. The Government shall be notified at least 48 hours in advance of beginning any of the required action of the preparatory 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 preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verification of full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be

prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

### 3.6.3 Follow-up Phase

Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, 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 or conceal non-conforming work.

### 3.6.4 Additional Preparatory and Initial Phases

As determined by the Government, additional preparatory and initial phases may be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, on-site production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

## 3.7 TESTS

### 3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Testing includes operation and 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 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, will 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 will be given. If approved, 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 off-site or commercial test facility will 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 \$2,000 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

### 3.7.3 On-Site Laboratory

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

### 3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will 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., at the following address:

Waterways Experiment Station  
3909 Halls Ferry Road  
Vicksburg, Mississippi 39180-6199

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

## 3.8 COMPLETION INSPECTION

### 3.8.1 Punch List Inspection

Near the completion of all work or any increment thereof established by a completion time stated in Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK, or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies/uncompleted work shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies/uncompleted work shall be corrected/completed. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies/uncompleted work have been corrected/completed. 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 this inspection to verify that the facility is complete and ready to be occupied or put in use. A Government "Pre-Final Punch List" may be developed as a result of this inspection. 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 will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control System Manager, his Superintendent or other primary personnel, and the Contracting Officer's Representative shall be in attendance at this inspection. The customer and other Government personnel may also be in attendance. In the event of unavailability of the Contractor's representative, the Contracting Officer may elect to conduct the final acceptance inspection as scheduled. The Contracting Officer will formally schedule the final acceptance inspection based upon the results of the pre-final inspection. At least 14 days prior to the scheduled final acceptance inspection, the Contractor shall give the Contracting Officer a written notice of completion. The notice shall include the Contractor's assurance that all items previously identified to the Contractor as being unacceptable and all remaining work under the contract will be completed 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 INSPECTION OF CONSTRUCTION.

## 3.9 DOCUMENTATION

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

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

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) 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 seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### 3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section are:

- a. CONSTRUCTION QUALITY MANAGEMENT REPORT
- b. PREPARATORY PHASE CHECKLIST FORM
- c. INITIAL PHASE CHECKLIST FORM

### 3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, 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 additional costs or damages by the Contractor.

-- End of Section --



**4. Results of control activities:** (Indicate whether P - Preparatory, I - Initial, or F - Follow-up Phase. When a P or I meeting is conducted, complete attachment I-A or I-B, respectively. When network analysis system is used, identify work by use of I-J)

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**5. Tests performed as required by plans and/or specifications:**

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**6. Materials received:**

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**7. Submittals Reviewed:**

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**8. Offsite surveillance activities, including action taken:**

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**9. Job safety: (Report violations; Corrective instructions given; Corrective actions taken.)**

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**PREPARATORY PHASE CHECKLIST FORM**

Contract No.: \_\_\_\_\_ Date: \_\_\_\_\_

Definable Feature: \_\_\_\_\_ Spec Section: \_\_\_\_\_

Government Rep Notified \_\_\_\_\_ Hours in Advance Yes \_\_\_\_ No \_\_\_\_

**I. Personnel Present:**

NAME	POSITION	COMPANY/GOVERNMENT
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____

(List additional personnel on reverse side)

**II. Submittals**

1. Review submittals and submittal log 4288. Have all submittals been approved? Yes \_\_\_\_ No \_\_\_\_

If No, what items have not been submitted?

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

2. Are all materials on hand? Yes \_\_\_\_ No \_\_\_\_

If No, what items are missing?

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

3. Check approved submittals against delivered material. (This should be done as material arrives.)

Comments \_\_\_\_\_

**III. Material storage**

Are materials stored properly? Yes \_\_\_\_ No \_\_\_\_

If No, what action is taken? \_\_\_\_\_

**PREPARATORY PHASE CHECKLIST FORM (Cont'd)**

IV. Specifications

1. Review each paragraph of specifications.

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2. Discuss procedure for accomplishing the work.

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3. Clarify any differences.

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V. Preliminary Work

Ensure preliminary work is correct.

If not, what action is taken? \_\_\_\_\_  
\_\_\_\_\_

VI. Testing

1. Identify test to be performed, frequency, and by whom. \_\_\_\_\_

2. When required? \_\_\_\_\_

3. Where required? \_\_\_\_\_

4. Review Testing Plan. \_\_\_\_\_

5. Has test facilities been approved? \_\_\_\_\_

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VII. Safety

1. Review applicable portion of EM 385-1-1. \_\_\_\_\_

2. Activity Hazard Analysis approved? Yes \_\_\_\_\_ No \_\_\_\_\_

VIII. Corps of Engineers comments during meeting.

\_\_\_\_\_  
CQC Representative

**INITIAL PHASE CHECKLIST FORM**

Contract No.: \_\_\_\_\_ Date: \_\_\_\_\_

Definable Feature: \_\_\_\_\_

Government Rep Notified: \_\_\_\_\_ Hours in Advance Yes \_\_\_\_\_ No \_\_\_\_\_

**I. Personnel Present:**

	NAME	POSITION	COMPANY/GOVERNMENT
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____

(List additional personnel on reverse side)

**II. Identify full compliance with procedures identified at preparatory phase. Coordinate plans, specifications, and submittals.**

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**III. Preliminary work. Ensure preliminary work is complete and correct. If not, what action is taken? \_\_\_\_\_**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**IV. Establish Level of Workmanship.**

1. Where is work located? \_\_\_\_\_
2. Is a sample panel required? Yes \_\_\_\_\_ No \_\_\_\_\_
3. Will the initial work be considered as a sample? Yes \_\_\_\_\_ No \_\_\_\_\_  
(If yes, maintain in present condition as long as possible.)

**V. Resolve any Differences.**

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**INITIAL PHASE CHECKLIST FORM (Cont'd)**

VI. Check Safety.

Review job condition using EM 385-1-1 and job hazard analysis.

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
CQC Representative

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SECTION 02109

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

Clearing and grubbing work for construction shall be completed prior to excavation or embankment construction. If regrowth of vegetation or trees occurs after clearing and grubbing and before construction, the Contractor will be required to clear and grub the area again prior to excavation or embankment construction. No payment will be made for this additional clearing and grubbing.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

3.1.1 General

Clearing, unless otherwise specified, shall consist of the complete removal above the ground surface of all trees, stumps, down timber, snags, brush, vegetation, old piling, loose stone, abandoned structures, underground structures, fencing, and similar debris.

3.1.2 Merchantable Timber

Merchantable timber remaining within the areas to be cleared on or after the date of award of this contract may be disposed of as the Contractor sees fit, as long as such merchantable timber is either removed from the rights-of-way or is satisfactorily disposed of in accordance with paragraph DISPOSAL OF DEBRIS. The Contractor is precluded from making any claim for time extensions, costs, or damage to his operations by reason of the existence or nonexistence of merchantable timber, crops, debris, or stumps within the areas to be cleared.

3.1.3 Trees

Trees shall be felled in such a manner as to avoid damage to trees to be left standing, to existing structures and installations and to those under construction, and with due regard for the safety of employees and others.

3.1.4 Vegetation

Vegetation to be removed shall consist of crops, grass, bushes, and weeds. This vegetation shall be removed to form a completely bare earth surface.

3.1.5 Miscellaneous

3.1.5.1 Debris

The Contractor shall remove all debris and other materials which remain after construction is complete. The Contractor shall remove debris in

gullies and existing ditches as shown.

#### 3.1.5.2 Existing Fencing

The Contractor shall remove any existing fencing within the confines of the contract rights-of-way as required to facilitate construction. After completion of the structure, and diversions, the Contractor shall replace the fencing in kind and shall erect it in a manner similar and at least equal to the removed fencing.

#### 3.1.5.3 Temporary Fencing

The Contractor shall provide temporary fencing as required to keep livestock outside the construction limits. Temporary fencing shall be erected in a manner similar to the removed fencing and existing fencing.

#### 3.1.5.4 Existing Power Poles and Lines

See Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph PUBLIC UTILITIES.

#### 3.1.6 Areas to be Cleared

##### 3.1.6.1 General

The entire area of the excavations, fill and embankment shall be cleared of all trees, brush, drift, miscellaneous debris, or other obstruction that would hinder excavation or grading, and subsequent construction operations. This will include removal of the remains of the existing apron slab and wing wall on the downstream end of the box culvert, which shall be accomplished without damage to the existing box culvert. Any damage done to the box culvert shall be repaired by the Contractor at no additional cost to the Government. Also, the debris pile of concrete, rocks, etc., in the stream channel immediately downstream of the box culvert shall be removed and disposed. Clearing shall be limited to the absolute minimum necessary for construction of the work, together with strips 1.5 m wide contiguous thereto. Care shall be taken by the Contractor not to cut or injure any trees which do not unreasonably interfere with the construction. Growth around the work area shall be preserved to the maximum extent practicable. Clearing shall be limited to approved areas. All trees, except as discussed in the next sentence and brush within the areas authorized to be cleared shall be felled and together with drift and other debris shall be disposed of as directed in paragraph DISPOSAL OF DEBRIS. Trees, south of CR 306 and east of the stream, that are within the right-of-way shall be cleared if they are within in the area being reworked. Care shall be taken to not damage the trees being left in place.

##### 3.1.6.2 Stockpile Areas

Areas for use as temporary stockpile areas, as approved, shall be cleared to the extent necessary to accommodate the materials and to preclude contamination of the materials.

#### 3.2 GRUBBING

##### 3.2.1 General

Grubbing shall consist of the removal of all stumps, roots, buried logs, and other unsuitable materials as described in Section 02226 EXCAVATION, FILL, BACKFILL, AND EMBANKMENT.

### 3.2.2 Areas to be Grubbed

Grubbing shall be performed within the limits of the excavations and embankments and all structures together with the 1.5 m strips contiguous thereto. All roots and other projections over 38 mm in diameter shall be removed to a depth of 300 mm below the natural surface of the ground.

### 3.2.3 Filling of Holes

All holes caused by grubbing operations, not including areas to be excavated, shall be backfilled with suitable material in 300 mm layers to the elevation of the adjacent ground surface, and each layer compacted to a density at least equal to that of the adjoining undisturbed materials.

## 3.3 DISPOSAL OF DEBRIS

### 3.3.1 General

All debris resulting from construction operations at the site shall be disposed of by removal from the site.

### 3.3.2 Removal

The Contractor shall remove all debris resulting from clearing and grubbing operations from the Government furnished rights-of-way. The Contractor may, at his option, retain for his own use or dispose of by sale or otherwise, any such materials of value. The Government assumes no responsibility for the protection or safekeeping of any materials retained by the Contractor. Such materials shall be removed from the site of work before the date of completion of the work under these specifications. When debris from clearing or grubbing operations is placed on adjacent property, the Contractor shall obtain, without cost to the Government and in accordance with the Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph RIGHTS-OF-WAY, additional rights-of-way for such purposes. Such material shall be so placed so as not to interfere with roads, drainage or other improvements and in such a manner as to eliminate the possibility of its entering the completed project.

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SECTION 02226

EXCAVATION, FILL, BACKFILL, AND EMBANKMENT

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fill, Backfill and Embankment

2.1.1.1 General

The Government makes no guarantee that the quantity of required excavation is adequate to provide the quantity of suitable material needed for required fill, backfill and embankment. Material for fill, backfill and embankment shall be obtained from required excavation and/or furnished by the Contractor from off-site sources at no additional cost to the Government. Material furnished by the Contractor shall be suitable material and shall be approved prior to being used. No frozen material shall be placed and material shall not be placed against frozen surfaces.

#### 2.1.1.2 Suitable Materials

Suitable materials to be used for fill and backfill shall be clay (CL, CH) or silt (ML) classified in accordance with ASTM D 2487. Suitable materials shall not contain masses of organic matter, sticks, branches, roots, trash and other debris.

### PART 3 EXECUTION

#### 3.1 EXCAVATION

##### 3.1.1 General

Excavation shall consist of removal of material in preparing the foundation to the lines and grade shown. Wherever unsuitable foundation material is encountered, the unsuitable material shall be removed to the depth directed. Overexcavation will not be permitted except to remove unsuitable material as directed. Backfill of authorized (required) overexcavation and of unauthorized overexcavation shall be as specified in paragraph PLACEMENT, subparagraph BACKFILL and paragraph COMPACTION, subparagraph BACKFILL. Excavated materials shall be disposed of as specified in paragraph DISPOSAL OF EXCAVATED MATERIALS.

##### 3.1.2 Excavation for Structures and Channels

The foundations for the structure, channel, riprap and filters shall be excavated to the lines, grades and sections indicated. The channels shall be excavated to the lines, grades and sections indicated within an allowable tolerance of plus or minus 150 mm. All foundations shall be solid, undisturbed or properly compacted material. The bottom of the excavation upon which concrete is to be placed shall be accurately finished to the dimensions prescribed or directed, within an allowable tolerance of plus 13 mm and minus 50 mm. Where disturbed by the Contractor's operations and elsewhere as required, the excavated surfaces shall be moistened with water or dried as necessary and tamped or rolled with suitable tools or equipment for the purpose of thoroughly compacting them and forming firm foundations upon or against which to place the concrete.

##### 3.1.3 Disposal of Excavated Materials

Excavated materials which are not suitable for use as fill, or in excess of that required for fill, shall be disposed of by placing it in Contractor furnished upland disposal area(s) outside the Government furnished rights-of-way. The location and dimensions of the Contractor furnished disposal area(s) shall be approved prior to disposal of any material and shall not be located in any river, stream, lake or wetland area. The Contractor shall obtain the rights-of-way for the disposal area(s) in accordance with the Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph RIGHTS-OF-WAY. No separate payment will be made for Contractor-furnished disposal area(s).

##### 3.1.3.1 Disposal of Discarded Materials

Discarded material other than those which can be included in the solid waste category shall be disposed of as specified in paragraph EXCAVATION, subparagraph DISPOSAL OF EXCAVATED MATERIALS above.

##### 3.1.4 Stockpiling of Material

Stockpiles of materials temporarily stored for later use shall be located in approved areas. Stockpiled material shall have a maximum height not to exceed 3 m, shall have end and side slopes not steeper than 1V on 2H, and the surfaces of all stockpiles shall be sloped to drain readily and sealed by compacting. Excavation from stockpiles shall be made so as to maintain drainage at all times. No stockpiled material shall be placed within 15 meters of top bank of channel excavation or structure excavation. Excavated materials which are suitable for incorporation in the fill shall either be placed directly therein or stockpiled and subsequently used in the fill.

### 3.2 PLACEMENT

#### 3.2.1 General

All fill and backfill associated with the channel, concrete structure and embankment above the structure, shall be placed as fully compacted fill or backfill. Fill shall consist of the placement of material in embankment, channel side slopes and any other area where filling is required to obtain the lines and grades above the existing ground surfaces as shown. The foundation surface and any concrete surfaces shall be suitably moistened prior to placement of fill against them. Backfill shall not be placed against concrete less than 14 days after the concrete has been placed unless otherwise directed by the Contracting Officer.

#### 3.2.2 Foundation Preparation

Immediately prior to the placement of fill or backfill material, the entire surface on or against which fill or backfill is to be placed shall be thoroughly broken to a depth of 150 mm. If for any cause this broken surface or other surface that is to receive fill or backfill becomes compacted in such a manner that a plane of seepage or weakness might be induced, if directed, it shall again be thoroughly broken before the depositing of material thereon at no additional cost to the Government. The foundation receiving fill, all partially completed fill or backfill shall be kept thoroughly drained. No fill or backfill shall be placed on any part of the foundation until such areas have been inspected and approved.

#### 3.2.3 Fill and Embankment

The materials shall be placed or spread in layers not more than 150 mm in thickness prior to compaction. Layers shall slope to provide satisfactory drainage during construction. Benching into the slope of the existing embankment may be required in order to place and compact the material in horizontal layers. When the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be adequately scarified before the next layer is placed thereon.

#### 3.2.4 Backfill

Backfill shall consist of the refill of excavation and holes to the existing ground surface or to the lines and grades shown, if below the existing ground surface, except for structure backfill as specified in paragraph COMPACTION, subparagraph STRUCTURE BACKFILL. Backfill material shall be deposited in 100 mm maximum thickness layers. No backfill shall be placed against slopes steeper than one (1) horizontal to one (1) vertical unless approved.

### 3.3 COMPACTION

#### 3.3.1 Fill and Embankment

Fill and embankment material shall be compacted to at least 90 percent of maximum dry density. The maximum dry density shall be determined by the Contractor from representative samples of each type of material in accordance with ASTM D 698. Test results shall be furnished to the Contracting Officer prior to placing material. Fill shall be constructed to the lines and grades shown. A tolerance of plus or minus 50 mm will be permitted in the final dressing provided there are no abrupt humps or depressions in surfaces, the slopes are uniform, and the fill is shaped to drain.

#### 3.3.2 Backfill

Backfill material shall be compacted with suitable tampers to at least the density of the adjacent undisturbed soil. A tolerance of plus or minus 50 mm will be permitted in the final dressing.

#### 3.3.3 Structure Backfill

Structural fill and backfill should be placed in horizontal layers with maximum loose lift thickness of 150 mm for a distance of at least 1 m above the top of the structure. The fill material shall be compacted to at least 95 percent of maximum dry density as determined by the Contractor in accordance with ASTM D 698.

### 3.4 MOISTURE CONTROL

#### 3.4.1 Fill and Embankment

The moisture content shall be as uniform as practicable throughout any one layer of random materials. The upper and lower limits of moisture content shall not be more than 3 nor less than 2 percentage points, respectively, from the optimum moisture content. The optimum moisture content shall be determined by the Contractor from representative samples of each type of material in accordance with ASTM D 698. Test results shall be furnished to the Contracting Officer prior to placing material. The method of determining the moisture content shall be according to ASTM D 2216 or ASTM D 3017. Material that is too wet shall be spread on the fill and permitted to dry, assisted by disking or harrowing, if necessary, until the moisture content is reduced to a value within the specified limits. When the material is too dry, the Contractor will be required to sprinkle each layer of the fill. Harrowing or other approved methods will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of fill shall be accurately controlled in quantity so that free water will not appear on the surface during or subsequent to rolling. Should too much water be added to any part of the fill so that the material is too wet to obtain the desired compaction, the rolling and all work on that section of the fill shall be delayed until the moisture content of the material is reduced to a value within the specified limits and such delay shall not be the basis for a claim. If it is impracticable to obtain the specified moisture content by wetting or drying the material on the fill, the Contractor may be required to prewet or dry back the material at the source. If the top or contact surfaces of a partial fill section becomes too dry or too wet to permit suitable bond between these surfaces and the additional fill to be placed thereon, the Contractor shall loosen the dried or wet materials by scarifying or disking

to such depths required and shall dampen or dry the loosened material to an acceptable moisture content and shall compact this layer as provided in paragraph COMPACTION, to densities comparable to the underlying backfill or fill, at no additional cost to the Government.

#### 3.4.2 Backfill

Moisture control shall be as specified in paragraph MOISTURE CONTROL, subparagraph FILL AND EMBANKMENT.

#### 3.4.3 Structure Backfill

Moisture control shall be as specified in paragraph MOISTURE CONTROL, subparagraph FILL AND EMBANKMENT.

#### 3.5 SLIDES

In case sliding occurs in any part of the prescribed excavation for the inlet or outlet channel during construction or after completion but prior to acceptance, the Contractor shall remove and repair such portions of the slides as directed. In case the slide is caused through fault or negligence of the Contractor, the slide shall be removed and repaired without cost to the Government. In case the slide is not caused through fault or negligence of the Contractor, an equitable adjustment pursuant to the Contract Clause CHANGES will be made for removing and repairing the slide.

#### 3.6 FIELD TESTING CONTROL

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Field density and moisture content tests shall be performed on every other horizontal lift of material placed and as otherwise directed by the Contracting Officer. A minimum of one test will be required for each day material is placed. Field in-place density shall be determined in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 2922. The calibration checks of both the density and moisture gages shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02542

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-- End of Section Table of Contents --

SECTION 02542

STONE PROTECTION FOR STRUCTURES

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 127 (1988; R 1993) Specific Gravity and Absorption of Coarse Aggregate

ASTM C 295 (1990) Petrographic Examination of Aggregate for Concrete

CORPS OF ENGINEERS (COE)

COE CRD-C 144 (1973) Testing Stone for Resistance to Freezing and Thawing

COE CRD-C 169 (1993) Resistance of Rock to Wetting and Drying

1.2 GOVERNMENT TESTING AND STUDIES

1.2.1 Stone

1.2.1.1 General

All stone shall be durable material as approved by the Contracting Officer. In case an unlisted source is to be used, the Contractor shall show that an adequate quantity of material is available and provide quality test data. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, seams and other defects that would tend unduly to increase its deterioration from natural causes. The stone shall be clean and reasonably free from earth and dust and shall contain no refuse.

1.2.1.2 Sources

Stone shall be furnished from any of the sources listed at the end of this section, or at the option of the Contractor may be furnished from any other source designated by the Contractor and accepted by the Contracting Officer, subject to the conditions herein stated. If the Contractor proposes to furnish stone from a source not currently listed at the end of this section, the Government will conduct a quarry investigation and evaluate the quality test data provided by the contractor to determine whether acceptable stone can be produced from the proposed source. Satisfactory service records on other work may be acceptable. In order for stone to be acceptable on the basis of service records, stone of a similar size must have been placed in a similar thickness and exposed to weathering

under similar conditions as are anticipated for this contract, and must have satisfactorily withstood such weathering for a minimum of 20 years.

a. List of Sources. On the basis of information and data available to the Contracting Officer, stone meeting the quality requirements of these specifications has been produced from the sources listed at the end of this section.

b. Selection of Source. The Contractor shall designate in writing only one source or one combination of sources from which he proposes to furnish stone. If the Contractor proposes to furnish stone from a source not listed at the end of this section, he may designate only a single unlisted source for stone and he shall notify the Contracting Officer at least 60 workdays before the stone leaves the quarry. It is the Contractor's responsibility to determine that the stone source or combination of sources selected is capable of supplying the quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work. Samples for acceptance testing shall be provided in accordance with paragraph EVALUATION TESTING. If a source for stone so designated by the Contractor is not accepted for use by the Contracting Officer, the Contractor may not propose other sources but shall furnish the stone from a source listed at the end of this section at no additional cost to the government.

c. Acceptance of Materials. Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for stone as determined by the Contracting Officer. Materials produced from a listed or unlisted source shall meet all the requirements herein.

### 1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-09 Reports

Gradation Test; FIO. Evaluation Tests; FIO.

The gradation tests shall be submitted using the GRADATION TEST DATA SHEET enclosed at end of this section.

Quality test on the stone in accordance with paragraph EVALUATION TESTING shall be the responsibility of the Contractor and submitted for approval prior to delivery of such material to the worksite.

#### SD-13 Certificates

Stone; FIO. Laboratory; FIO.

Certificates of compliance attesting that the materials meet specification requirements shall be submitted to the Contracting Officer.

A copy of the testing laboratory's certification and inspection report shall be submitted along with actions taken to correct deficiencies.

PART 2 PRODUCTS

2.1 FILTER MATERIAL

Filter material shall consist of filter stone. The filter stone shall be composed of tough, durable particles, reasonably free from thin, flat and elongated pieces, and shall contain no organic matter nor soft, friable particles in quantities considered objectionable by the Contracting Officer. Grading shall conform to the following requirements:

FILTER STONE

100 mm	100
75 mm	70-100
50 mm	25-100
25 mm	5-70
12.5 mm	0-30
6.25 mm	0-5

The filter stone shall be well-graded between the limits shown. At least one test shall be performed on each 1000 tons (metric) to be delivered to the project site. All points on individual grading curves obtained from representative samples of filter stone shall lie between the boundary limits as defined by smooth curves drawn through the tabulated gradation limits plotted on ENG FORM 2087 or similar form. The individual gradation curves within these limits shall not exhibit abrupt changes in slope denoting either skip grading or scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the filter.

2.2 RIPRAP

2.2.1 General

Only quarried stone shall be used. Riprap quality shall be as specified in paragraph GOVERNMENT TESTING AND STUDIES, subparagraph STONE. Gradation shall conform to the table(s) below and to the plate(s) attached at the end of this section. A maximum of 10 percent flat and elongated pieces will be acceptable. A flat and elongated piece of riprap is defined as a stone with either the width or thickness of the piece being less than one-third of the length.

TABLE I  
(FOR RIPRAP "M40")

PERCENT LIGHTER BY WEIGHT (SSD)	LIMITS OF STONE WEIGHT, kg
100	40 - 20
50	20 - 10
15	10 - 2.5

TABLE II  
(FOR RIPRAP "M65")

PERCENT LIGHTER BY WEIGHT (SSD)	LIMITS OF STONE WEIGHT, kg
------------------------------------	-------------------------------

100	65 - 30
50	30 - 15
15	15 - 5

### 2.2.2 Evaluation Testing

If the Contractor proposes to furnish stone from an unlisted source, the Contractor shall have evaluation tests performed on stone samples collected from the proposed source. The tests to which the stone shall be subjected include petrographic examination (ASTM C 295), specific gravity, unit weight, and absorption (ASTM C 127), resistance of stone to freezing and thawing (COE CRD-C 144), and if sandstone is used, resistance to wetting and drying in accordance with (COE CRD-C 169).

a. Unit Weight and/or Absorption. Stone shall weigh more than 2,480 kg/cubic meter. The stone shall have an absorption less than 2 percent unless other tests and service records show that the stone is satisfactory. The method of test for unit weight and absorption will be ASTM C 127, except the unit weight will be calculated in accordance with Note No. 5 using bulk specific gravity, saturated surface dry.

b. Resistance to Freezing and Thawing. Stone when tested in accordance with COE CRD-C 144 shall have a loss of less than 5 percent.

c. Resistance to Wetting and Drying. This test shall only be required to be performed on sandstone samples. When tested in accordance with COE CRD-C 169 (35 cycles), there shall be a loss of less than one percent.

d. Samples. Samples of stone from a source not listed at the end of this section shall be taken by a representative of the Quarry under the supervision of the Contracting Officer for testing and acceptance prior to delivery of any stone from this source to the site of the work. Samples shall consist of at least three pieces of stone, roughly cubical in shape and weighing not less than 34 kg each. The samples shall be shipped at the Contractor's expense to a laboratory certified by the government to perform the required tests.

e. Tests. The tests shall be conducted by the Contractor in accordance with applicable Corps of Engineers methods of tests given in the Handbook for Concrete and Cement, and shall be performed at a laboratory certified by the government. The cost of testing shall be borne by the Contractor.

### 2.2.3 Gradation Test

The Contractor shall perform a gradation test or tests on the riprap at the quarry in accordance with paragraph STANDARD TEST METHOD FOR GRADATION OF RIPRAP AND GRADED STONE. The sample shall be taken by the Contractor in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer not less than 3 days in advance of each test. In the event of unavailability of a Government representative; the Contractor shall perform the tests and certify to the Contracting Officer that the riprap shipped complies with the specifications. At least one gradation test shall be performed per 25,000 tons (metric) of each size of riprap placed, but not less than one test shall be performed. The gradation tests shall be reported using the forms, GRADATION TEST DATA SHEET and ENG FORM 4794-R, attached at end of this section. The Contractor shall designate on the test form that portion in tons (metric) of the lot tested which is

applicable to this contract. Any deviation from the reported tonnage shall be corrected and recorded on a revised GRADATION TEST DATA SHEET. The sample shall consist of not less than 15 tons (metric) of M40 and 15 tons (metric) of M65 riprap, and shall be collected in a random manner which will provide a sample which accurately reflects the actual gradation arriving at the jobsite. Failure of the test on the initial sample and on an additional sample will be considered cause for rejection of the quarry and/or quarry process, and all riprap represented by the failed tests shall be set aside and not incorporated into the work. Any additional tests required because of the failure of an initial test sample will not be considered as one of the other required tests. If collected by the truckload, each truckload shall be representative of the gradation requirements. The Contracting Officer may direct additional testing of the riprap at the project site if the riprap appears by visual inspection, to be out of gradation. The Contracting Officer may direct this testing under the Contract Clause INSPECTION OF CONSTRUCTION. The Contractor shall provide all necessary screens, scales and other equipment, the operating personnel, and shall grade the sample. Certification and test results shall represent riprap shipped from the quarry. Certification and tests results must be received by the Contracting Officer at the jobsite before the riprap is used in the work.

#### 2.2.4 Riprap Stockpile

Temporary storage of riprap at the worksite is not to be confused with off-site stockpiling of riprap. If the Contractor elects to provide off-site stockpiling areas, the Contracting Officer shall be notified by the Contractor of all such areas.

#### 2.2.5 Worksite Stockpile

Riprap delivered to the work site, which requires temporary storage landward of top bank, shall be placed in a container suitable for storing the riprap without waste, or a sand-clay-gravel pad shall be constructed for the storage area and removed upon completion of the work. If the sand-clay-gravel pad method is used, the pad shall have a minimum thickness of at least 150 mm. The container or sand-clay-gravel pad method shall be subject to approval prior to delivery of the riprap. Upon completion of the work, the storage areas shall be cleaned of all storage residues and returned to their natural condition. Temporary storage of riprap at the worksite will be allowed, provided the stream-side toe of the riprap be no closer than 20 m from the closest edge of the stream's top bank, and the amount shall not exceed 200 tons (metric). The Contractor's jobsite stockpile shall be a maximum of 3.6 m high and formed by a series of layers of truckload dumps, where the rock essentially remains where it is placed. Subsequent layers shall be started 3 m from the edge of the previous layer so that the rock will not roll down the edges of the previous layers. The first layer shall be a maximum of 2 m high. Any riprap which has become contaminated with soil, dirt, or refuse after being stockpiled, will not be put into the work unless the contaminating material has been removed from the riprap prior to placement.

#### 2.2.6 Off-site Stockpile

The Contractor's off-site riprap stockpile shall be a maximum of 3.6 m high and formed by a series of layers of truckload dumps, where the rock essentially remains where it is placed. Subsequent layers shall be started 3 m from the edge of the previous layer so that the rock will not roll down the edges of the previous layers. The first layer shall be a maximum of 2 m

high. Any riprap which has become contaminated with soil, dirt, or refuse after being stockpiled, will not be put into the work unless the contaminating material has been removed from the riprap prior to placement. In areas where riprap is stockpiled for placement, the area shall have excess rock removed prior to completion of work. All rock and spalls greater than 75 mm in diameter shall be removed. Where rocks may have become buried due to soft ground or operation of the equipment, the rock shall be disposed of as directed. After the rock has been removed, the storage area shall be graded, dressed, and filled to return the ground surface as near as practical to the condition that existed prior to construction.

### PART 3 EXECUTION

#### 3.1 BASE PREPARATION

Areas on which filter material and riprap are to be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within an allowable tolerance of plus 50 mm and minus 100 mm from the theoretical slope lines and grades. The prepared base shall be approved by the Contracting Officer. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by fill with earth similar to the adjacent material and then compacted to a density equal to the adjacent in place material. Immediately prior to placing the engineering fabric, the prepared base will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

#### 3.2 PLACEMENT OF FILTER LAYER

##### 3.2.1 General

The filter layer, composed of a 150 mm layer of filter stone, shall be placed on the prepared base as described below, in accordance with the details shown on the contract drawings, and within the limits either shown on the contract drawings or staked in the field, to form a backing for the stone protection.

##### 3.2.2 Filter Stone

The filter stone shall be spread uniformly to the slope lines and grades as indicated on the drawings. Placing of the stone by methods which tend to segregate the particle sizes within the filter layer will not be permitted. Compaction of material will not be required, but shall be finished to present a reasonably even surface, free from mounds or windrows.

#### 3.3 PLACEMENT OF RIPRAP

##### 3.3.1 General

Riprap shall be placed on the filter layer specified in paragraph FILTER MATERIAL within the limits shown on the drawings.

##### 3.3.2 Placement

Riprap shall be placed in such manner as to produce a reasonably well graded mass of rock with the minimum practicable percentage of voids, and shall be constructed within the specified tolerance to the lines and grades shown on the drawings. A tolerance of plus 100 mm or minus 50 mm from the slope lines and grades shown on the drawings will be allowed in the

finished surface of the riprap, except that either extreme of such tolerance shall not be continuous over an area greater than 18 square meters. The average tolerance of the entire job shall have no more than 50 percent of the tolerance specified above. No stone shall be dropped through air from a height greater than 1 m and stones heavier than 225 kg shall not be dropped from a height greater than 600 mm. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified in paragraph RIPRAP, subparagraph GENERAL. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Placing riprap in layers will not be permitted. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of the various sizes will not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope will not be permitted. No equipment shall be operated directly on the completed stone protection system. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source; by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. All dump trucks used in placing the riprap shall be equipped with bottom hinged tailgates. The gate releasing mechanism shall be arranged so that it may be operated only from, at, or near the front of the truck. Rearranging of individual stones will be required to the extent necessary to obtain a reasonably well-graded distribution of stone sizes as specified above. The Contractor shall maintain the stone protection until accepted by the Contracting Officer and any material displaced by any cause shall be replaced at his expense to the lines and grades shown on the drawings.

### 3.4 TESTS

#### 3.4.1 General

The Contractor shall perform gradation tests to assure compliance with contract requirements and shall maintain detailed records.

#### 3.4.2 Reporting

Reporting shall be in accordance with paragraph GRADATION TEST.

#### 3.4.3 Standard Test Method for Gradation of Riprap and Graded Stone

- a. Select a representative sample (Note No. 1), weigh and dump on hard stand.
- b. Select specific sizes (see example) on which to run "individual weight larger than" test. (See Note No. 2). Procedure is similar to the standard aggregate gradation test for "individual weight retained".
- c. Determine the largest size stone in the sample. (100 percent size)
- d. Separate by "size larger than" the selected weights, starting with the larger sizes. Use reference stones, with identified weights, for visual comparison in separating the obviously "larger than" stones. Stones that appear close to the specific weight must be individually weighed to determine size grouping. Weight each size group, either individually or cumulatively.
- e. Paragraph d above will result in "individual weight retained"

figures. Calculate individual percent retained (heavier than) cumulative percent retained and cumulative percent passing (lighter than). Plot percent passing, along with the specification curve on ENG Form 4794-R.

NOTE NO. 1: Sample Selection: The most important part of the test and the least precise is the selection of a representative sample. No "standard" can be devised; larger quarry run stone is best sampled at the shot or stockpile by given direction to the loader; small graded stone is best sampled by random selection from the transporting vehicles. If possible, all parties should take part in the sample selection, and agree before the sample is run, that the sample is representative.

NOTE NO. 2: Selection of Size for Separation: It is quite possible and accurate to run a gradation using any convenient sizes for the separation, without reference to the specifications. After the test is plotted on a curve, then the gradation limits may be plotted. Overlapping gradations with this method are no problem. It is usually more convenient, however, to select points from the gradation limits, such as the minimum 50 percent size, the minimum 15 percent size, and one or two others, as separation points.

F O R  
 E X A M P L E  
 O N L Y

EXAMPLE GRADATION  
 SPECIFICATIONS

STONE WEIGHT IN KG	PERCENT LIGHTER BY WEIGHT
180-75	100
75-35	50
35-15	15

EXAMPLE WORKSHEET

STONE SIZE KG	INDIVIDUAL WT. RETAINED	INDIVIDUAL PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
180	0	0	0	100
75	4,354	30	30	70
35	5,080	35	65	35
15	3,629	25	90	10
-15	1,451	10	100	-
TOTAL	<u>14,514</u> kg			

NOTE: Largest stone 114 kg

-- End of Section --

**STONE SOURCES**

LAT/LONG (TESTED)	QUARRY LOCATION, ADDRESS AND TELEPHONE NUMBER	MAIN OFFICE ADDRESS AND TELEPHONE NUMBER
<b><u>ALABAMA</u></b>		
34/88 (1995)	Allsboro Quarry is located 8 miles east of intersection of MS Hwy 25 and Tishomingo County Rd 957 at Midway, MS, just across AL state line.  Hoover Incorporated P.O. Box 613 Iuka, MS 38852 (205) 360-2400	Hoover Incorporated 1205 Bridgestone Parkway P.O. Box 17000 LaVergne, TN 37086-17000 (615) 793-2600
34/87 (1995)	Cherokee Quarry is located 3 miles east of Cherokee, AL on old Hwy 72.	Vulcan Materials Co. P.O. Box 459 Cherokee, AL 35616 (205) 359-6404
<b><u>ARKANSAS</u></b>		
34/92 (1997)	Granite Mountain Quarry #1 is located on east side of Hwy 65 and just north of Dixie Road	McGeorge Corporation P.O. Box 138 Sweet Home, AR 72164 (501) 490-1535
34/95 (1996)	River Mountain Quarry is located approx. 5 miles northwest of Delaware, AR, at AR River Mile 218.5.	Pine Bluff Sand and Gravel P.O. Box 7008 Pine Bluff, AR 71611-7008 (870) 534-7120

**STONE SOURCES**

(Continued)

LAT/LONG (TESTED)	QUARRY LOCATION, ADDRESS AND TELEPHONE NUMBER	MAIN OFFICE ADDRESS AND TELEPHONE NUMBER
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**KENTUCKY**

37/87 (1996)	Cedar Bluff Quarry is located 3 miles south of Princeton, KY on KY. Hwy 91.  The Kentucky Stone Co. 10234 Hopkinsville Rd. Princeton, KY 42445 (502) 365-6881	The Kentucky Stone Co. P.O. Box 7529 Louisville, KY 40207 (502) 897-1731
37/88 (1996)	Three Rivers Quarry is located 7 miles northeast of Smithland, KY, off Hwy 60 (Cumberland Road)	Martin Marietta Aggregates 830 Three Rivers Quarry Rd. Smithland, KY 42081 (502) 928-2141
37/88 (1996)	Gilbertsville Quarry is located on U.S. Hwy 62 "Between the Dams" Lake City, KY.	Vulcan Materials Co. Reed/BRT Operations 947 U.S. Hwy. 62 Grand Rivers, KY 42045 (502) 362-4265

**MISSOURI**

37/89 (1995)	Gray's Point Quarry is located at MRM 46.2, above the mouth of the Ohio River.  Tower Rock Stone Co. P.O. Box 4248 Scott City, MO 63780 (573) 264-3800	Tower Rock Stone Co. P.O. Box 50 Columbia, IL 62236 (618) 281-4106
38/90 (1995)	Bussen Quarry is located 5 miles north of St. Genevieve, MO, MRM 127.6, above the mouth of the Ohio River.  Tower Rock Stone Co. P.O. Box 111 St. Genevieve, MO 63670 (573) 883-7415	Tower Rock Stone Co. P.O. Box 50 Columbia, IL 62236 (618) 281-4106

**G R A D A T I O N      T E S T      D A T A      S H E E T**

Quarry \_\_\_\_\_ Type of Stone Tested \_\_\_\_\_

Date of Test \_\_\_\_\_ Testing Rate \_\_\_\_\_

**T E S T      R E P R E S E N T S**

Contract No.	District	Tons
		TOTAL

**G R A D A T I O N**

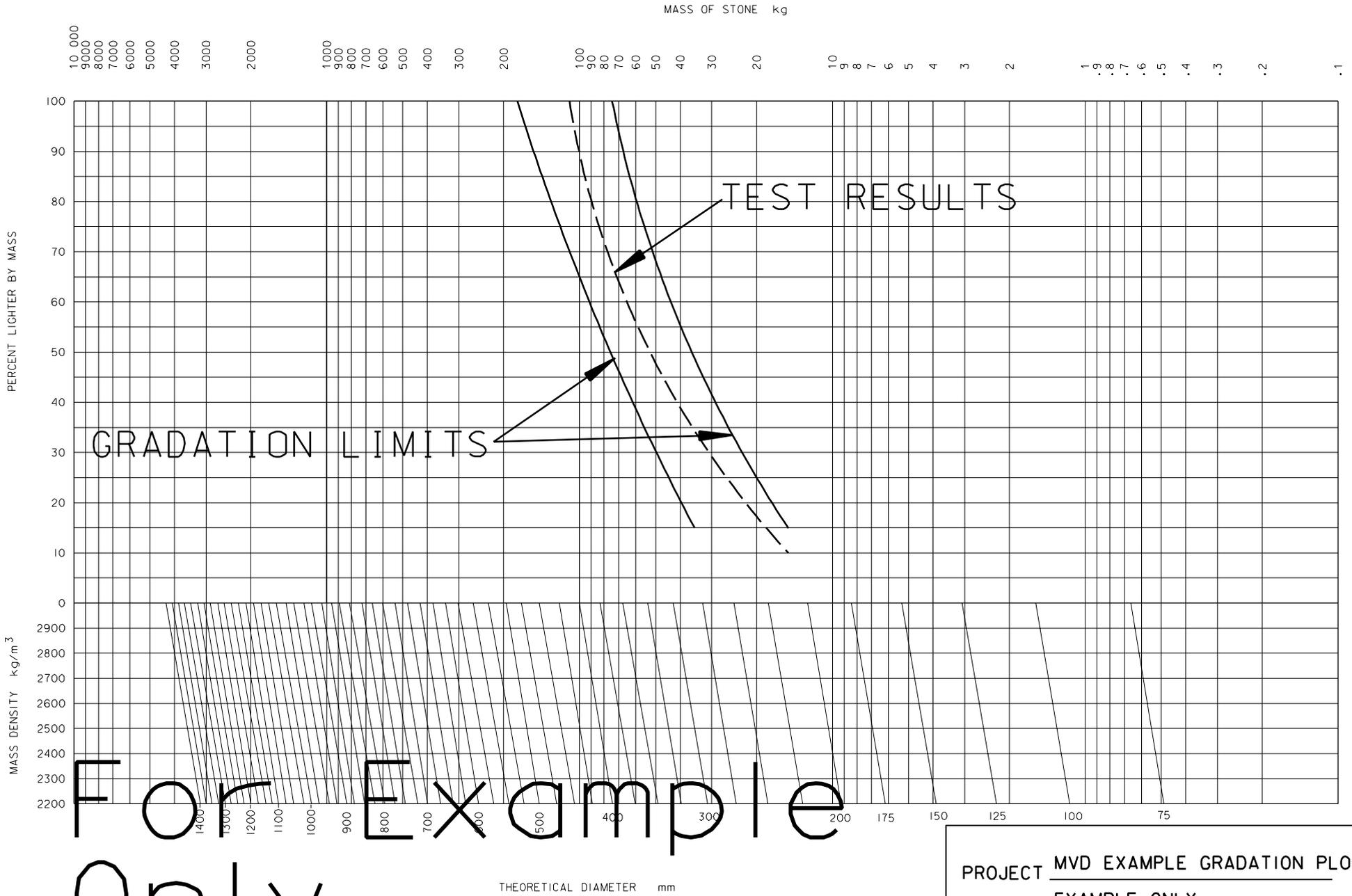
Stone Size (lbs)	Weight Retained	Individual % Retained	Cumulative % Ret.    % Pass		Specification % Finer by wt
Total Wt					

Remarks: \_\_\_\_\_

I certify that the above stone sample is representative of the total tonnage covered by this test report.

Contractor Representative \_\_\_\_\_

Government Representative \_\_\_\_\_



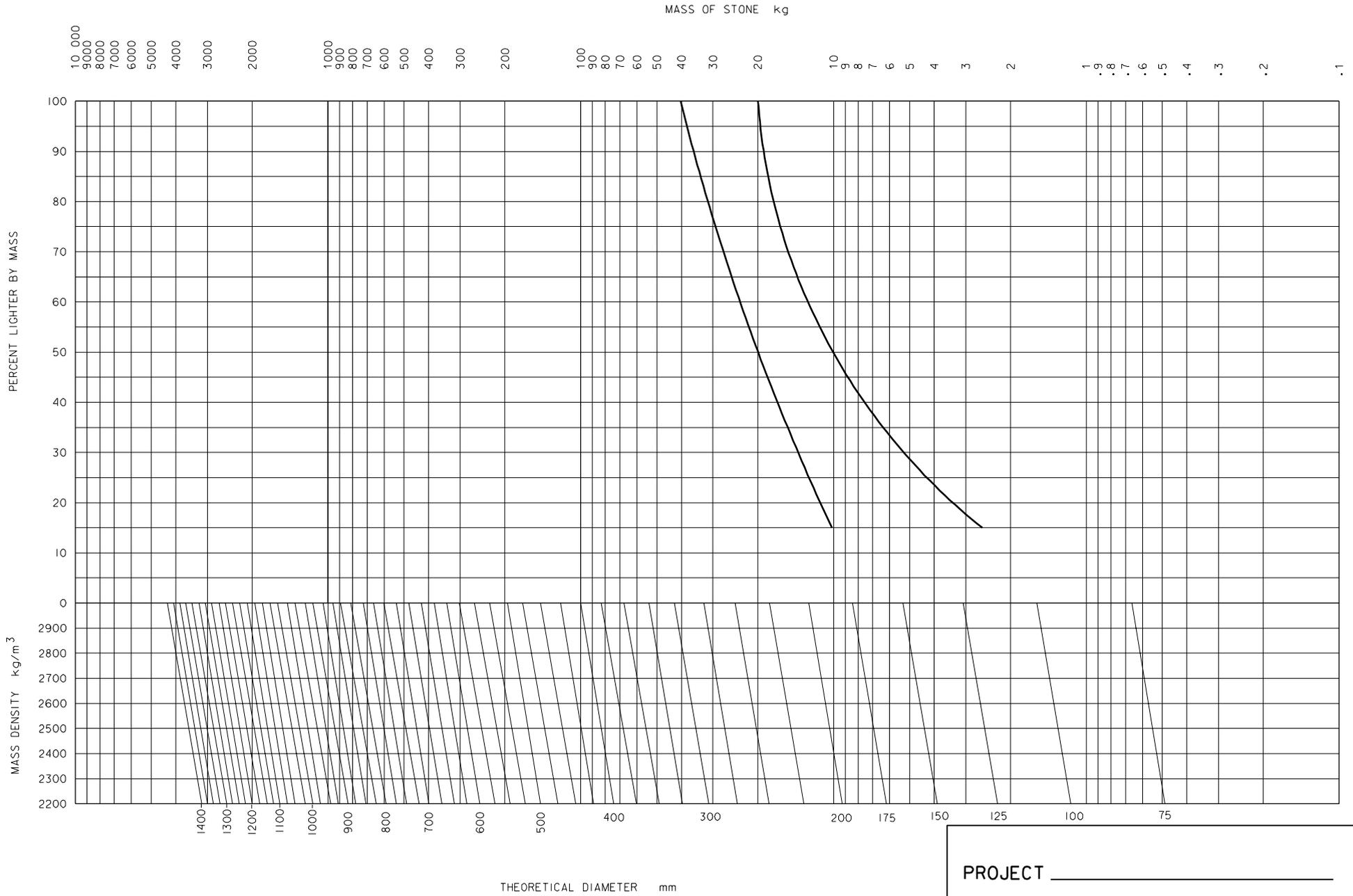
PROJECT MVD EXAMPLE GRADATION PLOT

AREA EXAMPLE ONLY

DATE \_\_\_\_\_ BY \_\_\_\_\_

---

RIPRAP GRADATION CURVES



MASS DENSITY OF STONE \_\_\_\_\_ kg/m<sup>3</sup>

"M40"

PROJECT \_\_\_\_\_

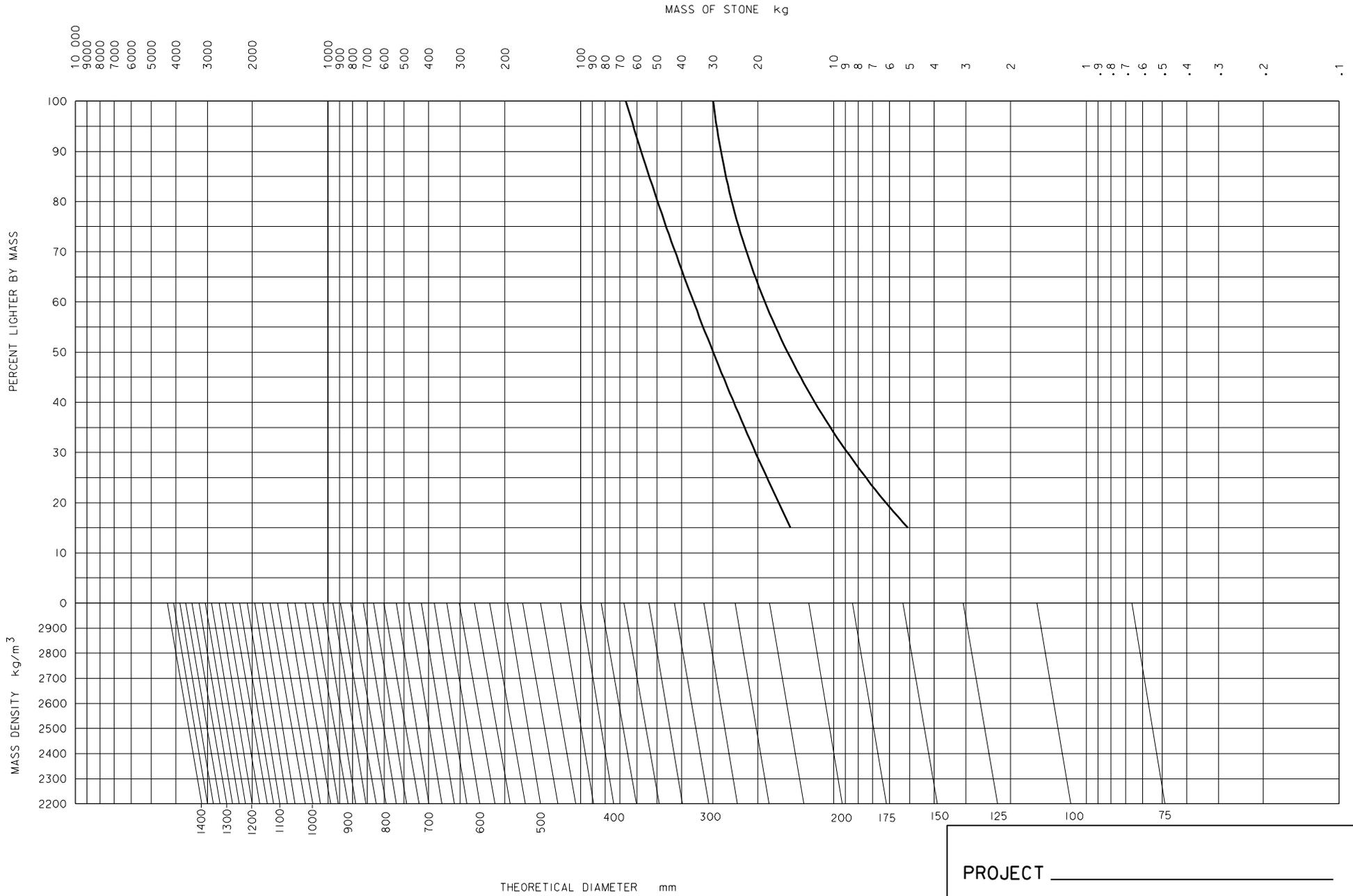
AREA \_\_\_\_\_

DATE \_\_\_\_\_ BY \_\_\_\_\_

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RIPRAP GRADATION CURVES

[R90]



MASS DENSITY OF STONE \_\_\_\_\_ kg/m<sup>3</sup>

"M65"

PROJECT \_\_\_\_\_

AREA \_\_\_\_\_

DATE \_\_\_\_\_ BY \_\_\_\_\_

RIPRAP GRADATION CURVES

[R140]

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SECTION 02719

CORRUGATED METAL PIPE

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 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 760/A 760M	(1995b) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1056	(1991) Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1996) Structural Welding Code - Steel
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1.2 GENERAL

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on corrugated metal pipe shall be in accordance with the applicable provisions of AWS D1.1, except that the limitations on types of base metal shall not apply where other types are specified or shown.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Corrugated Metal Pipe; FIO.

Certificates of compliance shall be submitted attesting that the materials meet the specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Corrugated Metal Pipe

The pipe shall be corrugated steel pipe in accordance with ASTM A 760/A 760M, zinc-coated, Type 1, with helical corrugations and folded lock seams. The lock seams shall be welded at each end of the pipe section. Corrugations shall be 68 by 13 mm (nominal size). If ASTM A 760/A 760M (metric) pipe is not locally available, then inch diameters pipe may be furnished as specified herein.

2.1.1.1 Pipe Ends

The pipe shall have the ends equipped with a minimum of four (4) rerolled annular corrugations.

2.1.1.2 Pipe Gage

The gage of the pipe shall be as specified below:

PIPE GAGE		
Pipe Diameter Millimeters (in.)	68 by 13 Corrugations	75 by 25 Corrugations
450 (18)	14	NA
610 (24)	14	NA

The Contractor may elect to furnish pipe section lengths in combinations that will reduce the number of connecting bands. Pipe section lengths shall be approved.

2.1.2 Connecting Bands

2.1.2.1 Pipe All Sizes

Connecting bands may be used for any size pipe. They shall have a minimum of nine (9) corrugations (68 by 13 mm corrugations) and a minimum circumferential lap of 150 mm. The band shall be rolled so that when it is placed on the pipe sections, the ends of the pipe will fit flush. The binders for the connecting band shall consist of a minimum of six (6) rods and tank lugs in accordance with the details shown. A closed cell expanded rubber gasket shall be used with this type connecting band. The closed cell gasket shall be 300 mm wide, 9.5 mm thick, unstretched diameter 10 percent less than the normal pipe size and shall comply with ASTM D 1056, Grade SCE-43. The gasket shall be centered over the pipe joint under the connecting band.

2.1.2.2 Pipe 800 mm Or Less

Connecting bands may be used for connecting pipe 800 mm in diameter or less. This band shall consist of one continuous corrugation on each side to mesh with the second annular corrugation on the end of the pipe. A 19 mm O-ring gasket shall be installed in the first annular corrugation of the end of the pipe. A mastic shall be placed in the lap area of the band prior to tightening of the rods and bolts. The mastic shall be as recommended by the pipe manufacturer. A tank rod and lug shall be placed in the annular corrugation on the outside of the band in accordance with the details shown.

#### 2.1.2.3 Tank Rods

The tank rods shall be 12 mm in diameter and shall be equipped with 12 mm diameter rolled threads. The nuts used on the rods shall be 12 mm x 100 mm steel hexagon head coupling nuts galvanized and retapped 0.5 mm (0.8 mm maximum) oversized to remove excess galvanizing from threads. Tank rods, nuts and washers shall be galvanized in accordance with ASTM A 123. If metric sized products are not locally available, the following may be substituted. The tank rods shall be 12 mm in diameter and shall be equipped with 12 mm x 100 mm steel hexagon head coupling nuts galvanized and retapped 0.5 mm (0.8 mm maximum) oversized to remove excess galvanizing from threads.

#### 2.1.2.4 Bands

The bands shall have the same coating, depth of corrugation and gage as specified for the pipe.

#### 2.1.3 Test Reports and Bills of Lading

A metallurgical test report and bill of lading showing respective heat numbers shall be furnished for all pipe delivered to the job.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### 3.1.1 Pipe

When delivered to the job site, the pipe shall be unloaded from the truck in a manner that will ensure no damage to the coatings or bending of the pipe. The pipe shall be unloaded by use of hoist, skids and snubbing ropes or other methods approved. Under no circumstances shall the pipe be allowed to drop from the truck or roll freely. Lifting of the pipe shall be done by use of slings or lifting lugs attached to the pipe. The use of hooks attached to the ends of the pipe will not be allowed.

##### 3.1.2 Connecting Bands

The connecting bands shall be installed as shown. The closed cell gasket shall be centered over the pipe joint under the connecting band.

##### 3.1.3 Touch-up

All welds and exposed metal shall be repaired in accordance with ASTM A 780 and painted with two coats of zinc dust-zinc oxide primer as recommended by the pipe manufacturer.

### 3.2 PIPE TRENCH EXCAVATION

The pipe trench excavation shall consist of removal of material in preparing the foundation to the lines and grades shown and removal of unsuitable materials. The surfaces upon which pipe is to be placed shall be accurately finished to the lines and grades required. All foundations shall be on solid, undisturbed or properly compacted material. When disturbed by the Contractor's operations, and elsewhere as required, the excavated surfaces shall be moistened with water if necessary and tamped or rolled with suitable tools or equipment for the purpose of thoroughly compacting them and forming firm foundations upon or against which to place the pipes. Wherever unsuitable foundation material is encountered, the unsuitable material shall be removed to the depth directed by the Contracting Officer. Over excavation will not be permitted except to remove unsuitable material as directed by the Contracting Officer. If at any point in the excavation for pipes, material is excavated beyond the excavation lines shown, such unauthorized overexcavation shall be backfilled and compacted as specified for structure backfill in Section 02226 EXCAVATION, FILL, BACKFILL, AND EMBANKMENT, paragraph STRUCTURE BACKFILL, at no additional cost to the Government. If at any point in excavation the foundation material is found to be unsuitable, it shall be removed as directed and replaced with selected materials placed and compacted as specified above and an equitable adjustment in contract price and time will be made in accordance with the Contract Clause CHANGES. Excavated materials shall be disposed of as specified in Section 02226 EXCAVATION, FILL, BACKFILL, AND EMBANKMENT, paragraph DISPOSAL OF EXCAVATED MATERIALS. All excavation and foundation preparation shall be performed in areas free of water. Where dimensions of pipe trenches are not shown, the bottom width shall be not less than 600 mm greater than the outside span dimension of the pipe. Excavation for pipes shall fit the outside periphery of the bottom quadrant of the pipe.

### 3.3 PLACING OF PIPES

Corrugated metal pipe shall be laid with separate sections jointed firmly together and with outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides. The coupling bands shall lap at equal portion on each pipe section jointed and shall be drawn tight to ensure that the corrugations fit snugly and provide a satisfactory joint. The pipe shall be placed with the pipe invert coinciding with the specified grade lines. Pipe shall be handled with care so that the coating will not be damaged. Proper facilities shall be provided for lowering the pipe into the trench. Damaged areas on coupling bands, pipe and bolts and angles shall be coated with an approved asphaltic cement prior to placing backfill except that exposed metal in joints shall be coated prior to making joints.

### 3.4 BACKFILL FOR PIPES

#### 3.4.1 General

Backfill around the corrugated metal pipe shall be hand compacted from the circumference of the pipe to a distance of at least one meter from the pipe. The fill material to be hand compacted shall be placed in layers not exceeding 100 mm in thickness and shall be compacted by application of a motor driven hand tamper or other approved hand compaction equipment over the fill in such a manner that every point of the surface of each layer of fill will be compacted by the hand tamper. The level of fill material in the pipe trench shall be kept at the same level on each side of the pipe as the fill material is placed and compacted. The pipe conduit shall be held

securely in place at all times while tamping is being performed to ensure proper bond between the pipe and the ground. Compaction of subsequent lifts shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment well suited to the type of material being compacted. No fill shall be placed against slopes steeper than one (1) horizontal to one (1) vertical unless approved.

#### 3.4.2 Compaction

Pipe backfill placed as describe above shall be compacted at optimum moisture (plus or minus 2 percent) to within 95 percent of maximum density. Optimum moisture and maximum density shall be determined by the Contractor in accordance with ASTM D 698 (Standard Proctor) from representative samples of each type of material to be placed. Test results shall be furnished to the Contracting Officer before placing pipe backfill. Field density and moisture content tests shall be determined by the Contractor in accordance with ASTM D 2922 and ASTM D 3017 (Nuclear Probe) on each lift placed. The Contractor shall furnish control tests and reports daily in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

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SECTION 02775

CONTROL OF WATER AT GRADE CONTROL STRUCTURE

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

The work covered by this section of the project specifications consists of furnishing all plant, labor, materials, equipment, and collecting and disposing of water within the work areas.

1.2 DEFINITIONS

1.2.1 Surface Water

"Surface water" is defined as any water above the ground surface, regardless of its source, and includes water that seeps into the excavation.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CONTROL OF WATER

3.1.1 Stream Description

During periods of rainfall the stream is subject to a fast rise and fall. Over bank flooding can occur.

3.1.2 Contract Requirements

Other than flooding, as defined in Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph PHYSICAL DATA, the Contractor shall take such action as necessary to divert normal stream flow through the work site. The height of cofferdams, if used, shall not result in upstream flooding. The Contractor shall construct such ditches, dikes, collectors, drains and sumps as may be required to collect the surface water from the area where the work is to be performed and dewater the foundation and side slopes in order that the work may be constructed on a firm foundation in areas free of surface water. The Contractor shall provide and operate pumps and discharge lines adequate for disposing of the collected water at a point or points outside the work area. When the diversion, collection and disposal system, or a portion thereof, is no longer needed, it shall be removed. No separate measurement or payment will be made for control of water.

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SECTION 02960

EROSION CONTROL AND EROSION CONTROL MATTING

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Fertilizer; FIO. Erosion Control Matting; FIO.

The Contractor shall submit signed copies of invoices from suppliers which show quantities, identify material and manufacturer, and show percentages of nitrogen, phosphorous, and potash.

1.2 AREAS TO RECEIVE EROSION CONTROL

All disturbed areas within the construction limits, except areas to receive erosion control matting or other types of surfacing, shall receive erosion control as specified.

1.3 AREAS TO RECEIVE EROSION CONTROL MATTING

Areas to receive erosion control matting shall be as shown on the drawings.

PART 2 PRODUCTS

2.1 FERTILIZER

Fertilizer shall meet the requirements of the State of Mississippi for commercial fertilizer. Fertilizer shall have a minimum analysis of 13 percent nitrogen, 13 percent phosphorus, and 13 percent potash (13-13-13). Duplicate signed copies of invoices from suppliers shall be furnished to the Contracting Officer upon delivery to the worksite. Invoices shall show quantities and percentages of nitrogen, phosphorus, and potash.

2.2 SEED

Grass seeds shall be labeled in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of purchase. The seed shall have a minimum purity of 90 percent and a minimum germination rate of 80 percent. Seeding mixtures per each hectare seeded shall be in accordance with the following:

2.2.1 Spring and Summer Seeding

If seeding is done during the period of 1 March through 30 September, the seeding mixture shall consist of a uniform mixture of 44 kg of Bahia and 3.5 kg of Bermuda Grass (hulled) seed per hectare.

### 2.2.2 Fall and Winter Seeding

If seeding is done during the period of 1 October through 28 February, the seeding mixture shall consist of a uniform mixture of 34 kg of Rye and 11 kg of Bermuda Grass (unhulled) seed per hectare.

### 2.3 MULCH

The mulch shall be a vegetative mulch consisting of grass hay.

### 2.4 EROSION CONTROL MATTING MATERIALS

The erosion control matting materials shall be a long term, non-degradable, three dimensional geosynthetic matting. The mats shall be rated by the manufacturer for use in vegetated channels having flow velocities of up to 2.0 meters per second.

## PART 3 EXECUTION

### 3.1 EROSION CONTROL

#### 3.1.1 Dressing

The areas to receive erosion control shall be dressed by the cutting off of high points and the filling of depressions to the extent necessary to provide a reasonably smooth surface that can be readily traveled by a farm tractor pulling a rotary type mower.

#### 3.1.2 Application

After dressing, the areas to receive erosion control shall be fertilized and seeded. Fertilizer shall be uniformly distributed at a rate of 225 kg per hectare over areas to be seeded and shall be incorporated into the soil to a depth of at least 100 mm by disking, harrowing, or other acceptable methods. After dressing has been completed and fertilizer incorporated, surfaces shall be seeded by uniformly distributing the applicable mixture of grass seed specified in paragraph SEED per each hectare. After the seed has been distributed, the entire finished surface shall be compacted by two passes of a conventional tractor-drawn cultipacker.

#### 3.1.3 Mulching

Mulching shall be performed immediately after seeding. Mulch shall be applied uniformly on the soil surface at the rate of 3.4 metric tons per hectare. The mulch shall be anchored into the soil with a mulch crimper. The mulch crimping equipment shall have straight, notched, dull blades no more than 255 mm apart and shall be equipped with scrapers. The mulching material shall be anchored at least 25 mm into the soil. Anchoring the mulch shall be performed along the contour of the ground surface. The mulch shall be applied by means of approved equipment suitable for such work.

### 3.2 EROSION CONTROL MATTING INSTALLATION

The erosion control matting shall be installed as shown on the drawings. Trenches shall be constructed as shown for anchoring erosion control matting. Prior to placing the matting, the ground shall be graded to the cross section shown with a maximum tolerance of plus 50 mm. Edges and overlaps of the material shall be staked at 3.6 m intervals (maximum)

unless otherwise shown. Erosion control matting shall be staked in  
trenches as shown.

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SECTION 03308

CONCRETE

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 117/117R	(1990; Errata) Standard Tolerances for Concrete Construction and Materials
ACI 308	(1992) Standard Practice for Curing Concrete
ACI 318/318R	(1995) Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1994) Steel Welded Wire Fabric Plain for Concrete Reinforcement
ASTM A 615/A 615M	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 775/A 775M	(1996) Epoxy-Coated Reinforcing Steel Bars
ASTM C 31/C 31M	(1996) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1993) Concrete Aggregates
ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	(1996) Ready-Mixed Concrete
ASTM C 143	(1990a) Slump of Portland Cement Concrete
ASTM C 150	(1997) Portland Cement
ASTM C 171	(1997) Sheet Materials for Curing Concrete
ASTM C 172	(1990) Sampling Freshly Mixed Concrete
ASTM C 231	(1997) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1995) Air-Entraining Admixtures for Concrete

ASTM C 309	(1997) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	(1992) Chemical Admixtures for Concrete
ASTM C 618	(1997) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 685	(1995a) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C 920	(1995) Elastomeric Joint Sealants
ASTM C 881	(1990) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 412	(1992) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic
ASTM D 1752	(1994; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 2240	(1997) Rubber Property - Durometer Hardness

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

CORPS OF ENGINEERS (COE)

COE CRD-C 400	(1963) Water for Use in Mixing or Curing Concrete
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## 1.2 SYSTEM DESCRIPTION

### 1.2.1 Design Requirements

#### 1.2.1.1 Concrete Mixture Proportions

Specified compressive strength  $f'_c$  shall be 20.7 MPa at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate shall be 19 mm in accordance with guidance given in ACI 318/318R, Paragraph 3.3.3. The air content shall be between 4.5 and 7.5 percent. The slump shall be between 50 mm and 127 mm. The maximum water cement ratio shall be 0.50.

### 1.2.2 Performance Requirements

#### 1.2.2.1 Strength

Acceptance test results will be the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete will be considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength,  $f'_c$ , and no individual acceptance test result falls below  $f'_c$  by more than 3.5 MPa.

#### 1.2.2.2 Construction Tolerances

A Class "C" finish shall apply to all surfaces except those specified to receive a Class "D" finish. A Class "D" finish shall apply to all surfaces which will be permanently concealed after construction. The surface requirements for the classes of finish required shall be as specified in ACI 117/117R.

#### 1.2.3 Construction Testing by Government

The Government will maintain the option to sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172. Slump and air content will be determined in accordance with ASTM C 143 and ASTM C 231, respectively, when cylinders are molded. Compression test specimens will be made, cured, and transported in accordance with ASTM C 31/C 31M. Compression test specimens will be tested in accordance with ASTM C 39. Samples for strength tests will be taken not less than once each shift in which concrete is produced. A minimum of three specimens will be made from each sample, two will be tested at 28 days (90 days if pozzolan is used) for acceptance, and one will be tested at 7 days for information.

#### 1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-01 Data

Batching and Mixing Equipment; FIO. Air-Entraining Admixtures; FIO. Water-Reducing or Retarding Admixtures; FIO. Reinforcing Steel; FIO. Curing Materials; FIO.

The Contractor shall submit Manufacturer's Literature from suppliers which demonstrates compliance with applicable specifications for all equipment and materials. Batching and mixing equipment will be accepted on the basis of manufacturer's data which demonstrates compliance with the applicable specification.

##### SD-07 Schedules

Concrete Placement; FIO.

The methods and equipment for transporting, handling, depositing, and consolidating the concrete shall be submitted prior to the first concrete placement.

##### SD-08 Statements

Formwork; FIO. Concrete Mixture Proportions; FIO.

Formwork design shall be submitted prior to the first concrete placement.

Concrete mixture proportions shall be the responsibility of the contractor and shall be designed in accordance with the criteria in paragraph CONCRETE MIXTURE PROPORTIONS. Ten days prior to placement of concrete, the contractor shall submit the mixture proportions that will produce concrete of the qualities required. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic meter of concrete. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project.

#### SD-09 Reports

Aggregates; FIO. Test; FIO.

Aggregates will be accepted on the basis of test reports that show the material meeting the requirements of the specifications under which it is furnished.

Applicable test reports shall be submitted to verify that the concrete mixture proportions selected will produce concrete of the quality specified.

The results of all tests and inspections conducted at the project site shall be reported informally at the end of each shift and in writing weekly and shall be delivered within 3 days after the end of each weekly reporting period.

#### SD-13 Certificates

Cement; FIO.

Cementitious Material will be accepted on the basis of a manufacturer's certificate of compliance.

### 1.4 REGULATORY REQUIREMENTS

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

#### MISSISSIPPI STATE HIGHWAY DEPARTMENT (MS SHD)

MS SHD-01 (1990; Suppl 1991) Standard Specifications  
for Road and Bridge Construction

### PART 2 PRODUCTS

#### 2.1 MATERIALS

##### 2.1.1 Cement

Cement shall be Portland cement and shall conform to appropriate specifications listed below:

##### 2.1.1.1 Portland Cement

ASTM C 150, Type II, low alkali.

#### 2.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class C or F, including requirements of Tables 1A and 2A.

#### 2.1.3 Aggregates

Aggregates shall meet the quality and grading requirements of ASTM C 33, Class Designations 4M or better, or the requirements specified in MS SHD-01, see paragraph REGULATORY REQUIREMENTS.

#### 2.1.4 Admixtures

Admixtures to be used, when required or approved, shall comply with the appropriate specification listed below. Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the contractor at the request of the Contracting Officer and shall be rejected if test results are not satisfactory.

##### 2.1.4.1 Air-Entraining Admixture

Air-entraining admixtures shall meet the requirements of ASTM C 260.

##### 2.1.4.2 Water-Reducing or Retarding Admixture

Water-reducing or retarding admixtures shall meet the requirements of ASTM C 494, Type A, B, or D.

#### 2.1.5 Curing Materials

Curing materials shall comply with the following:

##### 2.1.5.1 Impervious Sheet Materials

ASTM C 171, type optional, except polyethylene film, if used, shall be white opaque.

##### 2.1.5.2 Membrane - Forming Curing Compound

ASTM C 309, Type 1-D or 2, Class A.

#### 2.1.6 Water

Water for mixing and curing shall be fresh, clean, potable, and free from injurious amounts of oil, acid, salt, or alkali, except that unpotable water may be used if it meets the requirements of COE CRD-C 400.

#### 2.1.7 Reinforcement Steel

Reinforcing steel bars shall conform to the requirements of ASTM A 615/A 615M, Grade 60. Welded steel wire fabric shall conform to the requirements of ASTM A 185. Details of reinforcement not shown shall be in accordance with ACI 318/318R. Steel for dowels at the interface between the box culvert and drop structure shall be epoxy coated in accordance with the requirements of ASTM A 775/A 775M.

#### 2.1.8 Formwork

Forms shall be of wood, steel, or other approved material. The type, size, shape, quality, and strength of all materials of which the forms are made shall be subject to approval. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor.

#### 2.1.9 Form Coatings

Forms for exposed surfaces shall be coated with a nonstaining form oil, which shall be applied shortly before concrete is placed.

#### 2.1.10 Epoxy Grout

The reinforcing dowels that are used between the base slab of the existing box culvert and the wall of the drop structure shall be grouted into the base slab of the box culvert. The grout shall be an epoxy adhesive grout conforming to ASTM C 881, Type IV, Grade 2.

#### 2.1.11 Expansion Joint Material

A flexible foam expansion joint material shall be used between the existing box culvert and the walls of the new drop structure. The expansion joint material shall meet the requirements of ASTM D 1752, sections 5.1 through 5.4 with the compression requirement modified to  $7.03 \text{ g/mm}^2$  (10 psi) minimum and  $17.58 \text{ g/mm}^2$  (25 psi) maximum.

#### 2.1.12 Joint Sealer

A sealer shall be used to seal all joints by the flexible foam expansion material between the existing box culvert and walls of the new drop structure. The joint sealer shall be a non-sag polyurethane-based elastomeric sealant conforming to ASTM C 920 and have a tensile strength at break of 1.2 Mpa (175 psi) per ASTM D 412, and Shore A Hardness of 25 plus or minus 5 per ASTM D 2240.

### PART 3 EXECUTION

#### 3.1 PREPARATION

##### 3.1.1 General

Construction joints shall be prepared to expose coarse aggregate and the surface shall be clean, damp, and free of laitance. Ramps and walkways, as necessary, shall be constructed to allow safe and expeditious access for concrete and workmen. Snow, ice, standing or flowing water, loose particles, debris, and foreign matter shall have been removed. Earth foundations shall be satisfactorily compacted. Spare vibrators shall be available. The entire preparation shall be accepted by the government prior to placing.

##### 3.1.2 Embedded Items

Reinforcement shall be secured in place; joints, anchors, and other embedded items shall have been positioned. Internal ties shall be arranged so that when the forms are removed all metal will be not less than 50 mm from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Embedded items shall be free of oil and other foreign matter such as loose coating or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. All equipment needed to place, consolidate,

protect, and cure the concrete shall be at the placement site and in good operating condition.

### 3.1.3 Formwork Installation

#### 3.1.3.1 General

Forms shall be properly aligned, adequately supported, and mortar-tight. The form surfaces shall be smooth, free from irregularities, dents, sags, or holes when used for permanently exposed faces. All exposed joints and edges shall be chamfered, unless otherwise indicated.

### 3.1.4 Production of Concrete

#### 3.1.4.1 Ready-Mixed Concrete

Ready-mixed concrete shall conform to ASTM C 94, except as otherwise specified.

#### 3.1.4.2 Volumetric Batching and Continuous Mixing

Volumetric batching and continuous mixing shall conform to ASTM C 685.

## 3.2 CONCRETE PLACEMENT

### 3.2.1 General

Concrete placement shall not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. When concrete is mixed or transported by a truck mixer, the concrete shall be delivered to the site of the work and discharge shall be completed within 1-1/2 hours after introduction of the cement to the aggregate and water, or within 45 minutes when the placing temperature is 30 degrees C or greater, unless a retarding admixture is used. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods which prevent segregation or loss of ingredients. Concrete shall be in place and consolidated within 15 minutes after discharge from the mixer. Concrete shall not be dropped from a height greater than 1.5 m and deposited as close as possible to its final position in the form and be so regulated that it may be effectively consolidated in horizontal layers 455 mm or less in thickness with a minimum of lateral movement. The placement shall be carried on at such a rate the formation of cold joints will be prevented.

### 3.2.2 Consolidation

Each layer of concrete shall be consolidated by internal vibratory equipment. Internal vibration shall be systematically accomplished by inserting the vibrator through the fresh concrete into the layer below at a uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator and overlap the adjacent, just vibrated area by 75 to 100 mm. The vibrator shall penetrate rapidly to the bottom of the layer and at least 150 mm into the layer below if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly at the rate of 75 mm per second.

### 3.2.3 Cold-Weather Requirements

No concrete placement shall be made when the ambient temperature is below 0 degrees C, nor if the ambient temperature is below 4.5 degrees C and falling. Suitable covering and other means, as approved, shall be provided for maintaining the concrete at a temperature of at least 10 degrees C for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. Salt, chemicals, or other foreign materials shall not be mixed with the concrete to prevent freezing. Concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.

### 3.2.4 Hot Weather Requirements

When the rate of evaporation of surface moisture, as determined by use of Figure 1 of ACI 308, is expected to exceed 0.1 kg per 0.09 square meters per hour, provisions for windbreaks, shading, fog spraying, or covering with a light-colored material, shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

### 3.3 FORM REMOVAL

Forms shall not be removed before the expiration of 24 hours after concrete placement, except where otherwise specifically authorized. Supporting forms and shoring shall not be removed until the concrete has cured for at least 5 days. When conditions on the work are such as to justify the requirement, forms will be required to remain in place for longer periods.

### 3.4 FINISHING

#### 3.4.1 General

No finishing or repair will be done when either the concrete or the ambient temperature is below 10 degrees C.

#### 3.4.2 Finishing Formed Surfaces

##### 3.4.2.1 General

Within 72 hours after removal of forms, all fins and loose materials shall be removed, and surface defects including tie holes shall be filled. All honeycomb areas and other defects shall be repaired. Forms shall only be removed at a rate at which all surface defects can be repaired within the allotted 72 hours. All unsound concrete shall be removed from areas to be repaired. Surface defects greater than 13 mm in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry-pack mortar. The prepared area shall be brush-coated with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filled with mortar or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of Portland cement and white cement so that the final color when cured will be the same as adjacent concrete.

#### 3.4.3 Finishing Unformed Surfaces

All unformed surfaces that are not to be covered by additional concrete or backfill shall be float finished to elevations shown on the drawings, unless otherwise specified. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown on the drawings and left

as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown on the drawings. Joints shall be carefully made with a jointing tool. Unformed surfaces shall be finished to a tolerance of 9.5 mm for a float finish and 8 mm for a trowel finish as determined by a 3 m straightedge placed on surfaces shown on the plans to be level or having a constant slope. No water or cement shall be added to the surface during finishing.

#### 3.4.3.1 Float Finish

Surfaces to be float finished shall be screed and darbyed or bullfloated to eliminate the ridges and to fill in the voids left by the screed. In addition, the darby or bullfloat shall fill all surface voids and only slightly embed the coarse aggregate below the surface of the fresh concrete. When the water sheen disappears and the concrete will support a person's weight without deep imprint, floating should be completed. Floating should embed large aggregates just beneath the surface, remove slight imperfections, humps, and voids to produce a plane surface, compact the concrete, and consolidate mortar at the surface.

#### 3.5 CURING AND PROTECTION

Beginning immediately after placement and continuing for at least 7 days, except for concrete made with Type III cement, at least 3 days, all concrete shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to the rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of placement prior to the start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

- a. Continuous sprinkling or ponding.
- b. Application of absorptive mats or fabrics kept continuously wet.
- c. Application of sand kept continuously wet.
- d. Application of impervious sheet material conforming to ASTM C 171.
- e. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view and Type 2 on other surfaces shall be accomplished in accordance with manufacturer's instruction.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 days. If forms are removed prior to end of the required curing period, other curing methods shall be used for the balance of the curing period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 14 degrees C within a 24 hour period.

#### 3.6 TESTS AND INSPECTIONS

##### 3.6.1 General

The individuals who sample and test concrete as required in this specification shall have demonstrated a knowledge and ability to perform

the necessary test procedures equivalent to ACI minimum guidelines for certification of concrete Field Testing Technicians, Grade I.

### 3.6.2 Inspection Details and Frequency of Testing

#### 3.6.2.1 Preparations for Placing

Foundation or construction joints, forms, and embedded items should be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that it is ready to receive concrete.

#### 3.6.2.2 Air Content

Air content will be checked at least once during each shift that concrete is placed. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 231.

#### 3.6.2.3 Slump

Slump shall be checked twice during each shift that concrete is produced for each class of concrete required. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 143.

#### 3.6.2.4 Consolidation and Protection

The Contractor shall ensure that the concrete is properly consolidated, finished, protected, and cured.

### 3.6.3 Action Required

#### 3.6.3.1 Placing

The placing foreman shall not permit placing to begin until he has verified that an adequate number of acceptable vibrators, which are in working order and have competent operators, are available. Placing shall not be continued if any pile is inadequately consolidated.

#### 3.6.3.2 Air Content

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment shall be made to the dosage of the air-entrainment admixture.

#### 3.6.3.3 Slump

Whenever a test result is outside the specifications limits, the concrete shall not be delivered to the forms and an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the water-cement ratio does not exceed that specified in the submitted concrete mixture proportion.

#### 3.6.3.4 Reports

The Contractor shall prepare reports of all tests and inspections conducted at the project site.

-- End of Section --