

Tue 01 Jul 1997
 Eff. Date 06/13/97

U.S. Army Corps of Engineers
 PROJECT 96-230: Allendale Dam Repair, R.I. - Replace Existing Dam
 BUDGET/CHECKLIST ESTIMATE
 ** 2ND VIEW SUMMARY (Rounded to 100's) **

TIME 09:24:52
 SUMMARY PAGE 9

	** CONTRACT **			PROJECT
	QUANTITY UOM	UNIT	TOTAL	
001 CLEARING AND GRUBBING	1.00	LS	8684	8,700
002 REM/DISPOSE OF EXISTING WOOD DAM	1.00	LS	23417	23,400
003 EXCAVATION - PARTIAL REUSE	860.00	CY	9.88	8,500
005 ROCK EXCAVATION	60.00	CY	47.80	2,900
006 STONE PROTECTION	160.00	CY	32.73	5,200
007 GRAVEL - REUSED	430.00	CY	9.92	4,300
008 FURNISH/BACKFILL GRAVEL FILL MAT	320.00	CY	20.81	6,700
009 CAST-IN-PLACE CONCRETE	250.00	CY	316	79,100
010 MODIFICATIONS TO GATE STRUCTURE	1.00	LS	27456	27,500
011 REPAIR EXISTING STONE WALL (WEST	1.00	LS	16891	16,900
013 4" TOPSOIL AND SEED	900.00	SY	3.77	3,400
014 CONTROL AND DIVERSION OF WATER	1.00	LS	57924	57,900
015 EROSION & SEDIMENTATION CONTROL	1.00	LS	449	400
016 GRAVEL BEDDING	20.00	CY	27.69	600
101 Land Easements and Rights-of-Way	1.00	LS	10000	10,000
102 Project Management (PM) and Envi	1.00	LS	35000	35,000
103 Engineering and Design	1.00	LS	72000	72,000
104 Supervision and Administration	1.00	LS	30000	30,000
Allendale Dam Repair, R.I.	1.00	EA	392350	392,300

Allendale Minor
 2.2
 9694

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BIDDING SCHEDULE

06/94

Refer to Section 01025 - MEASUREMENT AND PAYMENT

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Clearing and Grubbing	1	Job	LS	\$ _____
0002	Removal of Existing Wood Dam	1	Job	LS	_____
0003	Excavation and Reuse	430	CY	_____	_____
0004	Excavation and Disposal	430	CY	_____	_____
0005	Rock Excavation	60	CY	_____	_____
0006	Stone Protection	160	CY	_____	_____
0007	Gravel Bedding	20	CY	_____	_____
0008	Gravel Fill	320	CY	_____	_____
0009	Cast-in-Place Concrete T-Wall	250	CY	_____	_____
0010	Modifications to Concrete Gate Structure	1	Job	LS	_____
0011	Repair Existing Stone Wall (West Abutment)	1	Job	LS	_____
0012	4-inch Topsoil and Seed	1	Job	LS	_____
0013	Control and Diversion of Water	1	Job	LS	_____
0014	Erosion and Sedimentation Control	1	Job	LS	_____
Estimated Subtotal					\$ _____
0015	Bond Costs (Bond Costs shall include the cost of Bid, Performance, and Payment Bonds) (see Section 00700, Contract Clauses, clause entitled "Notice of Evaluation Preference for Small Disadvantaged Business Concerns -- Construction Acquisitions -- Test Program (Apr 1996)")	1	Job	LS	_____
TOTAL ESTIMATED AMOUNT					\$ _____

Note 1: The work will be awarded as a whole to one bidder. Bidders must bid all items.

Note 2: Each bidder is strongly encouraged to visit the site to obtain a precise first hand accounting of the work to be performed and the conditions to be encountered.

BIDDING SCHEDULE

SPECIAL CLAUSES

02/95

1. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK
(APR 1984) FAR 52.212-3
 - a. The Contractor shall be required to--
 - (1) commence work under this contract within 15 calendar days after the date the Contractor receives the notice to proceed,
 - (2) prosecute the work diligently, and
 - (3) complete the entire work ready for use not later than 365 calendar days after the date the Contractor receives notice to proceed. The time stated for completion shall include final cleanup of the premises. See Paragraph, "WORK SEQUENCE" in Section: SUMMARY OF WORK.
 - b. Time Extension for Construction of Turf: In the event the contract completion date, as established in Subparagraph "a" above, is thirty (30) days or more after the limiting date established for seeding in Section: TURF, herein, the contract completion date for topsoiling and seeding will be the last date of the next succeeding period specified as acceptable for seeding. (NEDCD).
2. LIQUIDATED DAMAGES - CONSTRUCTION (APR 1984) FAR 52.212-5
 - a. If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages the amounts specified below.
 - b. If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.
 - c. If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.
 - d. Entire Work: For failure to complete the entire work, except construction of turf, the sum of \$500.00 for each calendar day of delay. (NEDCD)
 - e. Turf: For failure to complete the construction of turf by the date established in Special Clause 1.0, the sum of \$100.00 for each calendar day of delay beyond the established date until the topsoiling and seeding work is completed and accepted. (NEDCD)

3. TIME EXTENSIONS (APR 1984) FAR 52.212-6

Notwithstanding any other provisions of this contract, it is mutually understood that the time extensions for changes in the work will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements so delayed and that the remaining contract completion dates for all other portions of the work will not be altered and may further provide for an equitable readjustment of liquidated damages under the new completion schedule.

4. CONTRACT DRAWINGS, MAPS AND SPECIFICATIONS (DEC 1991) DFARS 252.236-7001

a. The Government--

1. Will provide the Contractor, without charge, 5 sets of large-scale contract drawings and specifications except publications incorporated into the technical provisions by reference;
2. Will furnish additional sets on request, for the cost of reproduction; and
3. May, at its option, furnish the Contractor one set of reproducible, or half-size drawings, in lieu of the drawings in paragraph (a)(1) of this clause.

b. The Contractor shall--

1. Check all drawings furnished immediately upon receipt;
2. Compare all drawings and verify the figures before laying out the work.
3. Promptly notify the Contracting Officer of any discrepancies; and
4. Be responsible for any errors which might have been avoided by complying with this paragraph (b).

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

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

e. The work shall conform to the specifications and the contract drawings. The list of drawings set out on Drawing No. WST-1, Sheet T-1, is hereby incorporated by reference into these specifications.

(Note that contract drawings furnished for bidding are generally reproduced at one half of full size. Drawing graphic scales should always be checked when making quantity take-offs.)

5. DESIGNATED BILLING OFFICE (NEDCD)

Reference Contract Clause 52.232-0027 "PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS" (APR 1989). The "designated billing office" will be the Construction Area Engineer, Resident Engineer or project office where the Contracting Officer Representative for this contract is located. The Contractor will be notified of the exact location of this office at the project preconstruction conference specified in Section \=01010=\ SUMMARY OF WORK.

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

- a. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE entitled, "DEFAULT (FIXED PRICE CONSTRUCTION)." In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied.
 - (1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
 - (2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.
- b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

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

<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
(6)	(5)	(2)	(2)	(2)	(1)	(1)	(2)	(2)	(2)	(2)	(5)

- c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual

adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "DEFAULT (FIXED PRICE CONSTRUCTION)."

7. BASIS FOR SETTLEMENT OF PROPOSALS EFARS 49.113 (100)

Actual costs will be used to determine equipment cost for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a termination settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

- (1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the Contractor's accounting records to determine total actual equipment costs.
- (2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.
- (3) Recorded job costs adjusted for unallowable and unallocable expenses will be used to determine equipment operating expenses.
- (4) Ownership costs (depreciation) will be determined using the Contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).
- (5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the Contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

8. BID GUARANTEE (APR 1984) FAR 52.228-1

- a. Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.
- b. The Offerer (bidder) shall furnish a bid bond, postal money order, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.
- c. If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or give a bond(s) as required by

the solicitation within the time specified, the Contracting Officer may terminate the contract for default.

- d. Unless otherwise specified in the bid, the bidder will (1) allow 60 days for acceptance of its bid and (2) give bond within 10 days after receipt of the forms by the bidder.
- e. In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid. The bid bond, or bonds or notes of the United States is available to offset the difference.

9. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE
(MARCH 1995) - EFARS

- a. This statement shall become operative only for negotiated contracts where cost or pricing data is requested, and for modifications to sealed bid or negotiated contracts where cost or pricing data is requested. This clause does not apply to terminations. See 52.231-5001, Basis for settlement of proposals, and FAR Part 49.
- b. Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a Contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the Contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series of equipment from the Contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule". Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For active pricing, the schedule in effect at the time the work was performed shall apply.
- c. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-lease back arrangements will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.
- d. When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411,

Contract Pricing Proposal Cover Sheet.

10. PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) FAR 52.236-1

The Contractor shall perform on the site, and with its own organization, work equivalent to at least thirty percent (30%) of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

11. PERFORMANCE AND PAYMENT BONDS (APR 1984) FAR 28.102.

Within ten (10) days after the prescribed forms are presented to the bidder to whom award is made for signature, a performance bond (Standard Form 25) and a payment bond (Standard Form 25A), each with good and sufficient surety or sureties acceptable to the Government, shall be furnished. Each form shall show the contract number to which the bond applies. The penal sums of such bonds will be as follows:

- a. Performance Bond: The penal sum of the performance bond shall equal one hundred percent (100%) of the contract price. In accordance with Federal Tax Lien Act of 1966, the performance bond shall provide coverage for taxes imposed by the United States which are collected, deducted, or withheld from wages paid by the Contractor in carrying out the contract.
- b. Payment Bond:
 - (1) When the contract price is \$1,000,000 or less, the penal sum will be fifty percent (50%) of the contract price.
 - (2) When the contract price is in excess of \$1,000,000 but not more than \$5,000,000, the penal sum shall be forty percent (40%) of the contract price.
 - (3) When the contract price is more than \$5,000,000, the penal sum shall be \$2,500,000.

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

- a. In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any Subcontractor or supplier at any tier.
- b. This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.
- c. The Contractor shall remedy at the Contractor's expense any failure

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

- (1) The Contractor's failure to conform to contract requirements;
- or
- (2) Any defect of equipment, material, workmanship, or design furnished.
- d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.
 - e. The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.
 - f. If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.
 - g. With respect to all warranties, express or implied, from Subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall
 - (1) Obtain all warranties that would be given in normal commercial practice;
 - (2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and
 - (3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.
 - h. In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a Subcontractor's, manufacturer's, or supplier's warranty.
 - i. Unless a defect is caused by the negligence of the Contractor or Subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.
 - j. This warranty shall not limit the Government's rights under the INSPECTION AND ACCEPTANCE clause of this contract with respect to latent defects, gross mistakes, or fraud.
 - k. Defects in design or manufacture of equipment specified by the

Government on a "brand name and model" basis, shall not be included in this warranty. In this event the Contractor shall require any Subcontractors, manufacturers, or suppliers thereof to execute their warranties, in writing, directly to the Government.

13. PHYSICAL DATA. (APR 1984) FAR 52.236-4

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and borings. The conditions represented prevailed at the time the investigations were made. Before commencing work at the site, the Contractor shall verify the existing conditions indicated on the drawings and in the specifications. See CONTRACT CLAUSE entitled "SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK."

(b) Weather conditions: The monthly normal mean temperature and the monthly normal mean precipitation for the site may be obtained by the Contractor from the nearest U.S. National Weather Service Office.

(c) Transportation facilities: The Contractor shall make his own investigations on the use of municipal, State, and Federal highways, roads, streets, and bridges.

14. QUANTITY SURVEYS. (APR 1984) ALTERNATE 1 52.236-16

(a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. An these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

---- End of Section ----

SECTION 01010

SUMMARY OF WORK
12/94

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

The general description below is given to indicate the approximate scope of this project only. It does not limit the work required under the project drawings and specifications.

The work of this project consists of reconstructing the Allendale Dam in North Providence, Rhode Island. Major items of work include control and diversion of water, clearing and grubbing, removal of the existing wooden dam, general and rock excavation, placing gravel bedding and stone protection, repair of existing concrete, placing new cast-in-place concrete with an architectural surface treatment, and stone masonry repair. Other work items include erosion and sedimentation control and turf establishment.

1.2 REFERENCES

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

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

\-FHWA MUTCD-\ 1983 Manual on Uniform Traffic Control
Devices

1.3 SUBMITTALS

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

SD-01 Data\.

Alternate Construction Sequence and Water Control Scheme\; *GA*\.

Pre-Construction Photographic Survey\; *GA*\.

SD-04 Drawings\.

As-Built Drawings\; *GA*\.

As-built drawings showing all deviations which have been made from the contract drawings shall be submitted to the Contracting Officer for approval at the completion of work. See paragraph AS-BUILT DRAWINGS for record keeping and submittal requirements.

SD-07 Schedules\

Progress Schedule\; *GA*\.

In accordance with the contract provisions, the Contractor shall, within five (5) days after receipt by him of notice to proceed or as otherwise determined by the Contracting Officer, submit for approval a practicable progress schedule. When changes are authorized that result in contract time extensions, Contractor shall submit a modified chart for approval by the Contracting Officer.

1.4 WORK SEQUENCE AND SCHEDULING

1.4.1 Hours of Operations

Normal work hours are from 8:00 a.m. through 4:30 p.m., Monday through Friday. The Contractor will not be permitted to work on Saturday, Sunday or legal holidays unless otherwise authorized by the Contracting Officer. The exclusion of work on Saturday, Sunday and legal holidays has been considered in computing the performance time of this contract. The following legal holidays are observed:

January 1st
Third Monday in January
Third Monday in February
Last Monday of May
July 4th
1st Monday of September
2nd Monday of October
11th of November
Fourth Thursday of November
25th of December

When one of the above designated legal holidays falls on a Sunday, the following Monday will be observed as a legal holiday. When a legal holiday falls on a Saturday, the preceding Friday is observed as a holiday. Requests to perform work at other times shall be made in writing to the Contracting Officer. Every effort will be made to accommodate such requests.

1.4.2 Work Sequence

1.4.2.1 General

There are certain essential criteria relative to the preparation of a work sequence and time schedule which the Contractor will be required to implement and follow during the prosecution of the work. Minor variations in the sequence of the items of work as specified may be made by the Contractor, provided such variations do not conflict with critical elements of the schedule. Proposed minor variations shall be noted on the progress charts submittal required by CONTRACT CLAUSE, entitled "SCHEDULES FOR CONSTRUCTION CONTRACTS." Variations shall be approved by the Contracting Officer prior to implementation.

1.4.2.2 *Progress Schedule\

The progress schedule shall be in the form of a chart graphically indicating the sequence proposed to accomplish each work feature or operation. The chart shall be prepared to show the starting and completion dates of all work features on a linear horizontal time scale beginning with date of Notice to Proceed and indicating calendar days to completion. Contractor shall indicate on the chart the important work features or operations that are critical to the timely overall completion of the project. Key dates for such important work features and portions of work features are milestone dates and shall be so indicated on the chart. This schedule will be the medium through which the timeliness of the Contractor's construction effort is appraised.

1.4.2.3 Work Specified Elsewhere

Certain other construction sequence and time period restrictions relative to particular items of work are specified in the applicable specification sections to which the work pertains, and as specified on the contract drawings.

1.4.2.4 Proposed Sequence of Construction

Construct critical items of work in the following sequence:

1. Clear and grub where required.
2. Modify concrete gate structure.
3. Install Phase I Cofferdam as shown on the contract drawings.
4. Remove entire existing wooden dam.
5. Excavate behind existing stone wall (west abutment).
6. Repair existing stone wall (west abutment).
7. Backfill behind repaired stone wall (west abutment).
8. Construct western portion of dam.
9. Install Phase II Cofferdam as shown on the contract drawings.
10. Backfill against new western portion of dam.
11. Construct eastern portion of dam.
12. Backfill against new eastern portion of dam.
13. Remove cofferdam.

1.4.2.5 Alternate Construction Sequence and Water Control Scheme

The contract drawings show a proposed construction sequence and water control scheme. The Contractor may submit an alternate sequence and scheme for approval. The Contractor shall engage the services of a licensed professional engineer, experienced in the design and construction of small dams, to plan and design the alternate sequence and scheme. The submittal shall be submitted for review and approval a minimum of 30 days before the start of construction. The submittal shall include a complete set of design calculations and drawings, descriptions of the equipment to be used, test and quality control procedures, material test reports, permits and any other information required by the Contracting Officer. The design shall be based on specific conditions at the site. It shall demonstrate that the sequence and scheme proposed are safe and will not cause damage to existing features. It shall be sufficiently detailed to show the manner of construction and that the work can be performed in the required time frame.

The design of the alternate sequence and scheme shall be in accordance with commonly accepted standards and practices. It shall be stamped by the professional engineer.

1.4.2.6 Time of Year Restrictions on Work

For the protection of environmental resources, items of work that require work within the river channel or affect the river shall be performed only during the period of 1 July through 31 October. Items of work not performed within the river or not affecting the river may be performed at any time during the prosecution period of this contract.

1.4.3 Organization at the Site

1.4.3.1 General

The Contractor shall employ ample personnel and sufficient equipment to accomplish the work of this contract in the least amount of time, within the prosecution period specified in SPECIAL CLAUSES, Paragraph 1.

1.4.3.2 Rate of Progress

Should the Contractor fail to maintain a satisfactory rate of progress, the Contracting Officer may require that additional personnel and equipment be placed on the work and weekend and overtime work be performed, in order that the work be brought up to schedule and maintained.

1.5 CONTRACTOR USE OF PREMISES

1.5.1 Storage Areas

Area within the project limits is available for use by the Contractor, for work, storage of equipment, materials and trailers during the life of this contract. A site is shown on the drawings. The Contractor shall confine his storage areas to the limits as designated or approved by the Contracting Officer and shall be responsible for the security of the areas. Upon completion of the contract, the Contractor shall remove all equipment and materials, except as otherwise specified, and restore the site to its original condition as approved by the Contracting Officer at no additional cost to the Government.

1.5.2 Work Limits

Work shall be restricted to the areas shown on the contract drawings in addition to any storage area assigned to this Contractor.

1.5.3 Contractor's Receipt of Supplies

The Contractor shall be responsible for all arrangements for the receipt of materials and supplies at the job site. Government personnel are not permitted to receive or sign for items delivered to the site.

1.5.4 Access to Work Site

Access to the project site is currently available for construction traffic.

1.6 LOCATION OF UNDERGROUND FACILITIES

Obtain necessary digging permits to start of excavation. Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated or specified to be removed but indicated in locations where work is to be installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.6.1 Notification Prior to Excavation

For excavation work in Rhode Island call Dig Safe at 1-800-225-4977. Notification shall not be earlier than 30 days prior, nor later than 3 days prior, to the planned excavation.

1.7 PRECONSTRUCTION CONFERENCE

The Contracting Officer will conduct a preconstruction conference with key Contractor personnel. The purpose of the conference is to review contract requirements and to establish a working relationship between the Contractor's Staff and the Corps Of Engineers personnel who will be closely associated with the project. During the conference, the Contracting Officer will inform the Contractor concerning Job Safety, Quality Control, Labor Relations, and Environmental Protection. The Contractor's Superintendent and Quality Control Representative shall attend this conference. All submittals which are ready for submission prior to start of work may be brought to the conference for distribution to the participating reviewers.

1.8 *AS-BUILT DRAWINGS*\

Maintain at the jobsite one set of full-size contract drawings marked to show any deviations which have been made from the contract drawings, including buried or concealed construction and utility features revealed during the course of construction. Record the horizontal and vertical location of all buried utilities that differ from the contract drawings. These drawings shall be available for review by the Contracting Officer at all times. Upon completion of the work, submit the original marked set of prints to the Contracting Officer for approval. Requests for partial payments will not be approved if the marked prints are not current, and request for final payment will not be approved until the marked prints are submitted to and approved by the Contracting Officer.

1.8.1 Preparation of As-Built Drawings

The entries shall be made in the jobsite set of prints at the time field changes are made, pertinent information collected, or need for corrections established, as a continuing process during the life of the contract. As revised drawings are issued by the Contracting Officer, revised prints shall be introduced into the set to replace the superseded drawings and all

applicable notations previously made on the superseded drawings transferred to the current prints. Carefully prepared sketches, not less than 8-1/2" x 11", may be used to depict changes or added information in lieu of notations on the actual prints. Staple sketches to the prints affected by the change. All plan views, sections, elevations, profiles, diagrams, details, or schedules affected by a change shall be marked up as required to reflect the change. All notations or changes made on the prints shall be in sufficient detail to clearly depict the change. Colored pens or pencils shall be used to make notations on the as-built prints as follows:

Red pen or pencil shall be employed to indicate added or corrected work or information.

Green pen or pencil shall be used to show the deleted or incorrectly depicted work or information.

Blue or black pen or pencil shall be used to show information not to be recorded on the drawings but included on the marked-up prints for explanatory or clarification purposes for the benefit of the Contracting Officer.

1.9 PRE-CONSTRUCTION PHOTOGRAPHIC SURVEY

The Contractor shall perform a pre-construction photographic survey of the project site to fully document existing conditions for historical archives. The survey shall photographically record all major components of the Allendale Dam and related pertinent historical features at the project site. Photographs shall be taken in sufficient quantity to document such items as dam structures, access ways, fencing, vegetation, etc. A written report shall accompany the photographs, and shall describe the existing conditions encountered at the site and the particulars (time, date, view, etc.) for each photograph taken. The final survey submittal shall include photographic prints, negatives, and the written report. The pre-construction photographic survey shall be completed and submitted to the Contracting Officer for approval at least two weeks prior to the start of disruptive on-site activities. No disruptive on-site activities will be permitted until the survey has been approved by the Contracting Officer.

1.9.1 Archival Requirements

All film and prints shall be processed according to manufacturer's specifications, using only fresh chemicals, to insure archival permanence for both the negative and contact prints. The fixer solution shall not contain hardener. Each step in the developing process shall be thoroughly completed with recommended agitation. All films shall be treated in a hypo clearing bath (such as "Permawash", by Heico, Inc., Delaware Water Gap, PA, or approved equal) for the recommended maximum time. Films shall be washed before and after the hypo clearing treatment. Developer shall be replenished according to the manufacturer's specifications, including limitations. Films and prints will be tested for significant traces of residual hypo (sodium thiosulfate) when submitted. The presence of visible levels above comparison patch #1 of the standard Kodak Hypo Estimator Scale (Kodak publication J-11) used with the test kit (Catalogue No. 196-5847) will result in the rejection of negatives and/or prints. It is highly recommended that photographers test their negatives and prints before

submittal is made. Film developed by automatic processors generally fail the above test and therefore automatic processors are not recommended.

1.9.2 Negatives

The Contractor shall not write on negative margins. Original negatives, 4" X 5", shall be submitted; copy negatives are not permitted.

1.9.3 Contact Prints

- Contact Prints shall be produced on single or double weight polyfiber base photographic paper. Contact speed printing paper shall be used. Textured printing papers and resin coated papers are not acceptable.

- All prints submitted shall be contact prints, the same size as the negatives. Enlargements are not permitted.

- Contact prints shall be trimmed to the size of the corresponding 4" X 5" negative.

- Contact prints shall be made with black (bleed) margins of the entire sheet of film to reveal all details in the picture area plus the clear film margin (no white wash margins).

- Prints shall not be written on, rubber stamped, or have adhesive labels affixed to their backs.

- Contact prints shall have a glossy finish.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

SECTION 01025

MEASUREMENT AND PAYMENT

04/94

PART 1 GENERAL

1.1 SUBMITTALS

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

SD-01 Data\

Quantity Surveys\; *FIO*\.

Submit originals of all field notes and all other records relating to the quantity surveys.

1.2 RELATED REQUIREMENTS

a. CONTRACT CLAUSES:

(1) "Payments under fixed price construction contracts."

b. Paragraphs entitled, "MEASUREMENT AND PAYMENT" as may appear in each specification section.

1.4 BIDDING SCHEDULE - PAYMENT ITEMS

Payment items for the work of this contract on which the contract progress payments will be based are listed in the BIDDING SCHEDULE and are described below and in the various sections of these specifications. All costs for items of work, which are not specifically mentioned to be included in a particular Bidding Schedule payment item, shall be included in the listed item most closely associated with the work involved.

a. Item No. 0001, Clearing and Grubbing.

All costs for material, labor, and equipment to clear and grub as shown on the contract drawings and in accordance with Section \=02110=\ SITE PREPARATION.

Unit of Measure: Job Lump Sum.

b. Item No. 0002, Removal of Existing Wood Dam.

All costs for material, labor, and equipment to remove the existing wood dam as shown on the contract drawings and in accordance with Section \=02110=\ SITE PREPARATION.

Unit of Measure: Job Lump Sum.

c. Item No. 0003, Excavation and Reuse.

All costs for material, labor, and equipment for excavation and reuse as shown on the contract drawings and in accordance with Section \=02228=\ EXCAVATION. The quantity of excavation, including stripping, to be paid for shall be the total volume in cubic yards of suitable gravel material satisfactorily removed and reused from behind the existing dam in accordance with the contract drawings and specifications. Areas within which excavation is to be done shall be surveyed after completion of site preparation. All measurements shall be based on this survey. Measurement shall be made between the ground surface as indicated by this survey and the required excavation lines as indicated on the drawings, specified herein, or directed in the field.

Unit of Measure: Cubic Yard.

d. Item No. 0004, Excavation and Disposal.

All costs for material, labor, and equipment for excavation and disposal as shown on the contract drawings and in accordance with Section \=02228=\ EXCAVATION. The quantity of excavation, including stripping, to be paid for shall be the total volume in cubic yards of unsuitable material satisfactorily removed and disposed of from behind the existing dam in accordance with the contract drawings and specifications. Areas within which excavation is to be done shall be surveyed after completion of site preparation. All measurements shall be based on this survey. Measurement shall be made between the ground surface as indicated by this survey and the required excavation lines as indicated on the drawings, specified herein, or directed in the field.

Unit of Measure: Cubic Yard.

e. Item No. 0005, Rock Excavation.

All costs for material, labor, and equipment for rock excavation as shown on the contract drawings and in accordance with Section \=02228=\ EXCAVATION.

Unit of Measure: Cubic Yard.

f. Item No. 0006, Stone Protection.

All costs for material, labor, and equipment for stone protection as shown on the contract drawings and in accordance with Section \=02278=\ STONE PROTECTION AND GRAVEL BEDDING. The quantities of stone protection to be paid for will be measured as the total volumes computed from the applicable lines, grades, thickness and limits shown on the drawing or as modified by the Contracting Officer. The lower limits of stone protection, underlayer stone and gravel bedding layers which are not definite on the drawing and

depend upon field conditions or topography shall be determined by surveys made immediately prior to the placement of material.

Unit of Measure: Cubic Yard.

g. Item No. 0007, Gravel Bedding.

All costs for material, labor, and equipment for gravel bedding as shown on the contract drawings and in accordance with Section \=02278=\ STONE PROTECTION AND GRAVEL BEDDING. The quantities of gravel bedding to be paid for will be measured as the total volumes computed from the applicable lines, grades, thickness and limits shown on the contract drawings beneath the stone protection at the toe of the dam, or as modified by the Contracting Officer. The lower limits of stone protection, underlayer stone and gravel bedding layers which are not definite on the drawing and depend upon field conditions or topography shall be determined by surveys made immediately prior to the placement of material.

Unit of Measure: Cubic Yard.

h. Item No. 0008, Gravel Fill.

All costs for material, labor, and equipment for gravel fill as shown on the contract drawings and in accordance with Section \=02227=\ GRAVEL FILLS. Gravel fill will be paid for on the basis of the number of cubic yards of approved gravel fill material acceptably placed to the neat lines and grades shown on the drawing, specified herein, or directed in the field. This price will include all costs in connection with furnishing, stockpiling, hauling, placing, compacting, and quality control testing of the gravel fill material.

Unit of Measure: Cubic Yard.

i. Item No. 0009, Cast-in-Place Concrete T-Wall.

All costs for material, labor, and equipment for the cast-in-place concrete T-Wall, including reinforcement, expansion joints, waterstops, and formwork as shown on the contract drawings and in accordance with Section \=03100=\ STRUCTURAL CONCRETE FORMWORK, Section \=03200=\ CONCRETE REINFORCEMENT, Section \=03250=\ EXPANSION JOINTS, CONSTRUCTION JOINTS, AND WATERSTOPS, and Section \=03300=\ CAST-IN-PLACE STRUCTURAL CONCRETE.

Unit of Measure: Cubic Yard.

j. Item No. 0010, Modifications to Concrete Gate Structure.

All costs for material, labor, and equipment for modifications to the concrete gate structure, including enlarging the gate openings, spall repair, cementitious coating, and wood stop logs, as shown on the contract drawings and in accordance with Section \=03730=\ REPAIR MORTARS FOR PATCHING and Section \=06146=\ WOOD STOP LOGS.

Unit of Measure: Job Lump Sum.

k. Item No. 0011, Repair Existing Stone Wall (West Abutment).

All costs for material, labor, and equipment to repair the existing stone, including resetting and repointing of stone, and excavation and reuse of gravel fill behind the wall at the west abutment, as shown on the contract drawings and in accordance with Section \=04400=\ STONE MASONRY.

Unit of Measure: Job Lump Sum.

l. Item No. 0012, 4-inch Topsoil and Seed.

All costs for material, labor, and equipment for 4-inch topsoil and seed as shown on the contract drawings and in accordance with Section \=02935=\ TURF.

Unit of Measure: Job Lump Sum.

m. Item No. 0013, Control and Diversion of Water.

All costs for material, labor, and equipment for the control and diversion of water as shown on the contract drawings and in accordance with Section \=02403=\ CONTROL AND DIVERSION OF WATER.

Unit of Measure: Job Lump Sum.

n. Item No. 0014, Erosion and Sedimentation Control.

All costs for material, labor, and equipment for erosion and sedimentation control as shown on the contract drawings and in accordance with Section \=02274=\ EROSION AND SEDIMENTATION CONTROL.

Unit of Measure: Job Lump Sum.

o. Item No. 0015, Bond Costs.

All costs for material, labor, and equipment for bid, performance and payment bonds.

Unit of measure: Job Lump Sum.

-- End of Section --

SECTION 01050

FIELD ENGINEERING
04/94

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Engineering Services

The Contractor shall provide and pay for field engineering services required for the project.

- a. Survey work required in execution of project.
- b. Civil, structural or other professional engineering services specified, or required to execute Contractor's construction methods.

1.1.2 Existing Control Points

The Contracting Officer's Representative will identify existing control points indicated on the drawings, as required.

1.3 SUBMITTALS

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

SD-08 Statements\

Qualifications\; *FIO*\.

Name and address of the Surveyor and Professional Engineer and proof of registration.

1.4 *QUALIFICATIONS*\

1.4.1 Registered Land Surveyor

Registered land surveyor, licensed in the State of Rhode Island, and approved by the Contracting Officer.

1.4.2 Registered Professional Engineer

Registered professional engineer of the discipline required for the specific service on the project, licensed in the State of Rhode Island.

1.6 LAYOUT OF WORK

- a. The Government has established bench marks and horizontal control points at the site of the work. These are described and indicated on contract drawings.
- b. From these control points the Contractor shall lay out the work by establishing all lines and grades at the site necessary to control the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings. The Contractor shall establish and maintain at the site of the work such stakes and markers as are necessary for control and guidance of his construction operations. All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings and computations made by the Contractor in establishing above horizontal and vertical control points shall be available at all times during the progress of the work for ready examination by the Contracting Officer or his duly authorized representative.
- c. The Contractor shall furnish, at his own expense, all such stakes, spikes, steel pins, templates, platforms, equipment, tools and material and all labor as may be required in laying out any part of the work from the control points established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other markers established by him until authorized to remove them. If any of the control points established at the site by the Government are destroyed by or through the negligence of the Contractor prior to their authorized removal, they may be replaced by the Contracting Officer, and the expense of replacement will be deducted from any amount due or which may become due the Contractor. The Contracting Officer may require that work be suspended at any time when horizontal and vertical control points established at the site by the Contractor are not reasonably adequate to permit checking the work. Such suspension will be withdrawn upon proper replacement of the control points.
- d. During the layout of the work, the Contractor shall notify the Government of any inconsistencies or conflicts which arise due to the supplied control points or features of the project.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

 DEPARTMENT OF THE ARMY NEDSPEC-01300 (Jan 1995)
 U.S. ARMY CORPS OF ENGINEERS -----
 NEW ENGLAND DIVISION Superseding
 NEDSPEC-01300 (March 1993)

GUIDE SPECIFICATION FOR ALL CONSTRUCTION

SECTION 01300

SUBMITTALS
01/95

NOTE: This guide specification updated based on
 EIRS Bullitin combining 01300 and 01305. Note in
 "SUBMITTALS" subpart in other sections of the
 specifications to change section reference to "01300
 SUBMITTALS". Updated by B. Pastorini 1/24. This
 guide specification is to be used in the preparation
 of project specifications in accordance with ER
 1110-345-720.

PART 1 GENERAL

NOTE: See Additional Note A.

1.1 SUBMITTAL DESCRIPTIONS

NOTE: The SD numbers, titles, and descriptions
 provided here have been established by the
 SPECSINTACT Construction, Control, and Coordination
 Board and should not be changed. Also, these SD
 numbers and titles are used throughout the technical
 sections and changes would introduce
 inconsistencies.

See Additional Notes B, C and D.

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

SD-01 Data

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

SD-04 Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-06 Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

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, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm 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 inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.

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, must name the project, and must list the specific requirements which are being certified.

SD-14 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

SD-18 Records

Documentation to record compliance with technical or administrative requirements.

SD-19 Operation and Maintenance Manuals

Data which forms a part of an operation and maintenance manual.

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved - GA

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 entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings".

1.2.2 For Information Only - FIO

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 approval of submittals by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract, is responsible for the dimensions and design of adequate connections, details and 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 given consideration unless accompanied by an explanation as to 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 as specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the Contract Clause entitled "Changes" 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 Used)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall submit all items listed on the attached submittal register or specified in the other sections of these specifications. Submittal for review shall be made only after review by the Contractor's Quality Control Representative see Section 01440. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective addresses set forth below. 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 respective transmittal form (ENG FORM 4025) shall be stamped, signed, and dated by the CQC representative certifying that the accompanying submittal complies with the contract requirements. 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 manufacturers Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER AND ENG FORM 4288

NOTE: ENG Form 4288 is not a part of this guide specification; the completed ENG Form must be developed locally for each project.

At the end of this section is a Submittal Register (Part A and Part B) listing each item of equipment and material for which submittals are required by the specifications. Columns "a" thru "e" have been completed by the Government. The Contractor shall complete columns "f" thru "j" and return six (6) completed copies to the Contracting Officer for approval within 15 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. This register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals shall be submitted for review in a timely manner. Those submittals which are possible to bring to the pre-construction conference

shall be submitted at that time, see Section 01010. 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 15 business days exclusive of mailing time) shall be allowed on the register for review and approval. No delays, damages or time extensions will be allowed for time lost in late submittals.

 An additional (____) calendar days shall be allowed and shown on the register for review and approval of submittals for food service equipment (and submittals for refrigeration and HVAC control systems.)

 3.4 TRANSMITTAL FORM (ENG Form 4025)

 NOTE: ENG Form 4025 is not a part of this guide specification; the sample ENG Form 4025 must be added to this section locally.

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

Submit six (6) copies of each submittal item with an attached ENG FORM 4025 Transmittal Form.

3.5.1.1 Construction Directorate ("C" Reviewer)

A 'C' in column 'e' indicates that the submittal review action is by the NED Construction Directorate. Send all such submittals to the project Resident or Area Engineer, as applicable.

3.5.1.2 Engineering Directorate ("E" Reviewer)

An "E" on the attached submittal register, column 'e' indicates that the submittal review action is by the New England Division (NED) Engineering Directorate. Send all such submittals to the U.S. Army Corps of Engineers, New England Division, Attn: Chief Design Division (CENED-ED-D), Bldg. 116S, 424 Trapelo Road, Waltham, MA 02254-9149.

3.5.1.3 Safety Office ("S" Reviewer)

An "S" on the attached submittal register, column 'e' indicates that the submittal review action is by the New England Division (NED) Safety Officer. Send all such submittals to the U.S. Army Corps of Engineers, New England Division, Attn: CENED-SO (Bldg. 101), 424 Trapelo Road, Waltham, MA 02254-9149.

3.5.1.4 Information on Submittal Status

All Contractor requests for current status of submittal reviews shall be made through the Resident Engineer.

3.5.2 Transmittal Procedure (ENG FORM 4025)

Each copy of a submittal item shall have an attached transmittal ENG FORM 4025. In addition to the above, and commensurate with the submittal review process, as indicated below, separate information copies of ENG FORM 4025, only, (i.e., without enclosures) shall be forwarded by the Contractor directly to each of the following, as applicable:

- (a) Submittals reviewed by Resident Engineer: One copy each to the Area Engineer, and the Construction Directorate, NED.
- (b) Submittals reviewed by Area Engineer: One copy each to the Resident Engineer, and the Construction Directorate, NED.
- (c) Submittals reviewed by Engineering ("E") Directorate, NED: One copy each to the Area Engineer, the Resident Engineer and the Construction Directorate, NED.
- (d) Submittals reviewed by Safety Office ("S"), NED: One copy each to the Area Engineer, the Resident Engineer and the Construction Directorate, NED.
- (e) Additional information copies for a submittal may be directed; these shall be to addresses indicated in specification section and concurrent with the submittal. Send Resident Engineer one copy of transmittal letters to the addressee.

3.6 DEVIATIONS

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

3.6.1 Substitutions

3.6.1.1 Basis of Contract

The contract is based on the materials, equipment, and methods described in the contract documents.

3.6.1.2 Consideration of Substitutions

The Contracting Officer will consider proposals for substitutions of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Contracting Officer to evaluate the proposed substitution. Document each request with complete data substantiating compliance of proposed substitution with contract documents.

3.6.1.3 Representation

Requests constitute a representation that the Contractor:

- a. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
- b. Will provide the same warranty for substitution as for specified product.
- c. Will coordinate installation and make other changes which may be required for work to be completed in all respects.
- d. Waives claims for additional costs which may subsequently become apparent due to substitution.

3.4.1.4 Implied Substitutions

Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without separate written request, or when acceptance will require substantial revision of contract documents.

3.4.1.5 Approval

Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this work by the Contracting Officer.

3.4.1.6 Notification of Acceptance or Rejection

The Contracting Officer will determine acceptability of proposed substitutions, and will notify Contractor of acceptance or rejection in writing.

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 - GA

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Four copies of the submittal will be retained by the

Contracting Officer and two copies of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS - FIO

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. These submittals will be used for information purposes. 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 and will not prevent the Contracting Officer from requiring removal and replacement if nonconforming material is incorporated in the work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or 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:	_____

3.10 ACTION CODES BY GOVERNMENT REVIEWER

The following are the action codes placed in column i of the Form 4025

- A - Approved as Submitted
- B - Approved, except as noted on drawings
- C - Approved, except as noted on drawings. Refer to attached sheet, resubmission required.
- D - Will be returned by separate correspondence.
- E - Disapproved

- F - Receipt acknowledged (FIO submittals only)
- FX - Receipt acknowledged, does not comply as noted with contract requirements (FIO submittals only)
- G - Other (Specify)

-- End of Section --

ADDITIONAL NOTES

NOTE A: For additional information on the use of all CEGS, see CEGS-01000 CEGS GENERAL NOTES.

NOTE B: SPECSINTACT includes 19 submittal descriptions. The ten submittal descriptions used in Corps of Engineers guide specifications (CEGS-Series) are included in this guide specification. The other nine submittal descriptions are used by the Naval Facilities Engineering Command (NAVFAC); therefore if NAVFAC guide specifications are used in a Corps project the following conversion should be made:

NAVFAC SD Number and Title	Convert To
SD-02 Manufacturer's Catalog Data	SD-01 Data
SD-03 Manufacturer's Standard Color Charts	SD-01 Data
SD-05 Design Data	SD-01 Data
SD-10 Test Reports	SD-09 Reports
SD-11 Factory Test Report	SD-09 Reports
SD-12 Field Test Report	SD-09 Reports
SD-15 Color Selection Samples	SD-14 Samples
SD-16 Sample Panels	SD-14 Samples
SD-17 Sample Installation	SD-14 Samples

NOTE C: SPECSINTACT is programmed to produce a submittal list or submittal register based on coding included in the various technical sections. When preparing sections not covered by guide specifications, tokens must be added for automatic generation of the submittal register. SPECSINTACT steps used in producing the submittal register are provided below as background information for adding tokens.

1. Find first section and print the section number in the proper column.
2. Find paragraph "1.* SUBMITTALS" then:
 - a. Find first *SD-** Title*\ and print this entry in the proper column.
 - b. Find next occurrence of * *\ and print this entry in the proper column under the SD number and title but indented to the right.
 - c. Find match of * *\ in b above wherever it occurs in the section and print the paragraph number

in which it occurs in the proper column. If no match is found, go to next step.

d. Find *GA*\ or *FIO*\ and print this entry in the proper column.

e. Repeat steps b, c, and d above until no other occurrences are found.

3. Repeat steps a through e for each subsequent SD number until no other occurrences are found.

4. If no other SD numbers are found, go to next section and repeat steps 1, 2, and 3.

NOTE D: SAMPLE SUBMITTALS FOR LAB TESTING NEED TO BE COORDINATED. NED HAS CONTRACTED WITH MATERIAL TESTING LABS, USES THE BARRE FALLS LAB FOR IN-HOUSE HTRW TESTING AND ROUTES VISUAL SOIL and Rock sampling THRU GEOTECH/GEOLOGY, CHECK WITH EPM or DESIGNER

-- End of Section --

CORPS OF ENGINEERS
NEW ENGLAND DIVISION
NEDSPEC

NEDSPEC-01430

Superseding
Draft CW-01430 (Feb 1991)

SECTION 01430

ENVIRONMENTAL PROTECTION

01/95

PART 1 GENERAL

1.1 PAYMENT

No separate payment will be made for the cost of the work covered under this section. All environmental protection work will be considered as a subsidiary obligation of the Contractor.

1.2 DEFINITIONS

For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

1.3 SUBMITTALS

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

- *SD-04 Drawings*\
- *Environmental Protection Plan*\; *GA*\

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain environmental protection during the life of the contract. Plan for and provide environmental protective measures to control pollution that develops during construction. Correct environmental problems which develop during the construction. Comply with Federal, State, and local regulations pertaining water, air, and noise pollution. The Contractor shall obtain all needed permits or licenses. Assurance of compliance with this section by subcontractors shall be the responsibility of the Contractor.

1.4.1 *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 and meet with representatives of the Contracting Officer to develop mutual understanding relative to compliance with this provision and administration of the environmental protection program. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. The Government reserves the right to make changes in his environmental protection plan and operations as necessary to maintain satisfactory environmental protection performance. The environmental protection plan shall include but not be limited to the following:

1.4.1.1 Federal, State and Local Laws, Regulations, and Permits

The Contractor shall prepare a list of Federal, State and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits.

1.4.1.2 Protection of Features

The Contractor shall determine methods for the protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection, i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archaeological and cultural resources.

1.4.1.3 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.

1.4.1.4 Drawings

The Contractor shall include drawings showing 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 unsatisfactory earth materials.

1.4.1.5 Environmental Monitoring Plans

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

1.4.1.7 Surface and Ground Water

The Contractor shall establish methods of protecting surface and ground water during construction activities.

1.4.1.8 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.

1.8 PERMITS OBTAINED BY CORPS OF ENGINEERS

The Corps of Engineers will not obtain any permits for this project. See Contract Clause entitled "PERMITS AND RESPONSIBILITIES".

1.9 QUALITY ASSURANCE

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. 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 has been taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the contract drawings or specifications.

3.1.1 Protection of Land Resources

Prior to the beginning of any construction, the Contracting Officer will identify all land resources to be preserved within the Contractor's work area. The Contractor shall protect all such identified land resources.

3.1.1.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas where no work is to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced.

3.1.1.2 Protection of Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features to be preserved, indicated and defined on the drawings submitted by the Contractor as a part of the Environmental Protection Plan, shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. Contractor shall avoid removing, cutting, deface, injure, or destroy trees, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized.

3.1.1.3 Reduction of Exposure of Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in instances where the constructed feature obscures waste material areas, these areas shall not initially be cleared in total. Clearing of such areas shall progress in reasonably sized increments as needed to use the areas developed as approved by the Contracting Officer.

3.1.1.4 Temporary Protection of Disturbed Areas

Such methods as necessary shall be utilized to effectively prevent erosion and control sedimentation. Runoff from the construction site shall be controlled through the construction of diversion ditches, benches, and berms, or other appropriate measures. Runoff shall be diverted to protected drainage courses and the Contractor shall also utilize any measures required by area-wide plans approved under Paragraph 208 of the Clean Water Act.

3.1.1.5 Erosion and Sedimentation Control Devices.

The Contractor shall construct or install all temporary and permanent erosion sedimentation control features as indicated on the contract drawings. Temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

3.1.1.6 Location of Contractor Facilities

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

3.1.1.9 Temporary Excavation and Embankments

Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

3.1.1.11 Disposal of Hazardous Wastes

Hazardous wastes shall be removed from the work area and disposed of in accordance with Federal, State, and local regulations.

3.1.1.12 Disposal of Discarded Materials

Discarded materials other than those which can be included in the solid or hazardous waste categories shall be handled as directed by the Contracting Officer.

3.2 HISTORICAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

If during construction items of apparent archaeological or historical interest are discovered, the Contractor shall immediately stop work, they shall be left undisturbed, and the Contractor shall report the find immediately to the Contracting Officer.

3.3 PROTECTION OF WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities which are included in this contract.

3.3.1 Washing and Curing Water

Waste waters directly derived from concrete washing and curing procedures and other construction activities shall not be allowed to enter water areas. These waste waters shall be collected and placed in retention ponds where the suspended materials can be settled out or the water evaporated in order to separate the pollutants from the water.

3.3.2 Cofferdam and Diversion Operations

The Contractor shall plan his operations and perform all work necessary to minimize adverse impact or violation of water quality standards. Construction operations for dewatering and removal of cofferdams shall be controlled at all times to limit impact of water turbidity on the habitat for wildlife and impacts on water quality for downstream use. See Section \=02403=\ CONTROL AND DIVERSION OF WATER for requirements for diversion operations.

3.3.4 Monitoring of Water Areas Affected by Construction Activities

Monitoring of water areas affected by construction activities shall be the responsibility of the Contractor. All water areas affected by construction activities shall be monitored by the Contractor.

3.4 PROTECTION OF FISH AND WILDLIFE RESOURCES

The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife. Species that require specific attention along

with measures for their protection shall be listed by the Contractor prior to beginning of construction operations.

3.5 PROTECTION OF AIR RESOURCES

The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with the State of Rhode Island and Providence Plantations and all Federal emission and performance laws and standards. Special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.

3.5.1 Particulates

Dust particles, aerosols, and gaseous by-products from all construction activities, 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.

3.5.1.1 Particulates Control

The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned in the 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, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

3.5.2 Hydrocarbons and Carbon Monoxide

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

3.5.3 Odors

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

3.5.4 \+Monitoring Air Quality+\

Monitoring of air quality shall be the responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

3.6 QUALITY CONTROL

The Contractor shall establish and maintain quality control for environmental protection operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including, but not limited to the following items. The Contractor shall record on daily reports any problems in complying with laws, regulations and ordinances and corrective action taken.

3.6.2 Protection of Land Resources

The Contractor shall prevent landscape defacement and provide post-construction clean-up.

3.6.3 Protection of Water Resources

The Contractor shall prevent the contamination of lakes, ditches, or other bodies of water with harmful chemicals; the Contractor shall dispose of waste materials; and the Contractor shall provide erosion control.

3.6.4 Pollution Control Facilities

The Contractor shall provide for the maintenance of pollution control facilities. The Contractor shall conduct a training course on the maintenance of pollution control facilities.

3.7 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all area(s) used for construction.

3.8 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with the plans submitted for approval by the Contracting Officer.

3.9 MAINTENANCE OF POLLUTION FACILITIES

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

3.10 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

The Contractor shall train his personnel in all phases of environmental protection. The training 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.

-- End of Section --

and/or Inspection of Materials Used in
Construction

1.2 PAYMENT

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

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

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

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

3.2.2 Content of the CQC Plan

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

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff

shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section \=01300=\ SUBMITTALS.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks 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 of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 15 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 2 years in related work. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

3.4.3 Organizational Changes

The Contractor shall maintain his CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be made as specified in Section \=01300=\ SUBMITTALS. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

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

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work and shall include:

- a. A review of each paragraph of applicable specifications.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.

k. The Government shall be notified at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

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

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

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

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

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

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

3.7 TESTS

3.7.1 Testing Procedure

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

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and 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 by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility 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 \$1,200.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 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:

U.S. Army Corps of Engineers
Materials and Water Quality Laboratory
Building 142
424 Trapelo Road
Waltham, MA 02254-9149

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

3.8 COMPLETION INSPECTION

3.8.1 Pre-Final Inspection

At the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "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 shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. Once this is accomplished the Contractor shall notify the Government that the facility is complete and is ready for the Government's "Prefinal" inspection. The Government will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Prefinal Punch List" will be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected and so notify the Government so that a "Final" inspection with the customer can be scheduled. Any items noted on the "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 slated for completion of the entire work or any particular increment thereof if the project is divided into increments

by separate completion dates.

3.8.2 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, his superintendent or other primary management person and the contracting Officer's representative will be in attendance at this inspection. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon notice from the Contractor. This notice will be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being acceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause entitled "Inspection of Construction".

3.9 DOCUMENTATION

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

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase 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 are enclosed at the end of this section.

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 excess costs or damages by the Contractor.

-- End of Section --

Contractor/Sub. Name _____

DAILY CONSTRUCTION QUALITY CONTROL REPORT

Date: _____

Day: _____

Contract No: _____

Description and Location of Work: _____

Tide: (high) _____ (low) _____ (high) _____ (low) _____ Sea Condition: _____
Weather: Temp: _____ Cloud condition _____ Wind speed/direction _____

Environmental Protection:

Management

Area of responsibility

- a. Consultant - _____
- b. Contractor - _____
- c. Subcontractor - _____
- d. Purveyor - _____
- e. Supplier - _____
- f. Technical Support - _____

1. WORK PERFORMED TODAY (Indicate location and description of work performed. Refer to work performed by individuals listed by letter above.) _____

2. Results of Surveillance (Include satisfactory work completed, or deficiencies with action to be taken.)

a. Preparatory Inspection: _____

b. Initial Inspection: _____

c. Follow-up Inspection: _____

3. Tests Required by Specifications, Performed, and the Results:

- a. _____
- b. _____
- c. _____

4. Verbal Instruction Received; (List any instructions given by Government personnel on construction deficiencies, retesting required, etc. and action.)

5. Remarks: (Cover all conflicts in plans, specifications, or instructions.)

6. Safety Inspection (Report violations, corrective instruction given; and corrective actions taken.)

7. Quantities Completed;

Item #	Item #
Quantity:	Quantity:

Item #	Item #
Item #	Quantity:

8. Time

#	<u>LABOR</u>	<u>HOURS</u>	<u>EQUIPMENT</u>

9. Additional Comments:

Contractor's Verification: The above report is complete and correct and all material and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications except as noted above.

Contractor Quality Control Representative

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
01/94

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.

CORPS OF ENGINEERS (CE)

\-CE EM 385-1-1-\ (1996) Safety and Health Requirements
Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

\-NFPA 70-\ (1993) National Electrical Code

1.2 SUBMITTALS

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

SD-04 Drawings\

Temporary Electrical System\; *GA*\.

Sketch of the proposed temporary electrical system including any metering.

1.3 AVAILABILITY OF ELECTRIC AND WATER SERVICE

All water and electricity that may be required in the prosecution of the work shall be furnished by the Contractor at his own expense. There will be no Government furnished water and electricity at the project site.

1.4 ELECTRIC SERVICE

1.4.1 Temporary Connections

The Contractor, at his own expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines and he shall remove them prior to final acceptance of the construction

1.4.2 Temporary Equipment and Lines

All required temporary electrical equipment and lines shall be furnished, installed, connected, and maintained by the Contractor according to the \-CE EM 385-1-1-\, Section 11.D and shall be removed prior to final

acceptance of the work. Temporary wiring shall conform to Article 305 of \-NFPA 70-\. Materials and equipment need not be new, but must be in good repair and serviceable condition. Prior to being energized, the systems and devices will be checked and approved for polarity, continuity of ground, and resistance to ground. Periodic inspections of systems and devices will be made by the Contractor at intervals not to exceed one (1) week.

1.5 TEMPORARY HEAT

All temporary heat required by the Contractor in connection with his construction operations shall be furnished or provided by or at the expense of the Contractor. Only temporary heating devices having the approval of the Underwriters' Laboratories, Inc., and approved by the Government representative in charge will be used. The Contractor will be required to instruct his personnel in the use and operation of these portable type heaters. Such instructions shall be directed to all workmen who will have responsibilities connected with the use of such heaters. Instructions will include proper use, handling, location and placement of such heaters when in operation, fire protection provided, hazards connected with the use of such heaters and actions to be taken in case of fire. Portable oil-fired, or gas heaters will be so placed that the heating end will not be directed at combustible material within 10 feet and the unit, itself, shall be at least two feet from combustible material

1.6 TENTING

All materials used as tenting for temporary heated enclosures where oil-fired, or gas temporary heaters are used will be of a fire-resistant material. Clear polyethylene plastic material, or similar products will be permitted.

1.7 TELEPHONE SERVICE

Provide and maintain telephone service which will be in an easily accessible location and accessible during all work hours

1.8 SANITATION

Adequate sanitary conveniences of a type approved for the use of persons employed on the work shall be provided, properly secluded from public observation, and maintained by the Contractor in such a manner as required or approved by the Contracting Officer. These conveniences shall be maintained at all times without nuisance. Upon completion of the work, the conveniences shall be removed by the Contractor from the premises, leaving the premises clean and free from nuisance.

PART 2 PRODUCTS

2.1 GOVERNMENT FIELD OFFICE

The Government Field Office shall be a separate building or partitioned space within the Contractor's construction building. Office shall provide approximately 80 square feet of space for the Government. Office or space shall be weathertight, free of drafts, and have enough windows to provide

adequate natural light as necessary. Office shall be equipped with door with cylinder lock, plywood top table approximately 6' x 4', and adequate heating, lighting, and ventilation facilities.

PART 3 EXECUTION

3.1 CLEANING DURING CONSTRUCTION

3.1.1 Daily Cleaning

Execute daily cleaning to keep the work site and adjacent properties free from accumulation of waste materials, rubbish, and windblown debris resulting from construction operations.

3.1.2 On-Site Container

Provide on-site containers for the collection of waste materials, debris and rubbish.

3.1.3 Removal of Waste

Remove waste materials, debris and rubbish from the site periodically and dispose of off Government property in accordance with applicable laws and regulations.

3.1.4 Burning

No burning of brush or debris will be permitted at the site.

3.2 GOVERNMENT FIELD OFFICE

The Contractor shall provide a Field Office for the Government within fifteen (15) calendar days after receipt by him of notice to proceed. The Contractor shall provide all services and supplies in connection with heating, lighting, and maintaining the building.

3.3 SECURITY AT THE SITE

The Contractor shall be responsible for site security during the course of the work.

3.4 TRAFFIC REGULATION AND CONTROL

The Contractor shall be responsible for maintaining vehicular traffic flow at and adjacent to the entrance to the site during the progress of the work. The Contractor shall erect caution signs near the site entrance warning of slow-moving construction traffic entering and exiting the site. The signs shall be constructed and located as prescribed by the State of Rhode Island Department of Transportation.

3.5 REMOVAL OF TEMPORARY MATERIALS AND EQUIPMENT

Remove temporary materials, equipment, services, and construction prior to completion of work. Clean and repair damage caused by installation or use of temporary facilities. Return site to pre-construction condition.

-- End of Section --

SECTION 01900

GENERAL SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

Work performed under this contract shall comply with applicable Federal, State, and local safety and occupational health laws and regulations. This includes but is not limited to Occupational Safety and Health Administration (OSHA) General Industry standards, \-29 CFR 1910-\ and Construction Industry standards, \-29 CFR 1926-\ . Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall be followed.

1.1.1 Safety Controls

Provide safety controls for protection of persons and property in compliance with all applicable Federal, State, and municipal laws.

1.1.2 Records

Maintain accurate records, and report to the Contracting Officer exposure data and all accidents.

1.1.3 Noncompliance

Promptly correct noncompliance with safety provisions where they are observed or when notified.

1.1.4 Safety Program

Develop safety program and submit proposals for effective accident prevention.

1.1.5 Project Meeting

Attend project meetings relative to administration of the overall safety program.

1.2 REFERENCES

CODE OF FEDERAL REGULATIONS

\-29 CFR 1910-\ Occupational Safety and Health Standards,
General Industry Standards.

\-29 CFR 1926-\ Occupational Safety and Health Standards,
Construction Industry Standards.

CORPS OF ENGINEERS (CE)

\-CE EM 385-1-1-\ (1996) Safety and Health Requirements
Manual

FEDERAL ACQUISITION REGULATIONS (FAR)

\-FAR 52.227-14-\ Rights in Data-General.

FEDERAL STANDARDS (FED-STD)

\-FED-STD 313-\ Hazardous Materials

1.3 RELATED REQUIREMENTS

a. CONTRACT CLAUSE entitled "ACCIDENT PREVENTION."

1.4 COPIES OF SAFETY MANUAL

One copy of \-CE EM 385-1-1-\ will be provided to the Contractor at the preconstruction conference. Additional copies may be ordered from the following address:

U.S. Government Printing Office (GPO)
Superintendent of Documents
Washington, DC 20402

or by calling 202-783-3238 and using a credit card. The cost of the manual is \$20.00. In addition, \-CE EM 385-1-1-\ may be viewed at the CE Technical Library, at 424 Trapelo Road, Waltham, MA 02254-9149, Building 116N.

1.4 SUBMITTALS

Before commencing the work, the Contractor shall submit the following items for acceptance:

Material Safety Data Sheets:

Manufacturer's Safety Data Sheet (OSHA Form 20) for all hazardous and toxic materials used (see \-CE EM 385-1-1-\, paragraph 01.B.04).

Machinery Inspection Certification:

Submit certification by a competent mechanic that machinery and mechanized equipment is in safe operating condition (see \-CE EM 385-1-1-\, paragraph 16.A.01).

Accident Prevention Plan:

Submit a plan outlining Contractor proposals for accident prevention in accordance with Contract Clause "ACCIDENT PREVENTION" and \-CE EM 385-1-1-\, paragraphs 01.A.07 and 01.A.11 and TABLE 1-1.

Activity Hazard Analysis:

Submit a set of Hazard Analysis Worksheets in accordance with \-CE EM 385-1-1-\, paragraphs 01.A.09 and 01.A.10 and FIGURE 1-1. Activity Hazard Analysis shall address specific hazards by each major phase of the work.

Modification to Equipment:

Submit manufacturer's written approval of modifications or additions to hoisting equipment. Government approval of submittal must be attained before such equipment can be brought on the job-site.

Safety Meeting Report:

Safety meeting report detailing the subjects discussed at safety meetings. Submit within three days after each meeting.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 GENERAL SAFETY REQUIREMENTS

The Contractor shall comply with all pertinent provisions of \-CE EM 385-1-1-\ except Section 6.I CONFINED SPACE which has been superceded. For Confined Space Procedures, the Contractor shall comply with 29 CFR 190.146. Work shall not commence at the site until the Contractor's accident prevention plan has been accepted by the Government.

3.2 ACTIVITY HAZARD ANALYSES

Prior to beginning each major phase of work, an Activity Hazard Analysis shall be prepared by the Contractor performing that work. The format shall be in accordance with \-CE EM 385-1-1-\, Figure 1-1. A major phase of work is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform. The analysis shall define ALL activities to be performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the activity hazard analysis has been accepted by the Contracting Officer's Representative (COR) and a preparatory meeting has been conducted by the Contractor to discuss its contents with all engaged in the activities, including the Contractor, subcontractor(s), and government on-site representatives. The activity hazard analyses shall be continuously reviewed and when appropriate modified to address changing site conditions or operations.

3.3 OSHA SAFETY STANDARDS

The Contractor shall be familiar with and comply with all applicable OSHA safety standards. OSHA standards are subject to change and such changes may well affect the Contractor in his performance of the work under this contract. It shall be the Contractor's responsibility to become acquainted and comply with all such changes and the effective date of such changes.

3.4 WEEKLY SAFETY MEETINGS

In accordance with \-CE EM 385-1-1-\, Section 1, paragraph 01.B.03, at least once a month Contractor shall conduct a safety meeting for all supervisors and foremen. Additionally, at least one safety meeting per week shall be conducted by the foremen for all workers. After each safety meeting, a safety meeting report shall be completed. A copy of a suggested weekly safety meeting form is attached at the end of this section.

-- End of Section --

WEEKLY SAFETY MEETING

CENED

Date Held _____
Time _____

THRU: Area Engineer, _____
TO: CENED Safety Officer

SUBJECT: CONTRACT NO. DACW33-95-C-00___ - WEEKLY SAFETY MEETING

CONTRACTOR _____	PERSONNEL PRESENT		
	Contr.	Sub.	Govt.
Date and Time Held: _____			
Conducted By: _____			

Subjects discussed (Note, delete, or add):
EM 385-1-1, Section: _____

- Accident Prevention Plan _____ Individual Protective Equipment _____
- Prevention of Falls _____ Back Injury/Safe Lifting Techniques _____
- Fire Prevention _____ Sanitation, First Aid, Waste Disposal _____
- Tripping Hazards _____ Clean-up - trash, nails in lumber _____
- Staging, Ladders, Concrete Forms, Safety Nets _____
- Hand Tools, Power Tools, Machinery, Chain Saws _____
- Equipment Inspection & Maintenance (Zero Defects) _____
- Hoisting Equipment, Winch and Crane Safety _____
- Ropes, Hooks, Chains and Slings _____
- Vehicle Operation Safety _____
- Electrical Grounding, Temporary Wiring, GFCI _____
- Lockouts/Safe clearance procedures
(electrical, pressure, moving parts) _____
- Welding, Cutting _____ Excavation Hazard/Rescue _____
- Loose Rock/Steep Slopes _____ Explosives _____
- Water Safety _____ Boat Safety _____
- HAZMAT, Toxic hazards, MSDS, respiratory, ventilation _____
- Other Item of Concern:

CQC Rep. Signature _____ CE Inspector _____
CF:

DEPARTMENT OF THE ARMY CEGS-02011 (May 1991)
U.S. ARMY CORPS OF ENGINEERS -----

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 02011

SUBSURFACE INVESTIGATIONS

05/91

NOTE: This guide specification covers the requirements for \@layout of a CEGS@\. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-720.

PART 1 GENERAL

NOTE: See Additional Note A.

1.1 SUMMARY

The physical conditions indicated on the contract drawings and in the specifications are the result of site surveys, hand augerings, borings, and laboratory tests. Locations at the site where subsurface investigations were performed are shown on Figure 1 attached at the end of this section. Copies of the inspector's field logs and laboratory test results are also included at the end of this section. The subsurface data included in this section supercedes any previous presentations.

1.2 INTERPRETATION

Subsurface investigation data are provided only for information and the convenience of the Contractor. The data shown on the boring logs is for the specific locations indicated only and no assurance is given that these conditions are representative of conditions between borings or areas adjacent thereto. The responsibility lies with the Contractor to interpret subsurface conditions that may affect his work. It is expressly understood that the Government will not be responsible for any interpretation or conclusion drawn from the subsurface information furnished to the Contractor.

1.3 GROUND AND SURFACE WATER

Absence of the location of ground or surface water level on a log shall not be necessarily construed that ground or surface water will not be encountered at that level during construction.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

SECTION 02110

SITE PREPARATION

PART 1 GENERAL

1.1 SUMMARY

Site preparation includes clearing, grubbing, and existing wood dam removal.

1.2 DEFINITIONS

1.2.1 Clearing

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

1.2.2 Grubbing

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

1.3 SUBMITTALS

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

SD-01 Data\

Wood Dam Removal Plan\; *GA*\.

The Contractor shall prepare and submit for approval a Wood Dam Removal Plan. The plan shall describe the Work Sequence, equipment to be used, estimated duration, removal techniques and procedures, and the proposed disposal site.

1.4 MEASUREMENT AND PAYMENT

Clearing and grubbing and wood dam removal will be paid for as separate lump sum items. Payment shall constitute full compensation for furnishing all material, equipment, plant, and tools; and for all labor and other incidentals necessary to complete the work required by this section.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in the work areas and ten feet beyond shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches $\sim 1\frac{1}{2}$ inches \sim or more in diameter and shall be trimmed of all branches to the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than $\sim 1\frac{1}{2}$ inches \sim in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures and additional trees that obtrude, encroach upon, or otherwise obstruct the work.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than ~ 18 inches \sim below the original surface level of the ground within ten feet of the outlet structure, weir and gravity wall (including the zone to be excavated and backfilled), and flood plain compensation area.

STump removal is not required in other areas. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

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

3.4 WOOD DAM REMOVAL

The existing wood dam shall be removed completely within the limits shown on the contract drawings. All wood dam removal shall take place within completed cofferdams. Dam members and sections shall be adequately secured to insure they do not wash downstream during the removal operation. Debris from the removal operation shall be disposed off-site at a site selected by the Contractor.

3.5 DISPOSAL OF MATERIALS

Logs, stumps, roots, brush, rotten wood, stones, and other refuse from the clearing and grubbing and wood dam removal operations shall be disposed of by the Contractor at an off-site facility. The Contractor shall be responsible for compliance with all Federal and State laws and regulations.

-- End of Section --

SECTION 02227

GRAVEL FILLS
02/91

PART 1 GENERAL

1.1 SUMMARY

This section covers gravel fill placement for the Phase I and Phase II cofferdams and permanent berm.

1.2 SUBMITTALS

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

SD-01 Data\.

Sources\; *GA*\.

At least 30 days prior to the initial placement of any gravel fill material, the Contractor shall submit the locations of the proposed sources and the names of the processing firms.

SD-09 Reports\.

Gravel Gradation Test Results\; *GA*\.

At least 30 days prior to the initial placement of any gravel fill material, the Contractor shall submit the gradation test results.

SD-14 Samples\.

Gravel\; *GA*\.

A 50 pound bulk sample of gravel fill material shall be submitted for approval of gradation and for approval of the soundness and durability of the gravel, sand, and stone particles. Test samples shall be representative samples taken in the presence of the Contracting Officer. Testing and approval of the material for soundness and durability will be performed by the Government as specified in Section \=02278=\ STONE PROTECTION. Samples shall be delivered in accordance with Section \=01440=\ CONTACTOR QUALITY CONTROL, paragraph "Furnishing or Transportation of Samples for Testing".

1.3 SEQUENCING AND SCHEDULING

The Contractor shall plan the sequence of construction of the work covered herein with the work covered in this and other sections of the specifications to ensure minimum damage due to all causes, including high river flows and stream erosion, and to comply with the requirements in this

and other sections of the specifications. The sequence of construction and methods of construction of all earthwork will be subject to the approval of the Contracting Officer.

PART 2 PRODUCTS

2.1 Sources

Material for the construction of gravel fills shall be obtained from the required excavations, if possible, for the project and from Contractor furnished off-site sources. The Contracting Officer shall be the sole judge of the suitability of any material for use as a gravel fill material regardless of its source. If the quantity of suitable gravel fill material available from the required excavations is not sufficient for the completion of the gravel fill zones, these zones shall be completed using gravel fill material furnished by the Contractor from off-site sources.

2.2 Gravel Fill Material

Material for the construction of gravel fills shall consist of sand, gravel, or crushed stone composed of tough, durable particles. It shall be reasonably free from thin, flat, and elongated pieces, and shall contain no organic matter or soft, friable particles in quantities considered objectionable by the Contracting Officer. The material shall be reasonably well graded within the following limits.

Sieve Size (U.S. Standard)	Percent Passing by Dry Weight
6-inch	100
1-inch	50-85
No. 4	25-60
No. 40	5-30
No. 200	0-8

In addition, not more than 3 percent, by dry weight, of the component passing the No. 4 sieve shall consist of particles finer than 0.02 millimeters.

PART 3 EXECUTION

3.1 PREPARATION OF FOUNDATION

The foundation areas for all gravel fills shall be excavated or stripped as specified in Section \=02228=\ EXCAVATION. No fill material shall be placed in any foundation area until the area has been inspected and approved. No foundation area will be approved unless it is free of all mud, debris, trash, stumps, or other similar materials. All foundation areas except those for dumped fills shall be dry and free of water at the surface during placement of gravel fill material thereon.

3.2 PLACEMENT AND COMPACTION

3.2.1 General

The gravel fill zones shall be constructed to the lines, grades, and cross sections indicated on the drawings or defined in the specifications unless otherwise directed. Each fill zone shall extend to the actual bottom and side slopes of an excavation regardless of the locations of the payment or excavation lines indicated on the drawings or defined in the specifications. The bases of the cofferdams and the permanent berm shall be placed in one three foot lift of gravel fill. Compacted gravel fill layers shall be placed on the base fill material. Fill shall be brought up evenly on each side of the repaired granite wall during backfilling operations. No fill material shall be placed upon a surface of frozen material, nor shall snow, ice, or frozen materials be incorporated into any fills. The Contractor shall maintain and protect all excavations, foundation areas, and fills in completed and uncompleted portions of the work in a satisfactory condition at all times until final completion and acceptance of all work under the contract.

3.2.2 Operational Restrictions

No fill material shall be placed against concrete until the concrete has been in place at least 14 days. No fill material shall be placed against the sides of an uncompleted reach or section of any cast-in-place concrete structure without prior approval. No heavy equipment such as bulldozers, tractors, trucks, or graders, shall be operated in the following areas:

- a. Within 3 feet, measured horizontally, of the outer surface of utility pipes and appurtenant structures, small conduits and similar items until the fill has been constructed to a level 12 inches above the top of a metal pipe or 24 inches above the level of any other pipe or item.
- b. Over the top of footings until the concrete has been covered with 8 inches of fill material.
- c. Within 3 feet measured horizontally of the outer structure of retaining walls.

3.2.3 Haul Roads

Haul roads shall be designed to maintain the intended traffic, to be free draining and shall be maintained in good condition throughout the contract period, unless otherwise directed.

3.2.4 Moisture Control

Gravel fill materials shall be placed at moisture contents which will allow proper operation of hauling and compaction equipment without excessive rutting or dust.

3.2.5 Compacted Gravel Fill

Material for gravel fills shall be spread with bulldozer, other approved equipment, or by hand to form uniform loose layers not greater than

12-inches thick. During placement all stones with maximum dimension greater than $\frac{2}{3}$ the loose layer thickness shall be removed. Stones so removed shall be picked up and transported to waste areas. Each layer of gravel fill shall be compacted with four coverages of the vibratory roller specified in the "Compaction Equipment" paragraph of this specification section. In restricted areas fill materials shall be spread by hand shoveling in horizontal layers except as otherwise directed.

3.2.6 Compaction In Restricted Areas

A restricted area is hereby defined as a horizontal area of a fill zone at any elevation within which compaction of the layers of fill material cannot be accomplished with tractors due to space limitations or an area within which the operation of tractors and spreading equipment is prohibited by the provisions of the "OPERATIONAL RESTRICTIONS" paragraph herein. In restricted areas, gravel fill shall be spread in 6-inch layers and compacted with four coverages of the approved plate vibrator specified in subparagraph "Construction Equipment". The maximum permissible size stone for any gravel fill material to be placed in a restricted area shall not be greater than $\frac{2}{3}$ of the specified loose thickness of the layer being placed.

3.2.7 Dumped Gravel Fills

Dumped gravel fills shall be constructed in three foot lifts or as directed to form the bases of the cofferdams and permanent berm. Placement shall be done in a manner that will not cause segregation. Prior to the construction of a dumped fill, its foundation area shall be cleaned and approved as specified in paragraph "PREPARATION", herein. Dumped gravel fill material for the bases of the cofferdams may be placed without dewatering of the foundation area. The top surface of a dumped fill upon which a compacted fill is to be constructed shall be compacted as specified for a layer of compacted gravel fill. Materials for use in the construction of a dumped fill zone shall contain no stone too large to be placed in the zone or more than $\frac{1}{4}$ cubic yard in volume.

3.2.8 Compaction Equipment

3.2.8.1 Equipment

Compaction equipment shall conform to the following requirements and shall be used as prescribed in subsequent paragraphs.

3.2.8.2 Vibratory Roller

A vibratory roller shall be a unit designed for the compaction of soil or rock by vibration and shall be the product of a manufacturer nationally recognized for the design and production of such equipment. The roller shall be a single drum unit having a width of 25 inches or more. The roller shall weigh more than 1,200 pounds and shall be self-propelled with forward and reverse speeds.

3.2.8.3 Plate Vibrator

A plate vibrator shall be an approved plate surface vibrator designed for the compaction of soils by vibration and the product of a manufacturer nationally recognized as a specialist in the design and manufacture of such equipment. The surface contact plate shall be between 18 and 24 inches in width.

-- End of Section --

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS

NEDSPEC 02228 (JUNE 1991)

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 02228

EXCAVATION
06/91

NOTE: This guide specification covers the requirements for \@layout of a CEGS@\ . This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-720.

PART 1 GENERAL

1.1 SUMMARY

Excavation covers removal of the earth berm upstream of the existing dam, earth and rock for the foundation of the new dam, backfill material behind the existing west stone wingwall and bank material for the compensatory storage area.

1.2 DEFINITIONS

1.2.1 Unsuitable Material

The term "unsuitable material" as used in these specifications is defined as any excavation material or material to be excavated which, in the opinion of the Contracting Officer, does not meet the requirements for gravel fill, gravel bedding or stone protection. Unsuitable materials shall include all materials removed by stripping.

1.2.2 General Excavation

General excavation shall consist of the satisfactory removal and disposal of all materials, except materials removed as rock excavation, as defined below.

1.2.3 Rock Excavation

Rock excavation shall consist of the satisfactory removal and disposal of boulders, highly weathered bedrock, and rock blocks detached from bedrock.

1.2.4 Disposal

Disposal of the excavated material shall include its haul to a stockpile or an off-site area provided by the Contractor. Disposal shall also include the placement of excavated material in a stockpile and its excavation and haul therefrom.

1.3 SEQUENCING AND SCHEDULING

The Contractor shall plan the sequence of excavation with the work covered in other sections of the specifications to ensure minimum damage due to all causes, including high river flows and stream erosion, and to comply with the requirements in this and other sections of the specifications. Stripping and excavation in and along the river shall be coordinated with the construction of slope protection. Portions of the slopes and foundation areas which have been stripped or excavated shall be adequately stabilized and protected from erosion, until placement of permanent slope protection materials, in accordance with Section 01430 ENVIRONMENTAL PROTECTION.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

General excavation shall consist of the removal and disposal of all material of any description, except those defined as rock excavation, from within the lines, grades, and slopes and limits indicated on the contract drawings, specified herein, or directed in the field. General excavation shall include all required stripping and grading.

3.1.1 Stability

The Contractor shall be responsible for producing and maintaining the stability of the side slopes of all excavations.

3.1.2 Unsuitable Foundation Material

When and as directed, the Contractor shall excavate below the grades and limits shown on the drawings to remove unsuitable foundation materials.

3.1.3 Stripping

Stripping shall be done in all excavation areas and in the foundation areas of fills to the depths necessary to remove unsuitable foundation material such as organic soil or other soft material, sod, stonewalls, surface boulders, trash, debris and similar objectionable material. Stripping will also be required on the existing upstream earth berm. The Contracting Officer shall guide and control the extent and final depth of stripping.

3.1.4 Foundation Preparation

The surface areas upon which gravel fill is to be placed shall be trimmed and dressed to conform to the lines, grades, and cross-sections shown on

the drawings, or as modified, to within the tolerances specified herein. For surfaces produced by excavation and upon which gravel fill material is to be placed, the tolerances from the specified lines and grades shall be plus 2 inches and minus 4 inches for dry areas and plus 2 inches and minus 12 inches for surfaces below water. The extreme of these tolerances will not be allowed over a continuous area greater than 200 square feet. Where it is necessary or desirable to fill a low surface area of gravel, the fill material shall be gravel. These fill materials shall be placed, conditioned, and compacted as specified Section \=02227=\ GRAVEL FILLS. No additional payment will be made for any material or work thus required. Immediately prior to the placement of gravel fill, the surface upon which it is to be placed will be inspected and no material shall be placed thereon until the surface has been approved.

3.2 ROCK EXCAVATION

3.2.1 General

Rock excavation shall consist of the removal of boulders, highly weathered rock and rock blocks detached from the underlying bedrock measuring greater than one cubic yard in volume. The Contracting Officer shall control the amount of rock excavation.

3.2.2 Limits of Rock Excavation

The limits of the proposed foundations for the dam are approximately shown on the contract drawings. The Contracting Officer reserves the right to change the depth to, or the width of, the foundations if, in the opinion of the Contracting Officer, conditions exposed in the foundation excavations warrant such modifications.

3.2.3 Foundation Inspection

Inspections to determine the adequacy of the foundation materials will be performed by the Contracting Officer in all dam foundation areas between completion of excavation and placement of concrete. The Contractor will cooperate to the extent necessary to assist in inspection and mapping activities, which may require additional survey control points and access. The Contractor will coordinate his schedule for foundation excavation and preliminary cleanup with the Contracting Officer to ensure that the cleanup proceeds in an orderly manner.

3.2.4 Preliminary Cleanup

When the excavation has reached the approximate limits shown on the drawings or when the Contracting Officer determines that a satisfactory foundation may have been reached, a preliminary cleanup shall be performed on all or any part of the rock foundation surface. This work shall consist of removing loose and/or weathered rock and pockets of fines, sand, rock rubble or gravel, and other objectionable material from the in place rock surface including areas of depression, large crevices, and open rock joints. The loose material need not be removed where the width of the opening is less than 2 inches. Picking, barring, and hand excavation may be necessary to obtain a foundation surface free from loose, drummy, or shattered materials. The Contracting Officer may require that the

excavation be continued and the preliminary cleanup procedure repeated until a satisfactory foundation surface is reached and it is satisfactory for inspection and mapping.

3.2.5 Final Cleanup

Unless otherwise directed by the Contracting Officer, final cleanup shall be performed on all or any part of the rock foundation surface. Rock surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, ice, mud, drummy rock, coatings, debris and loose, semi-detached or unsound fragments, and seams shall be cleaned to a satisfactory depth and to firm rock on the sides. Immediately before concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of any or all methods specified for preliminary cleanup or other approved methods. All rock surfaces shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar approximately similar to that in the concrete mixture.

3.3 STOCKPILING

The Contractor shall stockpile excavated materials from the required excavations as required for the execution of the work. The Contractor may stockpile contractor-furnished materials subject to prior approval at no additional cost to the Government. All stockpiles shall be constructed in approved areas. The construction of a stockpile at a location where, in the opinion of the Contracting Officer, its presence will affect the stability of an excavation slope or face, will not be permitted. Stockpiled materials not used in the permanent work shall be excavated and removed from the site unless otherwise directed. Prior to completion of the contract all stockpile areas shall be cleaned and graded as directed.

3.4 GRADING

Roads, ramps, and other areas shall be graded in accordance with the sections and grades indicated on the drawings. Shoulders, ditches, side slopes, and other designated areas shall be shaped, trimmed, and dressed in a neat and workmanlike manner to the lines and grades shown on the drawings or directed in the field. All soft or yielding material or other unsuitable material in the subgrade shall be removed and replaced with suitable compacted fill material.

3.5 UTILIZATION OF MATERIALS

All excavation materials shall be satisfactorily utilized or disposed of as directed. All materials shall be excavated, separated, and utilized in the permanent work as specified in this and other sections of these specifications, with the exception of unsuitable materials and materials in excess of those required for the construction of gravel fills and stone protection. The Contracting Officer shall be the sole judge as to the suitability of a material or load of material for use in the construction of gravel fills and stone protection. No material shall be disposed of unless specifically authorized.

3.6 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

Excess and unsuitable materials from excavation shall become the property of the Contractor and shall be removed from the project site.

3.7 BLASTING

Blasting will not be permitted.

-- End of Section --

 DEPARTMENT OF THE ARMY
 U.S. ARMY CORPS OF ENGINEERS

CEGS-02274 (MAY 1991)

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

 SECTION 02274

EROSION AND SEDIMENTATION CONTROL
 05/91

 NOTE: This guide specification covers the requirements for \@hay bales and silt fence@\. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-720.

PART 1 GENERAL

1.1 SUBMITTALS

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

SD-01 Data\.

Erosion and Sedimentation Control Plan\; *GA*\.

The Contractor shall submit a plan showing proposed methods, locations, and extent of erosion and sedimentation control. Details of the sediment control fences, including filter fabric, siltation control barriers, and other methods used to control erosion shall be included in the submittal.

1.2 GENERAL

The intent of this work is to control sediment erosion into existing wetlands or watercourses. The sediment and erosion control plan shall meet all Federal, State, and local requirements. Sedimentation control measures shall be constructed to the extent necessary to completely protect the wetlands or watercourses from erosion caused by the Contractor's operations. Construction methods and procedures shall be implemented to minimize erosion.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Hay Bales

Hay bales shall be approximately 36" long by 18" wide by 24" high.

2.1.1.1 Hay

Hay for slope protection and for use in siltation barriers shall be clean, fresh, small grain straw. Salt marsh hay shall not be used.

2.1.2 Silt Fence

Silt fence shall be prefabricated, pre-assembled structure specifically designed for construction site control of sediment run-off. Fence shall include hardwood posts. Fabric shall be at least 2' in width.

2.1.2.1 Acceptable Fence

Silt fence shall be "Silt Fence" or "Envirofence" as manufactured by Mirafi Inc., Charlotte, NC.

PART 3 EXECUTION

3.1 INSTALLATION

The Contractor shall take every precaution to reduce erosion and to stop sediment from leaving the work limits of the Contractor's work area. These precautions are subject to approval by the Contracting Officer and shall include, but are not limited to, hay bales, sediment control barriers, and silt fences. Sedimentation control barriers, hay bales, and silt fences shall be installed prior to any excavation at the site. Hay bales and silt fences shall be toed-in a minimum of 3 inches to prevent undermining.

3.1.1 Silt Fence

Silt fences shall be installed in accordance with the manufacturer's written instructions. Maintenance and repair of the fence shall be performed as required.

3.1.2 Siltation Barrier

Siltation barriers shall consist of a line of hay bales securely staked in place. Bales shall be anchored with 2" by 2" by 3'-6" long wooden stakes. Adjacent hay bales shall be tightly butted together.

3.1.3 Control of Run-off

Berms and drainage swales may be constructed as needed and approved to contain and direct the run-off water towards sediment control fences. Hay bales or silt fences shall be staked across any swales constructed.

3.2 REMOVAL AND DISPOSAL

Upon completion of the turf establishment period specified in Section \=02935=\ TURF and final acceptance of grassed areas, the Contractor shall remove all erosion control structures and dispose off-site.

-- End of Section --

 DEPARTMENT OF THE ARMY
 U.S. ARMY CORPS OF ENGINEERS

 NEDSPEC-02278 (JUNE 1991)

 GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 02278

STONE PROTECTION AND GRAVEL BEDDING
 06/91

PART 1 GENERAL

1.1 SUMMARY

The work of this section consists of furnishing all plant, labor, and equipment required to construct stone protection and gravel bedding layers on the surface of the upstream berm and at the downstream toe of the dam, as shown on the contract drawings.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

\-ASTM C 97-\	(1993) Specific Gravity and Absorption of Coarse Aggregate
\-ASTM C 127-\	(1993) Specific Gravity and Absorption of Coarse Aggregate
\-ASTM D 75-\	(1992) Sampling Aggregates
\-ASTM D 422-\	(1990) Standard Test Method for Particle-Size Analysis of Soils

1.3 SUBMITTALS

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

SUBMITTALS:

SD-14 Samples\

Source\; *GA*\.

The sources from which the Contractor proposes to obtain material for the production of gravel bedding and stone protection materials shall be

selected well in advance of the time when these materials will be required in the work. Suitable samples of processed natural materials, as applicable, from sources shall be submitted to the Contracting Officer for approval of the soundness, specific gravity, and durability of the stone, gravel particles and sand particles. Quarried samples shall be representative of the whole quarry and include materials from distinctive strata and beds suitably identified by numbers and quarry name. Submission of the quarried samples shall designate each sample and its location within the quarry and include available geologic descriptions, records and methods of testing and history of use in similar construction. Stone samples shall consist of two or more pieces, each piece weighing a minimum of 20 pounds. All samples shall be obtained by the Contractor and delivered at his expense at a time which will allow a period of 30 days for testing and investigations. Unless otherwise directed at the time of sampling, each sample shall be delivered by the Contractor to the Government's laboratory at 424 Trapelo Road, Waltham, Massachusetts. Sampling of the materials shall be done at the source by the Contractor at his own expense and in the presence of a representative of the Contracting Officer.

1.4 DELIVERY STORAGE AND HANDLING

Stone protection materials may be stockpiled in approved areas at the project site. Gravel bedding materials shall not be stockpiled at the project site without prior approval. Such approval will be given only for small stockpiles of gravel bedding materials which must be readily available in small quantities. All stockpile areas shall be cleared, stripped, and graded as directed prior to placement of materials. The placement of materials in stockpiles and their excavation and hauling from stockpiles shall be done in a manner that will prevent segregation and/or contamination and will assure the placement of well-graded materials.

1.5 SEQUENCING AND SCHEDULING

The Contractor shall plan the sequence of construction of the work covered herein with the work covered in this and other sections of the specifications to ensure minimum damage due to all causes, including high river flows and stream erosion, to partially completed portions of fills, channel side slopes, earth structures, concrete structures, gravel bedding and stone protection and to comply with the requirements in this and other sections of the specifications. The Contractor shall maintain the portions of bedding layers and stone protection until accepted, and any material displaced by any cause shall be replaced at his expense.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Stone Protection

2.1.1.1 General

Stone protection materials shall consist of hard, durable and sound quarried rock fragments furnished by and at the expense of the Contractor. Each stone shall have a density of not less than 162 pounds per cubic foot based upon the saturated surface dry specific gravity determined in accor-

dance with \-ASTM C 127-\). The stones shall be irregular and angular in shape and shall be free from open or incipient cracks, seams, structural planes of weakness or other defects that would tend to increase unduly their deterioration from natural causes and from handling and placing. No stone in the material shall have its long dimension exceeding 3 times its short dimension. Stone protection material shall be well graded between the maximum and minimum stone sizes furnished. The maximum and minimum sizes furnished shall be selected by the Contractor and shall produce a material without "skip gradation" with stone sizes within the limits specified. The selection will depend on his processing operations, shapes of stones and other factors. All stones for the production of stone protection shall be obtained from one general rock type in one quarry. The rock shall be selected and placed so that the entire finished surface of stone protection will be of uniform appearance with respect to color.

2.1.1.2 Stone Protection

Stone protection materials shall meet the following gradation and size requirements:

Limits of Stone Weight (Pounds)	Percent Lighter by Weight (SSD)
Between 120 and 300 Max.	100
Between 60 and 90	50
Between 20 and 45	15
4 Min.	0

In the above table, the "(Max.)" size stone is the permissible maximum stone size and the "(Min.)" size stone is the permissible minimum size stone. Stone protection materials may contain up to 10 percent, by weight, of air-dried rock fragments, spalls and dust with each particle weighing less than the permissible minimum stone size. No particles weighing less than the permissible minimum stone size shall be defined as a stone in stone protection materials. In computing percentages by weight of stone in the above table, the weight of particles weighing less than the permissible minimum stone size shall not be included in the total weight.

2.1.2 GRAVEL BEDDING

Gravel bedding materials shall consist of sand, gravel or crushed stone composed of tough, durable particles and shall be reasonable free of thin, flat and elongated pieces. The materials shall contain no organic matter of soft friable particles in quantities considered objectionable by the Contracting Officer. The materials shall be reasonably well graded within the limits specified below:

Sieve Size (U.S. Standard)	Percent Passing by Dry Weight
6-inch	100
1-inch	50-85
No. 4	25-60
No. 40	5-30
No. 200	0-8

In addition, not more than 10 percent by dry weight of the component passing the No. 4 sieve shall pass the No. 200 sieve.

2.2 TESTING AND APPROVAL

The samples shall be subjected to such tests as are necessary to determine the quality of the material unless suitable test reports or service records are available that are satisfactory to the Contracting Officer. The Contracting Officer shall be the sole judge as to the acceptability of a material. Tests to determine the suitability of the rock and gravel materials may include, as applicable, petrographic analysis, specific gravity, abrasion, absorption, sulfate soundness, wetting and drying, and freezing and thawing. All testing shall be done by the selected testing laboratory at the Contractor's expense. The approval of a material by the Government based on test results, examination of the material exposed at the source and service records, shall not relieve the Contractor, in any way, of the responsibility of placing a material which meets the requirements specified herein. Approval of a sample of material for soundness, specific gravity, and durability from a source shall not be construed as approval of all material from that source or that the material from a gravel source will have the required gradations for gravel bedding materials or that the stones of stone protection materials produced using material from that source will have satisfactory quality, shape characteristics, and sizes after processing and placement. The right is reserved to reject, at any time, any or all portions of the materials in a source or products using the materials from that source when such materials are unsuitable in the opinion of the Contracting Officer.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

The surface areas upon which gravel bedding and stone protection materials are to be placed shall be trimmed and dressed to conform to the lines, grades and cross-sections shown on the drawings, or as modified, to within the tolerances specified herein. For surfaces produced by excavation and upon which gravel bedding is to be placed, the tolerances from the specified lines and grades shall be plus 2 inches and minus 4 inches for dry areas and plus 2 inches and minus 12 inches for surfaces below water. For surfaces of gravel bedding upon which overlying stone is to be placed, the tolerances shall be as specified in this section. Where it is necessary or desirable to fill a low surface area of the excavation, the fill material shall be gravel bedding material. No additional payment will be made for any material or work thus required. Immediately prior to the placement of any gravel bedding, or stone protection material, the surface upon which it is to be placed will be inspected and no material shall be placed thereon until the surface has been approved.

3.2 PLACEMENT AND TOLERANCES

3.2.1 General

Sections and layers of stone protection and gravel bedding shall be constructed to the lines, grades, and in the areas shown on the drawings or

as modified by the Contracting Officer within the tolerances specified herein. Materials for those portions of these sections and layers below the existing ground surface may be placed in water. The Contractor shall organize his operations so as to minimize erosion of gravel bedding and stone protection materials during and after placement.

3.2.2 Gravel Bedding

Gravel bedding material shall be placed and spread uniformly on surface areas prepared as specified below and in paragraph 3.1 herein so as to provide, in one operation, a layer with the thickness shown on the drawings or as directed. Except as otherwise specified, the tolerances for the surface of a gravel bedding layer or section shall be plus and minus 2 inches from the specified grades or lines except that neither of these tolerances will be allowed over a continuous area greater than 200 square feet. The tolerances below the water surface for the surface of a sloping gravel bedding layer shall be plus 6 inches and minus 2 inches from the specified lines. The placement and spreading of the gravel bedding material by methods which will tend to segregate particle sizes will not be permitted. The material below water in sloping layers of gravel bedding shall be spread and trimmed using a backhoe without teeth on the bucket or Gradall or similar approved equipment immediately prior to the placement of stone protection material thereon. The elevation of a surface area of a layer of gravel bedding below water shall be checked immediately prior to the placement of the specified overlying material to determine if the surface is within the specified tolerances. Compaction of the gravel bedding material will not be required. Any damage to the surface of a layer of gravel bedding prior to or during placement of the overlying material thereon shall be repaired before proceeding with the work.

3.2.3 Stone Protection

Stone protection materials shall be placed on surfaces of gravel bedding material, prepared as specified in paragraph 3.2.2 above, in such a manner as to avoid segregation and to produce a well graded mass of stone with the minimum practical percentage of voids and with uniform appearance of the exposed surface in the stone protection layer or section. The full thickness of the layer shall be constructed in one operation and in such a manner as to avoid displacing the underlying material. The stone protection material, after placement at any point, shall conform to the gradations specified in paragraph 2.1.1.2 of this section. Placement by dumping into chutes, pushing by bulldozers, or by other methods likely to cause segregation or breakdown of materials will not be permitted. Breaking of individual pieces in place either by blasting or mechanical methods will not be permitted. Unless otherwise approved, stone protection material shall not be placed against any concrete structures until the concrete has been in place for at least 14 days. Special care shall be exercised when placing such material against concrete structures to avoid damage thereto.

3.2.3.1 Finished Surfaces

The finished surfaces of stone protection above the river level shall be trimmed to the extent necessary and the stone shall be arranged by hand with a backhoe or similar equipment. The finished surface for stone

protection shall have a uniform appearance of well graded material free of pockets of small stones and clusters of large stones. No bulldozer, shovels, cranes or similar equipment will be permitted to operate on the outer surface of any stone protection layer.

3.2.3.2 Tolerances

The finished surfaces of stone protection layers above river level shall be within a tolerance of plus 6 and minus 6 inches from the specified lines except that the plus tolerance will not be allowed over a continuous area greater than 200 square feet. Below river level, the finished surfaces of all stone protection layers shall be within a tolerance of 0 to plus 12 inches from the specified lines.

3.3 FIELD SAMPLING AND TESTING LABORATORY

Field sampling and laboratory testing of materials specified in this section shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory, subject to the approval of the Contracting Officer. The applicable procedures prescribed in \-ASTM D 422-\ shall be used for determining the gradation characteristics of the materials. Copies of the test results shall be furnished to the Contracting Officer as soon as available.

Schedule of Sampling and Testing of Soils

Material Type	Minimum Sampling Schedule	Field Test Required
Gravel Bedding	1 per each type of bedding placed.	Gradation

-- End of Section --

SECTION 02403

CONTROL AND DIVERSION OF WATER
02/92

PART 1 GENERAL

1.1 SUMMARY

The work covered by this section of the specifications consists of furnishing all plant, labor, and materials and performing all work in connection with the control and diversion of the Woonasquatucket River, dewatering and control of subsurface water within cofferdams, control of water past or through work areas, and control of surface drainage. This work consists of installation and removal of temporary cofferdams and temporary site drainage facilities.

1.2 SUBMITTALS

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

SD-04, Drawings\

Design Details and Calculations\; *GA*\.

The contract drawings show a phased diversion scheme by which the Woonasquatucket River flows can be controlled and diverted during construction. The Contractor shall engage the services of a Registered Professional Engineer, experienced in this type of work, to develop design details and supporting calculations for all diversion structures or earth support systems as may be required. The engineer shall also develop design details showing all pertinent dimensions, elevations, slopes, slope protection, and materials for earth cofferdams and excavations. The design details shall include provisions for dewatering including, but not limited to ditches, sumps, well points, pumps, and erosion and seepage control measures, as necessary.

1.3 ALTERNATE CONSTRUCTION SEQUENCE AND WATER CONTROL SCHEME

Alternate sequences and schemes will be considered. They shall be submitted for review and approval in accordance with Section \=01010=\ SUMMARY OF WORK, Paragraph "Alternate Construction Sequence and Water Control Scheme".

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PHASED CONSTRUCTION SCHEME

See Section \=01010=\ SUMMARY OF WORK for requirements pertaining to the sequence of construction for this project.

3.1.1 Phase I

Phase I construction, as shown on the contract drawings, provides for construction of earth cofferdams to divert the Woonasquatucket River to the east side of the river channel. These cofferdam structures shall be constructed to the elevations shown on the contract drawings. Slope protection and seepage control measures shall be provided in accordance with the approved design. All excavation and new construction to be performed within this cofferdammed area shall be performed during this phase, as specified in other sections of the specifications.

3.1.2 Phase II

Phase II construction, as shown on the contract drawings, provides for construction of cofferdams to divert the Woonasquatucket River through the modified concrete gate structure. Phase II includes raised and extended Phase I cofferdams constructed of earth, precast concrete blocks, and precast concrete barriers. These cofferdams will be constructed to the elevations shown on the contract drawings. Slope protection and seepage control measures shall be provided in accordance with the approved design. All remaining excavation and new construction to be performed within this cofferdammed area shall be performed during this phase, as specified in other sections of the specifications.

Approximately 350 cubic feet per second (cfs) can be discharged through the modified gate structure without overtopping the Phase II cofferdam. This discharge is between a 1-year (230 cfs) and a 2-year (590 cfs) frequency storm event. The table below presents monthly mean discharges at the centerdale gage, 0.7 miles upstream of the Allendale Dam.

MONTHLY MEAN DISCHARGE AT CENTERDALE GAGE
(0.7 mile upstream of Allendale Dam)
(Period of Record: Water Years 1941 - 1994)

Month	Oct	Nov	Dec	Jan	Feb	Mar
Mean (cfs)	38.6	58.4	84.5	92.0	103	142
Month	Apr	May	Jun	Jul	Aug	Sep
Mean (cfs)	131	86.3	55.5	31.1	29.5	30.0

3.2 DEWATERING

The areas within the cofferdams and all excavation areas therein shall be dewatered and maintained in a dry condition to the extent required to construct the work in accordance with all applicable provisions in other sections of the specifications.

3.3 EMERGENCY BREACHING AND REMOVAL OF COFFERDAMS

During all time periods when cofferdams and diversion systems are in operation, the Contractor shall provide and maintain at the site suitable equipment for the breaching of cofferdams and removal of equipment for the passage of flood flows. The breaching and removal of cofferdams shall be done only at the direction of, or with the approval of, the Contracting Officer.

3.4 MAINTENANCE

The Contractor shall continuously monitor all cofferdams for evidence of movement, erosion, deterioration, and excessive seepage throughout their use. The cofferdams and diversion channels shall be maintained in good working order as directed and as necessary for the safety of workmen and the protection of the permanent work.

-- End of Section --

 DEPARTMENT OF THE ARMY
 U.S. ARMY CORPS OF ENGINEERS

CEGS-02935 (June 1990)

 Superseding
 CEGS-02935 (November 1988)

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

Includes note relocation Special change (August 1995)
 Includes changes through Notice 4 (April 1994)
 Includes Text Adjustment change 1 (June 1991)

Latest Notice change indicated by \&\ tokens

SECTION 02935
 TURF
 06/90

PART 1 GENERAL

1.1 REFERENCES

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

AGRICULTURAL MARKETING SERVICE (AMS)

\-AMS-01-\ (Amended thru: Aug 1988) Federal Seed
 Act Regulations (Part 201-202)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

\-ASTM D 977-\ (1991) Emulsified Asphalt

\-ASTM D 2028-\ (1976; R 1992) Cutback Asphalt
 (Rapid-Curing Type)

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

COMMERCIAL ITEM DESCRIPTIONS (CID)

\-CID A-A-1909-\ (Basic; Notice 1) Fertilizer

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS, DEPARTMENT OF
 TRANSPORTATION, DIVISION OF PUBLIC WORKS

\-State Specifications-\ (1971) Standard Specifications for Road
 and Bridge Construction. This publication
 will be referred to hereinafter as the "State
 Specifications".

1.2 SUBMITTALS

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

SD-01 Data\

Manufacturer's Literature\; *FIO*\.

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

SD-07 Schedules\

Equipment List\; *FIO*\.

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

SD-08 Statements\

Delivery\; *FIO*\.

Delivery schedule, at least 10 days prior to the intended date of the first delivery.

Application of Pesticide\; *GA*\.

Pesticide treatment plan with proposed sequence of pesticide treatment work. The pesticide trade name, chemical composition, formulation, concentration, application rate of active ingredients and method of application for all materials; and the name and state license number of the state certified applicator shall be included.

Maintenance Report\; *FIO*\.

Written record of maintenance work performed.

Turf Establishment Period\; *FIO*\.

Written calendar time period for the turf establishment period. When there is more than one turf establishment period, the boundaries of the turfed area covered for each period shall be described.

SD-13 Certificates\

Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Certified copies of the reports for the following materials shall be included:

Seed\; *GA*\.

For mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested and state certification.

Fertilizer\; *FIO*\.

For chemical analysis, composition percent.

Agricultural Limestone\; *FIO*\.

For calcium carbonate equivalent and sieve analysis.

Peat\; *FIO*\.

For compliance with \-ASTM D 2607-\.

Pesticide Material\; *GA*\.

For EPA registration number and registered uses.

Topsoil\; *FIO*\.

For pH, particle size, chemical analysis and mechanical analysis.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 *Delivery*\

1.4.1.2 Topsoil

A soil test shall be provided for topsoil delivered to the site.

1.4.1.3 Soil Amendments

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

1.4.1.4 Pesticide

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

1.4.2 Inspection

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

1.4.3 Storage

Materials shall be stored in areas designated by the Contracting Officer. Seed, lime and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.

1.4.4 Handling

1.4.4.1 Materials

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

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Seed

2.1.1.1 Seed Classification

State-approved seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with \-AMS-01-\ and applicable state seed laws.

2.1.1.2 Seed Mixtures

Seed mixtures shall be proportioned by weight according to the \-State Specifications-\, Section M.20.08.3, for "Slope Mix", as follows:

Botanical Name	Common Name	Mixture Percent by Weight	Percent Pure Live Seed
Festuca rubra	Red Fescue - Chewing's Pennlawn or Creeping	70	78
Lolium perenne	Perrenial ryegrass	10	85
Agrostis	Colonial bentgrass- Astoria or Exeter	5	85
Lotus corniculata	Birdsfoot trefoil	15	78*

*Includes up to 20% hard seed

2.1.1.3 Quality

Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected.

2.1.1.5 Temporary Seed

The temporary seed for erosion control shall be as follows:

Botanical Name	Common Name	Percent Pure Live Seed
Lolium annualis	Annual Ryegrass	85

2.1.1.6 Seed Mixing

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

2.1.4 Soil Amendments

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

2.1.4.1 Lime

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

2.1.4.2 Fertilizer

Fertilizer shall be commercial grade, free flowing, uniform in composition and conforming to \-CID A-A-1909-\ . Granular Fertilizer: As recommended by the soil test.

2.1.4.3 Organic Soil Amendments

a. Topsoil: Existing surface soil shall be stripped and stockpiled on the site in accordance with Section \=02228=\ EXCAVATION. When required beyond that available from stripping, the topsoil shall be delivered. Delivered topsoil shall conform to topsoil requirements specified in the \-State Specifications-\ , Section M.20.01, and shall be amended as recommended by soil test.

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

c. Sand: Clean, free of toxic materials; 95 percent by weight shall pass a \-No. 10 sieve-\ and 10 percent by weight shall pass a \-No. 16 sieve.-\

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

e. Decomposed Wood Derivatives: Ground bark, sawdust, or other wood

waste material free of stones, sticks, soil, and toxic substances harmful to plants, stabilized with nitrogen and having the following properties:

Particle Size: Minimum percent by weight passing:

Sieve Size	Percent
No. 4	95

Nitrogen Content: Minimum percent based on dry weight:

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

f. Calcined Clay: Granular particles produced from montmorillonite clay calcined to minimum temperature of ~1200 degrees F~ to the following gradation: minimum 90 percent passing ~No. 8,~ 99 percent retained on ~No. 60 sieve~ and maximum 2 percent passing ~No. 100 sieve.~ Bulk density: maximum ~40 pounds per cubic foot.~

2.1.4.4 Soil Conditioner

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

2.1.5 Mulch

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

2.1.5.1 Straw

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

2.1.5.2 Hay

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

2.1.5.3 Wood Cellulose Fiber

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

2.1.5.5 Paper Fiber Mulch

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

2.1.7 Water

Water shall not contain elements toxic to plant life.

2.1.8 Pesticide

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

2.1.9 Erosion Control Material

Soil erosion control shall conform to the following:

2.1.9.1 Soil Erosion Control Blanket

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

2.1.9.2 Soil Erosion Control Fabric

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

2.1.9.3 Soil Erosion Control Net

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

2.1.9.6 Anchors

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

PART 3 EXECUTION

3.1 SEEDING TIMES AND CONDITIONS

3.1.1 Seeding Time

Seed shall be sown from 15 April to May 31 for spring planting and from 15 August to 30 September for fall planting. Establishment of the turf in the compensation area shall be performed during the first planting period that occurs after the notice to proceed is given.

3.1.4 Turfing Conditions

Turf operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the turf operations, proposed times shall be submitted to and approved by the Contracting Officer.

3.2 SITE PREPARATION

3.2.1 Grading

The Contracting Officer shall verify that finished grades are as indicated on drawings, and the placing of topsoil and the smooth grading has been completed in accordance with Section \=02228=\ EXCAVATION.

3.2.2 Application of Soil Amendments

3.2.2.1 Soil Test

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

3.2.2.2 Lime

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

3.2.2.3 Fertilizer

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

3.2.2.4 Soil Conditioner

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

3.2.3 Tillage

3.2.3.1 Minimum Depth

Soil on slopes gentler than 3-horizontal-to-1-vertical shall be tilled to a minimum depth of \~4 inches.~\ On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum depth of \~2 inches~\ by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required.

3.2.4 Finished Grading

3.2.4.1 Preparation

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

3.2.4.2 Turf Area Debris

Turf areas shall have debris and stones larger than ~ 1 inch \sim in any dimension removed from the surface.

3.2.4.4 Protection

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

3.3 SEEDING

3.3.1 General

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

3.3.2 Equipment Calibration

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

3.3.3 Applying Seed

3.3.3.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of 5 \sim pounds per 1000 square feet \sim using broadcast seeders. Half of seed shall be broadcast in one direction, and the remainder at right angles to the first direction. Seed shall be covered to an average depth of $\sim 1/4$ inch \sim by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.3.2 Drill Seeding

Seed shall be uniformly drilled to an average depth of $\sim 1/2$ inch and at the rate of 5 \sim pounds per 1000 square feet using equipment having drills not more than $\sim 6-1/2$ inches apart. Row markers shall be used with the drill seeder.

3.3.3.3 Rolling

Immediately after seeding, except for slopes 3-horizontal-to-1 vertical and greater, the entire area shall be firmed with a roller not exceeding ~ 90 pounds for each \sim foot of roller width. Areas seeded with seed drills equipped with rollers shall not be rolled.

3.3.4 Hydroseeding

Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Wood cellulose fiber mulch shall be added at the rates recommended by the manufacturer after the seed, fertilizer and water have been thoroughly mixed, to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

3.3.5 Mulch

3.3.5.1 Straw or Hay Mulch

Straw or hay mulch shall be spread uniformly at the rate of ~ 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched. All seeded areas shall be mulched on the same day as the seeding.

3.3.5.2 Mechanically Anchoring

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

3.3.5.6 Wood Cellulose Fiber

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

3.3.6 Water

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

3.6 EROSION CONTROL

3.6.1 Erosion Control Material

Erosion control material, where indicated or required, shall be installed in accordance with manufacturer's instructions. Placement of the erosion control material shall be accomplished without damage to installed material or without deviation to finished grade.

3.6.2 Temporary Turf Cover

3.6.2.1 General

When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed as specified in Paragraph TEMPORARY SEED.

3.6.2.2 Application

When no other turfing materials have been applied, the quantity of one half of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. Seed shall be uniformly broadcast and applied at the rate of 5 \~pounds~\ per \~1000 square feet.~\ The area shall be watered as required.

3.7 *APPLICATION OF PESTICIDE*\

When pesticide becomes necessary to remove a pest or disease, a state-certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Hydraulic equipment shall be provided for the liquid application of pesticides with a leak-proof tank, positive agitation methods, controlled application pressure and metering gauges. A pesticide plan shall be provided to the Contracting Officer as stated in paragraph SUBMITTALS.

3.8 RESTORATION AND CLEAN UP

3.8.1 Restoration

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

3.8.2 Clean Up

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

3.9 PROTECTION OF TURFED AREAS

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

3.10 *TURF ESTABLISHMENT PERIOD*\

3.10.1 Commencement

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

3.10.2 Satisfactory Stand of Turf

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

3.10.3 Maintenance During Establishment Period

3.10.3.1 General

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

3.10.3.2 Mowing

Turf areas shall be mowed once during the season to a minimum height of 3 \-inches.-\

3.10.3.3 Watering

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

3.10.3.4 Post-Fertilization

Nitrogen carrier fertilizer shall be applied at the rate of 0.5 \-pounds per 1000 square feet-\ after the first month and again prior to the final acceptance. The application shall be timed prior to the advent of winter dormancy and shall avoid excessively high nitrogen levels.

3.10.3.5 Pesticide

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

3.10.3.6 Repair

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

3.10.3.7 *Maintenance Report*\

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

3.11 FINAL ACCEPTANCE

3.11.1 Preliminary Inspection

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

3.11.2 Final Inspection

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

-- End of Section --

DEPARTMENT OF THE ARMY CEGS-03100 (November 1988)
U.S. ARMY CORPS OF ENGINEERS -----
Superseding
CEGS-03100 (October 1987)

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

Includes Text Adjustment Change (Section 01300 Reference) (March 1995)
Includes metric Special change (September 1993)
Includes Changes through Notice 6 (August 1994)
Includes Text Adjustment change 1 (February 1992)

Latest Notice change indicated by \&&\ tokens

SECTION 03100

STRUCTURAL CONCRETE FORMWORK
11/88

NOTE: This guide specification covers the requirements for \@formwork for cast-in-place concrete@\ and will be used with Section 03300 CONCRETE FOR BUILDING CONSTRUCTION. Formwork for architectural cast-in-place concrete is specified in Section 03330 CAST-IN-PLACE ARCHITECTURAL CONCRETE. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-720.

PART 1 GENERAL

NOTE: See Additional Note A.

1.1 REFERENCES

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change (Notice) to this guide specification.

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 CONCRETE INSTITUTE (ACI)

\-ACI 347R-\ (1988) Guide to Formwork for Concrete

AMERICAN HARDBOARD ASSOCIATION (AHA)

\-AHA A135.4-\ (1982; R 1988) Basic Hardboard

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

&\-ASTM C 578-\ (1992) Rigid, Cellular Polystyrene
Thermal Insulation&\

DEPARTMENT OF COMMERCE (DOC)

\-DOC PS 1-\ (1983) Construction and Industrial
Plywood

1.2 SUBMITTALS

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

SD-01 Data\

Design\; *GA*\.

Design analysis and calculations for form design and methodology used in the design.

Concrete Formwork\; *FIO*\.

Manufacturer's data including literature describing form materials, accessories, and form releasing agents.

Textured Concrete Form Liner\; *GA*\.

Manufacturer's data including literature describing form liner materials, accessories, and recommended releasing agents.

SD-04 Drawings\

Concrete Formwork\; *GA*\.

Drawings showing details of formwork including, dimensions of fiber voids, joints, supports, studding and shoring, and sequence of form and shoring removal.

SD-06 Instructions\

Form Releasing Agents\; *GA*\.

Manufacturer's recommendation on method and rate of application of form releasing agents.

1.3 *DESIGN*\

Formwork shall be designed in accordance with methodology of \-ACI 347R-\ for anticipated loads, lateral pressures, and stresses. Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

PART 2 PRODUCTS

2.1 FORM MATERIALS

2.1.1 Forms For Class D Finish

All formed concrete surfaces shall be Class D finish, except where textured concrete is required on the exposed face of the stem of the concrete dam. Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.

2.1.2 Textured Concrete Form Liner

Form liners for the exposed face of the stem of the dam shall create an Ashlar Stone Texture pattern with 3/4 inch by 3/4 inch joints. Units shall be factory fabricated elastomeric form liners specifically designed for the construction of textured architectural concrete. Acceptable product is "Ashlar Stone #167" as manufactured by Scott Systems, Inc., 4575 Joliet Street, Denver, Colorado 80239, telephone number (303) 371-9580, or approved equal.

2.1.3 Form Ties

Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spall concrete upon removal. Solid backing shall be provided for each tie. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than \-1/4 inch-\ nor more than \-1 inch-\ deep and not more than \-1 inch-\ in diameter. Removable tie rods shall be not more than \-1-1/2 inches-\ in diameter.

2.1.4 *Form Releasing Agents*\

Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds. Form releasing agents shall not adversely affect the color or texture of the textured concrete on the exposed face of the dam stem.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Formwork

Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse. Form ties that are to be completely withdrawn shall be coated with a nonstaining bond breaker.

3.1.2 Textured Form Liners

Where textured form liners are used, the concrete texture shall not decrease the thickness of the wall section as required on the contract drawings. Therefore, the 3/4 inch by 3/4 inch joints in the form liner should extend outside of the required wall thickness and in no case should the form liner protrude into the structural section shown on the contract drawings.

3.3 COATING

Forms for Class D finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.4 REMOVAL OF FORMS

Forms shall be removed in a manner that will prevent injury to the concrete and ensure the complete safety of the structure. Formwork for columns, walls, side of beams and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement. Supporting forms and shores shall not be removed from beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads. In no case will supporting forms or shores be removed before the concrete strength has reached 70 percent of design strengths as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens, and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of forming and shoring system. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they

represent.

-- End of Section --

DEPARTMENT OF THE ARMY CEGS-03200 (November 1988)
U.S. ARMY CORPS OF ENGINEERS -----
Superseding
CEGS-03200 (October 1987)

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

Includes metric Special change (September 1993)
Includes changes through Notice 6 (May 1995)
Includes Text Adjustment 1 (November 1991)

Latest Notice change indicated by \&\ tokens

SECTION 03200

CONCRETE REINFORCEMENT
11/88

NOTE: This specification covers the requirements for \concrete reinforcement, including welded wire fabric, for building construction\ . This guide will be used in conjunction with Section 03300 CONCRETE FOR BUILDING CONSTRUCTION. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-720.

PART 1 GENERAL

NOTE: See Additional Note A.

1.1 REFERENCES

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change (Notice) to this guide specification.

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

ACI INTERNATIONAL (ACI)

\-ACI 318/318R-\ (1989; Rev 1992; Errata) Building Code

Requirements for Reinforced Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- \-ASTM A 53-\ \&(1993a)&\ Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
- \-ASTM A 82-\ \&(1994)&\ Steel Wire, Plain, for Concrete Reinforcement
- \-ASTM A 184-\ (1990) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
- \-ASTM A 185-\ \&(1994)&\ Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
- \-ASTM A 497-\ \&(1994a)&\ Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
- \-ASTM A 499-\ (1989) Steel Bars and Shapes, Carbon Rolled from "T" Rails
- \-ASTM A 615-\ \&(1994)&\ Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- \-ASTM A 675-\ (1990a) Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties
- \-ASTM A 706-\ \&(1993a)&\ Low-Alloy Steel Deformed Bars for Concrete Reinforcement
- \-ASTM C 1116-\ (1991) Fiber-Reinforced Concrete and Shotcrete

AMERICAN WELDING SOCIETY (AWS)

- \-AWS D1.4-\ (1992) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

- \-CRSI MSP-1-\ (1990) Manual of Standard Practice

1.2 SUBMITTALS

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

Indicate submittal classification in the blank space using "GA" when the submittal requires Government

approval or "FIO" when the submittal is for information only.

SD-08: Delete welding requirements if welding is not permitted. Welding will not be specified in blast-resistant structures.

SD-13: Certified mill reports should be obtained when welding is specified or permitted. On minor projects with no welding, submittal SD-13 may be deleted.

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

SD-04 Drawings\

Concrete Reinforcement System\; *GA*\.

Detail drawings showing reinforcing steel schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing.

SD-13 Certificates\

Reinforcing Steel\; *GA*\.

Certified copies of mill reports attesting that the reinforcing steel furnished meets the requirements specified, prior to the installation of reinforcing steel.

1.4 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.1 DOWELS

Dowels shall conform to ASTM A 615-, Grade 60.

2.2 FABRICATED BAR MATS

Fabricated bar mats shall conform to ASTM A 184-.

2.3 *REINFORCING STEEL*\

NOTE: Grades and sizes of reinforcing steel will be shown on the drawings. Low-alloy steel conforming to ASTM A 706 is specified for its special qualities

such as bending ability and ease of welding.

Special coated bars (epoxy and zinc) may be specified for use in a highly corrosive atmosphere where concrete cover is not considered sufficient. In which case reference to ASTM A 767 and A 775 will be included.

Reinforcing steel shall be deformed bars conforming to \-ASTM A 615-\ or \-ASTM A 706-\, grade 60. Sizes shall be as shown on the contract drawings.

2.4 WELDED WIRE FABRIC

Welded wire fabric shall conform to \-ASTM A 185-\ or \-ASTM A 497-\.

2.5 WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.6 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with \-CRSI MSP-1-\ and shall be steel or precast concrete blocks. Precast concrete blocks shall have wire ties and shall be not less than \-4 inches square-\ when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within \-1/2 inch-\ of concrete surface shall be galvanized, plastic protected or of stainless steel. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface.

PART 3 EXECUTION

3.1 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of \-ACI 318/318R-\ . Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Wire tie ends shall face away from the forms.

3.1.1 Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with \-ACI 318/318R-\ at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by \-ACI 318/318R-\ . If bars are moved more than

one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

3.1.2 Splicing

NOTE: Delete welding requirements if welding is not permitted. Welding will not be specified in blast resistant structures.

Splices of reinforcement shall conform to \-ACI 318/318R-\ and shall be made only as required or indicated. Splicing shall be by lapping. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or \-6 inches.-\

3.3 DOWELS

Dowels shall be installed in the base as shown on the contract drawings. Dowels shall be accurately positioned and aligned parallel to the finished concrete surface before concrete placement. Dowels shall be rigidly supported during concrete placement.

-- End of Section --

DEPARTMENT OF THE ARMY CEGS-03250 (July 1995)
U.S. ARMY CORPS OF ENGINEERS -----
Superseding
CEGS-03250 (December 1988)

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 03250

EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS
07/95

NOTE: This guide specification covers the requirements for \@expansion joints, contraction joints and waterstops used in concrete construction@\ . This guide will be used in conjunction with Section 03300, CONCRETE FOR BUILDING CONSTRUCTION. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-720.

PART 1 GENERAL

1.1 REFERENCES

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change (Notice) to this guide specification.

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 HARDBOARD ASSOCIATION (AHA)

\-AHA A135.4-\ (1982; R 1988) Basic Hardboard

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

\-ASTM A 109-\ (1993) Steel, Strip, Carbon, Cold-Rolled

\-ASTM A 167-\ (1993) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

\-ASTM A 480-\ (1994b) General Requirements for Flat-Rolled Stainless and Heat-Resisting

Steel Plate, Sheet, and Strip

- \-ASTM A 570-\ (1992; R 1993) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
- \-ASTM B 152-\ (1993a) Copper Sheet, Strip, Plate, and Rolled Bar
- \-ASTM B 370-\ (1992) Copper Sheet and Strip for Building Construction
- \-ASTM C 919-\ (1984; R 1992) Standard Practice for Use of Sealants in Acoustical Applications
- \-ASTM C 920-\ (1987) Elastomeric Joint Sealants
- \-ASTM D 412-\ (1992) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
- \-ASTM D 471-\ (1979; R 1991) Rubber Property - Effect of Liquids
- \-ASTM D 624-\ (1991) Test Method for Rubber Property - Tear Resistance
- \-ASTM D 1190-\ (1974; R 1980) Concrete Joint Sealer, Hot-Poured Elastic Type
- \-ASTM D 1191-\ (1984) Testing Concrete Joint Sealers
- \-ASTM D 1751-\ (1983; R 1991) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- \-ASTM D 1752-\ (1984; R 1992) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
- \-ASTM D 1854-\ (1974; R 1990) Jet-Fuel-Resistant Concrete Joint Sealer, Hot-Poured Elastic Type
- \-ASTM D 1855-\ (1989) Test Method for Jet-Fuel Resistant Concrete Joint Sealer, Hot-Poured Elastic Type
- \-ASTM D 2240-\ (1991) Test Method for Rubber Property - Durometer Hardness
- \-ASTM D 2628-\ (1991) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

\-ASTM D 2835-\ (1989; R 1993) Lubricant for Installation of Preformed Compression Seals in Concrete Pavements

\-ASTM D 5249-\ (1992) Backer Material for Use With Cold and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints

CORPS OF ENGINEERS (COE)

\-COE CRD-C 513-\ (1974) Corps of Engineers Specifications for Rubber Waterstops

\-COE CRD-C 572-\ (1974) Corps of Engineers Specifications for Polyvinylchloride Waterstops

FEDERAL SPECIFICATIONS (FS)

\-FS TT-S-230-\ (1970) Sealing Compound: Elastomeric Type, Single Component (for Calking, Sealing, and Glazing in Buildings and Other Structures)

1.2 SUBMITTALS

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

SD-01 Data\.

Preformed Compressible Joint Filler\; *FIO*\.

Sealant\; *GA*\.

Waterstops\; *GA*\.

Manufacturer's literature, including safety data sheets, for preformed fillers and the lubricants used in their installation; field-molded sealants and primers (when required by sealant manufacturer); preformed compression seals; and waterstops.

SD-04 Drawings\.

Waterstops\; *FIO*\.

Shop drawings and fabrication drawings provided by the manufacturer or prepared by the Contractor for each type used.

SD-06 Instructions\.

Preformed Compressible Joint Filler\; *FIO*\.

Sealant\; *GA*\.

Waterstops\; *GA*\.

Manufacturer's recommended instructions for installing preformed fillers, field-molded sealants; preformed compression seals; and waterstops; and for splicing non-metallic waterstops.

SD-13 Certificates\.

Preformed Compressible Joint Filler\; *GA*\.

Sealant\; *GA*\.

Waterstops\; *GA*\.

Certificates of compliance stating that the joint filler and sealant materials and waterstops conform to the requirements specified.

SD-14 Samples\

PVC and Expanding Waterstops and Splices\; *GA*\.

Specimens identified to indicate manufacturer, type of material, size, quantity of material, and shipment or lot represented. Each sample shall be a piece not less than ~12 inch~ long from each type used. One splice sample of each size and type. The splice samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each splice shall be not less than ~12 inches~ long.

1.3 DELIVERY AND STORAGE

Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants. Sealants shall be delivered in the manufacturer's original unopened containers. Sealants whose shelf life has expired shall be removed from the site.

PART 2 PRODUCTS

2.1 *PREFORMED COMPRESSIBLE JOINT FILLER*\

Compressible joint filler shall be preformed material conforming to ~ASTM D 1751~ or ~ASTM D 1752~. Unless otherwise indicated, filler material shall be 3/4 inch thick and of a width applicable for the joint formed. Backer material, when required, shall conform to ~ASTM D 5249~.

2.2 *SEALANT*\

Joint sealant shall conform to the following:

2.2.1 Polyurethane Elastomeric Sealant

Polyurethane elastomeric sealant shall be a one-component, polyurethane base material applicable for use in horizontal, vertical, and overhead joints. Sealant shall cure under the influence of atmospheric moisture to

form an elastomeric substance. Sealant color shall match that of the concrete surface.

2.2.2 Sealant Performance Criteria

2.2.2.1 Tensile Properties

Tensile properties (\-ASTM D 412-\) at 21 days

- | | |
|-------------------------------------|---------------|
| a. Tensile Strength | 140 psi, min. |
| b. Elongation at Break | 600%, min. |
| c. Tensile Stress @ 100% Elongation | 65 psi, min. |
| d. Tensile set after break | 15%, max. |

2.2.2.2 Shore Hardness

Shore hardness (\-ASTM D 2240-\) @ 21 days: 50, max (Shore A)

2.2.2.3 Tear Strength

Tear strength (\-ASTM D 624-\) @ 21 days: 60 lbf/inch, min.

2.2.2.4 Adhesion in Peel

Adhesion in peel (\-FS TT-S-230-\) @ 28 days

- | | |
|-------------|--------------|
| a. Concrete | 20 lb., min. |
| b. Aluminum | 20 lb., min. |
| c. Glass | 20 lb., min. |

2.2.2.5 Service Range

Service Range - 40 F to 167 F, min.

2.2.2.6 Sealant

- Sealant shall conform to \-FS TT-S-230-\, Type II, Class A.
- Sealant shall conform to \-ASTM C 920-\, Type S, Grade NS, Class 25.
- Sealant shall be non-staining.

2.2.2.7 Acceptable Product

Acceptable product shall be Sikaflex 1A as manufactured by Sika Corporation, or approved equal.

2.3 PRIMER AND BACKER ROD

Primer and backer rod for elastomeric sealant shall be as shown or recommended by the sealant manufacturer.

2.4 *WATERSTOPS*\

Intersection and change of direction waterstops shall be shop fabricated.

2.4.3 PVC Waterstops

PVC waterstops shall be manufactured from a prime virgin resin; the compound shall contain plasticizers, stabilizers, and other additives to meet specified requirements. Polyvinylchloride waterstops shall conform to \-COE CRD-C 572-\.

2.4.4 Expanding Waterstop

Expanding waterstop system shall consist of a hydro-active, expansive, closed cell polyurethane foam that is injected into the joint after the concrete has cured. Acceptable product shall be "Injecto-System" as manufactured by De-Neef Construction Chemicals, P.O. Box 1219, Waller, Texas 77484, or approved equal.

PART 3 EXECUTION

3.1 JOINTS

Joints shall be installed at locations indicated and as shown on the contract drawings.

3.1.2 Expansion Joints

Preformed compressible joint filler shall be used in expansion joints as shown on the contract drawings. The edges of the joint shall be neatly finished with an edging tool of \-1/8 inch-\ radius. The filler strips shall be installed at the proper level beneath the finished surface with a slightly tapered, dressed and oiled wood strip temporarily secured to the top thereof to form a recess to the size shown on the drawings. The wood strip shall be removed after the concrete has set. Contractor may opt to use a removable expansion filler cap designed and fabricated for this purpose in lieu of the wood strip. The groove shall be thoroughly cleaned of laitance, curing compound, foreign materials, protrusions of hardened concrete, and any dust which shall be blown out of the groove with oil-free compressed air.

3.1.3 Joint Sealant

Construction joints and expansion joints in the Dam shall be filled with elastomeric joint sealant and backer rod. Joint surfaces shall be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Joint sealant shall be applied as recommended by the manufacturer of the sealant.

3.1.3.2 Joints With Field-Molded Sealant

Joints shall not be sealed when the sealant material, ambient air, or concrete temperature is less than \-40 degrees F.-\ . Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

3.2 WATERSTOPS, INSTALLATION AND SPLICES

Waterstops shall be installed at the locations shown to form a continuous water-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Splices shall be made by certified trained personnel using approved equipment and procedures.

3.2.3 PVC Waterstops

Fittings shall be shop made using a machine specifically designed to mechanically weld the waterstop. A miter guide, proper fixturing (profile dependant), and portable power saw shall be used to miter cut the ends to be joined to ensure good alignment and contact between joined surfaces. The splicing of straight lengths shall be done by squaring the ends to be joined. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis, protrusions, etc.) shall be maintained across the splice.

3.2.3.2 Polyvinyl Chloride Waterstop

Splices shall be made by heat sealing the adjacent waterstop edges together using a thermoplastic splicing iron utilizing a non-stick surface specifically designed for waterstop welding. The correct temperature shall be used to sufficiently melt without charring the plastic. The spliced area, when cooled, shall show no signs of separation, holes, or other imperfections when bent by hand in as sharp an angle as possible.

3.2.3.3 Quality Assurance

Edge welding will not be permitted. Centerbulbs shall be compressed or closed when welding to non-centerbulb type. Waterstop splicing defects which are unacceptable include, but are not limited to the following: 1) Tensile strength less than 80 percent of parent section. 2) Free lap joints. 3) Misalignment of centerbulb, ribs, and end bulbs greater than $\sim 1/16$ inch. 4) Misalignment which reduces waterstop cross section more than 15 percent. 5) Bond failure at joint deeper than $\sim 1/16$ inch or 15 percent of material thickness. 6) Misalignment of waterstop splice resulting in misalignment of waterstop in excess of $\sim 1/2$ inch in ~ 10 feet. 7) Visible porosity in the weld area, including pin holes. 8) Charred or burnt material. 9) Bubbles or inadequate bonding. 10) Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.

3.2.4 Expanding Waterstop

The expanding waterstop system used at the right abutment stone wall and the existing gate structure shall be installed in accordance with the manufacturer's instructions.

-- End of Section --

 DEPARTMENT OF THE ARMY CEGS-03300 (September 1995)
 U.S. Army Corps of Engineers -----
 Superseding
 CEGS-03300 (December 1988)

 GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 03300

CAST-IN-PLACE STRUCTURAL CONCRETE
 09/95

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
 (AASHTO)

\-AASHTO M 182-\ (1991I) Burlap Cloth Made From Jute or Kenaf

AMERICAN CONCRETE INSTITUTE (ACI)

\-ACI 117/A117R-\ (1990; Errata) Standard Tolerances for Concrete Construction and Materials

\-ACI 211.1-\ (1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

\-ACI 211.2-\ (1991) Standard Practice for Selecting Proportions for Structural Lightweight Concrete

\-ACI 213R-\ (1987) Guide for Structural Lightweight Aggregate Concrete

\-ACI 214.3R-\ (1988) Simplified Version of the Recommended Practice for Evaluation of Strength Test Results of Concrete

\-ACI 301-\ (1989) Structural Concrete for Buildings

\-ACI 303R-\ (1991) Guide to Cast-In-Place Architectural Concrete Practice

- \-ACI 305R-\ (1991) Hot Weather Concreting
- \-ACI 318/318R-\ (1989; Rev 1992; Errata) Building Code Requirements for Reinforced Concrete
- AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- \-ASTM C 31-\ (1991) Making and Curing Concrete Test Specimens in the Field
- \-ASTM C 33-\ (1993) Concrete Aggregates
- \-ASTM C 39-\ (1993a) Compressive Strength of Cylindrical Concrete Specimens
- \-ASTM C 42-\ (1990) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- \-ASTM C 78-\ (1994) Flexural Strength of Concrete (Using Simple Beam With Third-Point Loading)
- \-ASTM C 94-\ (1994) Ready-Mixed Concrete
- \-ASTM C 131-\ (1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- \-ASTM C 136-\ (1993) Sieve Analysis of Fine and Coarse Aggregates
- \-ASTM C 143-\ (1990a) Slump of Hydraulic Cement Concrete
- \-ASTM C 150-\ (1994) Portland Cement
- \-ASTM C 171-\ (1992) Sheet Materials for Curing Concrete
- \-ASTM C 172-\ (1990) Sampling Freshly Mixed Concrete
- \-ASTM C 173-\ (1994a) Air Content of Freshly Mixed Concrete by the Volumetric Method
- \-ASTM C 192-\ (1990a) Making and Curing Concrete Test Specimens in the Laboratory
- \-ASTM C 231-\ (1991b) Air Content of Freshly Mixed Concrete by the Pressure Method
- \-ASTM C 260-\ (1994) Air-Entraining Admixtures for Concrete
- \-ASTM C 309-\ (1993) Liquid Membrane-Forming Compounds for Curing Concrete

- \-ASTM C 330-\ (1989) Lightweight Aggregates for Structural Concrete
- \-ASTM C 494-\ (1992) Chemical Admixtures for Concrete
- \-ASTM C 496-\ (1990) Splitting Tensile Strength of Cylindrical Concrete Specimens
- \-ASTM C 552-\ (1991) Cellular Glass Thermal Insulation
- \-ASTM C 567-\ (1991) Unit Weight of Structural Lightweight Concrete
- \-ASTM C 578-\ (1992) Rigid, Cellular Polystyrene Thermal Insulation
- \-ASTM C 591-\ (1985) Unfaced Preformed Rigid Cellular Polyurethane Thermal Insulation
- \-ASTM C 595-\ (1994a) Blended Hydraulic Cements
- \-ASTM C 618-\ (1994) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
- \-ASTM C 685-\ (1994) Concrete Made by Volumetric Batching and Continuous Mixing
- \-ASTM C 881-\ (1990) Epoxy-Resin-Base Bonding Systems for Concrete
- \-ASTM C 937-\ (1980, R 1991) Grout Fluidifier for Preplaced-Aggregate Concrete
- \-ASTM C 940-\ (1989) Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory
- \-ASTM C 989-\ (1993) Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- \-ASTM C 1017-\ (1992) Chemical Admixtures for Use in Producing Flowing Concrete
- \-ASTM C 1059-\ (1991) Latex Agents for Bonding Fresh to Hardened Concrete
- \-ASTM C 1064-\ (1986, R 1993) Temperature of Freshly Mixed Portland Cement Concrete
- \-ASTM C 1077-\ (1995) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

- \-ASTM C 1107-\ (1991a) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- \-ASTM C 1116-\ (1991) Fiber-Reinforced Concrete and Shotcrete
- \-ASTM C 1240-\ (1993) Silica Fume for Use in Hydraulic Cement Concrete and Mortar
- \-ASTM D 75-\ (1987; R 1992) Sampling Aggregates
- \-ASTM D 1751-\ (1983; R 1991) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- \-ASTM D 1752-\ (1984; R 1992) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
- \-ASTM E 96-\ (1994) Water Vapor Transmission of Materials
- \-ASTM E 1155-\ (1987) Determining Floor Flatness and Levelness Using the F-Number System

CORPS OF ENGINEERS (COE)

- \-COE CRD-C 94-\ (1995) Surface Retarders
- \-COE CRD-C 104-\ (1980) Method of Calculation of the Fineness Modulus of Aggregate
- \-COE CRD-C 400-\ (1963) Requirements for Water for Use in Mixing or Curing Concrete
- \-COE CRD-C 521-\ (1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete
- \-COE CRD-C 540-\ (1971; R 1981) Standard Specification for Nonbituminous Inserts for Contraction Joints in Portland Cement Concrete Airfield Pavements, Sawable Type
- \-COE CRD-C 572-\ (1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

- \-NIST HB 44-\ (1994) NIST Handbook 44: Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

\-NRMCA-01-\	(1992) Truck Mixer Agitator and Front Discharge Concrete Carrier Standards of the Truck Mixer Manufacturers Bureau
\-NRMCA CPMB 100-\	(1990) Concrete Plant Standards
\-NRMCA QC 3-\	(1984) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities

1.2 SUBMITTALS

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

SD-08 Statements\

Mixture Proportions\; *GA*\.

The results of trial mixture design studies along with a statement giving the maximum nominal coarse aggregate size and the proportions of ingredients that will be used in the manufacture of concrete, at least 14 days prior to commencing concrete placing operations. Aggregate weights shall be based on the saturated surface dry condition. The statement shall be accompanied by test results from an approved independent commercial testing laboratory, showing that mixture design studies have been made with materials proposed for the project and that the proportions selected will produce concrete of the qualities indicated. No substitutions shall be made in the materials used in the mixture design studies without additional tests to show that the quality of the concrete is satisfactory.

SD-09 Reports\

Testing and Inspection for Contractor Quality Control\; *GA*\.

Certified copies of laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolan, ground granulated blast furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

1.3 GENERAL REQUIREMENTS

1.3.1 Tolerances

Except as otherwise specified herein, tolerances for concrete batching, mixture properties, and construction as well as definition of terms and application practices shall be in accordance with \-ACI 117/A117R-\ . Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing; when forms or shoring are used, the measurements shall be made prior to removal.

1.3.2 Strength Requirements and w/c Ratio

1.3.2.1 Strength Requirements

Specified compressive strength (f'_c) for all concrete shall be 4000 pounds per square inch (psi) at 28 days.

1.3.2.2 Water-Cement Ratio

Maximum water-cement ratio (w/c) for all concrete shall be 0.40 by weight.

1.3.3 Air Entrainment

All concrete shall be air entrained to contain between 4 and 7 percent total air, except that when the nominal maximum size coarse aggregate is $\frac{3}{4}$ inch or smaller it shall be between 4.5 and 7.5 percent. Specified air content shall be attained at point of placement into the forms. Air content for normal weight concrete shall be determined in accordance with ASTM C 231.

1.3.4 Slump

Slump of the concrete, as delivered to the point of placement into the forms, shall be 1 to 4 inches. Slump shall be determined in accordance with ASTM C 143.

1.3.5 Concrete Temperature

The temperature of the concrete as delivered shall not exceed 90 degrees F. When the ambient temperature during placing is 40 degrees F or less, or is expected to be at any time within 6 hours after placing, the temperature of the concrete as delivered shall be between 55 and 75 degrees F.

1.3.6 Size of Coarse Aggregate

The largest feasible nominal maximum size aggregate (NMSA) specified in paragraph AGGREGATES shall be used in each placement. However, nominal maximum size of aggregate shall not exceed any of the following: three-fourths of the minimum cover for reinforcing bars, three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

1.3.7 Special Properties and Products

Concrete may contain admixtures other than air entraining agents, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete, if specified or approved. Any of these materials to be used on the project shall be used in the mix design studies.

1.4 *MIXTURE PROPORTIONS*\

Concrete shall be composed of portland cement, other cementitious and pozzolanic materials as specified, aggregates, water and admixtures as specified.

1.4.1 Fresh Concrete

Fresh concrete will be sampled as delivered in accordance with \-ASTM C 172-\ and tested in accordance with these specifications, as considered necessary.

PART 2 PRODUCTS

 NOTE: Edit this PART to include only those products which are locally available, are required by the project, and are acceptable to the designer.

2.1 CEMENTITIOUS MATERIALS

 NOTE: EPA regulations mandate to "always permit the use" of fly ash (pozzolan) unless a valid overriding technical reason exists; but it is not necessary to require its use.

Include the limits on soluble alkalies for portland cement and for pozzolan whenever there is a possibility of alkali-aggregate reactive aggregates being furnished.

Where alkali-bearing soil or groundwater is encountered, or where the concrete will be exposed to seawater, brackish water, or sewage, see ACI 201.2 R for guidance on selecting cementitious material. See EM 1110-2-2000 for guidance when proposing to use any type of portland-pozzolan or portland-furnace-slag cement.

Edit bracketed items as required.

Cementitious Materials shall be portland cement or portland cement in combination with pozzolan and shall conform to appropriate specifications listed below. Use of cementitious materials in concrete which will have surfaces exposed in the completed structure shall be restricted so there is no change in color, source, or type of cementitious material.

2.1.1 Portland Cement

\-ASTM C 150-\, Type I with a maximum 15 percent amount of tricalcium aluminate, or Type II.

2.2 AGGREGATES

 NOTE: Edit and fill in the blanks as appropriate.
 Consideration should always be given to the local
 aggregate supply situation, quality, and
 availability.

Aggregates shall conform to the following.

2.2.1 Fine Aggregate

Fine aggregate shall conform to the quality and gradation requirements of
 \-ASTM C 33-\.

2.2.2 Coarse Aggregate

Coarse aggregate shall conform to \-ASTM C 33-\ . Maximum coarse aggregate
 size shall be 3/4 inch.

2.3 CHEMICAL ADMIXTURES

 NOTE: Edit as appropriate for the project. Do not
 permit the use of calcium chloride.

Chemical admixtures, when required or permitted, shall conform to the
 appropriate specification listed. Admixtures shall be furnished in liquid
 form and of suitable concentration for easy, accurate control of
 dispensing.

2.3.1 Air-Entraining Admixture

\-ASTM C 260-\ and shall consistently entrain the air content in the
 specified ranges under field conditions.

2.3.2 Accelerating Admixture

\-ASTM C 494-\, Type C or E, except that calcium chloride or admixtures
 containing calcium chloride shall not be used.

2.3.3 Water-Reducing or Retarding Admixture

\-ASTM C 494-\, Type A, B, or D, except that the 6-month and 1-year
 compressive and flexural strength tests are waived.

2.3.4 High-Range Water Reducer

 NOTE: Use this paragraph only when high-range water
 reducing admixture is allowed in paragraph SLUMP in
 PART 1.

\-ASTM C 494-\, Type F or G, except that the 6-month and 1-year strength requirements are waived. The admixture shall be used only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

2.3.7 Other Chemical Admixtures

NOTE: Use this paragraph only when a plasticizing admixture is allowed in paragraph SLUMP in PART 1.

Chemical admixtures for use in producing flowing concrete shall comply with \-ASTM C 1017-\, Type I or II. These admixtures shall be used only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

2.4 CURING MATERIALS

2.4.1 Impervious-Sheet

Impervious-sheet materials shall conform to \-ASTM C 171-\, type optional, except, that polyethylene sheet shall not be used.

2.4.3 Burlap and Cotton Mat

Burlap and cotton mat used for curing shall conform to \-AASHTO M 182-\.

2.5 WATER

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

2.8 LATEX BONDING AGENT

Latex agents for bonding fresh to hardened concrete shall conform to \-ASTM C 1059-\.

2.9 EPOXY RESIN

Epoxy resins for use in repairs shall conform to \-ASTM C 881-\, Type V, Grade 2. Class as appropriate to the existing ambient and surface temperatures.

2.14 JOINT MATERIALS

2.14.1 Joint Fillers, Sealers, and Waterstops

NOTE: Do not use bituminous filler with non-bituminous sealer. Designer will edit bracketed

items for joint sealing.

Materials for joints shall be in accordance with Section \=03250=\ EXPANSION JOINTS, CONSTRUCTION JOINTS, AND WATERSTOPS.

PART 3 EXECUTION

3.1 PREPARATION FOR PLACING

Before commencing concrete placement, the following shall be performed. Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water. Forms shall be in place, cleaned, coated, and adequately supported, in accordance with Section \=03100=\ STRUCTURAL CONCRETE FORMWORK. Reinforcing steel shall be in place, cleaned, tied, and adequately supported, in accordance with Section \=03200=\ CONCRETE REINFORCEMENT. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition and in sufficient amount for the entire placement. When hot, windy conditions during concreting appear probable, equipment and material shall be at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete.

3.1.1 Foundations

3.1.1.2 Preparation of Rock

Rock surfaces upon which concrete is to be placed shall be excavated and prepared in accordance with Section \=02228=\ EXCAVATION.

3.6 TRANSPORTING CONCRETE TO PROJECT SITE

Concrete shall be transported to the placing site in truck mixers or by approved pumping equipment. Nonagitating equipment, other than pumps, shall not be used for transporting lightweight aggregate concrete.

3.7 CONVEYING CONCRETE ON SITE

NOTE: Delete conveying equipment not wanted on the project.

Concrete shall be conveyed from mixer or transporting unit to forms as rapidly as possible and within the time interval specified by methods which will prevent segregation or loss of ingredients using following equipment. Conveying equipment shall be cleaned before each placement.

3.7.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94. Nonagitating equipment shall be used only for transporting plant-mixed concrete over a smooth road and when the hauling time is less than 15 minutes. Bodies of nonagitating equipment shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will permit positive control of the discharge of the concrete.

3.7.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes normally attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete.

3.7.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure type; pneumatic placing equipment shall not be used. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least 3 times the nominal maximum-size coarse aggregate in the concrete mixture to be pumped but not less than 4 inches. Aluminum pipe shall not be used.

3.8 PLACING CONCRETE

Mixed concrete shall be discharged within 1-1/2 hours or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the concrete temperature exceeds 85 degrees F, the time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the transporting unit. Concrete shall be handled from mixer or transporting unit to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps and walkways shall be provided so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Sufficient placing capacity shall be provided so that concrete can be kept free of cold joints.

3.8.1 Depositing Concrete

Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 12 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screeded to

the proper level. Concrete shall be deposited continuously in one layer or in layers so that fresh concrete is deposited on in-place concrete that is still plastic. Fresh concrete shall not be deposited on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section. Concrete that has surface dried, partially hardened, or contains foreign material shall not be used. When temporary spreaders are used in the forms, the spreaders shall be removed as their service becomes unnecessary. Concrete shall not be placed in slabs over columns and walls until concrete in columns and walls has been in-place at least two hours or until the concrete begins to lose its plasticity. Concrete for beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as concrete for adjoining slabs.

3.8.2 Consolidation

NOTE: For large jobs, this paragraph may be expanded. Consolidation equipment and procedures are described in detail in ACI 309.

Immediately after placing, each layer of concrete shall be consolidated by internal vibrators, except for slabs \~4 inches-\ thick or less. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 10,000 vibrations per minute, an amplitude of at least \~0.025 inch,-\ and the head diameter shall be appropriate for the structural member and the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a reasonable amount. The vibrator shall penetrate rapidly to the bottom of the layer and at least \~6 inches-\ into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then vertically withdrawn slowly while operating. Form vibrators shall not be used unless specifically approved and unless forms are constructed to withstand their use. Vibrators shall not be used to move concrete within the forms. Slabs \~4 inches-\ and less in thickness shall be consolidated by properly designed vibrating screeds or other approved technique. Excessive vibration of lightweight concrete resulting in segregation or flotation of coarse aggregate shall be prevented. Frequency and amplitude of vibrators shall be determined in accordance with \-COE CRD-C 521-\ . Grate tampers ("jitterbugs") shall not be used.

3.8.4 Hot Weather Requirements

NOTE: If desired, placement of floor slabs may be specified to be delayed until a roof is in place. Additional information concerning hot weather concreting may be obtained from ACI 305R.

When the ambient temperature during concrete placing is expected to exceed ~85 degrees F,~ the concrete shall be placed and finished with procedures previously submitted and as specified herein. The concrete temperature at time of delivery to the forms shall not exceed the temperature shown in the table below when measured in accordance with ~ASTM C 1064~. Cooling of the mixing water or aggregates or placing concrete in the cooler part of the day may be required to obtain an adequate placing temperature. A retarder may be used, as approved, to facilitate placing and finishing. Steel forms and reinforcements shall be cooled as approved prior to concrete placement when steel temperatures are greater than ~120 degrees F.~ Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature.

Maximum Allowable Concrete Placing Temperature

Relative Humidity, Percent, During Time of Concrete Placement	Maximum Allowable Concrete Temperature Degrees
Greater than 60	~90 F~
40-60	~85 F~
Less than 40	~80 F~

3.8.5 Prevention of Plastic Shrinkage Cracking

During hot weather with low humidity, and particularly with appreciable wind, as well as interior placements when space heaters produce low humidity, the Contractor shall be alert to the tendency for plastic shrinkage cracks to develop and shall institute measures to prevent this. Particular care shall be taken if plastic shrinkage cracking is potentially imminent and especially if it has developed during a previous placement. Periods of high potential for plastic shrinkage cracking can be anticipated by use of Fig. 2.1.5 of ~ACI 305R~. In addition the concrete placement shall be further protected by erecting shades and windbreaks and by applying fog sprays of water, sprinkling, ponding or wet covering. Plastic shrinkage cracks that occur shall be filled by injection of epoxy resin as directed, after the concrete hardens. Plastic shrinkage cracks shall never be troweled over or filled with slurry.

3.8.8 Placing Flowable Concrete

NOTE: Delete this paragraph when flowable concrete is not permitted.

If a plasticizing admixture conforming to ~ASTM C 1017~ is used or if a Type F or G high range water reducing admixture is permitted to increase the slump, the concrete shall meet all requirements of paragraph GENERAL REQUIREMENTS in PART 1. Extreme care shall be used in conveying and placing the concrete to avoid segregation. Consolidation and finishing shall meet all requirements of paragraphs Placing Concrete, Finishing Formed Surfaces, and Finishing Unformed Surfaces. No relaxation of

requirements to accommodate flowable concrete will be permitted.

3.9.3 Expansion Joints

Installation of expansion joints and sealing of these joints shall conform to the requirements of Section \=03250=\ EXPANSION JOINTS, CONSTRUCTION JOINTS, AND WATERSTOPS.

3.9.4 Waterstops

Waterstops shall be installed in conformance with the locations and details shown on the drawings using materials and procedures specified in Section \=03250=\ EXPANSION JOINTS, CONSTRUCTION JOINTS, AND WATERSTOPS.

3.9.5 Dowels

Dowels shall be installed at the locations shown on the drawings and to the details shown, using materials and procedures specified in Section \=03200=\ CONCRETE REINFORCEMENT and herein.

3.10 FINISHING FORMED SURFACES

NOTE: Formwork, form materials and form construction are specified in Section 03100 STRUCTURAL CONCRETE FORMWORK. Classes of finish to be used for various formed surfaces of the structure must be indicated on the drawings or clearly specified herein. Criteria to use in choosing class of finish are as follows:

Class A Finish. This finish is for surfaces permanently exposed to public view that require excellent appearance at close range. Examples: Exterior walls of office and residential buildings, of warehouse/industrial type buildings where frequent public access occurs, and of other similar exposed structures; and interior walls, columns or beams of these same structures where no other finish treatment is to be added.

Class B Finish. This finish is for surfaces exposed to public view that do not require the excellent appearance of Class A. Exterior walls of warehouse/industrial buildings where public access is infrequent, structures on combat training ranges, and other similar exposed structures; interior exposed surfaces of such structures, and interior surfaces of liquid containers.

Class C Finish. This finish is for concealed surfaces not exposed to view and for all surfaces not covered by Class A, B, or D finish. Examples: Interior surfaces that will be covered by dry wall or other applied surfaces, surfaces of mechanical

rooms and elevator shafts.

Class D Finish. This finish is for surfaces where roughness and irregularities are not objectionable. **Examples:** Walls and foundation surfaces against which backfill will be placed, exterior surfaces permanently submerged in water where no coating is to be applied.

When a Class A or B Finish is specified, add to paragraph FIELD TEST PANELS in PART 1 requirements for the Contractor to construct a sample panel for approval before start of construction. Finishes for surfaces to be exposed to high velocity flow of water (above 40 ft per sec) will be designed and constructed in accordance with Civil Works criteria.

Forms, form materials, and form construction are specified in Section \=03100=\ STRUCTURAL CONCRETE FORMWORK. Finishing of formed surfaces shall be as specified herein. Unless another type of architectural or special finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired. Uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions. Except for major defects, as defined hereinafter, surface defects shall be repaired as specified herein within 24 hours after forms are removed. Repairs of the so-called "plaster-type" will not be permitted in any location. Tolerances of formed surfaces shall conform to the requirements of \-ACI 117/A117R-\. These tolerances apply to the finished concrete surface, not to the forms themselves; forms shall be set true to line and grade. Form tie holes requiring repair and other defects whose depth is at least as great as their surface diameter shall be repaired as specified in paragraph Damp-Pack Mortar Repair. Defects whose surface diameter is greater than their depth shall be repaired as specified in paragraph Repair of Major Defects. Repairs shall be finished flush with adjacent surfaces and with the same surface texture. The cement used for all repairs shall be a blend of job cement with white cement proportioned so that the final color after curing and aging will be the same as the adjacent concrete. Concrete with excessive honeycomb, or other defects which affect the strength of the member, will be rejected. Repairs shall be demonstrated to be acceptable and free from cracks or loose or drummy areas at the completion of the contract and, for Class A and B Finishes, shall be inconspicuous. Repairs not meeting these requirements will be rejected and shall be replaced.

3.10.3 Architectural and Special Finishes

The exposed face of the stem of the Dam shall have a stone texture as specified in Section \=03100=\ STRUCTURAL CONCRETE FORMWORK.

3.12 FINISHING UNFORMED SURFACES

NOTE: Type of finish of unformed surfaces should be indicated on the drawings. If not on the drawings,

it must be specified here. Correlate this paragraph with paragraph Tolerances in PART 1 and ACI 117/A117R.

The finish of all unformed surfaces shall meet the requirements of paragraph Tolerances in PART 1, when tested as specified herein.

3.12.1 General

The ambient temperature of spaces adjacent to unformed surfaces being finished and of the base on which concrete will be placed shall be not less than \~50 degrees F.-\ In hot weather all requirements of paragraphs Hot Weather Requirements and Prevention of Plastic Shrinkage Cracking shall be met. Unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish, with additional finishing as specified below, and shall be true to the elevation shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings, properly consolidated, and left true and regular. The dusting of surfaces with dry cement or other materials or the addition of any water during finishing shall not be permitted. If bleedwater is present prior to finishing, the excess water shall be carefully dragged off or removed by absorption with porous materials such as burlap. During finishing operations, extreme care shall be taken to prevent over finishing or working water into the surface; this can cause "crazing" (surface shrinkage cracks which appear after hardening) of the surface.

3.12.2 Rough Slab Finish

NOTE: Rough-slab finish alone is used when a bonded surface course for heavy use industrial floor is specified, or where roof fill or thick mortar setting bed is used. If the drawings do not indicate the slabs to receive only a rough slab finish, they must be specified here. Rough slab finish must be retained as the first operation for all subsequent finishing.

As a first finishing operation for unformed surfaces and as final finish for the base slab, the surface shall receive a rough slab finish. The concrete shall be uniformly placed across the slab area, consolidated as previously specified, and then screeded with straightedge strikeoffs immediately after consolidation to bring the surface to the required finish level with no coarse aggregate visible. Side forms shall be provided, rigidly supported, and set to exact line and grade. Allowable tolerances for finished surfaces apply only to the hardened concrete, not to forms. Forms shall be set true to line and grade. "Wet screeds" shall not be used.

3.15 CURING AND PROTECTION

3.15.1 General

NOTE: Do not allow membrane curing compound on surfaces where appearance is critical or that are maintained at curing temperature with free steam. Moist curing should almost always be permitted.

Concrete shall be cured by an approved method for the period of time given below:

Concrete with Type III cement	3 days
All other concrete	7 days

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and damage from rain and flowing water for the duration of the curing period. Air and forms in contact with concrete shall be maintained at a temperature above \-50 degrees F~\ for the first 3 days and at a temperature above \-32 degrees F~\ for the remainder of the specified curing period. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure, and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. Materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat, including welding, shall be permitted near or in direct contact with the concrete at any time.

3.15.2 Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period, commencing immediately after finishing. If water or curing materials used stain or discolor concrete surfaces which are to be permanently exposed, the concrete surfaces shall be cleaned as approved. When wooden forms are left in place during curing, they shall be kept wet at all times. If steel forms are used in hot weather, nonsupporting vertical forms shall be broken loose from the concrete soon after the concrete hardens and curing water continually applied in this void. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Surfaces shall be cured by ponding, by continuous sprinkling, by continuously saturated burlap or cotton mats, or by continuously saturated plastic coated burlap. Burlap and mats shall be clean and free from any contamination and shall be completely saturated before being placed on the concrete. The Contractor shall have an approved work system to ensure that moist curing is continuous 24 hours per day.

3.15.4 Impervious Sheeting

NOTE: Use impervious sheeting only for surfaces that are horizontal or near horizontal. Do not use

on slab surfaces where appearance is critical.

Except for plastic coated burlap, impervious sheeting alone shall not be used for curing. Impervious-sheet curing shall only be used on horizontal or nearly horizontal surfaces. Surfaces shall be thoroughly wetted and be completely covered with the sheeting. Sheeting shall be at least 18 inches wider than the concrete surface to be covered. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 12 inches and securely weighted down or shall be lapped not less than 4 inches and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing.

Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

3.15.5 Ponding or Immersion

Concrete shall be continually immersed throughout the curing period. Water shall not be more than 20 degrees F less than the temperature of the concrete.

3.15.6 Cold Weather Curing and Protection

When the daily ambient low temperature is less than 32 degrees F the temperature of the concrete shall be maintained above 40 degrees F for the first seven days after placing. During the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 25 degrees F as determined by suitable temperature measuring devices furnished by the Government, as required, and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. The installation of the thermometers shall be made by the Contractor as directed.

3.17 *TESTING AND INSPECTION FOR CONTRACTOR QUALITY CONTROL*

Testing and inspection for Contractor quality control is the responsibility of the Contractor and shall be performed at the Contractor's expense.

3.17.5 Concrete Mixture

a. Air Content Testing. Air content tests shall be made when test specimens are fabricated. In addition, at least two tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government inspector. Tests shall be made in accordance with ASTM C 231. Test results shall be plotted on control charts which shall at all times be readily available to the Government and shall be submitted weekly.

b. Slump Testing. In addition to slump tests which shall be made when test specimens are fabricated, at least four slump tests shall be made on

randomly selected batches in accordance with \-ASTM C 143-\ for each separate concrete mixture produced during each 8-hour or less period of concrete production each day.

c. Temperature. The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with \-ASTM C 1064-\ . The temperature shall be reported along with the compressive strength data.

d. Strength Specimens. At least one set of test specimens shall be made, for compressive or flexural strength as appropriate, on each different concrete mixture placed during the day for each portion thereof of that concrete mixture placed each day. Additional sets of test specimens shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A set of test specimens for concrete with a 28-day specified strength per paragraph Strength Requirements in PART 1 shall consist of four specimens, two to be tested at 7 days and two at 28 days. Test specimens shall be molded and cured in accordance with \-ASTM C 31-\ and tested in accordance with \-ASTM C 39-\ for test cylinders. Results of all strength tests shall be reported immediately to the Contracting Officer.

3.17.6 Inspection Before Placing

Foundations, construction joints, forms, and embedded items shall be inspected by the Contractor in sufficient time prior to each concrete placement in order to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.17.8 Vibrators

The frequency and amplitude of each vibrator shall be determined in accordance with \-COE CRD-C 521-\ prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined while the vibrator is operating in concrete with the tachometer being held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head, and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing. Any vibrator not meeting the requirements of paragraph Consolidation, shall be immediately removed from service and repaired or replaced.

-- End of Section --

SECTION 03730

REPAIR MORTARS FOR PATCHING
12/93

PART 1 GENERAL

1.1 SUMMARY

The work covered by this section of the specifications consists of the use of polymer repair mortars to patch spalled areas & joint deterioration and parge and/or patch deteriorated concrete at cracks as shown on the drawings and specified herein.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

\-ASTM C 78-\	(1984) Test Method for Flexural Strength of Concrete
\-ASTM C 109-\	(1990) Test Method for Compressive Strength of Hydraulic Cement Mortars
\-ASTM C 190-\	(1985) Test Method for Tensile Strength of Hydraulic Cement Mortars
\-ASTM C 348-\	(1986) Test Method for Flexural Strength of Hydraulic Cement Mortars
\-ASTM C 496-\	(1990) Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
\-ASTM C 596-\	(1987) Test Method for Drying Shrinkage of Mortar Containing Portland Cement
\-ASTM C 882-\	(1987) Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete

1.3 SUBMITTALS

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

SD-01 Data\.

Polymer-Modified Repair Mortars\; *GA*\

The Contractor shall submit the manufacturer's printed literature,

component mixing instructions, and application instructions on all polymer-modified portland cement mortars.

Corrosion Inhibitor\; *GA*\.

The Contractor shall submit the manufacturer's printed literature, component mixing instructions, and application instructions on the epoxy resin/portland cement corrosion inhibitor.

SD-08 Statements\.

Job Reference List\; *GA*\.

The Contractor shall submit a job reference list stating the required qualifications as specified below.

SD-13 Certificates\.

Materials\; *GA*\.

The contractor shall submit a certificate of compliance stating that the materials proposed for use meets all of the specified requirements. A separate certificate is required for each material proposed.

1.4 GENERAL REQUIREMENTS

The minimum ambient and surface temperatures must be a minimum of 45°F and rising at the time of application. The material shall be stored at 65-80°F. Keep components from freezing. If frozen discard. Do not use solvent based curing compounds.

1.5 QUALITY ASSURANCE

1.5.1 Job Reference List

The Contractor shall verify to the Contracting Officer that he or his subcontractor has sufficient experience in concrete repair work in general, and in the application of polymer-modified repair mortars. A job reference list providing the following information: a minimum of five recently completed projects of similar concrete repair work, brief description of each project, and a point of contact for each. Point of contact should include referenced person's name, current address and phone number. At the discretion of the Contracting Officer, technical instruction from the manufacturer, including on-site guidance during performance of the work, may be substituted for not fully satisfying the experience requirement, or may be required in addition to the experience criteria.

1.5.2 Prewrite Conference

The Contractor shall arrange with the materials manufacturer to have the services of a competent Technical Representative available to attend a prework conference with the Contractor and the Government Representative prior to the start of any repair work. The purpose of the prework conference is to ensure that the Contractor understands all aspects of the repair material, its properties and application procedures. The Technical

Representative must be fully qualified to perform the work and shall be subject to the approval of the Government Representative. The Government Representative shall be present at the prework conference to review any administered details associated with the contract.

1.5.3 On-Site Guidance

If the Government Representative determines it is necessary, the Contractor shall also arrange to have the service of the same Technical Representative available at the work site, prior to the start of any work, to ensure that the work crews are thoroughly familiar with, and capable of, all mixing and application procedures. He shall remain at the job site after work commences and shall continue to oversee and instruct as necessary, until the Contractor, the Technical Representative, and the Government Representative are satisfied that the crew is totally capable of all aspects of successful material application. The Technical Representative shall provide the Government Representative with a written report of each site visit.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 *Polymer-Modified Repair Mortars*\

All repair mortars shall be one or two-component, fast-setting, polymer-modified portland cement mortars with the following formulations based on the depth of concrete deterioration, and type of repair specified.

2.1.1.1 Horizontal Repair Mortar

For spall and joint deterioration repairs on horizontal surfaces of all depths, and on vertical or overhead surfaces when the patch depth exceeds 1-1/2 inches. Forms are required for vertical and overhead applications of this product. Also for concrete overlaying on horizontal surfaces. When the repair depth is greater than 1-1/2 inches, the repair mortar shall be extended with clean 3/8 inch aggregate.

2.1.1.2 Non-sag Repair Mortar

For use as a concrete overlay on vertical surfaces. Also for repair of spalls and joint deterioration on vertical and overhead surfaces when the depth of repair is 1-1/2 inches or less, and forms are not used. Non-sag repair mortar may be used when the depth of repair is greater than 1-1/2 inches, but must be applied in lifts as per the manufacturer's instructions, and shall not be extended with aggregate.

2.1.1.4 Thin Coat Repair Mortar

For use on vertical surfaces, for parge coat over entire surface of existing concrete gate structure.

2.1.2 Properties of Polymer Repair Mortars

2.1.2.1 Compressive Strength

Compressive Strength \-ASTM C 109-\	Horiz. <u>Mortar</u>	Non-Sag <u>Mortar</u>	Thin Coat <u>Mortar</u>
24 hours (min)	1800 psi	3800 psi	1700 psi
28 days (min)	6000 psi	5500 psi	5800 psi

2.1.2.2 Splitting Tensile Strength

Splitting Tensile Strength at 28 days \-ASTM C 496-\ (min)	880 psi	700 psi	700 psi
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2.1.2.3 Flexural Strength

Flexural Strength at 28 days \-ASTM C 78-\ (min.)	1600 psi	1500 psi	1400 psi
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2.1.2.4 Bond Strength

Bond Strength at 28 days \-ASTM C 882-\ (Modified) (min.)	2200 psi	2500 psi	1700 psi
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2.1.2.8 Shrinkage

Shrinkage @28 days in/in (max) \-ASTM C 596-\	0.0010	0.0018	0.0013
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2.1.3 *Corrosion Inhibitor*\

The corrosion inhibitor shall be an epoxy resin/portland cement adhesive which is fast setting and is capable of coating reinforcing steel and non-structural steel to prevent corrosion. The material shall in no way decrease the bond strength between the reinforcing steel and the repair mortar, or between the (concrete) repair surface and the repair mortar.

2.1.4 Properties of Corrosion Inhibitor

2.1.4.1 Flexural Strength, \-ASTM C 348-\ or \-ASTM C 78-\

28 day 1100 psi (min)

2.1.4.2 Splitting Tensile Strength, \-ASTM C 496-\ or \-ASTM C 190-\

28 day 540 psi (min)

2.1.4.3 Bond Strength @ 14 Days, \-ASTM C 882-\

- (1) 2 hours open time: 1800 psi (min)
- (2) 24 hours open time: 1700 psi (min)

2.1.4.4 Material Characteristics

- (1) Pot life: 75 - 105 minutes
- (2) Contact time: 24 hours
- (3) Material shall not produce a vapor barrier.

2.1.5 Acceptable Products

- a. Horizontal Repair Mortar: 'Sikatop 122', by Sika Corporation, or 'Powermix Patch', by Powercrete, or approved equal.
- b. Non-sag Repair Mortar: 'Sikatop 123', by Sika Corporation, or 'Powermix Gel Patch', by Powercrete, or approved equal.
- c. Thin Coat Repair Mortar: 'SikaTop 121', by Sika Corporation, or 'Powermix Leveler', by Powercrete, or approved equal.
- d. Corrosion Inhibitor: 'Armatec 110', by Sika Corporation, or 'Powerprep AC', by Powercrete, or approved equal.

PART 3 EXECUTION

3.1 AREAS TO BE REPAIRED

3.1.1 Spalls and Concrete Deterioration

All spalls and concrete deterioration on the existing gate structure as indicated on the contract drawings and specified herein and identified during the sounding process shall be repaired as specified.

3.2 PREPARATION

3.2.1 Sounding

All concrete surfaces on the existing concrete gate structure shall be sounded to verify the extent of the deterioration at spalls and concrete deterioration.

3.2.2 Concrete Removal

At all areas to be patched or parged, all loose, unsound and deteriorated concrete shall be removed by combination of saw cutting and mechanical and/or hand removal methods as approved by the Contracting Officer. Concrete removal shall be performed in such a manner that the exterior edges of each repair are sound, neat and approximately 90° to the surface, with no feather edges. No repair shall be less than 1/4 inch in depth. Repairs greater than 1-1/2 inches in depth shall be extended with a clean sound 3/8 inch aggregate, using forms as required. Aggregate and addition rate shall be as recommended by the manufacturer.

3.2.3 Reinforcing Steel

Where reinforcing steel is exposed for more than half of the bar diameter, the concrete shall be removed to provide 1 inch clearance behind the bar. All rust, loose material, and contaminants shall be removed from exposed

bars by sand blasting or similar approved method. Reinforcing shall be measured at an area where no corrosion is present, and compared with the area having the greatest loss of material. All bars with a cross sectional loss of 25% or greater shall be replaced with new reinforcing steel of the same size. Where bars are to be replaced, the deteriorated section of the bar shall be cut out and concrete removed along the uncorroded length of bar, as necessary, to allow the new bar to lap the existing bar by 30 bar diameters at each end. New bars shall be tied to existing bars with 16 gauge steel tie wire.

3.2.4 Inspection of Prepared Surfaces

All prepared concrete surfaces and exposed reinforcing steel shall be inspected by the Government Representative prior to the application of any repair materials. No material application will be allowed to surfaces which do not meet these specifications and the manufacturer's preparation requirements. No material application will be performed until the surface preparation work has been approved by the Government Representative.

3.3 MIXING

Mixing shall be manually or mechanically as required for the quantity of material being mixed. All batching shall be as recommended by the manufacturer.

3.4 APPLICATION

3.4.1 Application of Corrosion Inhibitor

Corrosion inhibitor shall be applied to all exposed reinforcing steel, and miscellaneous embedded steel, according to the recommendations of the manufacturer.

3.4.2 Application of Polymer-Modified Repair Mortars

Mixing shall be manually or mechanically as required for the quantity of material being mixed. All batching and mixing shall be as recommended by the manufacturer. At the time of application, the concrete shall be saturated surface dry, with no standing water. Mortar shall be scrubbed into the concrete substrate, filling all pores and voids. Repair material shall be forced against the edges of the patch, and then shall be worked in toward the center of the patch. After filling, the repair mortar shall be consolidated, then screeded. After mortar has set to desired stiffness, the patch shall be finished as required to match existing finish.

3.5 PARGE COAT

After all spalls and concrete deterioration have been repaired, the entire gate structure shall be cleaned and coated with a thin coat mortar in accordance with the material manufacturer's instructions

3.6 CURING

Curing with a fine mist of water, wet burlap, or water based (non-solvent) curing compound, for a minimum of three days, shall be required unless

specifically recommended otherwise by the Manufacturer. Method of curing to be approved by the Government Representative.

3.7 CLEANING

Remove repair mortars from tools and mixing equipment with water. Cured material can only be removed mechanically.

-- End of Section --

 DEPARTMENT OF THE ARMY CEGS-04400 (Jan 1992)
 U.S. ARMY CORPS OF ENGINEERS -----

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 04400

STONE MASONRY

01/92

PART 1 GENERAL

1.1 SUMMARY

The work of this section consists of furnishing all plant, labor, equipment, materials and performing all operations in connection with the installation of the new granite cap on top of the new dam, and resetting stones and repointing portions of the existing stone wall on the right bank (west abutment).

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

\-ASTM C 144-\	(1991) Specification for Aggregate for Masonry Mortar
\-ASTM C 150-\	(1992) Specification for Portland Cement
\-ASTM C 207-\	(1991) Specification for Hydrated Lime for Masonry Purposes

1.3 SUBMITTALS

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

SD-01 Data\.

Existing Stone Wall Repair Plan\; *GA*\.

The Contractor shall prepare and submit for approval a repair plan for the existing stone wall at the west abutment. The plan shall describe the work sequence, equipment and materials to be used, estimated duration, restoration techniques and procedures, and the proposed disposal site.

SD-14 Samples\.

Granite Stone Cap\; *GA*\.

Contractor shall submit two samples of the granite stone cap in accordance with paragraph "Approval of Quality".

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials for constructing the new granite stone cap and for repair of the existing stone wall on the right bank shall be approved materials furnished by the Contractor. Stone and other materials may be stockpiled in approved areas as close as practicable to the location of the work. Such approval will be given only for small stockpiles of materials which must be readily available in small quantities. All stockpile areas shall be cleared and graded as directed prior to placement of materials therein. The placement of stone materials in stockpiles and their hauling therefrom shall be done in a manner that will prevent breaking or chipping. The Contractor shall be responsible for furnishing, delivering to site and placing stone mortar and materials meeting all applicable requirements specified herein. Any stone, or mortar material placed in the permanent work which does not meet all applicable specified requirements shall be removed and replaced with acceptable material at no additional cost to the Government.

2.2 STONE

2.2.1 Approval of Quality

The sources from which the Contractor proposes to obtain material for the construction of the new granite cap and repair of the existing stone wall shall be selected well in advance of the time when these materials will be required in the work. Suitable samples of processed materials, as applicable, from sources shall be submitted to the Contracting Officer for approval of the soundness and durability of the rock. Quarried samples shall be representative of the whole quarry. All samples shall be obtained by the Contractor and delivered at his expense at a time which will allow a period of 60 days for testing and investigations. Unless otherwise directed at time of sampling, each sample shall be delivered by the Contractor to the Government's laboratory at 424 Trapelo Road, Waltham, Massachusetts. Sampling of the materials shall be done at the source by the Contractor at his own expense and in the presence of a representative of the Contracting Officer. The approval of a material by the Government, based on test results, examination of the material exposed at the source and service records, shall not relieve the Contractor, in any way, of the responsibility of placing a material which meets the requirements specified herein. Approval of a sample of material for soundness and durability from a source shall not be construed as approval of all material from that source or that the stone material produced using material from that source will have satisfactory quality, shape characteristics and sizes after any or all portions and placement. The right is reserved to reject, at any

time, any or all portions of the materials in a source or produced using the materials from that source when such materials are unsuitable in the opinion of the Contracting Officer.

2.2.2 Existing Stone

Existing stone material that has fallen into the river or has otherwise been displaced shall be salvaged and reused to the greatest extent practicable so that repair work will match the color and texture of adjacent undamaged stone work.

2.2.3 New Stone

The Contractor shall furnish and install any new stone from off site sources as required to complete the repair of existing walls.

2.2.4 Granite Cap Stone

Masonry granite shall be of standard grade, free of cracks, seams or starts which may impair its structural integrity or function. Each piece shall be shaped as nearly as practicable in the form of a right rectangular prism. Each granite cap stone shall be five feet in length, minimum. All quarried stone shall be supplied from any approved source which will be able to provide sufficient stone of similar color and texture for the entire project. Inherent minor variations characteristic of the quarry from which it is obtained will be acceptable. Stone may not vary in dimension more than 1/2 inch in any direction.

2.3 MORTAR

Mortar for setting and pointing shall be composed of one part of a combination of air-entrained portland cement and hydrated lime and two and one-half parts of fine aggregate with sufficient water to create a workable plastic mass. The cement and lime combination shall be made up of ninety percent by volume of cement and ten percent by volume of lime. Mortar materials shall conform to the following requirements:

(1) Air-entraining cement shall conform to the requirements of \-ASTM C 150-\, Type IIA.

(2) Hydraulic hydrated lime shall conform to the requirements of \-ASTM C 207-\.

(3) Sand for use in mortar shall conform to the requirements of \-ASTM C 144-\.

(4) Water shall be clear, clean, free from oil, acid, alkali or vegetable substances and fit to drink.

2.4 SPALLS

Spalls, if needed, shall be composed of durable fragments of quarried stone reasonably well graded between the sizes of 2 inches and 6 inches. Crushed stone of like size and at least equal in quality will be acceptable in lieu of spalls.

PART 3 EXECUTION

3.3 RESETTING STONES IN EXISTING WALLS

3.3.1 General

Repair of the existing stone wall by salvaging stones and resetting them shall be performed at all locations necessary or as otherwise directed. Setting of stones for repair of the wall shall conform to the applicable requirements of paragraph SETTING STONES.

3.3.2 Setting Stones

The various sizes of stone shall be so distributed as to produce a uniform well graded mass. Adjacent stones shall be selected with reasonable care as to size and shape and placed in close contact, the smaller stones filling the spaces between the larger ones. "Through stones" shall be well distributed throughout the mass and the sum of their cross sections, parallel to the surface being protected, shall be not less than 70 percent of such area. A "through stone" is defined as a stone whose dimension normal to the surface being protected is not less than the full depth of the protection. The stones shall decrease in size from bottom to top of wall. Each stone to be set in mortar shall be cleaned and thoroughly wetted before being set. They shall be set on full beds of mortar, and mortar joints shall be full and the stone settled in place before the mortar has set. The walls shall be compactly laid having all interior joints completely filled with suitable stones or spalls thoroughly bedded in mortar.

3.4 POINTING STONE WALLS

3.4.2 Joints

All joints of the existing right bank stone wall shall be pointed and shall be thoroughly cleaned of all loose mortar and dirt for a depth in from the face of the stone to at least twice the width of the joint. After cleaning, all joints exceeding 2-inches in width and 4-inches in depth shall be chinked with spalls. The joints shall be filled with mortar well driven in and shall be finished with grooved joint so that the face of the mortar is one-half inch back from face of the stone. After the pointing is completed, all mortar shall be cleaned from the face of the stones. On completion of the chinking, pointing and cleaning of the stones, the work shall be protected from the elements in a satisfactory manner for a period of three days. The Contractor, subject to approval, may be permitted to use a "grout" machine for application of mortar. Chinking and pointing of all the stonework shall be done in the dry so as to allow for maximum repair.

-- End of Section --

 DEPARTMENT OF THE ARMY NEDSPEC 06146 (Jan 1992)
 U.S. ARMY CORPS OF ENGINEERS -----
 New England Division

GUIDE SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 06146

WOOD STOP LOGS
01/92

PART 1 GENERAL

1.2 REFERENCES

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

AMERICAN WOOD PRESERVERS BUREAU (AWPB)

\-AWPB LP22-\ (1980) Softwood Lumber, Timber and
 Plywood Pressure Treated With Water-Borne
 Preservatives for Ground Contact Use

1.3 SUBMITTALS

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

SD-13 Certificates\

Certificate of Treatment\; *GA*\.

Submit manufacturer's "Certificate of Treatment" attesting that stop logs have been properly treated in conformance with these specifications.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 General

Stop logs shall be delivered to the site in original packaging with tags, stamps or markings intact and legible and in undamaged condition. Store in a safe, dry place and handle in a manner to prevent damage.

1.4.2 Product Disposition

Following Government inspection of the installed stop log system specified in Paragraph - INSTALLATION DEMONSTRATION, remove the stop logs and transport them to a location to be determined by the Contracting Officer.

The stop logs shall be protected and placed in storage in manner as directed by the Contracting Officer.

PART 2 PRODUCTS

2.1 WOOD STOP LOGS

2.1.1 Wood Products

Wood for stop logs shall be norway (red) pine or southern yellow pine. Stop logs shall be the product of a pressure treated wood manufacturer regularly engaged in the manufacture of such products. The Contractor shall furnish stop logs in the size and number indicated on the drawings. The sizes given are nominal dimensions. Actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced. Stop logs shall be tongue and groove.

2.1.2 Preservative Treatment

All wood for stop logs shall be pressure treated after all cutting and shaping. Pressure treat all wood using the water-borne preservative chromated copper arsenate, type C in accordance with \-AWPB LP22-\. Wood products shall be "Dry" before delivery to the site. Each piece of preservative treated lumber shall be labeled with a permanent mark indicating conformance with the applicable AWPB standard. The label shall be an approved AWPB quality mark or that of an approved independent inspection agency that maintains continuing control, testing, and inspection over the quality of the product.

PART 3 EXECUTION

3.1 INSTALLATION DEMONSTRATION

After fabrication and delivery of materials to the site, install the stop log system in the presence of the Contracting Officer. Logs that are found to be crooked, warped, incorrect size or otherwise unsuitable shall be removed from the site and replaced with straight undamaged or proper sized stop logs at no additional cost to the Government.

-- End of Section --