INDEX

SECTION 02271 - STONE PLACEMENT

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PART 1 GENERAL

1.1 SCOPE OF WORK

1.1.1 General

The work provided for herein consists of furnishing all plant, materials, equipment, and labor and performing all operations in connection with flotation channel excavation for placing stone, and moving from site to site, where required by these specifications. The work required under this contract is divided into two separate work efforts as described in the following paragraphs.

1.1.1.1 Stone Bank Paving

Stone Bank Paving will consist of construction of various types of stone bank paving, as described in these specifications, along the banks of the Mississippi, Atchafalaya, and Red Rivers and the Old River Control Structures. This required paving shall, in general, follow the work efforts of the Government Revetment Units or where directed.

1.1.1.2 Stone Repairs

Stone Repairs will consist of stone placement to repair various types of existing stone bank paving, as described in these specifications, along the banks of the Mississippi, Atchafalaya, and Red Rivers and the Old River Control Structures. In general, these work sites will consist of small holes or failures in the existing bank paving or articulated concrete mattress which can be repaired without first performing the bank grading and sinking operations by others as described in paragraph 1b of Section 01100 - GENERAL PROVISIONS.

1.2 MEASUREMENT

The unit of measurement of stone satisfactorily placed in the work will be the ton (2,000 pounds). Quantities will be computed to the nearest whole ton. The quantity of stone placed in the work will be reasonably estimated at each individual worksite and quantities adjusted upon completed use of a barge of material, or completion of the contract. If delivered by barge, the Contracting Officer's representative will measure stone for payment by weight determined by barge displacement. The Contractor shall furnish the Contracting Officer a barge displacement table, not less than 10 days prior to unloading stone from any barge for which a displacement table has not previously been furnished and approved. The Contractor shall furnish with the barge displacement table a drawing or sketch of each barge, dimensioned in sufficient detail to permit checking of the tables. The drawing shall show, as a

minimum, the length, width, and depth of the barge, and dimensions of rake or rakes. Each such table shall have its accuracy certified by a person or firm, other than the Contractor, customarily performing this service and who has been approved by the Contracting Officer. Each table submitted shall show the name and/or number of the barge, the barge dimensions, the barge owner, the name of the fabricator, certification, and date of certification of the person or firm preparing the table. All new or modified barges shall be field checked for current dimensions by the Contractor, in the presence of the Contracting Officer's Representative. Each table submitted shall contain in parallel columns, the freeboard of the barge in feet and tenths from zero to the full depth of the barge, and the corresponding gross displacement to the nearest ton. Each barge shall be suitably marked with two displacement gaging lines along each side of the barge. Each gaging line shall be painted perpendicular to the edge of the barge and be no less than 4 inches wide and 1 foot long, on both the deck and side of the barge. Barges with rakes shall have the displacement gaging lines placed at each corner of the box section between the rakes. If a barge has a box end or ends, the gaging lines shall be placed approximately four feet from the box end. The freeboard will be measured at the four gaging locations and the displacement determined by the use of the "CEMVD Standard Barge Tables" from the average of these measurements. The displacement shall be determined before and after the barge is unloaded and the difference between these values shall be the quantity delivered. All barge measurements will be taken without adjustment for the degree of salinity in the water. The Contractor shall, during bid preparation, estimate the degree of salinity present in the water and include any adjustments in the applicable stone bid prices. All barge displacement measurements will be taken assuming fresh water. When stone, not handled by barge, is delivered by truck from a quarry or railroad siding, it shall be weighed on approved scales before being placed in the work. The scales shall be located as near the site of the work as is practicable and shall be tested as often as necessary to ensure accurate weights, as determined by the Contracting Officer. The Contractor shall furnish the scales and shall weigh the stone in the presence of a Contracting Officer's Representative, who will certify to the correctness thereof. Weight certificates furnished by a public weighmaster will be acceptable in lieu of such procedures when authorized by the Contracting Officer.

(1) The quantity of stone placed in the work will be reasonably estimated at each individual work site and quantities adjusted upon completed use of a barge of material, or completion of the contract. No barge of stone delivered for use in the contract work shall be used or removed until the inspector has made measurements to determine the quantities delivered and/or used.

1.3 PAYMENT

No separate payment will be made for testing stone. No payment will be made for any unauthorized use of the stone. Payment for stone placed in upper bank paving, subaqueous paving, dike paving will be made at the applicable contract unit prices for "Stone Upper Bank Paving", (Items 0001CA thru 0001CF); "Stone Subaqueous

Paving", (Items 0001DA thru 0001DF); and "Stone Dike Paving", (Items 0001EA thru 0001EC). Payment for stone repairs placed in bank paving, overbank paving, and dike paving will be made at the applicable contract unit prices for "Stone Repairs", (Items 0001FA thru 0001FF) based on the respective mileage of the work performed. Payment for "A" stone repairs made to any of the Hog Point Channel Contraction Works will be made at the applicable contract unit price for "Hog Point Channel Contraction Works Repairs ("A" Stone)", (Item 0001GA). Prices and payments shall constitute full compensation for furnishing all material, equipment, labor, surveys, placing stone, gradation tests, dressing of slopes and other incidental work, in accordance with these specifications and applicable drawings. Stone placed outside the allowable tolerances will not be paid for. Payment for mobilization and demobilization will be made at the lump sum unit prices for "Mobilization and Demobilization", (Item 0001AA) in accordance with provisions of the Special Contract Requirement entitled "PAYMENT FOR MOBILIZATION AND DEMOBILIZATION".

1.4 REFERENCES

The following publications referred to thereafter by basic designation only, form a part of this specification to the extent indicated:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 127	(1988) Specific Gravity and Absorption of Coarse Aggregate

1.5 QUALITY CONTROL FOR MATERIALS

1.5.1 General

The Contractor shall inspect all materials before they are incorporated into the work for compliance with contract requirements and any material found to be defective will be rejected. All information pertaining to the inspection shall be recorded and included in quality control reports furnished the Contracting Officer. The inspections shall include, but will not be limited to the following:

(1) Submission of stone samples for quality testing, if from other than approved sources. (See paragraph 2.1.1.2).

(2) Quality of stone meets the requirements specified in paragraph 2.1.1.1.

(3) Quantity of stone delivered and placed each day.

1.5.2 Reporting

The original and two copies of the mentioned records, as well as the records of corrective action taken, shall be furnished the Government daily. Format of report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.6 QUALITY CONTROL FOR CONSTRUCTION

1.6.1 General

The Contractor shall establish and maintain quality control for stone operations to assure compliance with contract specifications and maintain records of his quality control for all construction operations including but not limited to the following:

(1) Check subgrade, depth of stone and dike elevations and crown widths for compliance with design sections. Submit plan for method of placement of stone under water and set up system of horizontal control to assure specified coverage.

(2) Insure that method of handling and placement of stone is such as to provide a minimum of segregation of sizes in the in- place materials.

(3) Insure that the method of unloading of stone from barges is done in a manner, which provides a minimum amount of wastage.

(4) For dike construction, record tonnage of stone placed in each station of dike and check quantity for compliance with design sections.

1.6.2 Reporting

The original and two copies of the mentioned records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. Format of report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 STONE

2.1.1.1 General

All stone shall be of a hard, durable quality as approved by the Contracting Officer, which shall not disintegrate under the elements or be easily broken in handling. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, seams, and other

defects that would tend unduly to increase its deterioration from natural causes. It shall be clean and free from earth, dust, or other refuse. All such objectionable materials shall be removed prior to loading out at the quarry. Neither the width nor thickness of any piece shall be less than one third of its length. The faces of individual pieces of stone shall be roughly angular, not round, in shape. Field stone, rectangular block stone, slabs, and rounded boulders will not be accepted. Gradations shall conform to spec paragraph 2.1.1.4 and the gradation curves at the end of this section.

2.1.1.2 Sources and Evaluation Testing

All stone shall be obtained in accordance with the provisions in the General Provision entitled "STONE SOURCES". The sources from which the Contractor proposes to obtain the material shall be selected well in advance of the time when the material will be required. If the Contractor proposes to furnish stone from a source not listed in "STONE SOURCES", the Government will make such investigations as necessary to determine whether acceptable stone can be produced from the proposed source. Satisfactory service records on work outside the Corps of Engineers will be acceptable. If no such records are available, the Government will make tests to assure the acceptability of the stone. The tests to which the stone may be subjected will include petrographic analysis, specific gravity, abrasion, absorption, wetting and drying, freezing and thawing, and such other tests as may be considered necessary by the Contracting Officer. The following guidance is provided for use by the Contractor in analyzing a new source of stone not listed in "STONE SOURCES". Stone that either weighs less than 155 lbs/cf or has more than 2% absorption will not be accepted. The method of determining the unit weight and absorption of stone will be in accordance with ASTM C 127, except that unit weight will be calculated in accordance with note 5 using bulk specific gravity, S.S.D. Samples of stone from a source not listed in "STONE SOURCES" shall be submitted to the Contracting Officer for testing and acceptance prior to delivery of any stone to the site of the work. Samples shall consist of at least 7 pieces of stone, roughly cubical in shape and weighing not less than 100 pounds each. All such samples shall be taken by the Contractor under the supervision of the Contracting Officer. The samples shall be shipped at the Contractor's expense to the Waterways Experiment Station, Vicksburg, Mississippi, at least 90 days in advance of the time the placing of stone is expected to begin. The tests will be conducted in accordance with applicable Corps of Engineers Methods of tests, and will be performed at the Waterways Experiment Station, Vicksburg, Mississippi. The cost of testing will be borne by the Government.

2.1.1.3 Gradation of Stone

Gradation tests of stone shall be accomplished at the quarry. Tests by weight shall be made by the Contractor in the presence of the Contracting Officer's

representative. The Contractor shall notify the Contracting Officer not less than 3 working days in advance of each test. In the event of nonavailability of the Government representative, the Contractor shall perform the tests and certify to the Contracting Officer that the stone shipped complies with the specifications. A minimum of one test shall be performed for each 25,000 tons of riprap less than 1,000 pounds top size or a fraction thereof; and 50,000 tons of Grade A stone or a fraction thereof, of stone supplied to the Government from each source. Each test sample shall be representative of the stone being shipped and consist of not less than 15 tons for upper bank, subaqueous and dike paving, and repair stone; and not less than 50 tons for Graded Stone "A". Percentage determinations shall be made for each stone weight specified in each gradation in paragraph 2.1.1.4. Gradation test data shall be recorded on MVN Form 602-R "Gradation Test Data Sheet", a copy of which is shown at the end of this section. Failure of the test on the initial sample and on an additional sample will be considered cause for rejection of the quarry and/or quarrying process, and all stone represented by the failed tests shall be set aside and not incorporated into the work. Any additional test required because of the failure of an initial test sample will not be considered as one of the other required tests. Certification and test results shall represent stone shipped from the quarry and must be received by the Government field representative before the stone is used in the work, but not later than seven days after the stone leaves the quarry. The Certificate of Compliance shall contain the type of stone, the date loaded and the barge number. The Contractor shall designate on the test form that portion (in tons) of the lot tested which is applicable to this contract. Any deviation from the reported tonnage shall be corrected on a revised gradation test form. The Contracting Officer may direct, under the Contract Clause entitled "INSPECTION OF CONSTRUCTION" (FAR 52.246-12), additional testing of stone furnished to the worksite if the stone appears, by visual inspection, to be of questionable gradation or quality. Refer to paragraph 2.2 of this section for the gradation test method.

2.1.1.4 Size

2.1.1.4.1 Upper Bank Paving

Except as indicated by the following tolerances, stone shall be in pieces weighing not more than 125 pounds each, and no dimensions shall be over 20 inches. Each shipment shall be graded by weight as follows:

Weight of Pieces In Pounds	Individual Percent Retained by Weight
75 to 125	10 max.
25 to 75	40 to 60
6 to 25	20 to 40
0 to 6	0 to 15

Note: Not more than 5 percent shall pass a 1-inch sieve.

2.1.1.4.2 Subaqueous Paving and Stone Repairs

Stone for use in subaqueous bank paving and stone repairs to revetment shall be in pieces weighing not less than 6 pounds each, nor more than 200 pounds each. Each shipment shall be graded by weight as follows:

Weight of Pieces In Pounds	Percent of Total Weight
150 to 200	5 max.
125 to 150	5 to 15
75 to 125	15 to 40
25 to 75	40 to 55
under 25	10 max.

NOTE: Not more than 5 percent shall pass a 1-inch sieve.

2.1.1.4.3 Dike Paving

Stone for use in dike paving shall be "C" type stone and shall meet the gradation requirements shown in plate IV at the end of this section.

2.1.1.4.4 Hog Point Contraction Works Repairs

Stone used for dike repair to any of the Hog Point Channel Contraction Works shall be standard graded Stone "A", meeting the requirements shown in Plate II at the end of this section.

2.2 MVD STANDARD TEST METHOD FOR GRADATION OF BANK PAVING AND DIKE STONE

2.2.1 General

2.2.1.1 Sample Selection

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

2.2.1.2 Selection of Size for Separation

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

2.2.2 Procedure

(1) Select a representative sample (see paragraph 2.2.1.1), weigh and dump on hard stand.

(2) Select specific sizes on which to run "individual weight larger than" test. See respective example. Procedure is similar to the standard aggregate gradation test for "individual weight retained."

(3) Determine the largest size stone in the sample. (100% size).

(4) Separate by "size larger than" the selected weights, starting with the larger sizes. Use reference stones, with identified weights, for visual comparison in separating the obviously "larger than" stones. Stones that appear close to the specific weight must be individually weighed to determine size grouping. Weigh each size group, either individually or cumulatively.

(5) Subparagraph (4) will result in "individual weight retained" figures. Calculate individual percent retained for upper bank and subaqueous paving stone. For dike paving stone ("C" Stone) and contraction dike stone ("A" Stone), continue by calculating the cumulative percent retained and cumulative percent passing (see gradation examples). Plot the cumulative percent passing along with the specification limits on Plate IV for dike paving stone. Plot the cumulative percent

passing along with the specification limits on Plate II for contraction works stone. The test results should fall within the limits shown.

EXAMPLE GRADATION FOR UPPER BANK AND SUBAQUEOUS PAVING STONE	
SPECIFICATIONS	
STONE WEIGHT IN LBS.	INDIVIDUAL PERCENT RETAINED
75 - 125	10 max.
25 - 74	40 - 60
6 - 24	20 - 40
0 - 6	15 max.

EXAMPLE WORKSHEET FOR UPPER BANK AND SUBAQUEOUS PAVING STONE			
STONE WEIGHT IN LBS.	INDIVIDUAL WEIGHT IN LBS.	INDIVIDUAL % RETAINED	SPECS.
+125	0	0	0
75 - 125	2,600	8	10 max.
25 - 74	16,200	50	40 - 60
6 - 24	10,000	32	20 - 40
0 - 6	3,200	10	15 max.

TOTAL 32,000 lbs. NOTE: Largest stone 125 lbs.

EXAMPLE GRADATION FOR DIKE PAVING STONE	
SPECIFICATIONS	
Cumulative % Finer By Weight	Stone Weight. (lbs.)
100	400
70 - 100	250
50 - 80	100
32 - 58	30
15 - 34	5
2 - 20	1
0 - 5	<1/2" max. dia.

EXAMPLE WORKSHEET FOR DIKE PAVING STONE				
STONE SIZE LBS.	INDIVIDUAL WEIGHT RETAINED	INDIVIDUAL % RETAINED	CUMULATIVE % RETAINED	CUMULATIVE % PASSING
400	0	0	0	100
250	5,994	17	17	83
100	6,699	19	36	64
30	5,994	17	53	47
5	7,405	21	74	26
1	5,642	16	90	10
<1/2"	3,526	10	100	0

TOTAL 32,260 lbs. NOTE: Largest stone 251 lbs.

PART 3 EXECUTION

3.1 CONSTRUCTION

3.1.1 General

The Contractor shall furnish and place stone bank paving in those areas indicated on the "Before-Construction" drawings or as directed in the field by the Contracting Officer. Stone bank paving may be required at locations where no mattress sinking was performed. The contractor shall provide a positive means of preventing spillage of stone from supply barges during placement operations. The contractor shall either furnish supply barges with rails or secure the supply barges against the paving unit to prevent spillage.

3.2 STONE UPPER BANK AND SUBAQUEOUS PAVING

3.2.1 Description

Upper bank paving consists of ditch outlet paving and stone paving required riverward of top bank to the inshore edge of mattress or tie-end to subaqueous stone paving. The inshore edge of mattress may fall a considerable distance offshore. Normally, where the inshore edge of the mattress falls within approximately 30 feet of the shoreline, upper bank paving requirements are utilized for the area to be paved. Subaqueous paving consists of paving required to be placed in larger areas beneath the water surface as specified in jobsite specifications and work orders. Upper bank and subaqueous paving stone shall conform to the requirements set forth in paragraphs 2.1.1.4.1 and 2.1.1.4.2, respectively.

3.2.1.1 Top Bank

For the purpose of these specifications, top bank is defined as the general line formed by the intersection of the uniform slope of the graded bank with the original or backfilled ground surface.

3.2.1.2 Underwater Slope

Placement of underwater paving will be required on designated areas of the subaqueous riverbank. Paving in such areas shall not extend more than 200 feet, horizontal distance, from the water's edge at time of placing.

3.2.1.3 Ditch Outlets

Ditch outlet paving consists of paving the bottom and sides of the outlet and lateral ditches where shown on the drawings or designated by the Contracting Officer.

3.2.1.4 Exposed Flanks

When the bank paving ends with a flank or flanks not connected with existing work, the Contracting Officer may direct that the last 60 linear feet be paved with a layer of stone, averaging 20 inches in thickness, from a point 4 feet landward of the articulated concrete mattress to the landward limit of the paving.

3.2.2 Placing

3.2.2.1 Above Water

A 10-inch layer of stone upper bank paving shall be placed on the graded bank or filter blanket. Care shall be exercised in placing bank paving so that the filter blanket will not be damaged. Bank paving shall be placed by skip, clamshell or other method approved by the Contracting Officer. The bank paving shall be rearranged as necessary by hand and/or equipment, to provide complete coverage of the bank. Use of such equipment will be subject to the approval of the Contracting Officer's Representative. A tolerance of 2 inches above or below the specified 10 inches will be allowed, but the average rate of application for the entire job shall be 4.7 tons per square (100 Sq. Ft.). Openings between stones exposing more than 4 square inches of subgrade or filter blanket will not be permitted. Connections between the bank paving and concrete mattress, subaqueous paving or existing paving shall be made as detailed on the drawing. To prevent overtopping of the paved portion of the slope by rising river stages, bank paving shall be placed in strips parallel to the water's edge, when directed by the Contracting Officer, and the lower portion of the bank paving adjacent to the subaqueous mattress or subaqueous paving shall be completed at that locality before continuing the bank paving to top of the area to be paved. Stockpiling of stone on the graded bank to a height in excess of 3 feet will not be permitted.

3.2.2.2 Underwater

Subaqueous paving shall consist of placement of stone below water in the vicinity of docks, dolphins, submarine pipeline crossings, and other such obstructions, where underwater scour has occurred, or in areas of new articulated concrete mattress (ACM) construction where the inshore edge of ACM is placed riverward of the water's edge. Subaqueous paving shall be completed in areas requiring both subaqueous paving and upper bank paving before upper bank paving work is performed. Stone paving placed underwater shall be cast off the barge by machine uniformly over the area to be paved until the total quantity required has been placed. In areas where the subaqueous paving is to be placed around (ACM), the subaqueous paving shall overlap the ACM with a 10-foot wide strip of stone. Prior to the start of work the Contractor shall submit plans for approval of his method of placing stone underwater. The quantity and locations of paving shall be as specified in the jobsite specifications and "Before-Construction" drawings. The approximate rate of application and average thickness of the subaqueous paving shall be based on the water depths at the time of placing as follows:

Water Depth	Rate of Application Tons Per Square (100 Ft.^{2})	Average Thickness Inches
0 feet to 20 feet	7.0	14
20 feet to 64 feet	9.0	18
below 65 feet	12.0	24

3.3 STONE DIKE PAVING

3.3.1 Description

Dike paving consists of all stone dike work required landward of the inshore edge of the articulated concrete mattress. This includes, but is not limited to all overbank paving and stone dike work required at and immediately landward of top bank as defined in paragraph 3.2.1.1. Dike paving will be required at selected areas as shown on the "Before Construction" drawings, or as directed in the field. Dike paving stone shall conform to the requirements set forth in paragraph 2.1.1.4.3. Dike paving shall be located at and immediately landward of top of bank. At some locations, existing foreshore protection may remain after grading. This existing dike will form a part of the required new dike section shown on the jobsite construction plans.

3.3.2 Placing

The stone shall be dumped in place by skip, clamshell or other approved method, and rearranged by hand or approved equipment as necessary to conform to the dike dimensions shown on the "Before-Construction" drawings. Overbank paving required between the inshore edge of ACM and the stone dike shall have an average thickness of 20 inches. A tolerance of 2 inches above or below the specified average thickness will be allowed, but the average rate of application for the entire job shall be 9.5 tons per square (100 sq. ft.). Where underwater dike paving is required in scour areas, the stone shall be cast by machine uniformly over the area to be paved until the total quantity required has been placed or until the dike has been constructed to the specified section as determined by a representative of the Contracting Officer.

3.4 PLACEMENT OF STONE REPAIRS

3.4.1 Repairs to Bank Paving Above Water

After the subgrade over the area to be paved has been prepared by grading or dressing, stone shall be placed on the bank by skip, clamshell, or other approved method, and arranged as necessary to provide complete and uniform coverage of the bank to an average thickness of 12 inches. Openings between pieces of stone

exposing more than 4 square inches of the graded slope will not be permitted. Spalls and quarry chips may be used as a base, but not as a filler.

3.4.2 Overbank Paving

Overbank paving shall consist of placement of a blanket of stone to an average thickness of 12 inches over areas where overbank scour has occurred; in new or repaired drainage ditches and/or construction of traverse stone dikes in areas as directed by the Contracting Officer. It is intended that the work under this item be performed from a floating plant. If work is directed to be performed at river stages, which require land based equipment, then an equitable adjustment in the contract price will be made in accordance with the Contract Clause, entitled "CHANGES". The dikes shall be constructed perpendicular to the bank to the approximate section shown on the drawings. The elevation of the top of the dike shall be as directed by the Contracting Officer. Spalls and quarry chips may be used as a base, but not as a filler.

3.4.3 Dike Paving

Dike paving shall consist of placing stone in areas where the existing dike is deficient or as directed by the Contracting Officer, to the typical stone dike section shown on the drawings. At any one location, dike work requiring placement of less than 1,000 tons of stone shall be considered as dike repair work. The stone shall be placed by skip, clamshell or other approved methods and rearranged as necessary to conform to the dike dimensions shown on the drawings.

3.4.4 Hog Point Channel Contraction Works Repairs

The Hog Point Channel Contraction works include Contraction Dikes 1, 2, 3, 5, and 6, and the Trenchfill structure which runs from mile 300-R to 298-R, and the Chute Closure at mile 300-R. Repairs to the Contraction Dikes shall consist of raising low areas in dikes 1, 2, 3, 5, and 6 to grade as directed by the Contracting Officer. Repairs to the Trenchfill structure and Chute Closure will consist of raising low areas or reinforcing areas where stone launching has occurred. Repairs shall be made only when the river stage at Red River Landing is below the grade of the dikes 1, 2, and 3(El.+18 feet LWRP). Repairs shall also include shaping the crown to obtain the design width where repairs are required. The cost of degrading and shaping the crown shall be included in the contract unit price for "Hog Point Channel Contraction Works Repair ("A" Stone), Mississippi River Mile 300.5 to 298.0" and no separate payment will be made therefor. It is intended that the work under this item be performed by floating plant. If work is directed to be performed at stages, which would require land based equipment, then an equitable adjustment in the contract price will be made in accordance with the Contract Clause, entitled "CHANGES". The Contractor shall control the placement of stone in the dikes, trenchfill, and closure and it shall furnish, operate, and maintain the necessary equipment to

position its plant, equipment, and stone supply barges when stone placement is underway.

GRADATION TEST DATA SHEET

Quarry _____ Type of Stone Tested _____
Date of Test _____ Testing Rate _____ Tons

TEST REPRESENTS

Contract No.	District	Tons
	TOTAL	

GRADATION

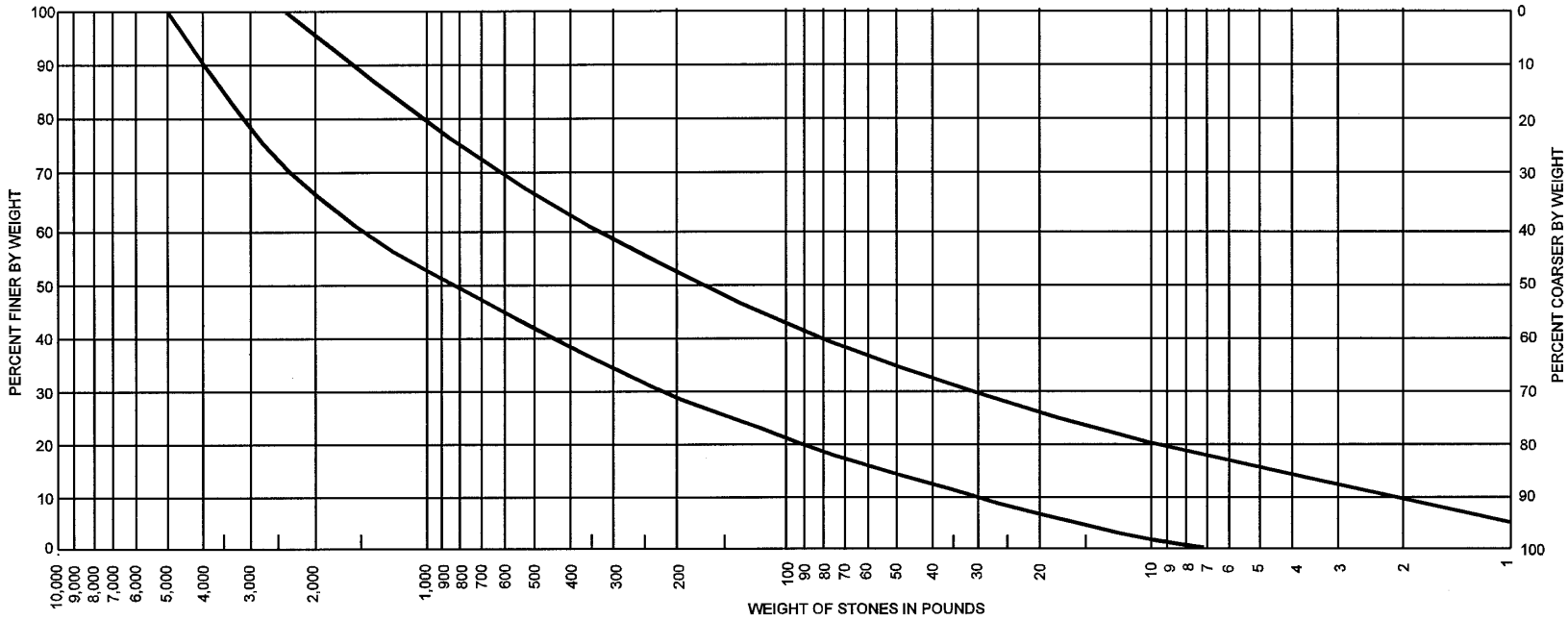
Stone Size (lbs)	Weight Retained	Individual % Retained	Cumulative % Ret.	Cumulative % Pass	Specification % Finer by Wt.
Total Weight					

Remarks: _____

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

Contractor Representative _____

Government Representative _____



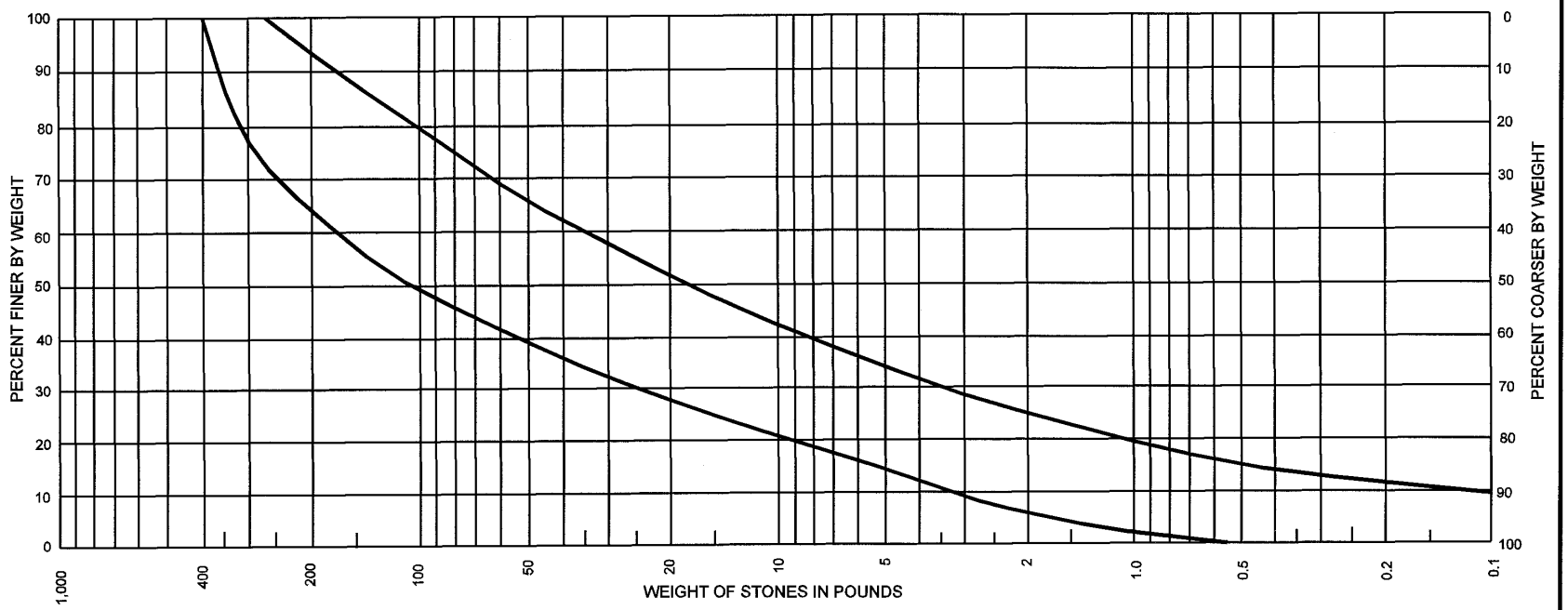
STONE WEIGHT POUNDS	CUMULATIVE % FINER BY WEIGHT
5000	100
2500	70 - 100
500	40 - 65
100	20 - 45
5	0 - 15
1	0 - 5

GRADATION

GRADED STONE A

MAY 1975

PLATE II



STONE WEIGHT POUNDS	CUMULATIVE % FINER BY WEIGHT
400	100
250	70-100
100	50-80
30	32-58
5	15-34
1	2-20
less than ½" max. dimension	0-5

NOTE: 5% of the material can weigh more than 400 pounds. However no piece shall weigh more than 500 pounds.

GRADATION

GRADE STONE C

September 1976

PLATE IV