



FILE NO. H-4-45895

US ARMY CORPS  
OF ENGINEERS  
NEW ORLEANS DISTRICT

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## SOUTHEAST LOUISIANA PROJECT

LAKE PONTCHARTRAIN, LA AND VICINITY  
HIGH LEVEL PLAN  
LONDON AVE. OUTFALL CANAL  
PARALLEL PROTECTION  
ORLEANS PARISH LOUISIANA

## FLOODPROOFING OF ROBERT E. LEE BOULEVARD BRIDGE

ROBERT E. LEE BLVD.  
ORLEANS PARISH LOUISIANA

95% FINAL SUBMITTAL

Construction Solicitation  
and Specifications

10 MARCH 2003

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**Robert E. Lee Boulevard**  
**Orleans Parish**  
**State Project No. 742-07-0029**  
**FAP No. M-8567(003)**  
**City of New Orleans Dept. of Public Works No. 88-US-002(91 A & D)**

**Specifications**

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SECTION 00010  
 ROBERT E. LEE BOULEVARD  
 ORLEANS PARISH  
 STATE PROJECT NO. 742-07-0029  
 FAP NO. M-856(003)  
 CITY OF NEW ORLEANS  
 DEPT. OF PUBLIC WORKS NO. 88-US-002(91 A&D)

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0001	CLEARING AND GRUBBING	Lump	LS		
0002	SELECTIVE DEMOLITION	Lump	LS		
0003	ROADWAY EXCAVATION	Lump	LS		
0004	UNSUITABLE SUBGRADE AND EXCAVATION AND FILLING (TRUCK MEASURE)	1940	CY		
0005	GEOTEXTILE FABRIC	19620	SY		
0006	CLASS II BASE COURSE (NET SECTION)	1990	CY		
0007	SUB-BASE COURSE (NET SECTION)	2960	CY		
0008	COLD PLANING ASPHALTIC PAVEMENT (AVG. 2.5" THICK)	6000	SY		
0009	PORTLAND CEMENT CONCRETE PAVEMENT (9" THICK)	8350	SY		
0010	REINFORCED CONCRETE PIPE (12")	567	LF		
0011	REINFORCED CONCRETE PIPE (15")	334	LF		
0012	REINFORCED CONCRETE PIPE (18")	332	LF		
0013	REINFORCED CONCRETE PIPE (24")	370	LF		

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0014	REINFORCED CONCRETE PIPE (30")	118	LF		
0015	REINFORCED CONCRETE PIPE (36")	720	LF		
0016	REINFORCED CONCRETE PIPE (48")	324	LF		
0017	REINFORCED CONCRETE ARCH PIPE (28" X 18") OR 24" EQUIV.	123	LF		
0018	REINFORCED CONCRETE WYE OR ARCH. EQUIV. NEW (12" X 15")	2	EA		
0019	REINFORCED CONCRETE WYE OR ARCH EQUIV. (NEW 15" X 15")	1	EA		
0020	REINFORCED CONCRETE WYE OR ARCH EQUIV. NEW (12" X 18")	1	EA		
0021	REINFORCED CONCRETE WYE OR ARCH. EQUIV. NEW (8" X 24")	1	EA		
0022	REINFORCED CONCRETE WYE OR ARCH EQUIV. NEW (12" X 24")	4	EA		
0023	REINFORCED CONCRETE WYE OR ARCH EQUIV. NEW (12" X 30")	1	EA		
0024	REINFORCED CONCRETE WYE OR ARCH EQUIV. NEW (12" X 36")	3	EA		
0025	REINFORCED CONCRETE WYE OR ARCH EQUIV. NEW (12" X 48")	1	EA		
0026	REINFORCED CONCRETE WYE OR ARCH EQUIV. (15" X 36")	1	EA		
0027	REINFORCED CONCRETE WYE OR ARCH EQUIV. NEW (15" X 48")	1	EA		
0028*	DRAIN HOUSE CONNECTIONS FROM NEW DRAIN LINE TO BOC	3	EA		

\*CONTINGENCY ITEM TO BE USED ONLY AS DIRECTED BY THE CONTRACTING OFFICER

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0029	NO. 1 STANDARD RAIN MANHOLE	45	VFH		
0030	NO. 2 STANDARD DRAIN MANHOLE	45	VFH		
0031	NO. 3 STANDARD DRAIN MANHOLE	80	VFH		
0032	SPECIAL DRAIN MANHOLE	3	EA		
0033	SPECIAL CONFLICT MANHOLE	2	EA		
0034	NO. 1 STANDARD CATCH BASIN	21	EA		
0035	DOUBLE NO. 1 CATCH BASIN	3	EA		
0036	NO. 2 STANDARD CATCH BASIN	2	EA		
0037	24" X 30" CLEAR OPENING STANDARD DROP INLET	11	EA		
0038	SINGLE MOUNTABLE CATCH BASIN	4	EA		
0039	TYPE "A" CATCH BASIN ADJUSTMENT	1	EA		
0040	ADJUST MANHOLE OR DROP INLET UP TO 6" WITH BRICK AND MORTAR	6	EA		
0041	ADJUST MANHOLE OR DROP INLET OVER 6" WITH BRICK AND MORTAR	6	EA		
0042	SAFETY FENCE (CHAIN LINK FENCE, 6 FT. HEIGHT)	2090	LF		
0043	CONCRETE SIDEWALK (4") INCLUDING REINFORCEMENT	1230	SY		
0044	CONCRETE DRIVEWAY (6") INCLUDING REINFORCEMENT	275	SY		

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0045	SIDEWALK AT INTERSECTION, INCLUDING HANDICAPPED RAMPS (6") AND REINFORCEMENT	160	SY		
0046	SIDEWALK IN MEDIAN INCLUDING HANDICAPPED RAMPS AND REINFORCEMENT	25	SY		
0047	CONCRETE MOUNTABLE CURB WITH OR WITHOUT DOWELS (STRAIGHT, CIRCULAR OR DEPRSED)	2730	LF		
0048	6" CONCRETE BARRIER CURB WITH OR WITHOUT DOWELS (STRAIGHT, CIRCULAR OR DEPRSED)	2660	LF		
0049	FERTILIZING AND SLAB SODDING	5600	SY		
0050	TREE PROTECTION	2	EA		
0051	TREE TRIMMING	Lump	LS		
0052	ROOT PRUNING	8	EA		
0053	CONCRETE PAVEMENT PATCH	15	SY		
0054	ASPHALTIC CONCRETE BINDER COURSE (PAVEMENT PATCH)	11	TONS		
0055	ASPHALTIC CONCRETE WEARING COURSE	30	TONS		
0056	MOBILIZATION AND DEMOBILIZATION	Lump	LS		
0057	PERMANENT TRAFFIC SIGNS	5	EA		
0058	STREET NAME SIGN ON NEW POST	9	EA		
0059	REFLECTORIZED RAISED PAVEMENT MARKERS	100	EA		
0060	PLASTIC PAVEMENT STRIPING (4")	5540	LF		



Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0061	PLASTIC PAVEMENT STRIPING (8")	480	LF		
0062	PLASTIC PAVEMENT STRIPING (24")	420	LF		
0063	PLASTIC PAVEMENT LEGENDS AND SYMBOLS	Lump	LS		
0064	6" NEW PVC WATER MAIN WITH MAIN LINE FITTINGS	240	LF		
0065	12" NEW PVC WATER MAIN WITH MAIN LINE FITTINGS	390	LF		
0066	12" NEW D.I. WATER MAIN WITH MAIN LINE FITTINGS, BEAMS AND OTHER SUPPORTS ALONG ROBERT E. LEE BRIDGE	300	LF		
0067	NEW 12" WATER VALVE	1	EA		
0068*	REPLACE 34" WATER HOUSE CONNECTION (FROM MAIN TO METER)	7	EA		
0069*	REPLACE 1" WATER HOUSE CONNECTION (FROM MAIN TO METER)	7	EA		
0070	6" WATER LINE OFFSET UP TO 24"	4	EA		
0071	6" WATER LINE OFFSET OVER 24"	1	EA		
0072	ADJUST WATER VALVE BOX	9	EA		
0073	NEW WATER VALVE MANHOLE	1	EA		
0074	REMOVE MUD AND DEBRIS FROM INSIDE OF WATER METER BOX	14	EA		
0075	ADJUST COMPLETE WATER METER BOX TO GRADE	14	EA		

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0076*	REPLACE BROKEN WATER METER BOX	7	EA		
0077*	REPLACE EISTING SEWER HOUSE CONNECTION FROM EXISTING MAIN TO BACK OF CURB	7	EA		
0078	REMOVE AND REPLACE REGULATORY SIGNS	22	EA		
0079	6" TOP SOIL	5600	SY		
0080	4" INCIDENTAL CONCRETE PAVEMENT INCLUDING REINFORCEMENT	300	SY		
0081	GEOGRID REINFORCEMENT	8900	SY		
0082	REMOVE AND RESET EXISTING BRICK PATIO STONE SIDEWALK	Lump	LS		
0083	HAND FORM ADJACENT CURB	105	LF		
0084	TEMPORARY SILT FENCING	430	LF		
0085	TEMPORARY BALED HAY	2620	LF		
0086	TRENCH AND BACKFILLING FOR ELECTRICAL CONDUIT	1310	LF		
0087	LIGHT POLE WITH 12' ARM, 30 FT. MTG. HT	8	EA		
0088	LIGHT POLE WITH 2-12' ARM, 30 FT. MTG. HT.	4	EA		
0089	LUMINAIRE (COBRA HEAD) 250W, HPS	16	EA		
0090	STREET LIGHT CONDUCTORS, 3#4, 1#6G	1450	LF		

\*CONTINGENCY ITEM TO BE USED ONLY AS DIRECTED BY THE CONTRACTING OFFICER

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0091	STREET LIGHT CONDUCTORS, 6#4, 2#6G	280	LF		
0092	CONDUIT 2" PVC, SCH 40 FOR STREET LIGHTS	1450	LF		
0093	CONDUIT 2-2 1/2" PVC, SCH. 40 FROM SERVICE CABINET TO EXISTING ELECTRICAL MANHOLE	50	LF		
0094	CONDUIT 2" RGS. FOR BRIDGE	280	LF		
0095	SERVICE CABINET	1	EA		
0096	HAND HOLE	7	EA		
0097	HAZARD BEACON RELOCATION	1	EA		
0098	ELECTRIC UTILITY COORDINATION	Lump	LS		
0099	PILING, STEEL SHEET, TYPE PZ 22	8180	SF		
0100	PILING, STEEL SHEET YPE PS 31	2220	SF		
0101	PRECAST CONCRETE PILES (12")	6153	LF		
0102	PRECAST CONCRETE PILES (20")	2322	LF		
0103	STEEL BEARING PILES (HP 14 X 73)	1683	LF		
0104	FURNISHING AND DRIVING 20" X 20" PPC TEST PILES	2	EA		
0105	FURNISHING AND DRIVING HP 14 X 73 TEST PILES	2	EA		
0106	FURNISHING AND DRIVING 12' X 12" PPC TEST PILE	1	EA		

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0107	COMPRESSION TEST – 20" X 20" PPC PILES				
	A) FIRST COMPRESSION TEST	1	EA		
	B) ALL OVER ONE COMPRESSION TEST	1	EA		
0108	COMPRESSION TEST – HP 14 X 73 TEST PILES				
	A) FIRST COMPRESSION TEST	1	EA		
	B) ALL OVER ONE COMPRESSION TEST	1	EA		
0109	COMPRESSION TEST – 12" X 12" PPC PILES				
	A) FIRST COMPRESSION TEST	1	EA		
0110	REINFORCED CONCRETE SUBSTRUCTURE	Lump	LS		
0111	REINFORCED CONCRETE SUPERSTRUCTURE	Lump	LS		
0112	REINFORCED CONCRETE CURTAIN WALLS, INCLUDING FOOTINGS	Lump	LS		
0113	REINFORCED CONCRETE STD. BARRIER RAIL AND PEDESTRIAN RAIL, INCLUDING BARRIER RAIL TRANSITION	Lump	LS		
0114	REINFORCED CONCRETE APPROACH SLABS	Lump	LS		
0115	REINFORCED CONCRETE I-WALLS	Lump	LS		
0116	REINFORCED CONCRETE STEPPED WALKWAY	Lump	LS		
0117	REINFORCED CONCRETE RETAINING WALL	Lump	LS		
0118	CONCRETE SLOPE PAVING UNDER BRIDGE				
0119	STRIP SEAL JOINTS	115	LF		
0120	MISCELLANEOUS METAL WORK	Lump	LS		
0121	RIPRAP	670	TONS		

Item	Description	Estimated Quantity	Unit	Unit price	Estimated Amount
0122	TEMPORARY FLOOD PROTECTION	Lump	LS		

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SECTION 00700 – CONTRACT CLAUSE INSERTS

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SECTION 00700 – CONTRACT CLAUSE INSERTS

1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK  
(FAR 52.211-10 - APR 1984)

The Contractor shall be required to

- (a) Commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed,
- (b) Prosecute the work diligently, and
- (c) Complete the entire work ready for use not later than 365 calendar days after the date of receipt by him of notice to proceed. The time stated for completion shall include final cleanup of the premises.
- (d) The Contractor is hereby informed that time allowed for completion of work has been established as the shortest reasonable duration and that he/she shall make any and all provisions necessary (multiple crews, overtime, concurrent operations, etc.) to accomplish the work within the available time period.

2. LIQUIDATED DAMAGES - CONSTRUCTION (FAR 52.211-12 – SEPT 2000)

- (a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$ \_\_\_\_\_ for each calendar day of delay until the work is completed or accepted.
- (b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

3. CONTRACT DRAWINGS AND SPECIFICATIONS (DFARS 252.236-7001 – AUG 2000)

- (a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference in reproducible paper media.
- (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;
- (4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and
- (5) Reproduce and print contract drawings and specifications as needed.

(c) In general --

- (1) Large-scale drawings shall govern small-scale drawings; and
- (2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the mis-description of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or mis-described details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

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

<u>Title</u>	<u>File</u>	<u>Drawing Nos.</u>
Robert E. Lee Boulevard	H-4-45895	1 thru 99
Orleans Parish		100 thru 130
State Project No. 742-07-0029		291 thru 214
FAP No. M-8567(003)		Standard LDOTD Plans (1 thru 7)
City of New Orleans Dept. of Public Works No. 88-US-002(91 A&D)		

4. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (EFARS 52.231-5000 - MAR 95)

(a) This clause does not apply to terminations. See *EFARS 52.249-5000, 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 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," Region III. 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 retroactive 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-leaseback 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.

NOTE1: Costs for repairs or overhauling are not allowed.

NOTE 2: A copy of the "EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE CD can be obtained from the Government Printing Office (GPO) by calling (202)512-1800 or through the Internet site [www.access.gpo.gov/su\\_docs](http://www.access.gpo.gov/su_docs). Also any references in the paragraph to the manual should be changed to reference the CD.

## 5. PHYSICAL DATA (FAR 52.236-4 - APR 1984)

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

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and borings. Field notes, graphic boring logs, field and laboratory test results, and other data on which this information is based are available at U.S. Army Engineer District, New Orleans, Corps of Engineers, Attn: CEMVN-ED, P.O. Box 60267, New Orleans, Louisiana 70160-0267, and access thereto may be had upon request. The soil boring information is included in the drawings.

(b) Weather Conditions. Data on weather conditions may be obtained from the National Weather Service.

(c) Transportation Facilities.

(d) The Contractor is responsible for keeping streets free of mud, tracking, spillage and/or other surface pollution from his equipment and operations. Contractor shall take whatever means required (i.e., street cleaners, manual labor, water trucks with sprayers) as often as needed to maintain clean streets near the work site. All debris resulting from street cleaning operations shall be hauled off-site and disposed of properly.

(e) Estimates of quantities involved in certain items of work for which bids are being solicited on a lump sum or job basis have been made for the use of the Government. Copies of these quantity estimates may be viewed/obtained by contacting the District Engineer, Attn: Mrs. Diane Pecoul, same address as stated in subparagraph (a) above. It is expressly understood that the accuracy of these estimates is in no way warranted and that the furnishing of this information to a bidder will not relieve him of his responsibility to estimate the quantities involved.

## 6. LAYOUT OF WORK (FAR 52.236-17 - APR 1984)

The Contractor shall lay out its work from Government-established base lines and benchmarks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

7. QUANTITY SURVEYS (FAR 52.236-16 - APR 1984)

(a) Quantity surveys will 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 Government shall conduct the original and final surveys and make the computations based on them. The Contractor shall conduct the surveys for any periods for which progress payments are requested and shall make the computations based on these surveys. All surveys conducted by the Contractor shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance.

(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.

8. PAYMENT FOR MOBILIZATION AND DEMOBILIZATION (DFARS 252.236-7004 - DEC 1991)

(a) The Government will pay all costs for the mobilization and demobilization of all of the Contractor's plant and equipment at the contract lump sum price for this item.

(1) Sixty percent (60%) of the lump sum price upon completion of the Contractor's mobilization at the work site.

(2) The remaining forty percent (40%) upon completion of demobilization.

(b) The Contracting Officer may require the Contractor to furnish cost data to justify this portion of the bid if the Contracting Officer believes that the percentages in paragraphs (a)(1) and (a)(2) of this clause do not bear a reasonable relation to the cost of the work in this contract.

(1) Failure to justify such price to the satisfaction of the Contracting Officer will result in payment, as determined by the Contracting Officer, of-

(i) Actual mobilization costs at completion of mobilization;

(ii) Actual demobilization costs at completion of demobilization;  
and

(iii) The remainder of this item in the final payment under this contract.

(2) The Contracting Officer's determination of the actual costs in paragraph (b)(1) of this clause is not subject to appeal.

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

The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty percent (20%) of the total amount of the 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.

10. CONTINUING CONTRACTS (EFARS 52.232-5001 - MAR 95)

(a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922, (33 US Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations, and from future contribution to the project having one or more non-federal project sponsors. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the Section 00700 Clause entitled *Payments under Fixed-Price Construction Contracts (FAR 52.232-5)*, or any other clause of this contract.

(b) The sum of \$\_\_\_\_\_ has been reserved for this contract and is available for payments to the Contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds together with funds provided by one or more non-federal project sponsors will be reserved for this contract.

(c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not entitle the Contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (f) and (i) below. No such failure shall constitute a breach of this contract, except that this provision shall not bar a breach-of-contract action if an amount finally determined to be due as a termination allowance remains unpaid for one year due solely to a failure to reserve sufficient additional funds therefore.

(d) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The Contracting Officer will promptly notify the Contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.

(e) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the Contractor shall give written notice to the Contracting Officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(f) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. The Contractor shall be entitled to simple interest on any payment that the Contracting Officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, as in effect on the first day of the delay in such payment.

(g) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the Contractor to any price adjustment under the "SUSPENSION OF WORK" clause or in any other manner under this contract.

(h) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(i) If, upon the expiration of sixty (60) calendar days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the Contractor, by written notice delivered to the Contracting Officer at any time before such additional funds are reserved, may elect to treat his/her right to proceed with the work as having been terminated. Such a termination shall be considered a termination for the convenience of the Government.

(j) If at any time, it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the Contractor because of work performed and to be performed under the contract during the fiscal year, the Government reserves the right, after notice to the Contractor, to reduce said reservation by the amount of such excess.

11. OBSTRUCTION OF NAVIGABLE WATERWAYS (DFARS 252.236-7002 - DEC 91)

Not Used.

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

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

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

13. IDENTIFICATION OF GOVERNMENT-FURNISHED PROPERTY (FAR 52.245-3 1984 APR)

Not Used.

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**SECTION 01100 - GENERAL PROVISIONS**

**1. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER**

(a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the Contract Clause in Section 00700, entitled Default (Fixed Price Construction) (FAR 52.249-10). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied.

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

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

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

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7	6	4	3	2	4	6	5	4	3	4	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.

(d) The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for



equivalent fair weather work days, and issue a modification in accordance with the Contract Clause in Section 00700, entitled Default (Fixed Price Construction) (FAR 52.236-7).

## 2. DAMAGE TO WORK

The responsibility for damage to any part of the permanent work shall be as set forth in the Contract Clause in Section 00700, entitled Permits and Responsibilities (FAR 52.236-7). However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood, earthquake, hurricane, or tornado which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor shall make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit price or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such work, an equitable adjustment shall be made pursuant to the Contract Clause in Section 00700, entitled Changes (FAR 52.243-4). Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

## 3. SAFETY PROVISIONS

The safety provisions as specified herein refer to the Sep 1996 edition of EM 385-1-1.

(a) Accident Investigations and Reporting. Refer to EM 385- 1-1, Section 01.D. Accidents shall be investigated and reports completed by the immediate supervisor of the employee(s) involved and reported to the Contracting Officer or his/her representative within one working day after the accident occurs. All data reported must be complete, timely and accurate. A follow-up report shall be submitted when the estimated lost time days differs from the actual lost time days.

(b) Accident Prevention Program. (See the Contract Clause in Section 00700, entitled Accident Prevention (FAR 52.236-13).) Within 15 days after receipt of Notice of Award of the contract, and at least 7 days prior to the prework conference, four copies of the Accident Prevention Program shall be submitted to the Contracting Officer for review and acceptance. The program shall be prepared in the following format:

(1) An executed LMN Form 385-7-R (Aug 99), Administrative Plan(available upon request), see Appendix A of EM 385-1-1.

(2) Executed LMN 385-6-R and Form 385-43R (Aug 99), Activity Hazard Analysis (available upon request), see Figure 1-1 of EM 385-1-1.

(3) A copy of company policy statement regarding accident prevention.

(4) When marine plant and equipment are in use under a contract, the method of fuel oil transfer shall be included on LMN Form 385-10R(Aug 99), Fuel Oil Transfer, (available upon request). (Refer to 33 CFR 156).

The Contractor shall not commence physical work at the site until the program has been accepted by the Contracting Officer, or his/her authorized representative. At the Contracting Officer's discretion, the Contractor may submit its Activity Hazard Analysis only for the first phase of construction provided that it is accompanied by an outline of the remaining phases of construction. All remaining phases shall be submitted and accepted prior to the beginning of work in each phase. Also refer to Section 1 of EM 385-1-1.

(c) Comprehensive Hazard Communication Program. The Contractor shall develop, implement, and maintain at the workplace a written, Comprehensive Hazard Communication Program (see Section 01.B.04 of EM 385-1-1) that includes identification of potential hazards as prescribed in 29 CFR Part 1910.1200 and/or 1926.59, effects of exposure and control measures to be used for chemical products and physical agents that may be encountered during the performance of work on this contract, provisions for container labeling, Material Safety Data Sheets, and employee training program, and other criteria in accordance with 29 CFR Part 1910.1200 and/or 1926.59. Training shall include communication methods and systems to be used (i.e., voice, hand signals, radios or other means), and training in the use and understanding of material safety data sheets and chemical product hazard warning labels. Prior to bringing hazardous substances, as defined in 29 CFR 1910.1200 and/or 1926.59, onto the job site, a copy of the Hazard Communication Program and the Material Safety Data Sheets of each substance shall be submitted to the Contracting Officer and made available to the Contractor's employees as part of its Accident Prevention Program.

(d) Daily Inspections. The Contractor shall perform daily safety inspections and record them on the forms approved by the Contracting Officer. Reports of daily inspections shall be maintained at the jobsite in accordance with Section 01451, "CONTRACTOR QUALITY CONTROL". The reports shall be records of the daily inspections and resulting actions. Each report shall include, as a minimum, the following:

(1) Phase(s) of construction underway during the inspection.

(2) Locations of areas where inspections were made.

(3) Results of inspections, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

(e) Safety Sign. The Contractor shall furnish, erect, and maintain a safety sign at the site where indicated by the Contracting Officer. The sign shall conform to the requirements of this paragraph and the drawing included at the end of this section. The lettering shall be black, the castle red, and the background white. Upon request, the Government will furnish two decals of the engineer castle. When placed on a floating plant, the sign may be half size. The sign shall be erected as soon as practicable, but not later than 15 calendar days after the date established for commencement of work. The data required shall be current.

(f) Ground Fault Protection. Electrical equipment used on this contract shall be equipped with ground fault circuit interrupters in accordance with EM 385-1-1, Section 11.C.05.

(g) Haul Roads. Whenever practical, one-way haul roads shall be used on this contract. Haul roads built and maintained for this work shall comply with the following:

(1) One-way haul roads for off-the-road equipment; e.g., belly dumps, scrapers, and off-the-road trucks shall have a minimum usable width of 25-feet. One-way haul roads for over-the-road haulage equipment only (e.g., dump trucks, etc.) may be reduced to a usable width of 15-feet. When the Contracting Officer determines that it is impractical to obtain the required width for one-way haul roads (e.g., a road on top of a levee), a usable width of not less than 10-feet may be approved by the Contracting Officer, provided a positive means of traffic control is implemented. Such positive means shall be signs, signals, and/or signalmen and an effective means of speed control.

(2) Two-way haul roads for off-the-road haulage equipment shall have a usable width of 60-feet. Two-way haul roads for over-the-road haulage equipment only may be reduced to a usable width of 30-feet.

(3) Haul roads shall be graded and otherwise maintained to keep the surface free from potholes, ruts, and similar conditions that could result in unsafe operation.

(4) Grades and curves shall allow a minimum sight distance of 200-feet for one-way roads and 300-feet for two-way roads. Sight distance is defined as the centerline distance an equipment operator (4.5-feet above the road surface) can see an object 4.5-feet above the road surface. When conditions make it impractical to obtain the required sight distance (e.g., ramps over levees), a positive means of traffic control shall be implemented.

(5) Dust abatement shall permit observation of objects on the roadway at a minimum distance of 300-feet.

(6) Haul roads shall have the edges of the usable portion marked with posts at intervals of 50-feet on curves and 200-feet maximum elsewhere. Such markers shall extend 6-feet above the road surface and, for nighttime haulage, be provided with reflectors in both directions.

(h) Safety Fence. The Contractor shall provide, erect, and maintain a temporary safety fence around the limits of work. The fabric for the safety fence shall be zinc coated hog wire mesh at least 47 inches high. Posts shall be round wood posts and shall be at least 6 1/2 feet long, 3 1/2 inches in diameter, and may be untreated. Posts shall extend at least 48 inches above ground and shall be spaced at 10 feet on center. Swing gates shall be at least 12 feet wide by 47 inches high. The swing gate frame shall be fabricated of either 1-3/8-inch O.D. tubular steel, or 1/4 -inch angle iron brace with an adjustable brace wire to prevent sagging. Gates shall be fitted with hinges and shall be supported by 1-3/8- inch O.D. tubular steel posts embedded in 3-feet of concrete. The fabric from the gates shall be the same as that for the fence. All gates shall be closed and padlocked at the end of each work day. When necessary, an owner of a facility located within the limits of work will obtain keys from the levee district. The Contractor shall provide and maintain on the fence "KEEP OUT" signs every 100 feet facing out from the work. Details of the safety fencing and location shall be submitted to the Contracting Officer for approval. No separate measurement or payment will be made for this work. Payment for all work associated with the safety fence shall be distributed amongst the existing bid items.

(i) Means of Escape for Personnel Quartered, or Working on Floating Plant.  
Not Used.

(k) Hurricane Plan. A detailed plan for protection and evacuation of personnel, in the event of an impending hurricane or storm, is required as an enclosure to the Contractor's Accident Prevention Program. This plan shall be submitted to the Contracting Officer, or his/her representative, for review prior to the preconstruction conference. The plan shall include at least the following:

(1) The time each phase of the plan will be put in effect. The time shall be the number of hours remaining for the storm to reach the worksite if it continues at the predicted speed and direction.

(2) The safe harbor for personnel specifically identified.

(l) Hazardous Energy Protection. The Contractor shall develop, implement and maintain at the workplace, a written Control of Hazardous Energy (Lockout/Tagout) System. Refer to Section 12 of EM 385-1-1.

(m) Handling Sheet Piling: The Contractor's personnel will not be allowed to sit or place themselves on top of the sheet piling during the handling, installation, and removal of the piling.

(n) Cranes. The Contractor (including subcontractors) shall have cage boom guards, insulating links, or proximity warning devices on cranes that will be working adjacent to power lines. These devices shall not alter the requirements of any other regulation of this part - even if such device is required by law or other regulation. Insulating links shall be capable of withstanding a 1-minute dry low frequency dielectric test of 50,000 volts, alternating current (EM 385-1-1, Section 11.E.07). Calibration records or stamped date of required manufacturer inspection of proximity warning devices shall be kept on the crane. Additionally, prior to any work commencing an Activity Hazard Analysis (EM 385-1-1, Fig.1-1) identifying and satisfying EM 385-1-1, Section 11.A.02, 11.E.03, 11.E.04 and 11.E.05 requirements shall be submitted and accepted by the Contracting Officer.

#### 4. INSPECTOR'S FIELD OFFICE AND PROJECT ENGINEER'S FIELD OFFICE

(a) The Contractor shall furnish, throughout the contract period, for the exclusive use of the Government employees, a temporary waterproof building, or trailer, to be utilized as a field office. It shall be conveniently located at the site of construction and shall be independent of any building, or trailer, used by the Contractor. Toilet facilities and potable water shall be provided within the Engineer's field office. The field office shall be equipped with a telephone and approved electrical wiring, including adequate ceiling lighting, at least one double convenience outlet on each wall, and the required switches and fuses, to provide 110-volt power for lighting and receptacles. The field office shall be equipped with an air conditioning unit to provide cooling in warm or hot weather, and a heater, properly installed and vented in accordance with the National Fire Protection Association Code, for heating in cold weather, as required. The Contractor shall make the necessary arrangements to obtain or to generate the power required to operate the air conditioning unit, lights, receptacles and the power or fuel required for the heater and shall bear the cost thereof. A drafting table providing a working surface having dimensions of at least 4-feet by 6-feet (which may consist of a piece of plywood, at least 3/4-inch thick, hinged to a wall of the building with hinged legs) shall be installed in the building. The building shall have a built-in locker, extending from the floor to the ceiling, having dimensions of at least 2- feet by 5-feet, with a shelf 12-inches from the top, and one door equipped with two hinges, a hasp and a padlock. The outside door of the building shall be equipped with butt hinges and a cylinder lock. The window frames shall be equipped with iron security guards. One draftsman's stool, two strong chairs and one desk shall be provided. The building or trailer shall conform to the following minimum requirements:

Ceiling height, not less than	7 feet
Floor space, no less than	240 square feet
Windows, not less than	3
Doors, outside	1
Rooms	1

Ceiling height, not less than	6-feet 9-inches
Floor space, no less than	240 square feet
Windows, not less than	2
Doors, outside	1
Rooms	1

Screens over doors and windows; walls and ceilings shall be insulated; and interior walls finished.

(e) The buildings, or trailers, shall be removed by the Contractor after completion of all work under this contract and before final acceptance thereof. No separate payment will be made for furnishing, maintaining, providing the prescribed utilities, and removing the temporary field office, but the cost of the same shall be distributed throughout the existing bid items. In the event the Contractor fails to furnish the required facilities, the Government may elect to procure the required facilities and deduct all costs from amounts due or to become due under this contract.

(f) The Contractor shall provide daily janitorial services for these and other buildings at the site throughout the life of the contract. The cost of this service shall be distributed throughout the existing bid items and there shall be no separate payment.

## 5. PROJECT SIGN

Prior to commencement of work, the Contractor shall construct and erect two (2) Corps of Engineers project signs; and shall pickup and erect two (2) Orleans Parish project signs at the site of the work at locations directed by the Contracting Officer.

### (a) Corps of Engineers Sign

The signs that will identify the work with the Corps of Engineers shall be 4 feet by 6 feet in size and shall conform to the requirements of the PROJECT SIGN drawing attached at the end of these General Requirements. The lettering for the 2 feet by 4 feet section of the sign with the Corps logo shall be white, all other lettering shall be black. Lettering for the project name shall be Helvetica Bold, all other lettering shall be Helvetica Regular.

### (b) Orleans Parish Department of Public Works Sign

The Contractor shall supply and erect two (2) project signs, complete in place. The project signs shall be in accordance with the drawing attached at the end of these General Requirements.

### (c) Corps of Engineers Safety Sign

No separate payment will be made for supplying and installing the Orleans Parish project signs, nor for construction and erection of the Corps of Engineers project signs. All costs in connection therewith will be considered an incidental obligation of the Contractor. Upon completion of the work all signs, shall become the property of the Contractor and, shall be removed from the job site.

6. RIGHTS-OF-WAY

(a) The rights of entry required for the work to be constructed under this contract, within the rights-of-way limits indicated on the drawings, have been obtained by the Government and are provided without cost to the Contractor. The Contractor shall make its own investigations to determine the conditions, restrictions, and difficulties which may be encountered in the transportation of equipment and material to and from the work site. The proposed work, including rights-of-way, as defined by these specifications and as shown on the drawings, is in compliance with all applicable Federal and state environmental laws and regulations. Upon completion of the Contractor's work, rights-of-way furnished by the Government shall be returned to its original condition prior to construction unless otherwise noted.

(b) If the Contractor proposes a deviation from the Government furnished rights-of-way for his convenience, the Contractor shall notify the Contracting Officer or its representative in writing. Contractor shall not provide any permanent rights-of-way for the project. The Contractor is cautioned that any deviation to the Government furnished rights-of-way is subject to all applicable Federal and state environmental laws and regulations. Compliance with these environmental laws and regulations may require additional National Environmental Policy Act (NEPA) documents, cultural resources surveys, coordination with the Louisiana State Historical Preservation Officer, water quality certification, modification of the Federal consistency determination, etc. The Government is ultimately responsible for environmental compliance; therefore, the Government will determine the additional environmental coordination and documentation necessary for a proposed deviation to the Government furnished rights-of-way. For any environmental investigations the Government is to perform on areas outside of Government furnished rights-of-way, the Contractor shall provide sufficient rights of entry to the Government. The Contracting Officer will advise the Contractor of the additional environmental coordination and documentation that must be completed. The Government shall be responsible for any additional environmental compliance; however, the Contractor may conduct specific tasks identified by the Government. The Government will offer advice and assistance to the Contractor in conducting these tasks. Depending on the environmental impact of the proposed deviation, obtaining the coordination and documentation may not be approved or could take as much as 180 days for approval by the Government. The Government must review, approve and ensure distribution of all environmental compliance documentation and ensure all comments on the same have been resolved before any utilization of any areas outside of the Government furnished rights-of-way. The Contractor shall reimburse the Government for actual expenses incurred for assistance in completing or attempting to

These signs shall be furnished and installed in accordance with subparagraph 3(e).

No separate payment will be made for supplying and installing the Orleans Parish project signs, nor for construction and erection of the Corps of Engineers project signs. All costs in connection therewith will be considered an incidental obligation of the Contractor.

Upon completion of the work all signs, shall become the property of the Contractor and, shall be removed from the job site.

6. RIGHTS-OF-WAY

(a) The rights of entry required for the work to be constructed under this contract, within the rights-of-way limits indicated on the drawings, have been obtained by the Government and are provided without cost to the Contractor. The Contractor shall make its own investigations to determine the conditions, restrictions, and difficulties which may be encountered in the transportation of equipment and material to and from the work site. The proposed work, including rights-of-way, as defined by these specifications and as shown on the drawings, is in compliance with all applicable Federal and state environmental laws and regulations. Upon completion of the Contractor's work, rights-of-way furnished by the Government shall be returned to its original condition prior to construction unless otherwise noted.

(b) If the Contractor proposes a deviation from the Government furnished rights-of-way for his convenience, the Contractor shall notify the Contracting Officer or its representative in writing. Contractor shall not provide any permanent rights-of-way for the project. The Contractor is cautioned that any deviation to the Government furnished rights-of-way is subject to all applicable Federal and state environmental laws and regulations. Compliance with these environmental laws and regulations may require additional National Environmental Policy Act (NEPA) documents, cultural resources surveys, coordination with the Louisiana State Historical Preservation Officer, water quality certification, modification of the Federal consistency determination, etc. The Government is ultimately responsible for environmental compliance; therefore, the Government will determine the additional environmental coordination and documentation necessary for a proposed deviation to the Government furnished rights-of-way. For any environmental investigations the Government is to perform on areas outside of Government furnished rights-of-way, the Contractor shall provide sufficient rights of entry to the Government. The Contracting Officer will advise the Contractor of the additional environmental coordination and documentation that must be completed. The Government shall be responsible for any additional environmental compliance; however, the Contractor may conduct specific tasks identified by the Government. The Government will offer advice and assistance to the Contractor in conducting these tasks. Depending on the environmental impact of the proposed deviation, obtaining the coordination and documentation may not be approved or could take as much as 180 days for approval by the Government. The Government must review, approve and ensure distribution of all environmental compliance documentation and ensure all comments on the same have been resolved before any utilization of any areas outside of the Government furnished rights-of-way. The Contractor shall reimburse the



Government for actual expenses incurred for assistance in completing or attempting to complete additional environmental coordination and documentation, which expenses will not exceed one hundred thousand (\$100,000.) dollars. There is no guarantee that environmental compliance will be obtained; therefore, the Contractor shall assume all risks and liabilities associated with pursuing a deviation. Any delays resulting from the deviation and/or the environmental coordination and documentation shall not be made the basis of any Contractor claim for increase in the contract cost and/or increase in contract time. Deviations will be at Contractor's sole risk and liability, including, but not limited to, such liabilities associated with items such as hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601 et. seq.), and at no cost to the Government. Government assistance in obtaining additional environmental clearances does not relieve the Contractor of responsibility for complying with other Federal, state or local licenses and permits.

## 7. CERTIFICATES OF COMPLIANCE

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

## 8. ENVIRONMENTAL LITIGATION

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If the order is not due in any part to acts or omissions of the Contractor (or a Subcontractor at any tier) other than as required by this contract, such suspension, delay, or interruption shall be as if ordered by the Contracting Officer under the Contract Clause in Section 00700, entitled Suspension of Work (FAR 52.242-14). The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the work has an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

9. UTILITIES AND IMPROVEMENTS

(a) All known utilities within the limits of the work, such as pipes, communication lines, power lines, etc., that would interfere with construction work shall be removed, modified or relocated by the appropriate utility at no cost to the contractor unless otherwise noted in the plans and/or specifications. The Contractor, however, shall cooperate with the authorities or company representatives and shall conduct his operations in such manner as to result in a minimum of inconveniences to the owners of said utilities. The Contractor shall notify each utility owner, Sewerage and Water Board of New Orleans (S&WB), Entergy (Gas and Electric), Cox Cable and Bell South by certified mail 45 days, 15 days, and by telephone 72 hours prior to the date utilities need to be moved and provide a copy of these notifications to the Contracting Officer. The following contact persons and telephone numbers should be utilized during the construction phase:

The following contact persons and telephone numbers should be utilized during the construction phase:

<u>Agency</u>	<u>Person to Contact</u>	<u>Telephone No.</u>
S&WB (Chief of Engineering)	Rudolph St. Germain	865-0409
S&WB (Engineering)	Michael Boyce	865-0659
S&WB (Inspection)	Hadi Amini	865-0445
S&WB (Electrical)	Clayton Perret	865-0480
Entergy (Electrical)	Stan Merrit	593-3419
Entergy (Gas)	Kenny Schindler or Stan Merrit	595-3877
Dept. of Parks and Parkway	Bernie Wisnowski	286-2100
Cox Cable	Chris Thomas	304-7345
Northstar Communications	Mike Breaux	245-8571
DPW Maintenance	Michael Nolan	483-2080
DPW Traffic	Elmer Darwin	565-6840
LA One Call		800-272-3020
DPW (Utility Engineer)	Drayfus Guient	565-6844

(b) Any unidentified pipes or structures which may be found within the limits of the work during the course of construction shall not be disturbed nor shall construction or excavation be performed at these locations unless and until approved by the Contracting Officer.

(c) Notices to Owners and Authorities. The Contractor shall notify owners of utilities (Sewerage and Water Board of New Orleans (S&WB), Entergy (Gas and Electric), Cox Cable and Bell South) when prosecution of the work may affect them. When it is necessary to temporarily disconnect utility services, the Contractor shall give notices sufficiently in advance to enable the affected persons to provide for their needs. Notices shall conform to any applicable local ordinance and, whether delivered orally or in writing, shall include appropriate information concerning the interruptions and instructions on how to limit their inconvenience. Utilities and other concerned agencies shall be contacted at least 48 hours (excluding Saturdays, Sundays and legal holidays) prior to cutting or closing streets or other traffic areas or excavating near underground utilities or pole lines.

(d) Entergy Electric Transmission and Distribution Lines (Entergy). While constructing the project, the Contractor will be working near, and under the Entergy overhead power lines. The Contractor shall contact Entergy prior to start of construction to coordinate all construction work with Entergy in order to insure safety.

(1) All Entergy Electric relocation and de-energizing work along Robert E. Lee Boulevard must be coordinated by the Contractor. Existing Entergy Electric facilities that have not been completely located at the time of construction shall be closely coordinated between Entergy Electric and the Contractor.

(2) The Contractor shall maintain a minimum distance from all power lines as required by NEC, Entergy and EM 385-1-1. Contractor shall be responsible for determining the maximum height and reach attainable by any part of any piece of equipment, and after coordinating with Entergy to determine the height and location of the power line, shall determine if the required clearance will be violated. The Contractor shall not work within the required clearance of the lines unless the lines are de-energized. If the clearance will be violated, prior to beginning any operations in the area, the Contractor shall coordinate with Entergy to de-energize the line. If the line is to be de-energized but is to remain in place, rather than being removed, the Contractor shall establish a procedure with Entergy to ensure that the Contractor shall have sufficient notice to allow removal of all equipment which may violate the required clearance from the area prior to the line being re-energized. These procedures and requirements shall also apply to any buried power lines.

(3) It shall be the Contractor's sole duty and responsibility to provide for the safety of his men, equipment, subcontractors and the general public during operations in the vicinity of overhead and underground power lines; and to assure that all of his operations and those of his employees and subcontractors comply with OSHA, EM 385-1-1, the National Electric Safety Code, and all applicable Parish, State and Federal codes and regulations.

(4) The utility contact is shown under paragraph 9(a).

#### 10. WEEKENDS, HOLIDAYS, AND NIGHTS

No Work shall be done between 9:00 p.m. and 7:00 a.m. Monday through Saturday. No work is allowed on Sundays, Orleans Parish holidays or legal holidays except in the event of an emergency. If due to an emergency, and the Contractor elects to work on weekends, holidays, or nights, notice shall be given to the Contracting Office, in writing in advance of the commencement of such operations to permit suitable arrangements for inspection to be made. Adequate lighting for thorough inspection of night operations shall be provided by the Contractor at his/her own expense.

#### 11. U.S ARMY CORPS OF ENGINEERS CRD-C STANDARDS

CRD-C standards can be found at [www.wes.army.mil/SL/MTC/handbook/handbook.htm](http://www.wes.army.mil/SL/MTC/handbook/handbook.htm)

Note: This address is case sensitive.

#### 12. AGGREGATE SOURCES

(a) Concrete aggregates meeting the quality requirements of these specifications have been produced from the sources listed below:

(Source list date: January 2001)

<u>Producer</u>	<u>Nearest Town to Pit*</u>	<u>Type**</u>	<u>Pit Designation</u>
A. B. Chisum Gravel Co.	Sicity Island, LA	S	A. B. Chisum Sand & Gravel
American Sand & Gravel Co.	Hattiesburg, MS	S, G	Plant R
American Sand & Gravel Co.	Hattiesburg, MS	G	Plant E
American Sand & Gravel Co.	Hattiesburg, MS	S	Plant F
Blain Sand & Gravel, Inc.	Georgetown, MS	S, G	Bailey Pit
B. & M. B., Inc.	Jackson, LA	S, G	Dudley Pit
B. & M. B., Inc.	Wakefield, LA	S, G	Island Pit
B. & M. B., Inc.	Jackson, LA	S, G	Thompson Pit
Bunch Gravel Co.	Clinton, LA	S, G	Bunch Gravel Plant #1
Bunch Gravel Co.	Darlington, LA	S, G	Bunch Gravel Plant #2
Fleniken Sand and Gravel Co.	Clinton, LA	S, G	Fleniken Sand & Gravel (Spears Lease)
Jackson Ready-Mix Concrete Co.	Crystal Springs, MS	S, G	Pit # 715-11
Lambert Gravel Co., Inc.	Clinton, LA	S, G	Billups Pit (B 1)
Lambert Gravel Co., Inc.	Bains, LA	S, G	Harvey Garrett & Butler lease (G-2)
Martin Marietta Aggregates	Smithland, KY	CLS	Three Rivers Quarry
Mears Sand & Gravel Co.	Watson, LA	S, G	Penny & Easterly Leases
Meridian Aggregate Co.	Watson, LA	S, G	Plant 1
Meridian Aggregate Co.	Watson, LA	S, G	Plant 6 & 6c
Meridian Aggregate Co.	Watson, LA	S, G	Plant 9
Pine Bluff Sand & Gravel Co.	Delaware, AR	SS, CSS	River Mountain Quarry

Standard Gravel Co.	Pearl River, LA	S, G	Nicholson Plant (Nic-7)
Standard Gravel Co.	Enon, LA	S, G	Enon Pit (C-10 & CZ-30 leases)
Texas Industries, Inc.	DeRidder, LA	S, G	Anacoco Creek Plant
Texas Industries, Inc.	Watson, LA	S, G	Clemons Plant
Texas Industries, Inc.	Grangeville, LA	S, G	Denkman Plant
Texas Industries, Inc.	Grangeville, LA	S, G	Harvel/Hartner/Dunn Plant
Texas Industries, Inc.	Pearl River, LA	S, G	Honey Island Operation (Pit #1)
Texas Industries, Inc.	Pearl River, LA	S, G	Honey Island Operation (Pit #2)
Texas Industries, Inc.	Ball, LA	S, G	Paradise Plant
Texas Industries, Inc.	Perryville, LA	S, G	Perryville Plant
Texas Industries, Inc.	Enon, LA	G	Price Plant
Texas Industries, Inc.	Woodworth, LA	S, G	Woodworth Plant
Tower Rock Stone Co.	Ste. Genevieve, MO	LS, CLS	Tower Rock Stone Co.
Tower Rock Stone Co.	Scott City, MO	LS, CLS	Grays Point Quarry
Trinity Materials, Inc.	Grangeville, LA	G	Plant #383
Trinity Materials, Inc.	Watson, LA	S, G	Plant 392 (Easterly lease)
Vulcan Materials Co.	Lake City, KY	CS	Reed Quarry

\* "Nearest Town to Pit" according to LDOTD Official State Highway Map and Rand McNally Road Atlas copyrighted 2000.

\*\*Type: CS = Crushed stone  
G = Gravel  
SS = Sandstone

CLS = Crushed limestone  
LS = Limestone

CSS = Crushed sandstone  
S = Sand

(b) Concrete aggregates may be furnished from any of the above listed sources or at the option of the Contractor may be furnished from any other source designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated and as specified in Section 02520 and Section 03301.

(c) After the award of the contract, the Contractor shall designate in writing only one source or one combination of sources from which he/she proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed above, he/she may designate only a single source or single combination of sources of aggregates. If a source for coarse and/or fine aggregate so designated by the Contractor is not approved for use by the Contracting Officer, the Contractor may not submit for approval other sources but shall furnish the coarse and/or fine aggregate, as the case may be, from a source listed above at no additional cost to the Government.

(d) Approval of a source of concrete aggregate is not to be construed as approval of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials do not conform to the quality requirements of ASTM C 33-93 (CRD-C 133), Concrete Aggregates. Aggregate gradations shall be in accordance with the specified requirements of Section 02520 and Section 03301. Materials produced from any source, including

those listed above, shall also meet all the requirements of Section 02520 and Section 03301 of the Technical Specifications.

(e) It is the Contractor's responsibility to determine that the aggregate source or combination of sources selected is capable of supplying the quantities and gradations needed and at the rates needed to maintain the scheduled progress of the work. The inability of a source or combination of sources to maintain the necessary volume shall not be the basis for any claim for a time extension.

### 13. STONE SOURCES

(a) On the basis of information and data available to the Contracting Officer, stone meeting the quality requirements of these specifications has been produced from the sources listed below:

#### STONE SOURCES

June 2002

Producer	Nearest Town to Pit*	Type of Material	Pit Designation
APAC	Bloomsdale, MO	CLS	Old Menefee Quarry
Bussen Quarries, Inc.	Mehlville, MO	RR,CLS,S	Bussen Quarry
Burfordville Stone LLC	Burfordville, MO	RR,CS,(DOL)	Burfordville Quarry
Central Stone Co.	Withers Mill, MO(Monroe City, MO)	CLS,RR,S	Pit # 1
Central Stone Co.	Perry, MO	RR,CLS	Pit # 9
Central Stone Co.	Florissant, MO (Ft. Bellefontaine, MO)	RR,CS,GS,S,(LS)	Bellefontaine Quarry
Granite Mountain Quarries	Sweet Home, AR	CS,GS,RR,(GR)	<b>Granite Mountain Quarry # 2</b>
Hoover Incorporated	Allsboro, AL	CLS,RR	Allsboro Quarry
Industrial Minerals Products Division/3M	Little Rock, AR	GS,(GR)	3M Arch Street Quarry
Martin Aggregates	Marietta Uniontown, MO	CLS,RR	Appleton Quarry
Martin Aggregates	Marietta Black Rock, AR	RR,GS,(DOL)	Black Rock Quarry (Sloan/Cavanaugh)
Martin Aggregates	Marietta <b>Cave In Rock, IL</b>	<b>CS,CLS</b>	Cave-In-Rock Quarry
Martin Aggregates	Marietta <b>Freedonia, KY</b>	RR,LS	Freedonia Quarry
Martin Aggregates	Marietta Cave In Rock, IL	CS,CLS	Plant # 1
Martin Aggregates	Marietta Smithland, KY	CLS,RR,GS	Three Rivers Quarry
Pine Bluff Sand & Gravel Co.	Delaware, AR	SS,CS,CSS	River Mountain Quarry

SRM Aggregates	Tuscumbia, AL	CLS,RR	Pride Quarry
Tower Rock Stone Co.	Scott City, MO	CLS,RR,GS	Grays Point Quarry
Vulcan Materials Co.	Cherokee, AL	GS,CLS,RR	Cherokee Quarry
Vulcan Materials Co.	Clifton, TN	GS,CS	Clifton Quarry
Vulcan Materials Co.	Lake City, KY	CLS,RR,GS	Reed Quarry
Vulcan Materials Co.	Tuscumbia, AL	GS,CLS,RR	Tuscumbia Plant (Quarry #114)

**Legend of type material available:**

CLS = Crushed limestone	DOL = Dolomite	LS = Limestone
CPS = Cap stone	FS = Filter stone	S = Sand
CS = Crushed stone	GR = Granite (Nepheline syenite)	SS = Sandstone
CSS = Crushed sandstone	GS = Graded stone A, B, or C	RR = Riprap

\* "Nearest Town to Pit" according to Rand McNally Road Atlas copyrighted 2000.

(b) Stone may be furnished from any of the above listed sources, or at the option of the Contractor may be furnished from any other source designated by the Contractor and accepted by the Contracting Officer, subject to the conditions hereinafter stated.

(c) It is the Contractor's responsibility to determine that the stone source or combination of sources selected is capable of supplying the quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work.

(d) After the award of the contract, the Contractor shall designate in writing only one source or one combination of sources from which he/she proposes to furnish stone. If the Contractor proposes to furnish stone from a source not listed above, he/she may designate only a single additional source for stone. Samples for acceptance testing shall be provided as required by Section 02520 of the Technical Specifications. If a source for stone so designated by the Contractor is not accepted for use by the Contracting Officer, the Contractor may not propose other sources but shall furnish the stone from a source listed above at no additional cost to the Government.

(e) Acceptance of a source of stone is not to be construed as acceptance of all material from the source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for stone as determined by the Contracting Officer. Materials produced from a listed or unlisted source shall meet all requirements of Section 02501 of these Technical Specifications.

**14. SIGNAL LIGHTS – NOT USED**

15. STATE TAXES

(a) The bid submitted in response to this Invitation shall not include any amount whatever for payment of any of the following taxes, fees or charges:

(1) The Louisiana "Severance Tax" imposed by LSA R.S. 47:631 and made applicable to the dredging of fill material from rivers and bodies of water within the State of Louisiana by the Severance Tax Regulations promulgated by the Collector of Revenue dated 31 March 1968.

(2) Any amounts claimed by the Louisiana Department of Wildlife and Fisheries for the privilege of removing fill from the water bottoms of the State of Louisiana.

(b) If the Contractor is required to pay or bear the burden of any tax, fee, or charge described in paragraphs a(1) and/or a(2) above, the contract prices shall be increased by the amount which the Contractor is required to pay to the State of Louisiana; provided, however, that no increase in contract price shall be made for any liability the Contractor may incur as a result of his/her fault or negligence or his/her failure to follow the instructions of the Contracting Officer (CO).

(c) The Contractor shall promptly notify the Contracting Officer of all matters pertaining to taxes, fees, or charges as described herein which reasonably may be expected to affect the contract price and shall at all times follow the directions and instructions of the Contracting Officer in regard to the payment of such taxes, fees, or charges.

(d) Before any increase in contract price becomes effective in accordance with the provisions of this clause, the Contractor shall warrant in writing that no amount of such taxes, fees, or charges was included in the contract price as a contingency reserve or otherwise.

(e) In addition to the costs allowed by subparagraph b, the Contracting Officer may also allow an increase in contract price for costs or expenses which accrue to the Contractor as a result of any directions or instructions received from the CO.

16. REQUIRED INSURANCE SCHEDULE

The Contractor and subcontractor shall procure and maintain during the entire period of this performance under this contract the following minimum insurance.

(a) Employer's Liability Insurance. The Contractor shall furnish evidence of Employer's Liability Insurance in an amount of not less than \$100,000.



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

(c) Automobile Liability Insurance. Minimum limits of \$200,000 per person and \$500,000 per occurrence for bodily injury and \$20,000 per accident for property damage. This insurance shall cover the operation of all automobiles used in performance of the contract. All vehicles to be used in the performance of this contract shall be expressly designated in the insurance policy. A copy of the list of such vehicles shall be submitted to the Contracting Officer. In the event that the Contractor acquires a new vehicle for use on this contract after his/her insurance policy has been obtained, he/she shall immediately amend his/her policy to reflect the inclusion of the new vehicle on the policy. In no event shall the Contractor drive a vehicle on the Government installation without first obtaining the required coverage for said vehicle.

17. REQUIRED INSURANCE (RAILROADS) – NOT USED

18. WORK ON OR ADJACENT TO RAILROAD – NOT USED

19. COMMERCIAL WARRANTY

The Contractor agrees that the standard commercial equipment furnished under this contract shall be covered by the most favorable commercial warranties the manufacturer gives to any customer for such equipment, and that the remedies provided herein are in addition to and do not limit any rights afforded to the Government by any other clause of this contract. Two copies of the warranties shall be furnished by the Contractor to the Contracting Officer.

20. ACCESS PLAN

The Contractor shall submit an access plan and haul route to be reviewed and approved by the Contracting Officer to include, as a minimum, the following:

(a) Layout drawings showing the location of all equipment, office structures, toilets, and storage areas for materials.

(b) Show mobilization and demobilization routing and locations of large equipment, such as draglines, cranes, etc. while on the jobsite.

(c) Access to the work site from Lake Pontchartrain via the London Avenue Canal is not available.

(d) Procedures and vehicles used for hauling materials and site access shall conform to the requirements include in Appendix "A", Motor Vehicle and Traffic, included at the end of this section.

## 21. PAYMENT FOR MATERIALS STORED OFFSITE

Pursuant to the Contract Clause in Section 00700, entitled Payments Under Fixed Price Construction Contracts (FAR 52.235-5), materials delivered to the Contractor's locations other than the site of the work may be taken into consideration in making progress payments if included in invoices for payment estimates and if all the conditions of the Contract Clauses are fulfilled. Payment for items delivered to locations other than the work site shall be limited to materials which have been approved (if required by the Technical Specifications) and fabricated to the point where they are identifiable to an item of work required under this contract. Such payment shall be made only after receipt of paid or receipted invoices or invoices with cancelled check showing title to the items by the prime contractor. These invoices must show the dollar value of the materials and labor incorporated into them. The delivery size shall be acceptable to the Government and the materials shall be available for inspection by the Government prior to any consideration for payment. Payment for materials delivered offsite is limited to the following items:

- (a) Piling
- (b) Manhole Frames and Castings
- (c) Catch Basin Frames and Castings
- (d) Drainage Pipe
- (e) Water Pipe
- (f) Water Valves

## 22. EXISTING FACILITIES

(a) Protection and Relocation of Existing Structures and Utilities. The Contractor shall assume full responsibility for the protection of all structures and utilities, public or private, including poles, signs, services to building utilities, in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's negligence shall be repaired by him at his expense. (See related General Provision entitled "DAMAGED STRUCTURES AND ROADWAYS" below.)

(b) The Contractor shall bear full responsibility for locating all underground structures and utilities (including existing water services, drain lines, and sewers) as indicated on the plan drawings. Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

(c) If, in the opinion of the Contracting Officer, permanent relocation of a utility owned by the Parish is required and is not indicated on the plans, he may direct the Contractor in writing, to perform the work. Work so ordered will be paid for by an

equitable adjustment under the Contract Clause in Section 00700, entitled Changes (FAR 52.243-4). If relocation of a privately owned utility is required, the Contractor shall notify the utility owner and shall have no claim for delay due to such relocation.

(d) Care and Protection of Property. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the Contracting Officer.

(e) Sidewalks and Curbs. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the current Federal (American Disability Act - ADA), State and local code requirements.

(f) Other Features. Along the location of this work, all fences, walks, bushes, trees, shrubbery, and other physical features noted on the drawings to remain, shall be protected and restored in a thoroughly workmanlike manner.

(g) Trees. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Contracting Officer. All injuries to bark, trunk, limbs, and roots of trees shall be repaired. All tree trimming shall be done under the direction of a licensed arborist in the State of Louisiana provided by the Contractor.

(h) The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the contract, and all costs in connection therewith shall be included in the applicable contract unit and/or lump sum prices for which the work is incidental thereto.

(i) Water for Construction Purposes. In locations where public water supply is available, the Contractor may purchase water for all construction purposes. The express approval of the Sewerage and Water Board of New Orleans shall be obtained in writing. Hydrants shall only be operated under the supervision of the New Orleans Sewerage and Water Board personnel.

(j) Maintenance of Flow. The Contractor shall at his own cost, maintain the flow of existing sewers, drains, and water courses, including drain pipes scheduled to be modified, within the project limits during the progress of the work, and shall

immediately cart away and remove all offensive matter. Contractor shall allow existing drainage flow directly into the active work area and pump it out. The entire procedure of maintaining existing flow shall be fully discussed with the Contracting Officer's representative well in advance of the interruption of any flow and a plan shall be submitted to the Contracting Officer's Representative for approval. Pavement removal and replacement which, in the opinion of the Contractor, is necessitated by placement of temporary flow control facilities shall be considered as an item for convenience to the Contractor. Such costs for pavement removal and replacement shall, therefore, be borne by the Contractor at his own cost as required for other flow control measures..

### 23. DAMAGED STRUCTURES AND ROADWAYS

The Contractor shall at his own expense remove and replace any damaged structures and roadways caused by the negligence of his construction work as directed by the Contracting Officer.

The Contractor shall coordinate the work with the Contracting Officer's representative. The existing buildings, houses, fences, pavement and other structures that are located close to the project may be damaged due to construction operations, construction vehicular traffic, de-watering, vibrations, sheeting (driving and withdrawal), excavation, etc. To minimize the possibility of damages to these structures, the Contractor shall use the following procedures and/or guidance:

(a) Drive temporary (construction) steel sheeting. Soil boring logs are included in the plans.

(b) Monitoring Dewatering. Excavations shall be dewatered as required by pumping. Well point systems shall not be allowed.

(c) Monitoring Vibrations. Pile driving and sheet pile withdrawing, vibrations, construction equipment and vehicular traffic may affect and damage existing structures. Vibrations shall be monitored by an independent testing laboratory retained by the City of New Orleans, Department of Public Works. Vibrations shall be limited to 0.25 inch per second at all structures including buildings and pools. Vibrations exceeding 0.5 of an inch per second may induce structural damages. The Contractor shall be informed when the vibrations from his operations have exceeded the above limit and the contractor shall take immediate action to reduce the vibrations to the acceptable limits.

**24. WORK IN THE LONDON AVENUE CANAL**

The Contractor is cautioned to be aware of the possibility of unpredictable surges of water in the London Avenue Outfall Canal due to water pumped by the New Orleans Sewerage and Water Board's Drainage Pumping Station No. 3 into the canal because of rainfall that may have occurred at some distance from the station and the job site. For the safety of his personnel, it is imperative that the Contractor contact Mr. Bob Moeinian of the New Orleans Sewerage and Water Board (telephone: 942-2960) at least three (3) and no more than fourteen (14) days prior to beginning work within the limits of the canal and advise him of the proposed work. The Contractor shall maintain constant contact with the personnel at Drainage Pumping Station No. 3 throughout construction so that the Contractor will be aware of when the drainage pumping station personnel will activate the drainage pumps, which may pose a hazard to any activity taking place in the canal limits.

**25. STATE PERMITS – NOT USED**

**26. YEAR 2000 COMPLIANCE**

In accordance with FAR 39.106, the Contractor shall ensure that with respect to any design, construction, goods, or services under this contract as well as any subsequent task/delivery orders issued under this contract (if applicable), all information technology contained therein shall be Year 2000 compliant. Specifically, the Contractor shall:

- (a) Perform, maintain, and provide an inventory of all major components to include structures, equipment, items, parts, and furnishings under this contract and each task/delivery order which may be affected by the Year 2000 compliance requirement.
- (b) Indicate whether each component is currently Year 2000 compliant or requires an upgrade for compliance prior to Government acceptance

**27. VIBRATION MONITORING (Revised May 2002)**

a. The Contractor shall perform monitoring of vibrations before, during, and after pile driving and extraction operations, and on all other construction operations involving hauling and placement of any construction materials, movement of heavy equipment, or any activity likely to cause high vibration levels. A sufficient number of monitoring stations for each source of major vibration shall be maintained to adequately ensure that vibration levels remain within the required limit during concurrent construction operations. A registered professional engineer with experience in interpreting/assessing vibration monitoring operations shall stamp all results and geotechnical interpretations/assessments obtained from the vibration monitoring. As a minimum, the geotechnical engineer shall have experience in performing and evaluating vibration monitoring results on at least five (5) projects of similar magnitude and similar subsurface soil conditions within the last five (5) years.

Qualifications of the registered engineer and the name of the independent vibration monitoring company shall be submitted to the Contracting Officer for approval 30 days prior to the need for any vibration monitoring as described above. The Contractor shall inform the Local Sponsor, the Orleans Levee District and the City of New Orleans Department of Public Works, by certified mail and the Contracting Officer's Representative at least 15 days prior to the beginning of any vibration-inducing construction operations.

b. Vibrations shall be limited to a peak particle velocity of 0.25 inches per second at the nearest structure. When vibrations from its operations have exceeded the limit, the Contractor shall take immediate action to reduce the vibrations to acceptable limits.

c. A daily monitoring summary sheet shall be provided in the Contractor's Quality Control report. Also, a weekly vibration assessment report shall be prepared and submitted to the Government no later than 7 days after that reporting period. The report shall include the job title; name of registered professional engineer and vibration monitoring firm; type of vibration monitoring equipment used including type, model and method of measuring vibrations; date of monitoring; location and sketch of monitoring operations; distance from operations; type and location of construction operation(s) being monitored; and minimum and maximum readings (any readings above the maximum peak particle velocity) with dates, durations and times, including copies of vibration recording tapes with the documentation of corrective actions taken and the interpretation/ assessment that these vibrations would have had on the structure.

d. The Government may check the vibration monitoring operations by performing its own independent vibration monitoring.

e. All pile driving and extraction operations and all other construction operations shall comply with EM 385-1-1.

f. Measurement and Payment. No separate measurement or payment will be made for vibration monitoring. All costs incurred for vibration monitoring shall be included in the items to which the work is incidental.

g. Additional Vibration Monitoring. The Contracting Officer may request additional vibration monitoring during any construction operations. All costs associated with additional vibration monitoring operations, other than those required for pile driving and extraction operations, and during construction operations involving hauling and placement of any construction materials, shall be paid for in accordance with the Contract clauses in section 00700 entitled "Changes" (FAR 52.243-4).

## 28. TRUCK REQUIREMENTS

The following requirements will apply to trucking operations on this project.

- a. The Contractor shall provide a portable timber ramp at the curb of each access site. The timber ramp shall not extend more than 12 inches into the street and shall be removed from the street each night or during periods when there is no loading activity.
- b. Upon completion of work at the access site, the Contractor shall repair the access site to remove all evidence that the site was used as an area of truck access. All debris and dead vegetation shall be cleared from the site and disposed of in accordance with Section 02231. The area shall then be graded to drain to the street and then fertilized and seeded in accordance with Section 02922. Care shall be exercised to prevent damage to existing curbs, but if so damaged, they shall be repaired/replaced to the satisfaction of the Contracting Officer.
- c. Trucks used for hauling shall not exceed the weight limits specified by the Louisiana Department of Transportation and Development or the New Orleans Department of Streets, nor shall they exceed 24 cubic yards in capacity. Weight limits for trucks operating on the streets of the City of New Orleans are provided in Appendix A at the end of these General Provisions.
- d. The streets between the loading areas and designated truck routes shall be kept clean of mud from tires, etc. Prior to leaving access sites, the wheels and undercarriage of every truck shall be sufficiently clean so as to prevent tracking mud onto these streets. When deemed necessary and so directed by the Contracting Officer, the Contractor shall be required to hose off or otherwise clean off the wheels and the undercarriage of the trucks in order to achieve a sufficiently clean condition. The Contracting Officer shall have the sole discretion as to what is considered a sufficiently clean condition. The Contractor shall leave on the job site or immediately accessible, a sweeper and sufficient personnel to sweep the streets twice each day during trucking operations or as required to keep the streets clean. At the end of each day and as directed by the Contracting Officer, the Contractor shall be required to scrape up any residual mud tracked by the trucks' tires and hose down the streets. The streets shall be scraped clean before any hosing is done.
- e. The Contractor shall perform, under the supervision of the Contracting Officer, periodic inspections of the drains along the above referenced streets, in order to make sure they are not becoming clogged.
- f. Trucks traveling between the access locations and designated truck routes shall not exceed a speed of 15 m.p.h. Random speed checks will be made by enforcement agencies throughout the duration of the project.

g. The Contractor shall be required to take immediate action to clean up any spilled haul material on any street between the loading areas and disposal sites. Failure to do so may result in having construction activities shut down by the Contracting Officer, until all spillage is cleaned up.

h. Violation of any of the above conditions may result in "Stop Work" order or suspension of hauling permits until violations are corrected and procedures instituted to prevent further violations.

i. No separate measurement or payment will be made for any of the requirements of this section. Payment will be distributed amongst the other bid items to which the work is incidental.

## 29. HURRICANE PROTECTION

The Contractor shall prepare and submit a hurricane protection plan to the Contracting Officer for approval. The Contractor is hereby notified that in the event of an approaching hurricane, he/she shall, at the direction of the Contracting Officer, have crews working around the clock to implement the flood protection plan, closing any gaps in the existing flood protection system within the limits of the jobsite in accordance with Part 3, 02111. This includes backfilling of open excavations adjacent to the flood protection system. The Contractor may also be directed to clear work areas for the Orleans Levee District for their flood protection preparation. Payment for these operations will be made as outlined in Section 02111. The required flood protection elevation during hurricanes is elevation 14.0 NAVD.

## 30. DOCUMENTATION OF EXISTING CONDITIONS

The Contractor, prior to mobilization on the jobsite, shall conduct a detailed survey and videotape the jobsite. The Contracting Officer shall view and approve the video prior to any mobilization. The Contractor shall make every attempt to gain permission from property owners for access to private property for documenting preconstruction conditions. The Contractor shall send a certified, return receipt requested introductory letter (wording to be reviewed by the Contracting Officer) informing the property owner of the survey and videotaping the existing conditions. If the property owner refuses access, the Contractor shall notify the Contracting Officer and log all contacts with the property owner.

(a) Survey. Elevations shall be taken of house and building slabs, driveway pavement, sidewalks and paving elements in street sections within 200 feet of the project right-of-way. The elevations shall be recorded and produced under the supervision of a Louisiana registered land surveyor. Elevations on abutting drives, walks and slabs shall be taken at approximately 25 foot intervals and at the point of juncture with any structure to which they are attached. In addition, elevations shall be taken of all corners of house and building slabs within the survey area. A copy of all field notes with sketches clearly showing reduced elevations shall be delivered to the Contracting Officer.



(b) Pre-construction and Post-Construction Videos. Pre-construction and post-construction videos shall be a VHS or 8 mm videotape and shall be done in the presence of the Contracting Officer's Representative. The Contractor shall document conditions within the construction right-of-way and on the streets used for trucking access to the jobsite. The Contractor shall also videotape the interior and exterior of all residences and structures within 200 feet of the project right-of-way. All existing damage to interior walls and ceilings should be videotaped. Post-construction videos shall document conditions within the construction right-of-way and on the streets used for truck access to the jobsite. The Contractor shall provide a copy of the videotapes to the Contracting Officer.

31. REMOVED, DAMAGED OR DESTROYED BASELINE MONUMENTS.

Corps of Engineers' Baseline Monuments removed, damaged or destroyed by the Contractor during construction operations must be reestablished at his expense.

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## SECTION 01330 - SUBMITTAL PROCEDURES

### PART 1 GENERAL

#### 1.1 SUBMITTAL IDENTIFICATION DEFINITIONS

##### Data

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

##### 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.

##### 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.

##### Schedules

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

##### 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.

##### Reports

Reports of inspections or tests, including analysis and interpretation of test results.

##### Certificates

Statement signed by an official authorized to certify on behalf of the 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 the contract,

must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

### **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.

### **Records**

Documentation to record compliance with technical or administrative requirements.

### **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**

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 in section 00700 entitled, Specifications And Drawings For Construction (FAR 52.236-21), they are considered to be "shop drawings." Any reference to Government approval by the Contracting Officer (CO) includes the approving authority of the CO, the Administrative Contracting Officer (ACO), or the Contracting Officer's representative (COR).

### **1.2.2 Information Only**

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

## **1.3 APPROVED SUBMITTALS**

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

purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

#### 1.4 DISAPPROVED SUBMITTALS

The Contractor shall respond to all concerns expressed by the Contracting Officer and promptly make any corrections necessary to address those concerns. The Contractor shall promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause in Section 00700 entitled, Changes (FAR 52.243-4), shall be given promptly to the Contracting Officer.

#### 1.5 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for submittal requirements as specified herein. Payment for the work covered under this section shall be distributed throughout the existing bid items. Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.1 GENERAL

The Contractor shall submit all items listed on the Submittal Register (ENG Form 4288) or specified in the other sections of these specifications. The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective Area Office address listed in the Contract Clause in Section 00700, entitled Site Visit Assistance (Construction) (FAR 52.236-27). Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon

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

### **3.2 SUBMITTAL REGISTER (ENG FORM 4288)**

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. Columns "c" thru "q" have been completed by the Government. The Contractor shall complete columns "a", "b", and "r" thru "w", and return 4 completed copies to the Contracting Officer for approval within 14 calendar days after Notice to Proceed for approval. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated. The Contractor shall maintain an effective submittal control system by reviewing and updating the register every thirty (30) days and submitting updated copies to the Resident Engineer every sixty (60) days.

### **3.3 SCHEDULING**

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

### **3.4 TRANSMITTAL FORM (ENG FORM 4025)**

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

### **3.5 SUBMITTAL PROCEDURE**

Submittals shall be made as follows:

#### **3.5.1 Procedures**

Procedures for submittals will be stipulated by the Contracting Officer at the preconstruction conference.

### 3.5.2 Deviations

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

### 3.6 CONTROL OF SUBMITTALS

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

### 3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Five (5) copies of the submittal will be retained by the Contracting Officer and 2 copies of the submittal will be returned to the Contractor.

All submittals requiring engineering consultations and or drawings shall be prepared and stamped by a Professional Engineer licensed in the State of Louisiana.

### 3.8 INFORMATION ONLY SUBMITTALS

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

### 3.9 STAMPS

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

**Contractor**

(Firm Name)

\_\_\_\_\_ Approved

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

\_\_\_\_\_ Rejected - Resubmit

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

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

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



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**SECTION 01352 - ENVIRONMENTAL PROTECTION**  
**(Dec. 98 Edition)**

**PART 1 GENERAL**

**1.1 SCOPE**

The work covered by this section consists of furnishing all labor, materials and equipment, and performing all work required for the prevention of environmental pollution and the handling, removal, transportation and disposal of any hazardous and/or regulated solid waste generated during and as the result of construction operations under this contract except for those measures set forth in other provisions of these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to man; or degrade the utility of the environment for esthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, and land, and involves noise, solid waste-management, management of radiant energy and radioactive materials, as well as other pollutants including hazardous wastes, materials, substances and chemicals.

**1.2 APPLICABLE REGULATIONS**

In order to prevent, and to provide for abatement and control of any environmental pollution arising from construction activities in the performance of this contract, the Contractor and his subcontractors shall comply with the Louisiana Pollution Discharge Elimination System (LPDES) General Permit requirements, all applicable Federal, State, and Local laws, and regulations as well as USACE regulations concerning environmental pollution control and abatement and any regulations referred to in the following paragraphs. For hazardous wastes, materials, substances and chemicals applicable regulations shall include, but are not limited to, 29 CFR 1910.106, 29 CFR 1910.1200, 40 CFR 260-268, 40 CFR 279, 40 CFR 355, 40 CFR 372, 49 CFR 171-178 and USACE EM 385-1-1.

**1.2.1 Louisiana Administrative Code**

- (a) Louisiana Administrative Code (LAC), title 33, Environmental Quality Part V, Hazardous Waste and Hazardous Materials.
- (b) Louisiana Administrative Code (LAC) title 33, Environmental Quality Part VII, Solid Waste Regulations.

**1.3 MEASUREMENT AND PAYMENT**

### 1.3.1 Environment Protection

No separate measurement or payment will be made for environment protection. Payment for the work covered under this section shall be distributed throughout the existing bid items.

## 1.4 QUALITY CONTROL

### 1.4.1 General

The Contractor shall establish and maintain quality control for environment protection 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) Submit plan of Environment Pollution Control. Include in the plan, a Pollution Prevention Plan (copy enclosed). For Contractor work activities (such as painting, metal finishing, etc.) that will involve bringing hazardous chemicals, hazardous substances or hazardous materials onto the project site, include in the plan a Hazard Communication Program and Safe Storage Plan. For Contractor activities that anticipate generation of hazardous wastes at the project site, include in the plan a waste identification / determination and waste disposal plan. For Contractor on-site activities that pose a risk of an oil or hazardous substance spill, include in the plan a Spill Reporting and Response Plan.
- (2) Procure applicable Federal, State, and Local regulations on pollution control.
- (3) Air Pollution - Checks made on dust, smoke, and noise.
- (4) Water Pollution - Checks made on disposal of water, oil, etc.
- (5) Land Pollution - Checks made on disposal of debris, restoration of temporary construction sites, etc.
- (6) Monitoring in accordance with the Louisiana Pollution Discharge Elimination System (LPDES).
- (7) Training Course for Employees.

### 1.4.2 Reporting

The original and two copies of these 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".

## 1.5 NOTIFICATION

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

## 1.6 LPDES STORM WATER DISCHARGE RULE

Any and all storm water discharge resulting from the work required in this specification shall be authorized under the terms and conditions imposed by Louisiana Department of Environmental Quality (LDEQ) storm water general permit. A copy of the State LDEQ form that includes all the information required under the LPDES Storm Water Discharge Rules is attached at the end of this section.

## 1.7 SUBCONTRACTORS

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

## 1.8 IMPLEMENTATION

Within 10 days after receipt of Notice of Award, or otherwise directed below, the Contractor shall:

(1) Submit in writing his/her proposals for implementing environmental pollution control at the project site, disposal of debris, non-hazardous wastes and hazardous wastes generated at the project site as well as storage and management of regulated materials, substances and chemicals brought onto and used at the project site.

(2) Meet with representatives of the Contracting Officer to develop mutual understanding relative to compliance with this provision and administration of the environmental pollution control program.

(3) Submit a signed copy of the LPDES NOI before conducting any professional service identified in the storm water pollution prevention plan.

(4) If applicable, submit a plan for the handling, removal, transportation and disposal of hazardous and/or regulated solid wastes generated because of the Contractor's operation.

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

## **PART 3 EXECUTION**

### **3.1 PROTECTION OF LAND RESOURCES**

#### **3.1.1 General**

The land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. The Contractor shall confine his/her construction activities to areas defined by the plans or specifications, [including borrow areas to be cleared]. The following additional requirements are intended to supplement and clarify the requirements of Contract Clauses for "PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS," "OPERATIONS AND STORAGE AREAS", and "CLEANING UP".

#### **3.1.2 Prevention of Landscape Defacement**

Except in areas to be cleared and as provided in paragraph 3.1.3, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without the approval of the Contracting Officer. Felling of trees shall be performed in such a manner as to avoid damage to trees to be left standing. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's operations or equipment; he shall protect adequately such trees. Earth that is displaced into uncleared areas shall be removed. All monuments and markers shall be protected before beginning operations near them. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense. Trees that are scarred shall be immediately painted with an acceptable tree wound paint. Any trees that are damaged beyond restoration shall be removed and disposed of as directed in paragraph 3.5.

#### **3.1.3 Temporary Excavation and Embankments**

If the Contractor proposes to construct temporary roads or embankments and excavation for plant and/or work areas, he shall obtain approval of the Contracting Officer prior to start of such temporary work.

#### 3.1.4 Post-Construction Cleanup or Obliteration

The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, and stockpiles of excess or waste materials upon completion of construction. The Contractor will be required to restore the construction area to near natural conditions which will permit the growth of vegetation.

#### 3.1.5 Recording and Preserving Historical and Archeological Finds

All items having any apparent historical or archeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archeological find undisturbed and shall immediately report the find to the Contracting Officer so that the proper authorities may be notified.

### 3.2 PROTECTION OF WATER RESOURCES

#### 3.2.1 Contamination of Water

The Contractor shall not pollute lakes, ditches, rivers, bayous, canals, groundwater, waterways, or reservoirs with fuels, oils, bitumens, calcium chloride, insecticides, herbicides, or other similar materials harmful to fish, shellfish, or wildlife, or materials which may be a detriment to outdoor recreation.

#### 3.2.2 Disposal of Materials

The methods and locations of disposal of materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., within the right-of-way limits shall be such that harmful debris will not enter lakes, ditches, rivers, bayous, canals, groundwater, waterways, or reservoirs by erosion, and thus prevent the use of the area for recreation or present a hazard to wildlife.

#### 3.2.3 Erosion Control

Shall be in accordance with Section 01356, Storm Water Pollution Prevention Plan.

### 3.3 PROTECTION OF FISH AND WILDLIFE

The Contractor shall at all times perform all work and take such steps required to prevent any interference of disturbance to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise disturb native habitat adjacent to the project area which are critical to fish or wildlife.

### 3.4 JANITOR SERVICES

The Contractor shall furnish daily janitorial services for all the offices, shops, laboratories, or other buildings being used by the Contractor or Government employees, whether existing or Contractor furnished, and perform any required maintenance of the facilities and grounds during the life of the contract. Toilet facilities shall be kept clean and sanitary at all times. Services shall be performed at such a time and in such a manner to least interfere with the operations but will be accomplished only when the buildings are in daily use. Services shall be accomplished to the satisfaction of the Contracting Officer. The Contractor shall also provide daily trash collection and cleanup of the buildings and adjacent outside areas, snow removal as required, and shall dispose of all discarded debris, aggregate samples and concrete test samples in a manner approved by the Contracting Officer.

### 3.5 DISPOSAL OF NON-REGULATED DEBRIS

All debris resulting from the work required in this specification shall be disposed of in accordance with all Federal, State and local regulations and ordinances.

### 3.6 DISPOSAL OF HAZARDOUS AND/OR REGULATED SOLID WASTES

If any hazardous or regulated solid wastes will be generated as a result of the Contractor's operations, the Contractor shall submit a Waste Classification, Handling, and Disposal Plan, which shall detail the proper handling, removal, transportation and disposal of such wastes. The plan shall be prepared in accordance with the requirements of Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Parts V and VII, Hazardous Waste and Hazardous Materials and Solid Waste Regulations. The plan shall include, but not be limited to the following:

- (a) Hazardous waste shall be placed in closed containers and shall be shielded adequately to prevent dispersion of the waste by wind or water. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.
- (b) Nonhazardous waste shall be stored in closed containers separate from hazardous waste storage areas.

- (c) All hazardous waste shall be transported by a licensed transporter in accordance with Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste and Hazardous Materials and 40 CFR 171, Subchapter C.
- (d) All nonhazardous waste shall be transported in accordance with local regulations regarding waste transportation.
- (e) In addition to the number of manifest copies required by LAC Title 33, one copy of each manifest will be supplied to the Contracting Officer prior to transportation.
- (f) The plan shall identify what types of hazardous and/or regulated solid wastes will be generated and shall list the hazards involved with each waste.

All waste generated on-site by the Contractor must be properly identified within 30 days of generation. No regulated wastes shall be allowed to accumulate on-site for more than 90 days. Regulated solid wastes are those listed in the Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII, Solid Waste Regulations (Feb 93). The plan shall include Material Safety Data Sheets (MSDS), if applicable, for all wastes expected to be generated.

### 3.6.1 Hazardous Wastes

For the handling, removal, transportation and disposal of any generated hazardous wastes, the plan shall conform to the requirements of 29 CFR 1910.120. All employees of the Contractor or his/her Subcontractors that will be directly involved in the handling and/or removal of hazardous wastes shall be trained in accordance with 29 CFR 1910.120. In addition, the employees shall have undergone a medical evaluation in accordance with 29 CFR 1910.120. The Contractor shall include copies of employees' certifications and medical examinations as part of the plan specified herein. The plan shall also address the proper Personnel Protective Equipment (PPE) that the employees will be required to wear during the handling and removal of hazardous wastes. The contractor shall obtain an PEA ID No. and Hazardous Waste Disposal Manifests and shall sign the manifests as the generator. Wastes shall be transported via State and Federal approved hazardous waste transporter and disposed of at a State and Federal approved temporary storage and disposal (TSD) facility. Copies of licenses and certifications of the transporter and TSD shall be included in the plan. The plan shall list the name and address of each transporter and TSD to be utilized. The Contractor shall be responsible for any sampling and analysis required by the TSD for characterization purposes. The Contractor shall submit to the Contracting Officer completed copies of all Hazardous Waste Disposal Manifests within five (5) days after ultimate disposal at the TSD. Other regulations applicable to the handling, removal, transportation and disposal of



hazardous wastes are: 40 CFR 261 "Identification and Listing of Hazardous Wastes", 40 CFR 268 "Land Disposal Restrictions", and, Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste and Hazardous Materials (December 31, 1993).

### 3.6.2 Regulated Solid Wastes

For the handling, removal, transportation and disposal of any generated regulated solid wastes, the plan shall conform to the requirements of Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII, Solid Waste Regulation (February 1993). Solid wastes shall be transported to a Federal and State approved TSD, oil recycler, or Industrial Type I Landfill. The Contractor shall identify in the plan how he/she intends to dispose of each solid waste. The plan shall include the name, address, licenses and certifications of each disposal facility that will be used. If disposal manifests are required, the Contractor shall sign them as the generator. The Contractor shall be responsible for any sampling and analyses that may be required by the disposal facility(ies) for characterization purposes. Licenses and certifications of the transporter and disposal facilities shall be included in the plan. The Contractor shall submit to the Contracting Officer a completed copy of any waste disposal manifests within five (5) days after ultimate disposal.

### 3.6.3 Laboratory Accreditation

All laboratory testing for waste determinations shall be performed by a laboratory which has Interim Accreditation-Applied status with the Louisiana Department of Environmental Quality (LDEQ) laboratory certification program. The name and address of the laboratory shall be included in the Waste Classification, Handling, and Disposal Plan.

## 3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES

During the life of this contract the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. Early in the construction period the Contractor shall conduct a training course that will emphasize all phases of environmental protection.

## 3.8 REPORTING OF POLLUTION SPILLS

In the event that an oil spill or chemical release occurs during the performance of this contract, the Contractor is required to contact the National Response Center,

telephone number 1-800-424-8802 as soon as possible, or if telephone communication is not possible, the nearest U.S. Coast Guard office may be contacted by radio to report the spill, (33 CFR 153.203). The Contractor shall comply with any instructions from the responding agency concerning containment and/or cleanup of the spill.

## **POLLUTION PREVENTION PLAN**

The Contractor shall review the Pollution Prevention Plan for compliance. In addition, the Contractor shall ascertain that his subcontractors have reviewed the plan, and that they comply with its provisions. The project is located in Orleans Parish, Louisiana. The Pollution Prevention Plan is as follows:

(1) The work consists of clearing and grubbing, excavation and grading as required for the construction of a new Floodproof bridge, roadway approaches, drainage system and utility relocations.

(2) The total project area is 5.6 acres. Approximately 4.3 acres will undergo excavation during the construction contract.

(3) The project site is a developed residential area. The drainage runoff is collected in a subsurface drainage system and is ultimately pumped in the London Avenue Canal, which flows into the Lake Pontchartrain.

(4) The contractor shall construct erosion control as indicated on the plans in accordance with Section 01356 and specifications to provide for abatement and control of environmental pollution arising from construction activities in the performance of this contract.

(5) The disturbed areas shall be fertilized and sodded within 14 days after construction activities have temporarily or permanently ceased.

(6) Lake Pontchartrain is the receiving water.

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SECTION 01356 -STORM WATER POLLUTION PREVENTION PLAN  
Nov 2001

PART 1     GENERAL

1.1   SCOPE

The work specified in this section consists of the Contractor implementing, and diligently pursuing all measures required in the Storm Water Pollution Prevention Plan (SWPPP). The SWPPP consists of this section, 01356, and any and all attachments including existing and future signed certification statements. The purpose of the SWPPP is to control soil erosion and the resulting sediment to the extent necessary to prevent sediment from leaving the contract rights-of-way and prevent pollution of any water body caused by the runoff from the areas of construction activities under this contract, under the terms of Permit No. LAR100000 (copy attached at the end of this section), and as specified herein and shown on the drawings. The requirements of these specifications are supplemental to and shall become part of the overall Environmental Protection Plan required by Section 01352 - ENVIRONMENTAL PROTECTION. The Contractor shall review the SWPPP to determine requirements for compliance. In addition, the Contractor shall ascertain that his subcontractors have reviewed the plan, and that they comply with its provisions. The Contractor shall ensure that all subcontractors sign, "*Certification Statements #2 and #3*" (attached at the end of this section).

1.2   REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4439	(2000) Standard Terminology for Geosynthetics
ASTM D 4491	(1999a) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999a) Determining Apparent Opening Size of a Geotextile

STORM WATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES

PERMIT NO. LAR100000

(1999) Authorization To Discharge Under The Louisiana Pollutant Discharge Elimination System

1.3 MEASUREMENT AND PAYMENT

1.3.1 SWPPP

No separate measurement or payment will be made for work required by this section, except as specified in paragraphs 1.3.2, and 1.3.3, for SWPP. Price and payment shall be distributed among the existing items.

1.3.2 Silt Fence

Measurement for silt fences satisfactorily placed along the banks of the London Avenue Canal will be made by the linear foot. Payment for silt fences as specified herein will be made at the contract unit price per linear foot for "Temporary Silt Fencing". Price and payment shall constitute full compensation for furnishing all plant, labor, materials and equipment, including geotextile fabric, and performing all operations necessary for the placement and maintenance of silt fences throughout the contract period, including final dressing and cleanup.

1.3.3 Straw Bale

Measurement for straw bales satisfactorily placed around inlets will be made by the linear foot. Payment for straw bales as specified herein will be made at the contract unit price per linear foot for "Temporary Baled Hay." Price and payment shall constitute full compensation for furnishing all plant, labor, materials and equipment, and performing all operations necessary for the placement and maintenance of straw bales throughout the contract period, including final dressing and cleanup.

1.3.4 Diversion Dikes – Not Used

1.3.5 Truck Wash-Down Racks – NOT USED

1.4 DEFINITIONS

Construction Owner - The construction owner is the party that has operational control over plans and specifications including the ability to make changes to those items. The New Orleans District (Government) is the construction owner.  
Construction Operator - The construction operator is the party having day-to-day operational control over those activities at a project site which are necessary to

ensure compliance with the SWPPP or other permit conditions. The Contractor is the construction operator.

**Notice of Intent (NOI)** – A document that is completed and submitted to the Louisiana Department of Environmental Quality (LDEQ) as application for coverage to discharge under the Permit No. LAR100000. (Copy provided at the end of this section.)

**Notice of Termination (NOT)** – A document that is completed and submitted to the LDEQ to terminate permission to discharge under the Permit No. LAR100000. The NOT should be filed when the permittee is no longer the Construction operator of the contract, or when termination of stormwater discharge has been accomplished. (Copy provided at the end of this section.)

## 1.5 GENERAL

The Contractor shall implement the Storm Water Pollution Prevention Plan (SWPPP) specified in a manner which will meet the requirements of Section 01352 ENVIRONMENTAL PROTECTION, and the requirements of the Louisiana Pollution Discharge Elimination System (LPDES) permit, Permit No. LAR100000, effective October 1, 1999.

### 1.5.1 Environmental Assessment of Contract Deviations

The Contractor is advised that deviations from the Storm Water Pollution Prevention Plan (SWPPP) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the Storm Water Pollution Prevention Plan erosion control requirements as specified herein and as shown on the drawings which may have an environmental impact will require an extended review, processing, and approval time by the Government.

### 1.5.2 Notice Of Intent

Upon preparation of a complete SWPPP, the NOI will be submitted by the Government to the (LDEQ) as application for the Contractor's coverage under the terms of Permit No. LAR100000. If a specific LPDES permit applicable to this construction item has been received from the LDEQ in response to the NOI, a copy of the specific LPDES permit, as well as a copy of the Government's NOI, will be provided to the Contractor at the Pre-construction Conference. The Contractor shall make any necessary modification to this SWPPP; attach the Construction Owner / Operator certification statement provided at the end of this section to the SWPPP; and certify by signing the statement as the Construction Operator. The Contractor shall then submit a NOI to the LDEQ as application for his/her coverage under the terms of Permit No. LAR100000 prior to initiating any construction activities. Certified mail is recommended for Contractor's proof of submittal. A copy of the Contractor's NOI submittal shall be provided to the Contracting Officer's representative at the time of submittal. LDEQ will provide a

specific LPDES permit to the Contractor in response to that NOI submittal. The NOI's of both the Contractor and the Government, as well as the specific permits in response to the NOI, shall be posted at the job site by the Contractor. (Forms are attached at the end of this Section.)

## 1.6 SUBMITTALS

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

### 1.6.1 Certificates, G

The Contractor shall submit the manufacturer's certification of compliance for the geotextile used on the silt fence. All brands of geotextile that are used in construction shall be accepted on the following basis. At least 30 days prior to installation, the Contractor shall furnish to the Contracting Officer, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The certificate shall contain the signer's title, the name and address of the Contractor, the contract number, and the project name and location. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical, and manufacturing requirements stated in this specification. Geotextiles shall not be delivered to the site until the geotextile certificates are approved by the Contracting Officer.

### 1.6.2 Samples, G

A 5-foot by 5-foot sample of the geotextile filter fabric that the Contractor plans to use for the silt fence shall accompany the certificate. If seams are used, then an additional 5-foot by 5-foot sample containing a sample seam in the center of the geotextile sample shall be submitted with the certificate.

## 1.7 RECORD RETENTION REQUIREMENTS

Records of the NOI as well as any data use to complete it, the SWPPP, and any reports required by Permit No. LAR100000 shall be retained by the permittee for at least three years from the date that the site is finally stabilized. Certification of the SWPPP by the Contractor or any sub-contractor is required in accordance with Permit No. LAR100000. Copies of required certification statements are attached at the end of this section.

### 1.7.1 Plan Accessibility

A copy of the SWPPP required by the permit, including a copy of the permit language, shall be retained at the construction site (or other local location accessible to the State

Administration Authority and the public) from the date of construction initiation to the date of stabilization. The permittee with day-to-day operational control over SWPPP implementation shall have a copy of the plan available at a central location on-site for the use of all operators and those identified as having responsibilities under the plan whenever they are on the construction site. A notice shall be posted near the main entrance to the construction site with the following information: (1) the LPDES permit number for the project or a copy of the NOI if a permit has not yet been assigned; (2) the name and telephone number of a local contact person; (3) a brief description of the project; and (4) the location of the SWPPP if the site is inactive or does not have an on-site location to store the plan.

#### 1.7.2 Activity Records

The dates of the following activities shall be recorded:

- (1) major grading activities occurred
- (2) construction activities temporarily or permanently ceased
- (3) stabilization measures were initiated

#### 1.7.3 LDEQ Correspondence

Any written correspondence concerning the NOI, NOT, SWPPP, or discharges from any facility covered under Permit No. LAR100000, shall be identified by permit number, if one has been assigned. The following is the LDEQ mailing address:

Louisiana Department of Environmental Quality  
Office of Environmental Services  
P.O. Box. 82135  
Baton Rouge, LA 70884-2135

Attn: Permits Division

#### 1.8 MAINTENANCE AND SURVEILLANCE FEES

In accordance with the Contract Clause in Section 00700 entitled *Permits And Responsibilities (FAR 52.236-7)*, the Contractor shall, without additional expense to the Government, be responsible for paying any state required annual maintenance and surveillance fee for work associated with coverage under Permit No. LAR100000

#### 1.9 EROSION AND SEDIMENT CONTROLS

The controls and measures required for controlling sediment during construction are described below.



## 1.9.1 Stabilization Controls

The stabilization practices to be implemented shall include fertilizing and slab sodding as specified in Section 02922. On the daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs 1.9.1.1 and 1.7.2, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

### 1.9.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

### 1.9.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased. Stabilization practices shall be initiated on that portion of the site by the fourteenth day in the case where construction activities will not resume within 21 days after construction activities have ceased.

## 1.9.2 Structural Controls

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices.

### 1.9.2.1 Silt Fence Barrier

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed, as shown on the contract drawings, to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. (Final removal of silt fence barriers shall be upon approval by the Contracting Officer.)]

### 1.9.2.2 Straw Bale Barrier

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area) as shown on the drawings. Areas where straw bales are to be used are shown on the drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided along the banks of the London Avenue Canal and around drain inlets and catch basins.

## PART 2 PRODUCTS

### 2.1 COMPONENTS FOR SILT FENCE BARRIER

#### 2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE		
PHYSICAL PROPERTY	TEST PROCEDURE	REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (%)	ASTM D 4632	30 % max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

## 2.2 COMPONENTS FOR STRAW BALE BARRIER

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as bahia, bermuda, Johnson grass, etc., furnished in air dry condition. The bales shall have a standard cross section of 14 inches by 18 inches. All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 inches x 2 inches in cross section and shall have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 3 feet.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF SILT FENCE BARRIER

The silt fence shall be located and installed as indicated on the contract drawings. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric. The geotextile shall be attached to the land side of the post with wire or other method recommended by the manufacturer and such that a six inch length of geotextile is left unattached at the bottom of the post, the unattached geotextile embedded in the trench and the trench backfilled. It is the responsibility of the Contractor to maintain the integrity of the silt fence. Any deficiencies shall be immediately corrected by the Contractor. The silt fence shall be promptly repaired or replaced should it become damaged or otherwise ineffective. The silt fence is to remain in place upon completion of the project, or as directed by the Contracting Officer. It's

maintenance shall be continual for that period of time for which excavated materials are placed in the area of the silt fence.

### **3.2 INSTALLATION OF STRAW BALE BARRIER**

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 18 inches deep into the ground to securely anchor the bales.

### **3.3. INSTALLATION OF TRUCK WASH-DOWN RACKS – NOT USED**

### **3.4 MAINTENANCE**

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

#### **3.4.1 Silt Fence Barrier Maintenance**

Silt fences shall be inspected in accordance with paragraph 3.5. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. Sediments shall be utilized in the job or disposed of as construction debris. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be sodded in accordance with Section 02922 "FERTILIZING AND SLAB SODDING".

#### **3.4.2 Straw Bale Barrier Maintenance**

Straw bale barriers shall be inspected in accordance with paragraph 3.5. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Sediments shall be utilized in the job or disposed of as construction debris. Bale rows used to retain sediment shall be turned uphill at each end of each row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be slab sodded in accordance with Section 02922 "FERTILIZING AND SLAB SODDING".

### **3.5 INSPECTIONS**

#### **3.5.1 General**

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every fourteen (14) calendar days, before anticipated storm events (or series of storm events such as intermittent showers over one or more days) expected to cause a significant amount of runoff, and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every two weeks.

#### **3.5.2 Inspections Details**

Disturbed areas [and areas used for material storage that are exposed to precipitation] shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

### 3.5.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site. Sample inspection reports (Exhibit D-2, Exhibit D-3, Exhibit D-4, and Table D-5) are included at the end of this section.

### 3.6 NOTICE OF TERMINATION

Upon stabilization and elimination of all storm water discharges authorized by Permit No. LAR100000, or where the operator of all storm water discharges at a facility changes, a Notice of Termination (NOT) shall be certified and submitted by the Contractor to the Permits Division at the LDEQ. A copy of the NOT form is provided at the end of this section. Certified mail is recommended for proof of the NOT submittal. The NOT shall be submitted within 30 days of stabilization or assumption of full control of the SWPPP by another operator/permittee over all areas of the site that have not been finally stabilized.

(a) Job description. The project is located in Orleans Parish, Louisiana. The work consists of the demolition and construction of a new flood protection bridge and roadway approaches, a drainage system, water line relocation and relocation of existing utilities.

(b) Activity sequence. The Contractor shall construct erosion control as indicated on the drawings and described in this section to provide for abatement and control of sediment arising from construction activities in the performance of this contract. Upon completion of construction, all disturbed areas shall be fertilized and slab sodded and the erosion control measures shall be removed.

(c) Disturbed area. The total project area is 5.6 acres. Approximately 4.3 acres will under go excavation and grading under this contract.

(d) Runoff coefficient. The estimated runoff coefficient for pre and post construction conditions are approximately 0.4 and 0.50, respectively. Discharge from the site may contain sediment resulting from excavation operations.

(e) Location. Refer to the drawings for the location of the project.

(f) Associated discharges. There are no discharges associated with industrial activity other than construction.

(g) Name of receiving waters / wetlands / special aquatic sites. The drainage runoff is collected in a subsurface drainage system and discharge into Drainage

Pumping Station No. 4W, which discharges into the London Avenue Canal, which flows into Lake Pontchartrain.

(h) Permit requirements. The permit requirements are described in the copy of Permit No. LAR100000, attached at the end of this Section.

(i) Endangered or threatened species concerns. There are no threatened species and/or critical habitat in proximity to this project. The construction is within a developed residential area.

(j) National Register of Historic Places concerns. None of the property included is registered with the National Historic Register.

**CERTIFICATION STATEMENT #1**

*Any person, including the construction owner/operator, signing documents under Part VI.G. of Permit No. LAR100000 (submitting NOIs, preparing SWPPPs, maintaining, or making revisions to the SWPPPs) shall make the following certification.*

(Contract Title)  
(Permit Number)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Construction Owner/Operator: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Telephone No: \_\_\_\_\_

Signature: \_\_\_\_\_ Title \_\_\_\_\_ Date: \_\_\_\_\_



**CERTIFICATION STATEMENT #2**

*Any Contractor or subcontractor implementing any part of this plan must prepare and sign a copy of the following certification.*

(Contract Title)  
(Permit Number)

I certify, under penalty of law, that I understand the terms and conditions of the Louisiana Pollutant Discharge Elimination System (LPDES) general permit that authorizes storm water discharges associated with construction activity from the construction site identified as part of this certification.

Firm Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Telephone No: \_\_\_\_\_

Signature: \_\_\_\_\_ Title \_\_\_\_\_ Date: \_\_\_\_\_

**CERTIFICATION STATEMENT #3**

***Any Contractor or subcontractor that does not meet the definition of "operator" that will conduct activities that may impact the effectiveness of the SWPPP control measures must prepare and sign the following certification.***

(Contract Title)  
(Permit Number)

I certify, under penalty of law, that I will coordinate, through the contractor, owner, or directly, with the Contractor (s) identified in the pollution prevention plan having responsibility for implementing storm water control measures to minimize any impact my actions may have on the effectiveness of these storm water control measures.

Firm Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Telephone No: \_\_\_\_\_

Signature: \_\_\_\_\_ Title \_\_\_\_\_ Date: \_\_\_\_\_

CONTRACTOR'S MODIFICATIONS TO SWPPP

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## SECTION 01451 - CONTRACTOR QUALITY CONTROL

### PART 1 GENERAL

#### 1.1 REFERENCES

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

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

ASTM D 3740 (2001) Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (2000b) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

#### 1.2 PAYMENT

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

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause in Section 00700, entitled Inspection Of Construction (FAR 52.246-12). 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 of award, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause in Section 0700, entitled Inspection Of Construction (FAR 52.246-12). 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 30 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 shall also be furnished to the Government.
- (d) Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330, "SUBMITTAL PROCEDURES".
- (e) Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities 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 shall establish verification that identified deficiencies have been corrected.

(h) Reporting procedures, including proposed reporting formats.

(i) A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there is 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 14 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 that 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 that shall be at the site at all times during progress of the work and with complete authority to act 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/her 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 3 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 does not 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 case 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 CQC Personnel

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



## Experience Matrix

<u>Area</u>	<u>Qualifications</u>
a. Civil Graduate	Civil Engineer with 2 years experience in the type of work being performed on this project or technician with five yrs related experience
b. Electrical Graduate	Electrical Engineer with two yrs related experience or person with five yrs related experience
c. Structural Graduate	Structural Engineer with two yrs experience or person with five yrs related experience
d. Environmental Graduate	Environmental Engineer with 3 yrs experience
e. Submittals	Submittal Clerk with 1 yrs experience
f. Concrete, Pavements and Soils	Materials Technician with two yrs experience for the appropriate area

### 3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at the New Orleans District and other Corps of Engineers districts

### 3.4.5 Organizational Changes

The Contractor shall maintain the 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 01330 "SUBMITTAL PROCEDURES". The CQC organization shall be responsible for certifying that all submittals comply 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, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- (a) A review of each paragraph of applicable specifications.
- (b) A review of the contract drawings.
- (c) A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- (d) Review of provisions that have been made to provide required control inspection and testing.
- (e) Examination of the work area to assure that all required preliminary work has been completed and complies 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 Quality Assurance personnel shall be notified at least 48 hours in advance of beginning the preparatory control phase. The Contractor shall submit a written agenda of the topics to be discussed at the preparatory meeting on the day prior to the meeting date. 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 that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

### 3.6.4 Additional Preparatory and Initial Phases

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

## 3.7 TESTS

### 3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product that 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. Depending upon the workload by the Government inspecting agency, acceptance or rejection of the Contractor proposed testing laboratory is usually done approximately 60 to 120 days after notification is received from the Contractor. The certification will be valid for two years. 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, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test

reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Capability Check

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

#### 3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$3500.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

### 3.7.3 Onsite Laboratory

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

### 3.7.4 Furnishing or Transportation of Samples for Testing

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

For All Materials Except Painting Materials and  
Quality Assurance Concrete Test Cylinders:

U.S. Army Engineer Research and Development Center  
Waterways Experiment Station  
3909 Halls Ferry Road  
Vicksburg, Mississippi 39180-6199

For Painting Materials:

Physical address:

U.S. Army Construction Engineering Research Laboratory  
2902 Newmark Drive  
Champaign, Illinois 61821

Mailing address:

U.S. Army Construction Engineering Research Laboratory  
P.O. Box 9005  
Champaign, Illinois 61826-9005

For Quality Assurance Concrete Test Cylinders:

U.S. Army Corps of Engineers  
New Orleans District  
7400 Leake Ave  
Room 105  
Soils and Materials Processing Unit  
New Orleans, Louisiana 70118

Concrete test cylinders shall only be delivered on Federal workdays between 8:30 AM and 3:00 PM. Coordination for each specific test, exact delivery location, and dates will be made through the Area Office. Details on the soils and materials testing laboratory and additional instructions for delivery of the QA samples will be given at the preconstruction conference.

### 3.8 COMPLETION INSPECTION

#### 3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Contract Requirement 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 3.9, entitled "Documentation", and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

### 3.8.2 Pre-Final Inspection

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

### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from the New Orleans District, Mississippi Valley Division, and local interest may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause in Section 00700 entitled, Inspection Of Construction (FAR 52.246-12).

## 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 12 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### **3.10 SAMPLE FORMS**

Sample forms for guidance in preparing the CQC Plan 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 work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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## **SECTION 01555 – TRAFFIC CONTROL AND COORDINATION, AND PERMANENT TRAFFIC SIGNING AND STRIPING**

### **PART 1 GENERAL**

#### **1.1 SCOPE**

The work covered by this section consists of providing and maintaining traffic control, coordination, and maintenance, as specified herein, in conformance to the MUTCD, and in accordance with Section 713 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition, and latest revisions, or as amended herein. All work shall be in conformance with the plan details and these specifications.

This work also consists of furnishing and installing Reflectorized Raised Pavement Markers (Class IV) at locations shown on the plans or as directed by the Project Engineer, in conformance to the MUTCD and in accordance with Section 731 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition, and latest revisions, or as amended herein. All work shall be in conformance with the plan details and these specifications.

This work also consists of furnishing and installing Reflectorized Thermoplastic Pavement Striping in conformance to the MUTCD and in accordance with Section 732 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition, and latest revisions, or as amended herein. All work shall be in conformance with the plan details and these specifications.

This work also consists of furnishing and installing Permanent Traffic Signs, including all accessories, posts, etc., in conformance to the MUTCD and in accordance with Section 729 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition, and latest revisions, or as amended herein. All work shall be in conformance with the plan details and these specifications.

#### **1.2 GENERAL**

The Contractor shall have a traffic control and truck haul route plan prepared by a Louisiana Registered Professional Engineer with a minimum of five years experience in traffic engineering. This traffic control plan shall be submitted to the Owner and Engineer for review. Following review of the traffic control plan by the Engineer and Owner, the Contractor will submit the plan to the City of New Orleans, Department of Public Works – Traffic Engineering Division for their review and approval. The Contractor shall submit an original and 10 copies of the Traffic Control Plan to the Engineer once the plan has been approved by the City of New Orleans, Department of Public Works – Traffic Engineering Division.

### 1.3 MEASUREMENT AND PAYMENT

- 1.3.1 No measurement will be made for design of the Traffic Control Plan, maintenance of control and coordination of traffic routing as specified herein. Payment will be made at the lump sum contract price for "Traffic Control and Coordination". Price and payment shall constitute full operations necessary for developing, coordinating, and implementing the Traffic Control Plan, including temporary signs, barricades and pavement markings.
- 1.3.2 Measurement for pavement markers shall be per each and payment will be made under the contract unit price per each for "Reflectorized Raised Pavement Markers".
- 1.3.3 Measurement for signs shall be per each and payment will be made under the contract unit prices per each for "Permanent Traffic Signs" and "Street Name Sign on New Post". These prices shall include all necessary accessories, including posts.
- 1.3.4 Measurement for "Plastic Pavement Striping" shall be per linear foot and payment will be made under the following items per linear foot.
- "Plastic Pavement Striping (4")"
  - "Plastic Pavement Striping (8")"
  - "Plastic Pavement Striping (24")"
- 1.3.5 No measurement will be made for plastic pavement legends and symbols. Payment will be made under the contract lump sum price for "Plastic Pavement Legends and Symbols".
- 1.3.6 Measurement for the removal and replacement of regulatory signs will be per each. Payment will be made under the contract unit price per each for "Remove and Replace Regulatory Signs" and shall include inventorying of signs, removing and replacing signs.

## PART 2 PRODUCTS

### 2.1 TEMPORARY SIGNS AND BARRICADES

In accordance with Section 713 of the Louisiana Standard Specifications for Roads and Bridges (LSSRB), 2000 Edition, the Contractor shall provide all necessary signs, barricades, temporary pavement markings, in accordance with the Louisiana Manual on Uniform Traffic Control Devices, Construction Section, as well as all signs,

barricades, blinking lights or other necessary traffic control devices required by the City of New Orleans or other governing specifications.

## **2.2 RAISED PAVEMENT MARKERS**

Adhesive for placing raised markers shall be a two (2) component epoxy adhesive conforming to Louisiana Standard Specifications Section 731, and Subsection 1017.02. The components shall be mixed in equal parts by volume. Mixing and dispensing of adhesive shall be by mechanical methods, unless hand methods are permitted.

Markers: Manufacturer's samples and specifications must be submitted and approved by City of New Orleans, Department of Public Works - Traffic Engineering Division prior to installation. A one-year warranty shall be required. Raised pavement markers, which become loose or damaged, must be replaced for one year after installation.

## **2.3 THERMOPLASTIC PAVEMENT STRIPING**

All permanent pavement striping shall be thermoplastic, conforming to Louisiana Standards Specifications Section 732.

## **PART 3 EXECUTION**

### **3.1 TRAFFIC CONTROL REQUIREMENTS**

Access to and from the site shall be primarily as follows: from the east, I-10 to I-610 to Elysian Fields Avenue to Robert E. Lee Boulevard; from the west I-10 to I-610 to Canal Boulevard to Robert E. Lee Boulevard. These are the primary truck haul routes.

### **3.2 CONSTRUCTION ZONE TRAFFIC**

The Contractor shall provide safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate area of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public. The Contractor shall be responsible for installation and maintenance of all traffic devices for the duration of the construction period.

### 3.3 DAILY CHECK

The Contractor shall check twice daily, once in the morning and at the close of work in the evening, that all signs, barricades, and lights are in place and functioning.

### 3.4 TRAFFIC ENGINEER'S CHECK

The traffic engineer responsible for preparing the traffic control plan shall inspect the site once every two weeks to ensure that all signs, barricades, and lights are in place and functioning.

### 3.5 EXISTING TRAFFIC CONTROL DEVICES

Any traffic control devices (signs, signals, markings) which exist as part of the normal pre-construction scheme, and that do not apply to a detour situation, or are in the way of construction, shall be covered, removed, or relocated by the contractor under the supervision of the City of New Orleans, Department of Public Works - Traffic Engineering Division. There is no direct payment for this item.

### 3.6 EMERGENCY CONTRACTOR DESIGNATION

The Contractor shall designate a person(s) who can be contacted and shall be available on a seven day week, 24 hour basis through the entire period that the contract is in force. Name(s) and telephone number(s) of the individual(s) designated shall be furnished to the Engineer prior to starting work. The person contacted shall be able to respond to emergencies occurring along the length of the project during normal work and holiday hours.

### 3.7 CONSULTANTS

The Contractor shall consult with the Engineer and the City of New Orleans, Department of Public Works – Traffic Engineering Division, immediately on any vehicular or pedestrian safety or efficiency problems incurred as a result of construction of the project.

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## SECTION 02075 – GEOTEXTILE AND GEOGRID REINFORCEMENT

### PART 1 GENERAL

#### 1.1 SCOPE

The work provided for herein consists of furnishing all plant, labor, material, equipment and performing all operations required for furnishing, hauling, and placing the geotextile fabric and geogrid reinforcement, complete, as specified herein and on the contract drawings, and maintaining the geotextile and geogrid reinforcement until placement of the subbase and stone base course is completed and accepted.

#### 1.2 REFERENCES

The current issues of the publications listed below, but referred to thereafter by basic designation only, form a part of this Specification to the extent indicated by the references thereto:

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

ASTM D 883	(2000) Terminology Relating to Plastics
ASTM D 1388	(1996) Stiffness of Fabrics
ASTM D 1621	(2000) Compressive Properties of Rigid Cellular Plastics
ASTM D 4437	(1999) Determining the Integrity of Field Seams used in Joining Flexible Polymeric Sheet Geomembranes
ASTM D 4439	(2002) Terminology for Geosynthetics
ASTM D 4491	(1999a) Water Permeability of Geotextiles By Permittivity
ASTM D 4595	(2001) Tensile Properties of Geotextiles by the Wide-Width Strip Method
ASTM D 4632	(1996) Grab Breaking Load and Elongation of Geotextiles



ASTM D 4751 (1999a) Determining Apparent Opening Size of a Geotextile

ASTM D 9884 (1996) Strength of Sewn or Thermally Bonded Seams of Geotextiles

Louisiana Standard Specifications for Roads and Bridges

1019.01 Geotextile Fabric

1019.02 Geocomposite Drainage Systems

### 1.3 MEASUREMENT AND PAYMENT

Geotextile fabric and geogrid reinforcement will be measured in place to the nearest square yard of protected area as delineated on the drawings. Overlaps will be measured as a single layer. Payment will be made at the applicable contract unit price for "Geotextile Fabric" and "Geogrid Reinforcement". Price and payment shall constitute full compensation for providing all plant, labor, material, and equipment and performing all operations necessary for the complete and satisfactory installation of the geotextile fabric and geogrid reinforcement. No payment shall be made for geotextile fabric or geogrid reinforcement that is rejected or damaged due to Contractor fault or negligence.

### 1.4 SUBMITTALS

All brands of geotextile fabric and geogrid reinforcement and all seams used in construction will be accepted on the following basis. At least 30 days prior to installation, the Contractor shall furnish to the Contracting Officer, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile fabric and the geogrid reinforcement. The certificates shall contain the signer's title, the name and address of the Contractor, the contract number, and the project name and location. The mill certificate or affidavit shall attest that the geotextile fabric and geogrid reinforcement meet the chemical, physical, and manufacturing requirements stated in this specification and that the seams used meet the seam requirements. A 5-foot by 5-foot sample of each geotextile fabric and geogrid reinforcement that the Contractor plans to use shall accompany the certificate. If seams are used, then an additional 5-foot by 5-foot sample containing a sample seam in the center of the geotextile fabric and the geogrid reinforcement samples shall be submitted with the certificate.

## 1.5 SHIPMENT AND STORAGE

The geotextile fabric and geogrid reinforcement shall be shipped and maintained in a heavy-duty protective cover until it is placed. During all periods of shipment and storage, the geotextile fabric and geogrid reinforcement shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, and other contaminants.

## PART 2 PRODUCTS

### 2.1 GEOTEXTILE REQUIREMENTS

The geotextile fabric shall be a woven pervious sheet made with plastic yarn as defined by ASTM D 883. The geotextile shall meet the physical requirements listed in Tables No. 1 at the end of this section. The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, amide, or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultra-violet exposure. The Contractor shall use a geotextile fabric that is chemically compatible with the material that will be placed on or in the vicinity of the geotextile fabric. Leachate from the material shall not deteriorate the geotextile fabric. The edges of the geotextile fabric shall be selvaged.

### 2.2 GEOGRID REQUIREMENTS

The geogrid reinforcement shall be Tensar Structural Geogrid BX 110060, TL Mirafi Enkagrid Max 20, Tenax MS 220, or equal and shall have the minimum properties listed in Table No. 2 at the end of this section.

### 2.3 GEOCOMPOSITE DRAINAGE SYSTEM

The geocomposite fabric shall conform to the requirements of subsections 1019.01 and 1019.02 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition.

## **PART 3 EXECUTION**

### **3.1 GEOTEXTILE FABRIC INSTALLATION**

The geotextile fabric shall be placed in the manner and at the locations shown on the drawings. The Contractor shall prepare the surface to receive the geotextile fabric to insure that the surface is relatively smooth and free of obstructions, depressions, debris, soft or low density pockets of material, or stone which could damage the geotextile fabric during placement. At the time of installation, the geotextile fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The geotextile fabric shall be protected at all times during construction to insure that the geotextile fabric's original chemical and physical properties are not changed. The work shall be scheduled so that all of the geotextile fabric that is placed is covered with a layer of the specified material by the end of each workday. Failure to comply shall require replacement of geotextile fabric. All wrinkles and sags shall be stretched out immediately before the subbase material or base course material is placed on the geotextile fabric. The geotextile fabric shall be protected from damage during placement of the subbase and base course material. This shall be accomplished by limiting the height of drop to less than 1 foot. In the event that this damages the geotextile fabric, the subbase or base course material shall be placed directly on the geotextile fabric with zero height of drop. Before placement of the subbase or base course material, the Contractor shall demonstrate that the placement technique will not damage the geotextile fabric. The Contractor at no additional cost to the Government shall replace any geotextile fabric that is rejected or damaged.

### **3.2 GEOGRID REINFORCEMENT INSTALLATION**

The geogrid shall be placed in continuous sheets parallel to the centerline of the roadway. Adjacent sheets of geogrid shall be overlapped a minimum of 18". Care shall be taken to ensure that geogrid sections do not separate during construction.

Tracked equipment will not be allowed to operate directly on the geogrid. Damaged geogrid shall be either removed and replaced with new geogrid or covered with a second layer of geogrid extending 3 feet in each direction from the damaged area at the Contractor's expense.

Each geogrid roll shall be labeled or tagged to provide product identification sufficient for field inventory and quality control purposes. Rolls shall be stored in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected from ultraviolet light.

### **3.3 SEAMS AND LAPS**

Seams or laps may be utilized to produce panels of geotextile fabric and geogrid reinforcement large enough to cover the area shown on the drawings. Seams or laps shall be perpendicular to the centerline of the roadway. Seams or laps shall not run parallel with the direction of the centerline.

### 3.3.1 Seams

All seams for the geotextile fabric shall be sewn using thread meeting the requirements for plastic yarn specified in paragraph 2.1. The sheets of geotextile fabric shall be sewn at the factory or other approved location. Seam strengths shall meet the requirements of Table 1.

### 3.3.2 Laps

Geotextile fabric and geogrid reinforcement shall be placed as shown on the drawings and lapped in accordance with the manufacturer's recommendation but in no case less than 24 inches for the geotextile reinforcement and 18 inches for the geogrid reinforcement.

TABLE NO. 1

PHYSICAL REQUIREMENTS FOR GEOTEXTILE FABRIC

<u>Physical Property</u>	<u>Physical Property</u>	<u>Acceptable Values</u>
Tensile Strength (*)	ASTM D 4632	200 pounds minimum in any principle direction
Seam Strength	ASTM D 4884	[180] pounds per inch minimum
Elongation at Break	ASTM D 4632	15 % minimum in any principle direction
Apparent Opening Size (AOS)	ASTM D 4751	No finer than the U.S. Standard Sieve No. 50 and no coarser than the U.S. Standard Sieve No. 30.
Geotextile	ASTM D 4491	The permittivity of the geotextile shall be greater than 0.35 per second
Flow Rate	ASTM D 4491	Minimum of 40 gallons per minute per square foot

(\*) Value represents minimum average roll value of new geotextile received from the manufacture or distributor (i.e., any roll in a lot shall meet or exceed the minimum value in the table).

TABLE NO. 2

PHYSICAL REQUIREMENTS FOR GEOGRID REINFORCEMENT

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD*	TD**
Tensile Strength (at ultimate)	ASTM D 4595	kn/m (lbs/ft)	20 (1370)	20 (1370)
Tensile Strength (at 2% strain)	ASTM D 4595	Kn/m (lbs/ft)	4.09 (280)	6.57 (450)
Tensile Modulus (at 5% strain)	ASTM D-4595	Kn/m (lbs/ft)	8.46 (580)	13.42 (920)
Tensile Modulus (at 2% strain)	ASTM D 4595	Kn/m (lbs/ft)	226.4 (115,170)	360.1 (24,685)
Flexural Rigidity	ASTM D 1388	Mg-cm	250000	

\*MD Machine Direction (Longitudinal to Roll)

\*\*TD Transverse Direction (Across Roll Width)

All number values in the above table represent minimum average roll values required in the designated direction.

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## SECTION 02101 - MODIFICATIONS TO EXISTING UTILITIES

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, equipment, shop drawings, and materials required to perform the operations in connection with the modification of existing utilities. The work specified herein includes relocation of an existing 12-inch water main through a floodwall and on the side of a new bridge and removal of the existing water main and valves and construction of a new 6 inch water main. Offsetting of existing water mains, replacing existing water house connections, cleaning, adjusting existing water meters and replacing existing sewer house connections. The Contractor shall be responsible for coordinating all work with the Sewerage and Water Board of New Orleans. All work shall be inspected and approved by the Contracting Officer before covering with backfill. No elevations, slopes, or dimensions of existing utilities shall be changed unless specified on the drawings or otherwise directed by the Contracting Officer.

All work and materials in this section shall be in accordance with Section C741 Water Mains Up to 12" in Diameter (Revised) and Section C742 Sewer Lines (Revised), by the Sewerage and Water Board of New Orleans, included in the Appendix of these specifications.

#### 1.2 MEASUREMENT AND PAYMENT

Water mains shall be measured for payment by the linear foot. Water valves, water house connections, water line offsets, adjusted water valve boxes, water valve manholes, cleaning of water meter boxes, adjusting water meter boxes, replacement of water meter boxes and replacement of sewer house connections will be measured for payment per each. There will be no direct measurement and payment for the removal and delivery of existing valves and hydrants to the Sewerage and Water Board of New Orleans. The cost shall be an incidental obligation to the Contractor. Payment for utility modifications will be made under the following:

<u>DESCRIPTION</u>	<u>UNIT</u>
6" New PVC Water Main With Main Line Fittings	Linear Foot
12" New PVC Water Main With Main Line Fittings	Linear Foot



12" New D.I. Water Main With Main Line Fittings, Linear Foot

\* Beams And Other Supports Along Robert E. Lee Bridge  
New 12" Water Valve and Manhole

Replace ¾" Water House Connection (from Main to Meter) Each

Replace 1" Water House Connection (From Main to Meter) Each

6" Water Line Offset Up to 24" Each

6" Water Line Offset Over 24" Each

Adjust Water Valve Box Each

New Water Valve Manhole Each

Remove Mud and Debris From Inside of Water Meter Box Each

Adjust Complete Water Meter Box to Grade Each

Replace Broken Water Meter Box Each

Replace Existing Sewer House Connection From Existing Main to Back of Curb Each

### 1.3 REFERENCES

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

#### AMERICAN SOCIETY FOR TEST AND MATERIALS (ASTM) STANDARDS

ASTM D 3034 Solid Wall Polyvinyl Chloride (PVC) Pipe (6" through 15")

#### AMERICAN WATER WORKS ASSOCIATION

AWWA C900 Class 150 Polyvinyl Chloride (PVC) Pipe

AWWA C 150 Special Thickness Class 52 Ductile Iron Pipe

AWWA C105 Polyethylene Wrap

AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI A 21.10	Ductile Pipe
ANSI A 21.11 S&WB	Rubber Gasket Joints Standard Specifications and Drawings
S&WB	Special Specifications for Installation of Replacement of Water Mains up to 12" in Diameter
S&WB	Special Specifications for the Installation, Replacement and Restoration of Sewer Systems

STANDARD SPECIFICATIONS OF THE  
SEWERAGE AND WATER BOARD OF NEW ORLEANS

Section C741	Water Mains up to 12" in Diameter (Revised)
Section C742	Sewer Lines (Revised)

1.4 SUBMITTALS FOR APPROVAL

1.4.1 Schedule

Thirty days before work is performed on any utility, the Contractor shall prepare and submit for approval of the Contracting Officer a schedule indicating the proposed date and time the water service will be interrupted and the date and time of permanent replacement.

1.4.2 Shop Drawings

The Contractor shall prepare and submit for the approval of the Contracting Officer complete shop drawings showing details of the sheet pile penetrations, sleeves, casing seals, and fittings, and all work associated with modifications to existing utilities.

1.5 QUALITY CONTROL

1.5.1 General

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

(1) checking construction operations and certifying compliance with applicable sections of the specifications,

(2) checking operations including concrete work, welding, and earth work, and certifying compliance with applicable sections of the specifications,

(3) checking materials to be used in utility modification, including plastic sealant, clamps, pipe sleeves, and casting seals and pipe sleeves attached to sheet piling. The Contractor shall certify that all materials are in compliance with applicable regulations.

#### 1.5.2 Reporting

The original and two copies of these records of 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".

### 1.6 QUALITY OF WORK

#### 1.6.1 Excavation and Backfill

All excavation and backfill required for utility modifications shall conform to the applicable provisions of Section 02318.

#### 1.6.2 Existing Utilities

The elevations, slopes, and dimensions of the existing utilities shall not be changed unless shown on the drawings adjusted to resolve a conflict or directed by the Contracting Officer.

#### 1.6.3 Passage Of Utilities

All work for passage of the water main through the concrete floodwall shall conform to the applicable details shown on the drawings and applicable provisions herein. The work shall be inspected and approved by the Contracting Officer before covering with backfill.

#### 1.6.4 Welding – Not Used

**PART 2 PRODUCTS**

**2.1 MATERIALS**

2.1.1 All materials shall be in accordance with the Sewerage and Water Board of New Orleans' specification for Section C741, "Water Mains up to 12" in Diameter" and Section C742 – Sewer Lines, included in the Appendix of these specifications.

**PART 3 EXECUTION**

**3.1 MODIFICATIONS TO EXISTING UTILITIES**

**3.1.1 General**

All work for the modifications of existing utilities shall be in accordance with the Sewerage and Water Board of New Orleans' specifications Section C741, "Water Mains up to 12" in Diameter", and Section C742 Sewer Lines included in the appendix of these specifications, except as amended herein.

**3.1.2 Cooperation With Owners**

The Contractor shall carefully plan and expeditiously prosecute the work in such manner as to cause the least interruption to services of the water mains. The Contractor shall coordinate the relocation of the water main and utility modifications with the Sewerage and Water Board of New Orleans so that no delay, interference or access problems occur.

**3.1.3 Installation of the Water Main Through the Floodwall**

The Contractor shall install a 24 inch steel pipe sleeve in the concrete floodwall prior to placing the concrete. The ductile iron water main shall be installed through the sleeve. The Contractor shall pack the sleeve around the pipe with plastic sealant in such a way as to completely fill the sleeve leaving no voids or air pockets. Neoprene rubber sleeve type casing seals shall be installed in accordance with the manufacturer's recommendations and held in place with stainless steel bands and clamps as shown on the drawings. The Contractor shall coordinate the requirements for installation with the Sewerage and Water Board of New Orleans.

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SECTION 02111 - TEMPORARY FLOOD PROTECTION

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## SECTION 02111 - TEMPORARY FLOOD PROTECTION

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, materials, equipment, and performing all operations necessary for designing, installing, and removing temporary flood protection including cleaning the work area and incidental work as required for reaches where the existing flood protection system will be breached by demolition of existing bridge and floodwalls in accordance with Section 02221, "Selective Demolition."

#### 1.2 MEASUREMENT AND PAYMENT

##### 1.2.1 First Event

No measurement will be made for work required by this section. Payment for temporary flood protection including design, installation, drainage, maintenance, removal for one event, and any incidental work as required, will be made at the contract lump sum price for "Temporary Flood Protection." Such price and payment shall constitute full compensation for furnishing all plant, labor, materials and equipment for work required by this section.

##### 1.2.2 Subsequent Events

Payment for all work required for installation and removal for subsequent storms or hurricanes will be made by an equitable adjustment under contract clause entitled "changes".

#### 1.3 SUBMITTALS

The Contractor shall submit for approval his proposed plan to accomplish the specified temporary flood protection. The submittal shall be in accordance with Section 01330, "Submittal Procedures" and shall include, but not necessarily be limited to the following:

- (1) Design and layout of temporary flood protection works.
- (2) Methods and duration of maintenance of temporary flood protection.
- (3) Methods, sequence, and equipment and materials to be used for drainage of excavations for floodwall demolition and floodwall replacement.
- (4) Method and sequence of removal, including disposal of materials.

## 1.4 QUALITY CONTROL

### 1.4.1 General

The Contractor shall establish and maintain quality control for temporary flood protection operations to assure compliance with contract requirements and maintain records for his quality control for all construction operations including but not limited to the following:

- (1) Equipment. Type, size, and suitability for construction of the prescribed work.
- (2) Construction. Location and identification of items installed, percentage of work accomplished, status of drainage provisions.

### 1.4.2 Reporting

The original and two copies of these records of inspections and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451, "Contractor Quality Control."

## 1.5 DESIGN

### 1.5.1 Criteria

The temporary flood control structures shall be designed for a minimum top elevation of 6.0 NAVD. At his option the contractor may design the temporary flood control structures to a higher elevation to provide superiority over the adjacent existing flood protection structures (levees). The temporary flood protection structures shall be constructed of materials and in such manner that they will not be subject to detrimental erosion that could lead to their failure. Construction of the temporary flood control structures shall in no way affect the stability of the existing flood protection. Design of the temporary flood control structures is the sole responsibility of the Contractor, and shall be performed and sealed by a registered professional engineer licensed to practice in the State of Louisiana.

The Contractor shall submit to the Contracting Officer for his approval copies of the professional engineers design along with drawings showing the layout of the proposed temporary flood control structures with all pertinent dimensions and material types and sizes to be used in construction of the structures. The copies submitted shall be in bound form.

**PART 2 PRODUCTS (Not Used)**

**PART 3 EXECUTION**

**3.1 GENERAL**

The Contractor shall not perform any work on temporary flood protection prior to receipt of written approval by the Contracting Officer of the Contractor's plan of temporary flood protection. In case of storm conditions, the Contracting Officer will give the Contractor a minimum of twenty-four (24) hours notice to begin installation of emergency sheet piling. Demolition of existing floodwalls shall not begin until necessary approved temporary flood protection preparation is done. The Contractor shall indemnify and hold the Government harmless against any loss or damage sustained by the Contractor arising out of or attributable to failure of temporary flood protection structures of his own design.

**3.2 REQUIREMENTS**

- (1) Temporary flood protection will be required whenever a reach of the existing floodwall is removed until the replacement floodwall is sufficiently completed to withstand flood waters. Sufficiently completed is defined as the time when the concrete in the replacement floodwall reaches a compressive strength of 3000 psi and all earthwork incidental to the floodwall replacement has been completed.
- (2) The Contractor's construction of the temporary protection or cofferdam shall in no way affect the stability of the existing flood protection or flood protection constructed under this contract.
- (3) The Contractor shall maintain as necessary all temporary flood control, including maintaining and operating drainage facilities, during the time they are required.
- (4) It shall be the responsibility of the Contractor to provide, maintain and operate pumps of adequate capacities, for the removal of the water that may find its way into the excavation within the area protected by the temporary flood protection, from whatever sources throughout the life of this project. The discharge from the pumps shall be into the canal on the flood side.
- (5) The Contractor shall remove all temporary flood control structures, and incidental features thereto when no longer required. All materials used in providing temporary flood control structures, and any debris generated during their removal becomes the property of the Contractor and shall be removed from the job site prior to completion.



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SECTION 02221 - SELECTIVE DEMOLITION  
(Feb 2001)

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor, and materials and to perform all operations in connection with the demolition and removal of existing facilities as shown on the drawings and specified herein, including the existing bridge, concrete and asphalt pavement, curbs, drainage structures, flood walls and utilities.

1.2 MEASUREMENT AND PAYMENT

**Removal and disposal of all items specified herein and shown on the drawings will not be measured for payment and will be paid for at the contract lump sum price for "Selective Demolition" and will include the following:**

Removal and disposal of existing Portland concrete pavement.

Removal and disposal of existing sidewalk, driveway, foot lap (concrete, brick, asphalt, etc.).

Removal of existing curb and gutter bottom.

Removal and disposal of existing asphaltic concrete pavement.

Removal and disposal of existing drain lines.

Removal and disposal of existing manholes, catch basins or drop inlets.

Plug and abandon existing water lines.

Removal and disposal of existing concrete wall.

Saw cut 1" concrete curb, pavement, sidewalk, driveway, etc., according to plans (6" to 8" depth).

Saw cut, wheel cut or spade cut existing asphalt according to plans.

Removal or existing Robert E. Lee Bridge over the London Avenue Canal, including existing piling, water main, floodwalls, and cutting off and abandoning existing piles.

Remove existing light standards complete with luminaires and footings.

### 1.3 REFERENCES

General Specifications for Street Paving (GSSP), 1995, Edition, City of New Orleans Department of Public Works. Note: Substitute all references to "Director" with "Contracting Officer".

### 1.4 SUBMITTALS

Prior to commencing work, the Contractor shall submit a detailed plan for demolition, removal and disposal of items designated on the drawings for such work. The plan shall be approved by the Contracting Officer, and shall contain the following:

- (1) plans for demolition of the existing bridge over the London Avenue Canal including the superstructure and the substructure, including the bents, abutment caps and cutting of the existing steel cylinder piles three feet below the mud line at intermediate bents and abandoning them in place and removal of timber piles and steel sheet piling at end bents and removal of sheet piles at scour walls as shown on the drawings.
- (2) plans for removal of steel girders with lead based pain;
- (3) plans for demolition of existing concrete floodwalls;
- (4) plans for demolition of existing roadway, sidewalk and driveway pavement and curbs;
- (5) plans for demolition of existing drainage structures;
- (6) methods for storage and/or disposal; and,
- (7) removal of existing drain lines and structures;
- (8) all other associated work,
- (9) methods to ensure new construction is not damaged during demolition operations and for maintaining safety of persons, vehicles and property in the vicinity of the construction site during demolition.

### 1.5 QUALITY CONTROL

#### 1.5.1 General

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

(1) Establish physical layout and dimensions of the existing bridge over the London Avenue Canal, existing floodwalls, existing pavement and curbs that are slated for demolition and removal as indicated on the contract drawings and specified herein;

(2) equipment, including type, size and suitability for the prescribed demolition and removal;

(3) removal of roadway signs;

(4) saw cutting and removing existing pavement;

(5) Demolition. Location and identification of all items to be demolished, percentage of demolition completed, and methods of demolition. This includes methods of pulling or cutting off foundation piles and sheet pile walls.

(6) Safety Protection and Access. Procedures for assuring the safety of persons and property subject to damage and injury resulting from demolition operations. Provisions for maintenance of access around the site of demolition work.

(7) Disposition of Materials. Method and location of disposition; and damage to existing structures or improvements.

#### 1.5.2 Reporting

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

### 1.6 GENERAL REQUIREMENTS

The Contractor shall ensure the work covered herein is performed in a safe and orderly manner. The Contractor shall submit his demolition procedures for approval to the Contracting Officer. The use of explosives will not be permitted.

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.1 BRIDGE DEMOLITION

The Contractor shall demolish the existing bridge over the London Avenue Canal, including the superstructure, with approximately 2040 feet of W21 steel girders with lead based paint, substructure and approach slabs. The bridge substructure includes the bents, abutment caps and removal of the existing piles. The steel cylinder piles under the intermediate bents shall be cut at three feet below mud line and abandoned in place. The timber piles and steel sheet piling at end bents and steel sheet piling at scour walls

shall be removed. The steel sheet piling at the existing floodwalls to be demolished shall be removed. A plan elevation and section of the existing bridge is included in the contract drawings. The Contractor shall retain diving services, as required to assist in demolition and/or to retrieve debris that falls into the canal during demolition. The Contractor shall demolish the bridge in such a manner as to minimize the amount of debris which falls into the canal. All bridge debris shall be immediately removed from the canal and hauled from the site. Voids left by the removal of piles shall be filled in accordance with paragraph 3.6.

### **3.2 REMOVAL OF EXISTING SIGNS**

The Contractor shall remove and temporarily relocate all signs in the construction area to the extent required to construct the project. Upon completion of construction, the Contractor shall satisfactorily replace the traffic signs to the approval of the Contracting Officer. All signs damaged through Contractor negligence shall be replaced with new items of like kind at no extra cost to the Government.

### **3.3 REMOVAL OF PAVEMENT**

#### **3.3.1 Concrete Paving**

The Contractor shall saw cut full depth and remove existing concrete pavement within the limits shown on the drawings.

#### **3.3.2 Miscellaneous Asphalt Paving**

The Contractor shall saw cut and remove asphalt paving shown on the drawings.

#### **3.3.3 Driveways and Sidewalks**

The Contractor shall remove existing sidewalk and driveway sections to the limits shown on the contract drawings. The Contractor shall saw cut existing driveways and sidewalks full depth at interface with existing driveways and sidewalks, which are to remain.

### **3.4 REMOVAL OF EXISTING FLOODWALLS**

The Contractor shall remove existing floodwalls to the extent shown on the contract drawings. The Contractor shall demolish floodwall concrete in its entirety. Sections of floodwall sheet pile shall be pulled and removed in locations shown on the contract drawings. Voids left by the pulling operation shall be filled per paragraph 3.2.3.8, Section 02365 of these specifications.

### **3.5 DISPOSAL OF MATERIALS**

All removed material as specified herein above and shown on drawings shall become property of the Contractor and shall be disposed of by removal from the site of the work.

Such disposal shall comply with all applicable Federal, State and local laws and shall also comply with the requirements of Section 01352, paragraph 3.3 of these specifications.

The Contractor shall, at his/her option, either retain for his/her own use or dispose of by sale or otherwise, such materials of value. The Government is not responsible for the protection and safekeeping of any materials retained by the Contractor. Such materials shall be removed from the site of the work before the date of completion of the work. If debris from clearing operations is placed on adjacent property, the Contractor shall obtain, without cost to the Government, additional right-of-way for such purposes. Such material shall be so placed as not to interfere with roads, drainage or other improvements and in such a manner as to eliminate the possibility of its entering into channels, ditches, or streams. The Contractor shall submit written evidence to the Contracting Officer that he/she has obtained from the property owner permission for disposal of material on the owner's property. The written evidence shall consist of an authenticated copy of the conveyance under which the Contractor acquired the property rights and access thereto, prepared and executed in accordance with the laws of the State of Louisiana.

The steel bridge beams are painted with lead based paint. The cost of removal and salvage value of the bridge beams will be affected by the presence of the lead based paint. The Contractor must dispose of the steel beams in accordance with Louisiana environmental regulations and the cost to remove and dispose of the beams is to be included in the lump sum price bid for "Selective Demolition".

### 3.6 VOID BACKFILL

Voids created by pulling piles and sheet piling shall be backfilled to within 3 feet of adjacent ground surface with a thick tremie placed slurry (from the bottom of the hole to the top of the hole). The slurry shall consist of one part Portland cement, two parts of bentonite and six parts of sand mixed with enough water to produce a slurry viscous enough to fill the voids. The upper three feet of the void shall be earth filled and compacted to the same density as the surrounding soil.

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## SECTION 02231 – CLEARING AND GRUBBING

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment and materials and performing all operations necessary for the clearing and grubbing of the areas specified herein or indicated on the drawings, for the removal and disposal of all cleared and grubbed materials, and for the filing of all holes caused by grubbing operations, as specified herein.

#### 1.2 MEASUREMENT AND PAYMENT

**No measurement will be made for clearing and grubbing. Payment for clearing and grubbing will be made at the contract lump sum price for "Clearing and Grubbing".** Price and payment shall constitute full compensation for furnishing all plant, labor, material and equipment and performing all operations necessary for clearing and grubbing of the areas specified herein or indicated on the drawings for removing and disposing of all cleared and grubbed materials and for filing holes resulting from grubbing operations.

#### 1.3 QUALITY CONTROL

The Contractor shall establish and maintain quality control for clearing and grubbing operations to assure compliance with contract requirements and maintain records of his/her quality control for all construction operations including, but not limited to, the following:

- (1) Clearing. Station to station limits transverse clearing limits from applicable centerline; percentages of area complete; type of material.
- (2) Grubbing. Station to station limits, transverse grubbing limits from applicable centerline; percentage of area complete; type of material.
- (3) Disposition of Cleared and Grubbed Materials. Method and location of disposition; damage to timber or improvements which are not to be cleared.

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

### PART 2 PRODUCTS (Not Applicable)



## **PART 3 EXECUTION**

### **3.1 GENERAL REQUIREMENTS**

All clearing and grubbing work shall be completed at least 500 feet in advance of construction. If regrowth of vegetation or trees occurs after clearing and grubbing and before placement of fill, the Contractor will be required to clear and grub the area again prior to construction and no payment will be made for this additional clearing and grubbing.

### **3.2 CLEARING**

#### **3.2.1 General**

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

#### **3.2.2 Areas to be Cleared**

##### **3.2.2.1 General**

The entire area to be occupied by the new construction in accordance with the Demolition Plan shown on the drawings.

### **3.3 GRUBBING**

#### **3.3.1 General**

Grubbing shall consist of the removal of all stumps, roots, buried logs and other unsuitable matter.

#### **3.3.2 Areas to be Grubbed**

##### **3.3.2.1 Embankments and Structures**

Grubbing shall be performed within the limits of construction. All roots and other projects over 1 ½ inches in diameter shall be removed to a depth of 3 feet below the natural surface of the ground and to a depth of 3 feet below the subgrade for the foundation of structures and roadways. The areas to be grubbed are those specific areas within the limits specified hereinabove from which trees, stumps, down timber, snags, old piling, abandoned structures, and other projects have been removed.

##### **3.3.3 Filing of Holes**

All holes caused by grubbing operations shall be backfilled with non-plastic fill material in 12 inch layers to the elevation of the adjacent ground surface and each layer compacted to a density of at least equal to that of the adjoining undisturbed material.

### 3.4 DISPOSAL OF DEBRIS

#### 3.4.1 General

All debris resulting from clearing and grubbing operations shall, at the Contractor's option, be disposed of by removal from the site.

#### 3.4.2 Removal From Site of Work

The Contractor may elect to remove all or part of the debris from the site of the work. Such disposal shall comply with all applicable Federal, State and local laws. The Contractor shall, at his/her option, either retain for his/her own use or dispose of by sale or otherwise, such material of value. The Government is not responsible for the protection and safekeeping of any materials retained by the Contractor. Such materials shall be removed from the site of the work before the date of completion of the work. If debris from clearing operations is placed on adjacent property, the Contractor shall obtain, without cost to the Government, additional right-of-way for such purposes. Such material shall be so placed as not to interfere with roads, drainage or other improvements and in such a manner as to eliminate the possibility of its entering into channels, ditches, or streams. The Contractor shall submit written evidence to the Contracting Officer that he/she has obtained from the property owner permission for disposal of material on the owner's property. The written evidence shall consist of an authenticated copy of the conveyance under which the Contractor acquired the property rights and access thereto, prepared and executed in accordance with the laws of the State of Louisiana. If temporary rights are obtained by the Contractor, then the period of time shall coincide with the requirements in the Contract Clause in Section 00700 entitled, Commencement, Prosecution, And Completion of Work (FAR 52.211-10), plus any extension authorized under the Contract Clause entitled, Default (Fixed-Price Construction) (FAR 52.249-10), subparagraph (b) (1). However, delay resulting from acquisition of additional rights-of-way for alternate disposal areas will not qualify as excusable delays if suitable Government furnished disposal areas are available.

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SECTION 02315 - STEEL H-PILING  
(Nov 2001)

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials, and performing all operations in connection with the installation, including painting, of new steel H-piling in accordance with these specifications and applicable drawings. Vibrations will be monitored during installation by independent Testing Laboratory.

1.2 MEASUREMENT AND PAYMENT

**Payment for furnishing and driving steel H-piling will be made at the contract unit price per linear foot for "Steel Bearing Piles (HP 14 x 73)". H-piles will be measured for payment on the basis of lengths along the axis of the pile below the cut-off elevation and shall be limited to length as determined by pile load tests. Pile lengths will be measured to nearest tenth of a foot. The portion of pile driven below the tip elevation determined by the Contracting Officer from the pile test results will not be measured for payment unless overdriving is directed by the Contracting Officer. Price and payment shall constitute full compensation for furnishing all plant, labor, equipment, material, and all other costs incidental thereto, including tension connectors and painting.**

1.2.1 Pulled Piling

Piling which are directed to be pulled and found to be in good condition and then redriven will be paid for by an equitable adjustment under the Contract Clause in Section 00700 entitled "CHANGES (FAR 52.243-4)". Piling pulled and found to be damaged through no fault of the Contractor will be paid for under the Contract Clause in Section 00700 entitled "CHANGES (FAR 52.243-4)".

1.2.2 Misaligned or Misplaced Piles

When a pile is driven but not acceptably placed or driven out of alignment and pulled at the direction of the Contracting Officer, no payment will be made for either originally furnishing and driving such pile or for the operation of pulling. If the pile is undamaged and it is acceptably redriven at the direction of the Contracting Officer, it will then be paid for at the contract unit price.

### 1.3 REFERENCES

The following standards of the issues listed below and referred to thereafter by basic designation only form a part of this specification to the extent indicated by the references thereto:

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

ASTM A 36 (2001) Carbon Structural Steel

### 1.4 SUBMITTALS

The Contractor shall submit descriptions of pile driving equipment, shop drawings, test procedures, test reports and certificates, pile driving records and other required submittals to the Contracting Officer for approval as required. Submittals and associated work not satisfactory to the Contracting Officer will be rejected.

#### 1.4.1 Equipment Descriptions

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

#### 1.4.2 Shop Drawings

Shop drawings for H-piling shall show complete dimensions and details of piling and shall show the driving sequence and location of piling. Shop drawings shall include details and dimensions of templates and other temporary guide structures for installing the piling, and shall provide details of the method of handling piling to prevent permanent deflection.

Splicing will be permitted for the H-piling. The splicing shall be either as shown on the drawings or as per approved detail on shop drawings. If the Contractor wants to change the splice detail, the shop drawings shall include computations and connection details prepared by a professional engineer licensed in the State of Louisiana. The connection shall be designed to develop full strength of the member spliced.

#### 1.4.3 Materials Test Certificates

Material test certificates shall be submitted for each shipment and identified with specific lots prior to installing piling. Identification data should include piling type,

dimensions, chemical composition, mechanical properties, section properties, heat number and mill identification mark.

#### 1.4.4 Driving Records

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

### 1.5 QUALITY CONTROL

#### 1.5.1 General

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

(1) Driving of H-piling. The record shall include the pile number or identification, location, size, length, elevation of tip, cut-off and top of pile, the number of blows and ram drop (in inches) required for each foot of penetration throughout the entire length of the pile, and the number of blows per inch for the last 18 inches of penetration. The record shall include the type and size of the hammer, the rate of operation, the type and dimensions of driving helmet, the cap-block and pile cushion used. The location and elevation of any obstruction or unusual occurrence encountered during driving shall be recorded and immediately reported to the Contracting Officer. His directed action shall also be recorded.

(2) Recording uplift and vertical tolerances after driving, pulled and redriven piles, and removal and disposal of damaged piles.

(3) Cutting and splicing of piling (welding).

(4) Plumbness of piling.

(5) Penetration depth.

(6) Stockpiling.

#### 1.5.2 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. Format of the

report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

## 1.6 QUALITY ASSURANCE

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified herein and in Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS". All steel H-piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site.

## 1.7 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be in a new and undamaged condition and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be stamped on each unspliced piling at a minimum of two locations. All piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of piling should also facilitate required inspection activities.

## PART 2 PRODUCTS

### 2.1 MATERIALS

Steel for H-piling shall conform to the requirements of ASTM A 36. The H-piling shall be of the shape and sections shown on the drawings. Piling shall have standard square ends, unless otherwise specified or directed. Lengths of piling shown on the drawings is for bidding purposes only. Piles shall be driven to the tip elevation, determined from the test results by the Contracting Officer. Piling shall be provided for lengths as directed by the contracting officer and painted per Section 09940. All steel H-piling shall be furnished in full available lengths, and shall be driven in full available length. Splicing will be permitted to make up for full required length. No more than two splices will be permitted per pile.

## PART 3 EXECUTION

### 3.1 PLACING

H-piling shall be driven as accurately as practicable in the correct locations, true to line both laterally and longitudinally and to the vertical or batter lines, all as indicated in the drawings. A lateral deviation from the correct location at the cut-off elevation of not more than 3 inches will be permitted. A variation in slope of not more than 1/4-

inch per foot of longitudinal axis will be permitted. A final lateral deviation from the correct location at the cut-off elevation of not more than 3 inches will be permitted. A vertical deviation from the correct cut-off elevation shown on the drawings of not more than 1 inch will be permitted. The correct relative position of group piling shall be maintained by the use of templates or by other approved means. Any H-pile driven out of correct location shall be pulled and redriven by the Contractor at no additional cost to the Government.

### 3.2 DRIVING

H-piling shall be driven in full available lengths by an approved steam or air single - acting, double-acting, or differential- acting pile driving hammer. The size and capacity of the hammer shall be as recommended by the manufacturer for the pile weights and soil formations to be penetrated. No drilling or jetting will be allowed before or during driving operations without Contracting Officer's written approval. The hammer shall be operated at all times at the steam or air pressure and at the speed recommended by the manufacturer. Boiler or compressor capacity shall be sufficient to operate the hammer continuously at full rated speed. To determine ram drop, the Contractor shall attach a scale (in inches) to the pile hammer and an indicator on the pile ram (see drawing at end of this section). Installation of both devices shall be in such a manner that displacement of the ram will be indicated on the scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. Pile drivers shall have firmly supported leads extending to the lowest point the hammer must reach to maintain the hammer in proper alignment at all times. Each pile shall be driven continuously and without voluntary interruption except for splicing until the required depth of penetration has been attained. Deviation from this procedure will be permitted only in case the driving is stopped by causes which could not reasonably have been anticipated. Steel H-piling shall be driven in full available lengths. Vibrations will be monitored by independent testing laboratory. When the sustained peak particle velocity is in excess of 0.25 ft/sec at a structure of concern, it is the Contractor's responsibility to revise and devise a plan for driving so as to comply with the contract requirements. Splicing of H-piling shall be permitted. The piling shall be spliced per pre-approved shop drawings. Any pile that cannot be driven to the required depth because of an obstruction shall, as directed by the Contracting Officer, be pulled and another pile driven adjacent thereto, be cut off and used, or be abandoned as directed by the Contracting Officer. Where voids adjacent to the steel H-piling are induced by pile driving or pulling operations, the Contractor shall pump out all seepage and rain water and backfill to within 3 feet of the ground surface with a tremie-placed slurry. The slurry shall consist of one part cement, two parts bentonite, and six parts sand mixed with enough water to produce a slurry viscous enough to thoroughly fill the voids. The upper 3 feet of the hole shall be filled with earth. The Contractor shall make observations to detect any uplift of piling already driven and uplifted piling shall be backdriven to the original penetration,



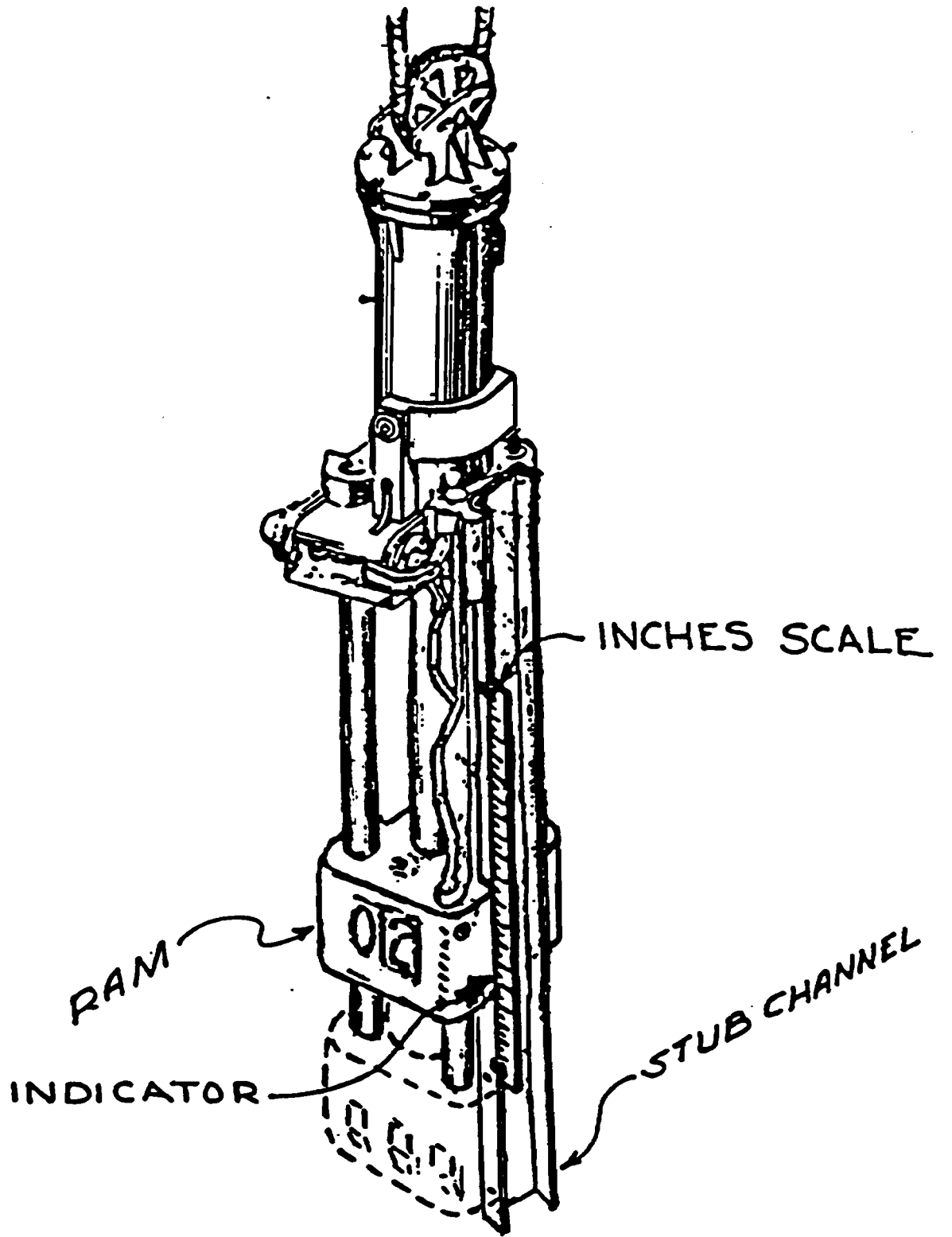
at no additional cost to the Government. Piling shall not be driven within 100 feet of concrete less than 7 days old nor within 30 feet of concrete less than 28 days old. The Contractor shall provide every facility for the Contracting Officer to inspect and record data relative to pile driving operations. This data shall include blows and ram drop (in inches) per foot of pile penetration, final tip elevation, and blows per inch prior to seating.

### 3.2.1 Scale

A scale (inches) shall be fixed to the hammer's ram guide and a pointed indicator on the ram, near the scale, to allow a reading of the ram drop (see example diagram at the end of this section). Installation of both scale and indicator shall be in such a manner that the drop of the ram can be read by observing the highest and the lowest position of the indicator and scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. The Contractor shall record in the pile driving record the ram drop of the pile hammer when recording the blows per foot as specified in paragraph 3.2.

### 3.3 DAMAGED AND MISPLACED PILING

Any pile which is damaged because of internal defects or by improper handling or driving, or which is otherwise damaged by fault of the Contractor so as to impair it for its intended use, or any pile driven out of proper location, shall be removed and replaced. All work of removal and cost of replacement shall be borne by the Contractor at no additional expense to the Government. The Contracting Officer may require the Contractor to pull certain selected piling after driving for inspection to determine the condition of the piling. Any pile so pulled and found to be damaged to such extent as, in the opinion of the Contracting Officer, would impair its usefulness in the completed structure, shall be removed from the site of the work and the Contractor shall furnish and drive a new pile to replace the damaged pile. Piling pulled and found to be sound and in a satisfactory condition as determined by the Contracting Officer's Representative shall be redriven. Any holes which remain as a result of pulling operations shall be filled as specified in paragraph 3.2.



PILE HAMMER

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AND ROADWAY EXCAVATION

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**SECTION 02318 - PREPARATION OF ROADWAY PAVEMENT SUBGRADE  
AND ROADWAY EXCAVATION**

**PART 1 GENERAL**

**1.1 SCOPE**

The work covered by this section consists of furnishing all plant, labor, equipment, and materials, and performing all operations necessary for the preparation of the roadway pavement subgrade and roadway excavation. Subgrade preparation shall include grading the existing subgrade to the lines and elevations shown on the plans and excavating soft spots in the subgrade and backfilling and compacting the excavations with granular material. All work shall be done in accordance with Section C203 of the General Specifications for Street Paving, 1995 Edition, City of New Orleans Department of Public Works.

**1.2 MEASUREMENT**

**1.2.1 Excavation**

**No measurement will be made for roadway excavation.**

**1.2.2 Unsuitable Subgrade Excavation and Filling**

Unsuitable subgrade excavation and filling will be measured by the cubic yard (truck measure). Quantities will be determined after the subgrade is proofrolled in accordance with Section C203 of the General Specifications for Street Paving, Department of Public Streets, City of New Orleans.

**1.2.3 Subgrade Preparation**

**Preparation of the roadway pavement subgrade shall not be measured for payment.**

**1.3 PAYMENT**

**1.3.1 Excavation**

**Payment for roadway excavation will be made under the lump sum price for "Roadway Excavation" and shall include excavating, hauling and disposing of the excavated materials.**

### 1.3.2 Unsuitable Subgrade Excavation and Filling

**Payment for unsuitable subgrade excavation and filling will be made at the contract unit price for "Unsuitable Subgrade and Excavation and Filling (Truck Measure)" and shall include excavation, disposal of unsuitable subgrade and replacement of this material with granular material, graded and compacted.**

### 1.3.3 Grading the Existing Subgrade

There shall be no direct payment for grading of the existing roadway subgrade. Payment shall be included in the applicable contract price for which the work is incidental.

## 1.4 QUALITY CONTROL

The Contractor shall establish and maintain quality control for excavation operations to assure compliance with contract requirements, and maintain records of its quality control for all construction operations.

The original and two (2) copies of these records of inspections and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

## 1.5 APPLICABLE PUBLICATIONS

The following publication, but referred to hereafter by basic designation only for a part of these specifications to the extent indicated by reference thereto.

**GENERAL SPECIFICATIONS FOR STREET PAVING (GSSP), 1995 EDITION, CITY OF NEW ORLEANS, DEPARTMENT OF PUBLIC WORKS**

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.1 ROADWAY EXCAVATION

Roadway excavation shall not exceed the prescribed lines and elevations established by the contract drawings. All work shall conform to the requirements of Section C203 of the General Specifications for Street Paving, Department of Streets, City of New Orleans.

#### 3.2 UNSUITABLE SUBGRADE EXCAVATION AND FILLING

All soft spots found while preparing the subgrade shall be removed to such an extent as directed by the Contracting Officer, replaced with granular material and compacted. Stumps and roots shall be excavated, removed and excavation backfilled with granular material and compacted. All work shall be in accordance with Section C203 of the General Specifications for Street Paving, Department of Streets, City of New Orleans.

### 3.3 HAULING

All excavated material to be removed from the site, including debris, shall be hauled in watertight trucks with secured binders on tailgates to the place of destination. The route for trucks carrying material to and from the job site shall avoid residential streets, and shall be approved by the Contracting Officer. Trucks shall not spill or track mud on public roads. The Contractor shall take immediate action to clean up any material spilled on the roads without notification from the Contracting Officer. Failure by the Contractor to satisfactorily clean public roads used for the hauling operation shall result in the suspension of hauling operations until such roads are cleaned to the satisfaction of the Contracting Officer.

### 3.4 GRADE TOLERANCES

#### 3.4.1 Excavation

All excavation shall be cut to the grades and cross sections shown on the drawings. For roadway excavation a tolerance of plus 2/10 of a foot above or 7/10 of a foot below the prescribed grade and cross section shown will be allowed.

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SECTION 02320 - STRUCTURAL EXCAVATION AND BACKFILL

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SECTION 02320 - STRUCTURAL EXCAVATION AND BACKFILL  
(Mar 2001)

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, materials, equipment, and performing all operations necessary for stockpiling materials, structural excavation and backfill for the bridge end bents, slab span bents, curtain walls and curtain wall footings, retaining walls, approach slabs and stepped sidewalk and all other incidental work specified herein or as shown on the drawings.

1.2 MEASUREMENT AND PAYMENT

1.2.1 Structural Excavation and Non-Select Backfill

**No separate measurement or payment will be made for structural excavation and non-select backfill.** The Contractor shall include any and all costs for structural excavation and backfill in the contract prices for items of work to which the work is incidental thereto.

1.2.2 Non-Plastic Backfill

**Non-plastic backfill under the approach slabs will not be measured for payment. Payment for non-plastic fill will be made at the contract lump sum price for "Structural Excavation and Backfill".** Price and payment shall include all cost for excavation, shoring, dewatering, if any, furnishing, placing, compacting and grading non-plastic fill and all other costs incidental thereto.

1.3 REFERENCES

The following publications of the issues listed below, but referred to before and thereafter by the basic designation only, form a part of this specification to the extent indicated by the references thereto:

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND  
BRIDGES, 2000 EDITION (LSSRB)

302

Class II Base Course



**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)  
STANDARD.**

ASTM D 422	(1998) Particle – Size Analysis of Soils
ASTM D 698	(2000) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lb f/ft <sup>3</sup> )
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2216	(1998) Laboratory Determination of Water, (Moisture) Content of Soil Aggregate Mixture
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes
ASTM D 2922	(2001) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3740	(2001) Minimum Requirements of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D 4318	(2000) Liquid Limit, Plastic Limit and Plasticity Index of Soils

**U.S. ARMY CORPS OF ENGINEERS ENGINEER MANUAL.**

EM 110-2-1906 Testing	(Nov 70 with change 1 May 1980) Laboratory Soils
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**1.4 QUALITY CONTROL**

The Contractor shall establish and maintain quality control for excavation 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:

- (1) Equipment. Type, size, and suitability for construction of the prescribed work.
- (2) Structural Excavation. Check grade, slopes, and dimensions for compliance with design sections.

(3) **Grade Tolerances.** Check fills to determine if placement conforms to prescribed grade and design section.

(4) **Construction.** Layout, maintaining existing drainage, moisture control, thickness of layers, spreading and compacting.

(5) **Classification of soils, placing and compacting of structural fill, and density tests.**

(6) **Control Testing.**

(a) **Contractor Testing.** The Contractor shall perform all control testing such as soil classification, control compaction curves, and in-place density.

The Contractor shall perform as a minimum, the specified number of each of the tests to demonstrate to the satisfaction of the Contracting Officer that the specifications are in compliance. Testing shall be performed by a Government approved testing agency or organization. Criteria used for obtaining Government approval shall be in accordance with ASTM D 3740.

Tests performed shall be pursued in such a manner that the results are obtained and furnished to the Government within 24 hours. No additional payment will be made for control testing required in this paragraph. All cost in connection therewith shall be included in the contract lump sum price for "Structural Excavation and Backfill". The following tests are required to provide adequate control:

1. **Soil Classification Tests.** Determination of soil classification shall be in accordance with ASTM D 2487 and the Unified Soil Classification System. Atterberg Limits Test required for soil classification shall be performed in accordance with ASTM D 4318.

One Atterberg test shall be obtained from the sample material used for each control compaction curve for backfilling. Visual classification shall be made for the sample material used for each in-place density test.

2. **Control Compaction Curves – Compacted Fills.** Control compaction curves shall be established in accordance with ASTM D 698, (Standard Proctor Density Tests). Two control compaction curves will be required for each type of random material from each source. Where construction operations result in blending of several types of material prior to or during fill placement within the embankment design sections, two control compaction curves will be required for each resulting blend of material and will be utilized in lieu of those required for the "unblended materials". The average of the two tests shall be the controlling optimum moisture

content and maximum density, subject to verification by the Contracting Officer.

3. In-Place Density Tests. In-place density tests for compacted fill material shall be made in accordance with ASTM D 2922 (Nuclear Method) or ASTM D 1556 (Sand Cone Method). The minimum frequency for performing the density tests shall be one density test per lift per 100 consecutive linear feet of floodwall and retaining wall; one density test per lift of structural fill for each bridge abutment; one density test at the west side approach slab; and one density test per each lift for the east side approach slab. The location of the test shall be representative of the area being tested or as directed by the Contracting Officer.

4. Moisture Content Tests. Moisture content tests at each density test location shall be taken to assure compliance with requirements for fill placement within the design sections as specified in paragraph 3.1. Determination of moisture content shall be performed in accordance with ASTM D 2216.

#### 1.4.1 Reporting

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

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Non Plastic Material (Commercial Source)

Non Plastic material shall be a clean, non-plastic material that is free of roots, clay lumps, and any other deleterious materials with at least 75 percent passing the No. 4 sieve and containing not more than 15 percent (by weight) of material passing a No. 200 sieve. The maximum organic content shall be 4.0 percent.

#### 2.1.2 Suitable From Excavation

Granular or non-granular material not classified as unsuitable as described in paragraph 3.2

## 2.2 EQUIPMENT

Equipment for compaction shall conform to the requirements herein.

### 2.2.1 Hand Tampers

Hand tamping shall be used in the compaction of structural fill within three feet of any floodwall or structure and near floodwalls and structures where vehicular equipment cannot be used. These hand tampers should be power driven, hand operated type.

### 2.2.2 Alternative Compaction Equipment

The Contractor may propose for use alternative types of compaction equipment not included in these specifications. The suitability of the alternative equipment must be demonstrated to the Contracting Officer by a field test conducted by and at the expense of the Contractor. The alternative compaction equipment must be capable of properly compacting the soil so that no planes of weakness or laminations are formed in the fill. Additionally, the alternative compaction equipment must not detrimentally affect any adjacent structure. The field test shall consist of compacting a minimum of three layers of an area of embankment with the alternative type equipment.

### 2.2.3 Miscellaneous Equipment

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, power tampers and other equipment shall be of types suitable for the required construction. Sprinkling equipment shall be designed to apply water uniformly and in controlled quantities to variable widths of surface.

## PART 3 EXECUTION

### 3.1 STRUCTURAL EXCAVATION AND BACKFILL

#### 3.1.1 General

The Contractor shall make all excavations required for the construction of the abutments, floodwalls, slab bents, curtain walls, approach slab, retaining walls and stepped walkway. Suitable material from required structural excavation shall be used in the structural backfill at the abutments, floodwalls and curtain wall footings. Materials determined to be unsuitable by the Contracting Officer shall be ordered wasted.

### **3.1.2 Structural Backfill**

Structural backfill is defined as any soil material, which is placed within the limits of the structural excavation and the final grade as indicated on the drawings, and as herein specified. The Contractor shall fill all excavations to final grade. The structure backfill shall be placed to facilitate drainage away from the structures. Structure fill shall be placed in successive layers not to exceed 8 inches and fully compacted to 95 percent maximum density as determined by ASTM D 698 at a moisture content limit of plus 5 to minus 3 percent of optimum. When the surface of any compacted layer is too smooth to bond properly to the succeeding layer, it shall be disked or scarified to a depth of three inches before the next layer is placed thereon. Material for structure fill shall be obtained from the required structure excavation and shall be free of organic matter, sticks, branches, roots, brick, concrete, rock and other debris including regulated solid or hazardous materials or wastes. Structural fill shall not be placed in water or upon frozen ground. Excess material from the structural excavation, which is not required as fill on any other area of the project, shall become the property of the Contractor, and shall be removed from the site at no additional cost to the Government. Structural fill shall not be placed against concrete structures for a minimum of 14 days after the concrete is placed. The Contractor may at his expense place fill sooner if he furnishes and tests cylinders to demonstrate that the concrete has achieved 75 percent of its design capacity.

### **3.2 UNSUITABLE MATERIALS**

Materials, which are classified as unsuitable structural backfill, are defined as material containing organic matter, sticks, branches, roots, brick, concrete, rock, and other debris.

### **3.3 FROZEN MATERIALS**

Under no circumstances shall frozen earth, snow or ice be placed in the fill. The Contracting Officer may require the wasting of frozen material.

### **3.4 DRESSING**

The fill shall be brought to not less than the prescribed design cross section at all points. Unreasonable roughness of surface shall be dressed out to permit fertilizing and seeding operations.

### **3.5 SHORING**

The Contractor shall provide all necessary shoring, bracing, sheeting, underpinning, and/or supports as may be required for the construction of the approach slab and other structures. A design and the method of installing the proposed shoring shall be submitted to the Contracting Officer for approval at least 30 days prior to its actual

intended use. Upon completion of the structure, the Contractor shall remove the shoring at the direction of the Contracting Officer or his representative. The void created by the shoring removal shall be backfilled and the surface area shall be treated to match the existing surface prior to the installation of the shoring. Excavations more than 5 feet deep shall be shored unless shown otherwise on the drawings. Additional requirements for shoring shall be in accordance with Section 25 "Excavations" of EM 385-1-1, the Corps of Engineers Safety Manual.

### 3.6 NON-PLASTIC FILL

Non-plastic fill shall be a clean hydraulically dredged or pumped river sand that is free of roots, clay lumps and any other deteriorious materials conforming to the following gradation:

<u>U.S. Sieve</u>	<u>Percent Passing</u>
No. 4	85 - 100
No. 40	65 - 100
No. 200	0 - 10

Non-plastic fill shall be placed in successive layers not to exceed 8 inches and fully compacted to 95 percent maximum density as determined by ASTM D 698 at a moisture content near optimum.

### 3.7 APPROACH SLAB FILL

Base course material under the approach slabs shall be in accordance with Section 302 of the LLSRB and shall be either crushed stone or crushed recycled Portland Cement Concrete in accordance with subsections 1003.03(d) and 1003.03(e) of the LLSRB respectively. The base course material shall be compacted to 95% of maximum dry density in accordance with ASTM D698. Thickness of the bedding shall be as shown on the drawings. Underlying material shall be non-plastic fill in accordance with paragraph 3.6. The fill shall be placed in 9 inch layers and each layer uniformly compacted to 95% of maximum dry density near optimum water content in accordance with ASTM D 698.

### 3.8 RETAINING WALL BACKFILL

Aggregate backfill behind the retaining wall shall be crushed stone in accordance with subsection 1003.03(d) of the LSSRB compacted to 95% of maximum dry density at optimum water content in accordance with ASTM D 698. Non-plastic fill behind the retaining structure shall be in accordance with paragraph 3.6 and shall be placed in 9 inch maximum lifts. Each lift shall be uniformly compacted to 95% of maximum dry density near optimum moisture content in accordance with ASTM D 698.

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## SECTION 02355 - PILE LOAD TESTS

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor, and materials, and performing all operations in driving, testing, pulling, and removing of steel H-piles and prestressed concrete piles, in accordance with these specifications and as shown on the drawings. Test methods described herein are generally in accordance with ASTM D 1143 and D 3689. The Contractor shall submit his plan for conducting tests to the Contracting Officer for approval a minimum of 15 days prior to the beginning of the tests. The test pile site is located on the drawings. Prestressed concrete piles shall be as specified in Section 02365. Steel H-piles shall be as specified in Section 2315. Vibrations will be monitored during installation by independent testing laboratory.

#### 1.2 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 D 1143 (1994) Method for Testing Piles Under Static Axial Compressive Load

#### 1.3 MEASUREMENT AND PAYMENT

##### 1.3.1 Furnishing and Driving Test Pile

Measurement for furnishing and driving test piles will be per each. Payment for the test steel H-piles and prestressed concrete piles and all costs in connection therewith shall be made at the contract unit price per each for "Furnishing and Driving 20" x 20" PPC Test Piles," "Furnishing and Driving, HP 14 x 73 Test Piles", "Furnishing and Driving 12" x 12" PPC Test Piles". Price and payment shall constitute full compensation for furnishing all plant, labor, equipment, and materials for furnishing and driving test piles, excavating and all operations incidental thereto.

##### 1.3.2 Pile Test

Pile tests will be measured by the number of pile tests performed. Payment for pile tests shall be made at the contract unit price per each as follows:



“Compression Test – 20” x 20” PPC Piles”, which includes “First Compression Test” and “All Over One Compression Test”.

“Compression Test – HP 14 x 73 Steel Piles” which includes “First Compression Test” and “All Over One Compression Test”.

“Compression Test – 12” x 12” PPC Piles” which includes “First Compression Test” and “All Over One Compression Test”.

Price and payment shall include calibration of the extensometers, local cell, and hydraulic jack; placing and removing test loads and test equipment; backfilling holes at pile cutoffs; and all operations incidental thereto. No measurement will be made for design of the loading frame. Price and payment for designing the loading frame shall be included in the contract price for the test pile.

## 1.4 QUALITY CONTROL

### 1.4.1 General

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

(1) Facilities and personnel providing for installation and reading by the Contractor of all measuring devices.

(2) Compression test (pile number, location); loading frames and description (number, size, type, and location of supporting piles); sequence and method of loading; records of measurements, and driving records.

### 1.4.2 Reporting

The original and two copies of these records and tests, as well as records of corrective action taken, shall be furnished to the Government daily. Format of reports other than test data shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

## 1.5 SUBMITTALS

The Contractor shall furnish all data from each pile tested within 24 hours after completion of each test. Blow counts shall be recorded for each foot of each test pile and, in addition, the Contractor shall complete revised LMN Form 1119 (Pile Driving Report) and furnish copies to the Contracting Officer. The Pile Driving Report shall include, but not necessarily be limited to, unusual driving conditions, interruptions or delays during driving and any other information considered pertinent. Pile test data

shall be recorded for all items shown in paragraph 1.7. Copies of these forms shall also be furnished to the Contracting Officer.

## 1.6 TEST MEASUREMENT

Measurements of compression loads, deflections and settlements, of the test piles and reports on all test piles shall be made by the Contractor. The lengths of prestressed concrete piles and steel service piles as determined by the result of the load tests shall be determined by the Contracting Officer and furnished to the Contractor within 15 days after receipt of the last test report.

## 1.7 REPORTS

The report of the load test shall include the following items where applicable:

### 1.7.1 General

- (1) Project Identification
- (2) Location

### 1.7.2 Pile Installation Equipment

- (1) Make, model, type, and size of hammer
- (2) Weight of hammer and ram
- (3) Stroke of ram
- (4) Rated energy and operating speed of hammer
- (5) Type and thickness of cap blocks and pile cushions
- (6) Weight and dimensions of drive-cap and follower

### 1.7.3 Test and Support Piles

- (1) Identification of test pile(s)
- (2) Type of piles
- (3) Pile material including basic specifications
- (4) Dimensions of pile

- (5) Pile weight as driven
- (6) Not Used
- (7) Degree of batter
- (8) Driven length
- (9) Embedded length
- (10) Tested length, and
- (11) Final elevation of piles butt referenced to fixed datum (identify datum)

#### 1.7.4 Pile Installation - Test and Support.

- (1) Date driven
- (2) Pre-excavation or jetting - depth, size, pressures, duration, etc.
- (3) Operating of hammer during final driving
- (4) Driving log, blows per foot
- (5) Final penetration resistance, blows per inch
- (6) Description of special installation procedures used, and
- (7) Notation of any unusual occurrences during installation

#### 1.7.5 Pile Testing

- (1) Date tested
- (2) Type of test pile
- (3) Type of load application apparatus
- (4) Number of support piles of each test
- (5) Instrumentation used to measure pile movement
- (6) Special testing procedures used
- (7) Temperature and weather conditions during test

- (8) Tabulation of all load-time-movement reading
- (9) Gages, scales, and reference points identified
- (10) Adjustment made to field data and explanation
- (11) Notation of any unusual occurrences during test, and
- (12) Test jack and other required calibration reports

## **PART 2 PRODUCTS**

### **2.1 TYPES AND PROPERTIES**

Prestressed concrete piles shall conform to the requirements of Section 02365. Steel H-piles shall conform to the requirements of Section 02315. Tip elevations are shown on the drawings.

## **PART 3 EXECUTION**

### **3.1 PLACING TEST PILE**

Test piles shall be driven vertically to the tip elevation and at the locations shown on the drawings. A variation from the vertical of not more than 1/4-inch per ten (10) feet of longitudinal axis will be permitted. Any pile driven and not meeting the above requirements shall be pulled and redriven by the Contractor at no additional cost to the Government.

### **3.2 DRIVING TEST PILE**

The service pile driving procedures specified in Sections 02315 and 02365 also apply to the driving of test piles. The hammer used for driving the test piles shall be the same hammer that will be used to drive the service piles.

### **3.3 TEST PILE LOADING**

#### **3.3.1 Scope**

This part covers procedures for testing vertical foundation piles to determine the response of the pile to a static compressive or tensile load applied axially to the pile. Determination of the allowable compression and tensile load for the pile is made by the incremental loading and measurement of the pile deformation.

#### **3.3.1.1 Compression Test**

Test piles shall be furnished in the lengths required and driven as directed by the Contracting Officer at the location shown on the drawings. Test piles TP-1, TP-2 and TP-3 will be subjected to compression load tests. A minimum time period of 21 days shall be allowed to elapse between driving of the piles and the initiation of a compression test. If the results of the compression test on the pile are not acceptable, the Contracting Officer will direct the Contractor to perform additional compression tests on piles TP-1A and TP-2A. There will be no payment nor additional time granted for delays incurred between driving of test piles and initiation of pile tests.

### 3.3.2 General Procedures

The Contractor shall provide and be responsible for furnishing all necessary apparatus, measuring equipment, and personnel to install, test, and extract the test piles described within this specification in its entirety. The recording and reporting of all data shall be the responsibility of the Contractor. However, the Contracting Officer's representative shall have free access to the pile test data at any time. A Government representative (engineer) will be present during the load tests. The Contractor shall provide the Contracting Officer 72 hours notice prior to initiating each pile load test in order that arrangements may be made to have a Government representative present during the test. The reduction, analysis, and interpretation of the test data will be accomplished by Government personnel after completion of each pile test. Additional pile tests may be required as determined by the Contracting Officer. In order to prevent disturbances to the instrumentation readings, construction activities, equipment movement, or operation of construction equipment, will not be permitted within 200 feet of any load test in progress.

### 3.3.3 Loading Frames

For illustration purposes, the loading frames for applying known compressive loads to a pile are shown on the drawings. Loading frames shall be constructed so that the loads are applied axially to minimize eccentric loading. Design considerations such as sizes, numbers, and material of specific beams, support piles, bearing plates, etc., shall be the responsibility of the Contractor and subject to approval of the Contracting Officer. Included with his plan for conducting the tests, the Contractor shall submit computations used in the design of the loading frame. The computations shall be certified by a registered professional engineer Licensed in the State of Louisiana. For the compression test, a steel bottom bearing plate of appropriate thickness for the loads involved shall not be less than the size of the pile butt, nor less than the area covered by the base of the hydraulic jack. A top bearing plate shall have a size not less than the load cell head, nor less than the total width of the reactor beam(s). The support piles for the loading frame shall be placed as far from the test piles as practicable, but in no case less than a clear distance of 8-feet (2.4 m). The box or platform shall be loaded with any suitable material such as soil, rock, concrete, steel, or water filled tanks with a total weight (including that of the test beams(s) and box or

platform) at least 10 percent greater than the anticipated maximum test load. The anticipated maximum test load is three times the service load. Service loads are shown in this section of the specifications.

### 3.3.4 Apparatus for Applying Pile Load and Measuring Movement

All equipment related to the load test (extensometers, level, load cell, hydraulic jack, scales, mirrors, etc.) and testing shall be furnished and operated by the Contractor. Typical apparatus setup is depicted on the drawings. The hydraulic jack shall be equipped with a pressure reading gage calibrated in tons and with a ram having a spherical bearing head to minimize eccentric loading. The jack shall be capable of maintaining constant loads between load changes and shall be calibrated prior to the test so that the load applied is controllable to within 5 percent. The load cell (non-self-leveling) shall be an electric strain gage type equipped with a readout device. Load cells shall be calibrated prior to the test to an accuracy within 2 percent of the applied load. The changing and maintaining of loads on each test pile shall be done utilizing the load cell as the primary loading device and pressure gage on the jack as a backup. However, both readings shall be recorded. Extensometers shall be used to measure pile movement and shall have dial gages with stems having at least a 2-inch (50 mm) travel, or sufficient gage blocks shall be provided to allow this travel with shorter gage stems. Gages shall be read to an accuracy of 0.001-inch (0.025 mm). Smooth bearing surfaces perpendicular to the direction of the measurements shall be provided for by the gage stems. The hydraulic jack, load cell, and extensometers shall be calibrated both before the start and after the completion of the testing program, by a certified testing laboratory for both the loading and unloading cycles and calibration curves furnished to the Contracting Officer. The calibration curves shall be load cell strain readings versus load in tons. In developing the calibration curves, the load cell shall be placed above the jack in the testing machine and the loads shall be applied through the ram to the load cell to the testing machine in the actual working manner of the field loading system. Two reference beams, one on each side of the pile, shall be independently supported with supports firmly embedded in the ground at a clear distance of not less than 8-feet (2.5 m) from the test pile, and 7 to 8 feet (2.1 to 2.5 m) from the support piles. Reference beams shall be of sufficient stiffness to prevent excessive deflections. Reference beam stakes shall be firmly embedded in the ground. If steel reference beams are used, one end of each beam shall be free to move as the length of the beams change with temperature variations. As a backup to the extensometers, an engineer's level and scale shall be used to check the movement of the test pile. The level shall also be used to check the movement of the support piles. Scales used to measure pile movements shall read to 1/64th of an inch or to 0.01 inch (0.25 mm). Target rods shall read 0.001 foot (0.3 mm). All dial gages, scales, and reference points shall be clearly marked with a reference number or letter to assist in recording data accurately. Readings from the surveyor's level may be taken on a target rod or a scale and shall be referenced to two permanent benchmarks located outside the immediate test area or the surveyor's level shall be mounted on an object of fixed

elevation (for example, a driven pile) outside of the immediate test area. Readings shall be taken on two fixed points or scales on opposite sides of the pile or pile cap or on a single fixed point or scale in the center of the pile top or pile cap. Readings shall be taken on a sufficient number of support piles and on the reference beams to establish if there is any movement. A tarpaulin of minimum dimension of 12-feet x 12-feet shall be installed by the Contractor to protect at all times the instrumentation, measuring system, and prevent adverse temperature variations.

### 3.3.5 Loading Procedure and Measurement of Pile Movement

The anticipated service loads for the test are shown on the drawings. After the test piles are driven, the Contractor shall allow a time period of not less than 21 days to elapse before loading the test piles. Apply loads to the piles in increments of 25 percent of the anticipated service load until 200 percent of the service load is reached or until failure, whichever ever occurs first. The rate of application and removal of load shall be 2 tons per minute. The Contractor shall take readings of time, load, and movement and record them for each load increment or load decrement. When the 25 percent increment has been reached, the Contractor shall maintain the load for 2 hours and readings shall be taken at the 2 minute, 8 minute, 15 minute, 30 minute, 60 minute, and 120 minute intervals. After the application of loads equal to 50, 100, and 150 percent of the test load, remove the applied load in each case in decrements equal to the loading increments with 20 minutes between decrements. After removing each total applied load, reapply the load to the previous load level in increments equal to 50 percent of the test load with 20 minutes between increments. When the previous load level has been obtained, increase load in 25 percent increments to the next load level. When 200 percent of the service load has been applied and failure has not occurred, allow the 200 percent service load to remain on the pile for 24 hours, except in the event that the average rate of settlement is greater than 0.01 in/hour, hold the total load on the pile for 48 hours. During this time, readings shall be taken every hour. After the required holding time, remove the load in decrements of 50 percent of the service load with 1 hour between decrements. After the load has been applied and removed in accordance with the above, reload the pile to 200 percent of the service load in increments of 50 percent, allowing 20 minutes between increments. The Contractor shall then increase the load in increments of 10 percent of the service load until failure occurs or the applied load reaches 300 percent of the service load. The time lapse between increments shall be 20 minutes. If failure does not occur, hold the full load for 2 hours at which time remove the load in four equal decrements, allowing 20 minutes between decrements. For purposes of stopping pile tests in progress, failure is achieved when the full extent of the extensometers is reached. If failure occurs before the load reaches 300 percent of the service load then the load shall be removed in 4 equal decrements allowing 20 minutes between decrements. Test apparatus shall not be removed from the pile until approval is received from the Government representative. To illustrate the loading and pile measurement procedures, a sample test schedule is provided following this paragraph.

## SAMPLE OF COMPRESSION PILE TEST SCHEDULE

<u>Load (Tons)</u>	<u>Intermediate Time</u>	<u>Elapsed Time</u>	<u>Incremental Time</u>	<u>Remarks</u>
0		0:00	0 min.	
21.3		0:10	10 min.	25% service load
	0:12		2 min.	
	0:18		8 min.	
	0:25		15 min.	
	0:40		30 min.	
	1:10		60 min.	
	2:10		120 min.	
42.5		2:20	10 min.	50% service load
	2:22		2 min.	
	2:28		8 min.	
	2:35		15 min.	
	2:50		30 min.	
	3:20		60 min.	
	4:20		120 min.	
21.3		4:30	10 min.	Decrement 25%
	4:50		20 min.	
0		5.00	10 min.	Decrement 25%
	5.20		20 min.	
42.5		5:40	20 min.	Increment 50%
	6.00		20 min.	
64.0		6.10	10 min.	75% service load
	6.12		2 min.	
	6.18		8 min.	
	6.25		15 min.	
	6.40		30 min.	
	7.10		60 min.	
	8.10		120 min.	
85.0		8.20	10 min.	100% service load
	8.22		2 min.	
	8.28		8 min.	
	8.35		15 min.	
	8.50		30 min.	
	9.20		60 min.	
	10.20		120 min.	
64.0		10.30	10 min.	Decrement 75%
	10.50		20 min.	
64.0		11.00	10 min.	Decrement 50%
	11.20		20 min.	



## SAMPLE OF COMPRESSION PILE TEST SCHEDULE

<u>Load (Tons)</u>	<u>Intermediate Time</u>	<u>Elapsed Time</u>	<u>Incremental Time</u>	<u>Remarks</u>
0		11.40	20 min.	Decrement 0%
	12.00		20 min.	
42.50		12.20	20 min.	Increment 50%
	12.40		20 min.	
85.0		13.00	20 min.	Increment 100%
	13.20	20 min.		
106.3		13.30	10 min.	125% service load
	13.32		2 min.	
	13.38		8 min.	
	13.45		15 min.	
	14.00		30 min.	
	14.30		60 min.	
	15.30		120 min.	
127.5		15.40	10 min.	150% service load
	15.42		2 min.	
	15.48		8 min.	
	15.55		15 min.	
	16.10		30 min.	
	16.40		60 min.	
	17.40		120 min.	
106.3		17.50	10 min.	Decrement 125%
	18.10		20 min.	
85.0		18.20	10 min.	Decrement 100%
	18.40		20 min.	
42.5		18.50	10 min.	Decrement 50%
	19.10		20 min.	
0		19.30	20 min.	Decrement 0%
	19.50		20 min.	
42.5		20.00	10 min.	Increment 50%
	20.20		20 min.	
85.5		20.30	10 min.	Increment 100%
	20.50		20 min.	
127.5		21.00	10 min.	Increment 150%
	21.20		20 min.	
148.8		21.30	10 min.	175% service load
	21.32		2 min.	
	21.38		8 min.	
	21.45		15 min.	
	22.00		30 min.	

### SAMPLE OF COMPRESSION PILE TEST SCHEDULE

<u>Load (Tons)</u>	<u>Inermediate Time</u>	<u>Elapsed Time</u>	<u>Incremental Time</u>	<u>Remarks</u>
170.0	22.30	23.40	60 min.	200% service load. Continue to hold load for 24 hours. If settlement is greater than .01 load for 48 hours. inch/hour hold
	23.30		120 min.	
	23.42		10 min.	
			2 min.	
	23.48		8 min.	
	23.55		15 min.	
	0.10		30 min.	
127.5	0.40	0.00	60 min.	Decrement 150%
	1.40		120 min.	
	2.40		3 hr.	
	3.40		4 hr.	
	4.40		5 hr.	
	22.40		23 hr.	
	23.40		24 hr.	
	0.20		20 min.	
	0.40		20 min.	
	1.00		40 min.	
85.0		1.20	60 min.	Decrement 100%
	1.40		20 min.	
	2.00		40 min.	
	2.20		60 min.	
42.5		2.40	20 min.	Decrement 50%
	3.00		20 min.	
	3.20		40 min.	
0	3.40	4.00	60 min.	Decrement 0%
	4.20		20 min.	
	4.40		40 min.	
42.5	5.00	5.20	60 min.	Increment 50%
	5.40		20 min.	
85.0		6.00	20 min.	Increment
100%			20 min.	

**SAMPLE OF COMPRESSION PILE TEST SCHEDULE**

<u>Load (Tons)</u>	<u>Intermediate Time</u>	<u>Elapsed Time</u>	<u>Incremental Time</u>	<u>Remarks</u>
	6.20		20 min.	
127.5		6.40	20 min.	Increment 150%
	7.00		20 min.	
170.0		7.20	20 min.	Increment 200%
	7.40		20 min.	
178.5		7.44	4 min.	Increment 210%
	8.04		20 min.	
187.0		8.08	4 min.	Increment 220%
	8.28		20 min.	
195.5		8.32	2 min.	Increment 230%
	8.52		20 min.	
204.0		8.56	4 min.	Increment 240%
	9.16		20 min.	
212.5		9.20	4 min.	Increment 250%
	9.40		20 min.	
221.0		9.44	4 min.	Increment 260%
	10.04		20 min.	
229.5		10.08	4 min.	Increment 270%
	10.28		20 min.	
238.0		10.32	4 min.	Increment 280%
	10.52		20 min.	
246.5		10.56	4 min.	Increment 290%
	11.16		20 min.	
255.0		11.20	4 min.	Increment 300%
	11.40		20 min.	
	12.0		40 min.	
	12.20		60 min.	
	12.40		80 min.	
	13.00		100 min.	
	13.20		120 min.	
191.2		13.50	30 min.	Increment 225%
	14.10		20 min.	
127.5		14.40	30 min.	Increment 150%
	15.00		20 min.	
63.8		15.30	30 min.	Increment 75%
	15.50		20 min.	
0		16.20	30 min.	0
	16.30		20 min.	

END OF TEST

Loading and unloading time increments have been rounded upward to the nearest whole minute. Service load = 65.0 tons (SAMPLE).

### 3.3.6 Additional Load Cycles

Any load cycles not accomplished in accordance with these specifications shall be redone at the direction of the Contracting Officer.

### 3.4 REMOVAL OF PILES

After the pile tests are completed and accepted at each site, all support piles, and test piles shall be pulled and removed from the test site. The remaining holes in the ground shall be filled to within 3 feet of the ground surface with the cement-bentonite-sand slurry specified in 02365-3.2. The upper 3 feet of the hole shall be filled with semicompacted fill.

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## SECTION 02365 - PRESTRESSED CONCRETE PILES

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor, and materials, except materials specified to be furnished by the Government, and performing all operations in connection with the manufacture, and installation of prestressed concrete piles. Pile tests shall be in accordance with the provisions of Section 02355, "PILE LOAD TESTS".

#### 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 CONCRETE INSTITUTE (ACI)

SP-66 (1988) ACI Detailing Manual

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

ASTM A 27 (2000) Steel Castings, Carbon, for General Application

ASTM A 36 (2001) Carbon Structural Steel

ASTM A 82 (2001) Steel Wire, Plain, for Concrete Reinforcement

ASTM A 416 (1999) Steel Strand, Uncoated Seven-Wire for Prestressed Concrete

ASTM A 615 (2001a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C 33 (2002a) Concrete Aggregates

ASTM C 88 (1999a) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM C 150 (2002) Portland Cement

ASTM C 260 (2001) Air-Entraining Admixtures for Concrete \

- ASTM C 494 (1999a) Chemical Admixtures for Concrete
- ASTM C 595 (2002a) Blended Hydraulic Cement
- ASTM C 618 (2001) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Concrete
- ASTM C 666 (1997) Resistance of Concrete to Rapid Freezing and Thawing

**AMERICAN WELDING SOCIETY, INC. (AWS)**

- D1.4 (1994) Structural Welding Code - Reinforcing Steel

**CORPS OF ENGINEERS (COE)**

- CRD-C 400 (1963) Water for Use in Mixing or Curing Concrete

**PRESTRESSED CONCRETE INSTITUTE (PCI)**

- MNL 116 (1985) Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products
- STD 112 (1984) Standard Prestressed Concrete Piles Square, Octagonal and Cylinder

**LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (LSSRB). 2000 EDITION, STATE OF LOUISIANA, DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LDOTD).**

- 1003.02 Aggregates for Portland Cement Concrete and Mortar

**MISSISSIPPI STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (MSSRBC). 1990 EDITION, MISSISSIPPI STATE HIGHWAY DEPARTMENT (MSHD)**

- 703.02 Fine Aggregate for Portland Cement Concrete
- 703.03 Coarse Aggregate for Portland Cement Concrete



### 1.3 MEASUREMENT

**Precast prestressed concrete piles will be measured for payment on the basis of lengths along the axis of the pile in place below the cut-off elevation and shall be limited to the lengths as shown on the drawings. Pile lengths will be measured to the nearest tenth of a foot. The portion of any pile driven below the tip elevation shown on the drawings will not be measured for payment unless overdriving is directed by the Contracting Officer. Pulled piles shall be measured for payment on the basis of lengths along the axis of the pile pulled above the cut-off elevation. Redriving of pulled piles will be measured in accordance with the provisions stated hereinabove for originally driving the piles. Cut offs shall be measured for payment on the basis of total length minus driving head length provided that this length is not greater than the difference between the total length of piles shown on the plans for that location and the length of piles driven below the point of cut off.**

### 1.4 PAYMENT

#### 1.4.1 Driven Piles

**Payment for the measured length below cut-off elevation of precast prestressed concrete piles acceptably driven will be made at the applicable contract price per linear foot for "Precast Concrete Piles (12") and "Precast Concrete Piles (20)", for the length and type of pile specified or directed to be driven; each price includes all items incidental to driving the piles, backdriving uplifted piles, cutting off all piles at the cut-off elevation, spacing of piles, and furnishing the piles.**

#### 1.4.2 Pulled Piles

##### 1.4.2.1 Sound Piles

**Each concrete pile pulled at the direction of the Contracting Officer for inspection and found to be in good condition, will be paid for at the original contract price in its original driven position plus 50 percent of the contract unit price for the length pulled which shall constitute payment for pulling. Payment for a pulled pile shall include backfilling the pile hole if required. Undamaged pulled piles when redriven acceptably will be paid for at 50 percent of the contract unit price for furnishing and driving the measured length of piles redriven, which price and payment shall constitute payment for redriving only. Pulled piles which are damaged through no fault of the Contractor shall be replaced by a new pile which will be paid for at the contract unit price for the length acceptably driven.**

#### 1.4.2.2 Damaged Piles

When a pile is pulled for inspection and found to be damaged due to Contractor negligence, no payment will be made for originally furnishing and driving such pile nor for the operation of pulling and it shall be replaced by a new pile which will be paid for at the contract unit price for the length acceptably driven.

#### 1.4.2.3 Misaligned or Misplaced Piles

When a pile is driven but not acceptably placed or driven out of alignment and pulled at the direction of the Contracting Officer, no payment will be made for either originally furnishing and driving such pile nor for the operation of pulling. If the pile is undamaged and it is acceptably redriven at the direction of the Contracting Officer, it will then be paid for at the contract unit price. If damaged, it shall be replaced by a new pile, which will then be paid for at the contract unit price.

#### 1.4.3 Cut-Offs

Payment will be made for measured cut-off portion of any pile furnished by the Contractor at the rate of 50 percent of the applicable contract unit price for furnishing and installing piles. No other payment will be made for such cut-off. Cut-off portions of the piles shall be disposed of as directed by the Contracting Officer at the Contractor's expense.

### 1.5 SUBMITTALS

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

#### 1.5.1 Pile Driving Equipment; GA

Descriptions of pile driving equipment, including hammers, power packs, driving helmets, cap blocks, pile cushions, leads, extractors, jetting equipment, and preboring equipment, shall be submitted for approval at least 30 days prior to commencement of work. The following information for each hammer proposed shall be submitted:

- (1) make and model
- (2) ram weight (pounds)
- (3) anvil weight (pounds)
- (4) weight of the moving parts of the hammer (pounds)

(5) rated stroke (inches)

(6) rated energy range (foot-pounds)

(7) rated speed (blows per minute)

(8) steam or air pressure, hammer, and boiler and/or compressor (pounds per square inch)

(9) rated bounce chamber pressure curves or charts, including pressure correction chart for type and length of hose used with pressure gage (pounds per square inch)

(10) power pack description.

(11) pile driving helmet, make, and weight (pounds).

(12) pile cushion material, type, proposed thickness, modulus of elasticity, and coefficient of restitution.

#### 1.5.2 Cutting of Piles; GA

The proposed method for cutting piles for desired length and for removal of driving heads shall be submitted for approval 30 days prior to the start of pile driving.

#### 1.5.3 Delivery, Storage, and Handling; GA

Delivery, storage, and handling plans for piles shall be submitted for approval at least 30 days prior to delivery of piles to the jobsite.

#### 1.5.4 Concrete Mix; FIO

Concrete mixture proportions shall be submitted prior to casting piles.

#### 1.5.5 Curing of Piles; GA

Methods and details for curing piles shall be submitted for approval prior to casting piles.

**1.5.6 Prestressed Concrete Piles; GA**

Detailed drawings of piles shall be submitted for approval at least 30 days prior to commencement of work. Drawings shall show pile dimensions and fabrication details, including forms, reinforcement, embedded or attached lifting devices, pick-up and support points.

**1.5.7 Pile Placement and Tolerances; GA**

Pile placement plans, as specified in paragraph 3.2.2, shall be submitted for approval at least 30 days prior to delivery of piles to the jobsite.

**1.5.8 Cap Blocks; GA**

The make-up of the proposed cap block, including material type, dimensions, modulus of elasticity, and coefficient of restitution shall be submitted for approval. This information shall be included with the Pile Driving Equipment submittal.

**1.5.9 Certificates of Compliance; FIO**

Certificates of compliance for admixtures, aggregates, cement, pozzolan, reinforcing steel, and prestressing steel shall be submitted prior to commencing fabrication of piles. Certificates for admixtures, aggregates, cement, and pozzolan shall be submitted along with concrete mix proportions. Aggregate source and gradation information shall be submitted for aggregates.

**1.5.10 Driving Records; GA**

The proposed form for recording pile driving records shall be submitted for approval 30 days prior to commencement of work. Requirements are specified in paragraph 3.2.3.1.

**1.5.11 Driving Records; FIO**

Original pile driving records shall be submitted daily.

**1.6 QUALIFICATIONS**

The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute, Plant Certification Program, or the manufacturer shall establish a quality control program based on PCI MNL-116, prior to the start of production.

## 1.7 DELIVERY, STORAGE, AND HANDLING

Piles shall be stored, handled, and transported in accordance with PCI MNL-116 except as follows. Methods used for handling and storage of piles shall be such that the piles are not subjected to excessive bending stress, cracking, spalling, or other damage. Piles which are damaged during delivery, storage, or handling to the extent they are rendered unsuitable for the work, in the opinion of the Contracting Officer, will be rejected and shall be removed from the work site at no cost to the Government.

### 1.7.1 Delivery and Storage

Piles shall be held at the plant until the specified ultimate compressive strength is obtained or 14 days, whichever occurs first. Storage areas for piles shall be stabilized and suitable foundations provided so differential settlement or twisting of the pile does not occur. Stacked piles shall be separated and supported by uniform load transferring material placed across the full width of each bearing point and in vertical planes between the piles. The stacks shall be limited to 5 feet in height unless otherwise approved. Each pile shall be stacked in a straight position and supported every 10 feet or less along its length (ends inclusive) to prevent excessive sweep in the pile.

### 1.7.2 Handling

Piles shall be lifted by means of a suitable bridle or slings attached to the pile at the marked pickup points. Unless special lifting devices are attached for pickup, pickup points shall be plainly marked on all piles after removal of the forms. Alternate pickup methods or locations shall be subject to approval prior to commencement of pile fabrication. Dragging of piles across the ground will not be permitted. The Contractor shall inspect each pile for sweep and structural damage such as cracking and spalling before transporting them from the storage site to the driving area. Sweep shall be checked by placing the pile on a firm level surface and rotating the pile. Sweep shall be limited to 2 inches over the length of the pile. The Contractor shall again check the pile for excessive sweep and damage immediately prior to placement in the driving leads. Piles having excessive sweep shall not be used.

## 1.8 QUALITY CONTROL

### 1.8.1 General

The Contractor shall establish and maintain quality control for pile manufacturing and driving operations, assure compliance with contract specifications and maintain quality control records for all construction operations including, but not limited to, the following:

- (1) Testing and gradation of aggregates and compressive strength of concrete as required, including batched proportions.
- (2) Setting and bracing of forms and checkout just prior to concrete placement, including accurate placement of reinforcing steel.
- (3) Casting, handling and storage of precast, prestressed piling: records of prestressing tension strands.
- (4) Curing method and duration.
- (5) Driving of all piles and maintaining records of such.

### 1.8.2 Reporting

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

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Admixtures

Chemical admixtures shall conform to ASTM C 494. Air-entraining admixture shall conform to ASTM C 260. Calcium chloride or admixtures containing chlorides or nitrates shall not be used.

#### 2.1.2 Aggregates

Aggregates shall conform to ASTM C 33, Class 3M, except as specified otherwise herein. Aggregates shall conform to the grading requirements of either ASTM C33 Class 3M LSSRB, Section 1003.02; or MSSRBC, Sections 703.02 and 703.03. Fine aggregates from different sources of supply shall not be mixed or stored in the same stockpile, or used alternately in the same concrete mix or the same structure without approval. The fineness modulus of fine aggregate shall not be less than 2.40 or greater than 3.00. For piles that will be exposed to freezing and thawing, fine and coarse aggregate subjected to five cycles of the sodium sulfate soundness test in accordance with ASTM C 88 shall show a loss not greater than 10 percent. If the selected aggregates fail the soundness test, the aggregate source may be used if the concrete specimens made with the aggregates have a durability factor of not less than 80, based on 300 cycles of freezing and thawing, when tested in accordance with ASTM C 666.

### 2.1.3 Cement

Portland cement shall conform to ASTM C 150, Type I or II low alkali

### 2.1.4 Pozzolan

Pozzolan shall conform to ASTM C 618, Class C or F with alkali requirement of Table 2 and with the requirement for multiple factor of Table 4. Exceeding the alkali limit may be allowed if test results are submitted showing that the requirement for effectiveness is controlling alkali – silica reaction of Table 4 is met.

### 2.1.5 Prestressing Steel

Prestressing steel shall be seven-wire, 1/2 inch diameter, Grade 270, low relaxation steel strand conforming to the requirements of ASTM A416. Steel shall be free from grease, oil, wax, paint, soil, dirt, loose rust, kinks, bends, and other defects.

### 2.1.6 Reinforcing Steel

Non-prestressing reinforcing steel shall conform to ASTM A 615, Grade 60 ksi, Deformed.

### 2.1.7 Ties and Spirals

Steel for ties and spirals shall conform to ASTM A 82

### 2.1.8 Water

Water for mixing concrete shall be fresh, clean, drinkable, and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or steel. Undrinkable water may be used if it meets the requirements of COE CRD-C 400. The time of set for concrete made with undrinkable water may vary from one hour earlier to one and one-half hours later than a control sample made with distilled water.

## 2.2 FABRICATION

### 2.2.1 Prestressed Concrete Piles

Prestressed concrete piles shall be solid concrete piles of the type indicated. Piles shall be cast as monolithic units of homogeneous concrete and pretensioned with prestressing steel. Manufacturing requirements for piles shall conform to PCI MNL-116 except as modified herein. Pick-up points shall be marked on the piles at the indicated location after removal of the forms. Detail drawings of piles, showing

dimensions and fabrication details including forms, reinforcement, collars, and pick-up points shall be submitted for approval. The Contractor shall notify the Contracting Officer 1 week prior to the date casting of piles is to begin.

#### 2.2.2 Forms

Forms shall be of steel, braced and stiffened against deformation, accurately constructed, watertight, and supported on unyielding concrete casting beds. Form surfaces shall be within 1/4 inch of a true plane in a length of 50 feet. Forms shall permit movement of the pile without damage during release of the prestressing force. Voids shall be formed.

#### 2.2.3 Reinforcement and Embedments

Reinforcing steel, prestressing steel, and embedded items shall be accurately positioned in the forms and secured to prevent movement during concrete placement. Steel shall have a minimum concrete cover of 2 inches. Reinforcing steel details shall conform to ACI SP- 66. Welding of reinforcing steel shall be in accordance with AWS D1.4.

#### 2.2.4 Concrete Mix

The concrete mix shall be selected by the Contractor to have a compressive strength of 6,000 psi at 28 days (90 days if pozzolan is used) and a slump of 1 to 3 inches. The water-cementitious material ratio (by weight) shall be held to the minimum consistent with workability required for placement but in no case shall it exceed 0.45. Concrete shall be air entrained with a minimum of 4 percent and a maximum of 6 percent air entrainment, accomplished by use of an additive at the mixer. If pozzolan is used, it shall range from 15 to 30 percent by weight of the total cementitious material. Nominal maximum size coarse aggregate shall be 1 inch. Once production begins, changes to the mix will not be permitted without written submittal and approval of the proposed changes.

#### 2.2.5 Concrete Work

Concrete shall not be deposited in the forms until the placement of the reinforcement and anchorages has been inspected and approved by the Contracting Officer. Conveying equipment shall be cleaned thoroughly before each run and the concrete conveyed from the mixer to the forms as rapidly as practicable using methods that will not cause segregation or loss of ingredients. Concrete shall be deposited as nearly as practicable in its final position in the forms. At any point in conveying, the free vertical drop of the concrete shall not exceed 3 feet. Chuting will be permitted if the concrete is deposited into a hopper before being placed in the forms. Concrete that has segregated in conveying shall be removed. Each pile shall be produced of dense concrete with smooth surfaces. Each pile shall be a continuous pour until it is



completed. Vibrator heads shall be smaller than the minimum distance between steel pretensioning. Side forms shall not be removed until concrete has attained 3500psi compressive strength. Dimensional tolerances shall conform to PCI MNL-116. The ends of all piles and corners of square piles shall be chamfered 3/4 inch or, in lieu of chamfering, may be rounded to a 1-inch radius.

#### 2.2.6 Pretensioning

Anchorage for tensioning the prestressing steel shall be an approved type. The tension to which the steel is to be pretensioned shall be measured by the elongation of the steel and also by the jack pressure reading on a gauge or by the use of an accurately calibrated dynamometer. The gauge or dynamometer shall have been calibrated by a calibration laboratory approved by the Contracting Officer within 12 months of commencing work and every 6 months thereafter during the term of the contract. Means shall be provided for measuring the elongation of the steel to the nearest 1/4 inch. The applied load determined from elongation measurements shall be computed using load-elongation curves for the steel used. When the difference between the results of measurement and gauge reading is more than 5 percent, the cause of the discrepancy shall be corrected. The tensioning steel shall be given a uniform prestress prior to being brought to design prestress. The same initial prestress shall be induced in each unit when several units of prestressing steel in a pile are stretched simultaneously.

#### 2.2.7 Detensioning

Releasing of prestressing force in pretensioned piles shall be performed in a manner that minimizes eccentricity of prestress. Tension in the strands shall be released from the anchorage gradually. In no case shall the stress be released after casting without approval by the Contracting Officer. The transfer of prestressing force shall be done when the concrete has reached a compressive strength of not less than  4,000 psi. The prestressing steel shall be cut or ground flush with the pile ends.

#### 2.2.8 Curing of Piles

Piles shall be cured in accordance with the provisions contained in PCI MNL-116 except as follows. The maximum rate of heat gain shall not exceed 40 degrees Fahrenheit per hour and the maximum concrete temperature shall not exceed 165 degrees Fahrenheit during the curing cycle. Curing shall be continued until the concrete has attained a minimum compressive strength of 4000 psi as determined by the concrete test cylinders.

### 2.2.9 Splices

Splices will not be permitted.

## 2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

Testing during manufacture shall be performed by an approved commercial testing laboratory or by an approved laboratory maintained by the manufacturer of the material. Minimum requirements for testing during manufacture shall be as required in PCI MNL-116 except as modified herein.

### 2.3.1 Concrete Cylinders

A minimum of four standard 6-inch by 12-inch concrete test cylinders per casting bed shall be made to indicate transfer and 28-day (or 90 day if pozzolan is used) strengths.

### 2.3.2 Testing by Government

Facilities shall be made available to the Contracting Officer for making and testing any additional test cylinders desired.

### 2.3.3 Certificates of Compliance

The Contractor shall certify that admixtures, aggregates, cement, and pozzolan used conform with the requirements of the specifications. Manufacturer's literature indicating conformance may be submitted for admixtures.

## PART 3 EXECUTION

### 3.1 PILE DRIVING EQUIPMENT

The Contractor shall select the proposed pile driving equipment as specified and submit descriptions of the proposed equipment for approval. Equipment approval will be based on wave equation drivability analysis furnished by the Contractor and the engineering judgment of the Contracting Officer. Stresses predicted by wave equation analysis shall not exceed 0.85 times the concrete compressive strength minus the effective prestress in compression and the effective prestress in tension. Final approval of the proposed equipment is subject to the satisfactory completion and approval of pile tests. Changes in the selected pile driving equipment will not be allowed after the equipment has been approved by the Contracting Officer except as specified herein and directed by the Contracting Officer. No additional contract time will be allowed for Contractor proposed changes in the equipment.

### 3.1.1 Pile Driving Hammers

Pile driving hammers shall be of the impact type and capable of satisfying the requirement of paragraph 3.2.3.2. Hammers shall be steam or air hammers single acting, double-acting, or differential acting type. The size or capacity of hammers shall be as recommended by the manufacturer for the pile type, weight, and soil formation to be penetrated. Boiler, compressor, or engine capacity shall be sufficient to operate hammers continuously at the full rated speed so that a single-acting hammer obtains a full upward stroke of the ram, a double-acting hammer operates at or near the blows per minute at which the hammer is rated, and a differential type hammer obtains a slight rise of the hammer base during each upward stroke. Single-acting hammers shall have a scale (in inches) fixed to the hammer's ram guide and a pointed indicator fixed on the ram to allow reading of the hammer's stroke. Both the scale and indicator shall be easily legible to observers on the ground. Hammers shall have a gage to monitor pressure at the hammer for air and steam hammers. This gage shall be operational during the driving of piles and shall be mounted in an accessible location for monitoring by the Contractor and the Contracting Officer.

### 3.1.2 Pile Driving Leads

Leads shall align the pile and hammer concentrically, and maintain the pile in proper position and alignment throughout driving. Hammers shall be supported and guided with fixed extended leads or fixed underhung leads. The leads shall be of sufficient length to fully accommodate the combined length of the pile and hammer. Two intermediate pile supports shall be provided in the leads to reduce the unbraced length of the pile during driving and pulling.

### 3.1.3 Driving Helmets and Pile Cushions

A driving helmet including a pile cushion shall be used between the top of the pile and the ram to prevent impact damage to the pile. The driving helmet and pile cushion combination shall be capable of protecting the head of the pile, minimize energy absorption and dissipation, transmit hammer energy uniformly over the top of the pile and prevent excessive tensile stresses from developing in the concrete during driving. The driving helmet shall fit loosely around the top of the pile so that the pile is not restrained by the helmet if the pile tends to rotate during driving. The pile cushion may be of solid wood or of laminated construction, completely cover the top surface of the pile, and be retained by the driving helmet. Minimum thickness of the pile cushion shall be 3 inches and the thickness shall be increased so as to be suitable for the size and length of pile, character of subsurface material to be encountered, hammer characteristics, and the required driving resistance.

### 3.1.4 Cap Blocks

The cap block (hammer cushion) used between the driving cap and the hammer ram may be of solid hardwood block with grain parallel to the pile axis and enclosed in a close-fitting steel housing or may consist of aluminum and approved industrial type plastic laminate disks stacked alternately in a steel housing. Steel plates shall be used at the top and the bottom of the cap block. The cap block shall be replaced if it has been damaged, highly compressed, charred, or burned or has become spongy or deteriorated in any manner. If a wood cap block is used, it shall not be replaced during the final driving of any pile. Under no circumstances will the use of small wood blocks, wood chips, rope, or other material permitting excessive loss of hammer energy be permitted.

### 3.1.5 Pile Extractors

Impact hammers are required for pulling piles.

### 3.1.6 Jetting

Jetting shall be permitted per paragraph 3.2.3.6.

### 3.1.7 Preboring Equipment

The auger of the preboring equipment shall be sufficiently rigid to drill the pilot hole within the tolerances for pile driving specified in paragraph 3.2.2. The auger diameter shall not exceed two-thirds the width of the pile.

## 3.2 INSTALLATION

### 3.2.1 Lengths of Permanent Piles

The estimated quantities of piles listed in the unit price schedule are given for bidding purposes only. The Contracting Officer will determine the actual lengths of piles required to be driven below cutoff elevation for the various locations in the work and will furnish the Contractor a quantities list indicating lengths and locations of all piles to be placed. Pile length determination will be made from the results of the pile tests specified in Section 02355. The Contracting Officer will determine the number of over length piles required, if any, to provide for variations in subsurface conditions.

### 3.2.2 Pile Placement and Tolerances

Foundation preparation (removal of unsuitable material and densification of foundation fill) shall be completed in an area prior to driving permanent piles within that area. A pile placement plan shall be developed to show the installation sequence and the methods proposed for controlling the location and alignment of

piles and submitted for approval. Piles shall be placed accurately in the correct location and alignments, both laterally and longitudinally, and to the vertical or batter lines indicated. The Contractor shall establish a permanent baseline during pile driving operations to provide for inspection of pile placement by the Contracting Officer. The baseline shall be established prior to driving permanent piles and shall be maintained during the installation of the permanent piles. Prior to driving and with the pile head seated in the hammer, the Contractor shall check each pile for correct alignment. The alignment of battered piles shall be checked and monitored during driving with an accurate batter board level [and surveying instrument]. A final lateral deviation from the correct location at the cutoff elevation of not more than 3 inches will be permitted. A vertical deviation from the correct cutoff elevations shown on the drawing of not more than 1 inch will be permitted. A final variation in slope of not more than 1/4 inch per foot of longitudinal axis will be permitted. A final variation in rotation of the pile about its center line of not more than 7.5 degrees will be permitted. The correct relative position of all piles shall be maintained by the use of templates or by other approved means. Piles not located properly or exceeding the maximum limits for rotation, lateral deviation, and/or variation in alignment shall be pulled and redriven at a directed location.

### 3.2.3 Pile Driving

Piles shall not be driven within 100 feet of concrete less than 7 days old nor within 30 feet of concrete less than 28 days old unless otherwise authorized. Driving shall not result in cracking, crushing, or spalling of concrete. The sequence of installation shall be such that pile heave is minimized. The Contracting Officer shall be notified 30 days prior to the date driving is to begin.

#### 3.2.3.1 Driving Records

The Contractor shall develop a form for recording the pile driving operations, obtain approval of this form, and compile complete records of the operations. Pile driving records shall include pile dimensions and location, pile identification number, casting date, date driven, original pile length, cutoff and tip elevations, description of hammer used, rated hammer energy, observed stroke and rate of hammer operation (blows per minute), air or steam pressure at the hammer or bounce chamber pressure, length of pressure hose, penetration under the combined weight of the pile and hammer, number of blows required for each foot of penetration throughout the entire length of each pile and for each inch of penetration in the last foot of penetration, time for start and finish of driving, total driving time in minutes and seconds for each pile, cushion information including changes during driving, and any other information as required or requested. Record shall also include information such as unusual driving conditions, interruptions or delays during driving, observed pile damage, heave detected in adjacent piles, records of restriking, depth and description of voids formed adjacent to the pile, and any other pertinent information.

**3.2.3.2 Penetration Criteria**

Piles shall be driven to the required depth of penetration as determined by the Contracting Officer or until the maximum permissible blow count is exceeded. The required depth of penetration and maximum blow count will be established subsequent to the analysis of pile tests as specified in Section 02355. .

**3.2.3.3 Driving**

Permanent and test piles shall be driven with hammers of the same model and manufacturer, same energy and efficiency, and using the same driving system. The hammer shall be operated at all times at the speed and under the conditions recommended by the manufacturer subject to the approval of the Contracting Officer. Once pile driving has begun, conditions such as alignment and batter shall be kept constant. Each pile shall be driven continuously and without interruption until the required depth of penetration has been attained. Deviation from this procedure will be permitted only for necessary changes to the pile cushion or whenever driving is stopped by causes that reasonably could not have been anticipated. Pile cushion changes will be considered necessary whenever the cushion has become highly compressed, charred, burned, or deteriorated. Changes to the cushion will not be allowed near the end of driving. A pile that cannot be driven to the required depth because of an obstruction, as indicated by a sudden unexplained change in blow count and drifting, shall be pulled and redriven or shall be cut off and abandoned, whichever is directed.

A pile which cannot be driven to the required tip elevation because the maximum permissible driving stress is exceeded shall be reported to the Contracting Officer. The Contracting Officer will direct the Contractor to cut off the pile, pull and redrive the pile, or perform other corrective measures. Corrective measures may consist of requiring the Contractor to utilize preboring when redriving the pile.

Preboring to assist pile driving is specified in paragraph(s) [3.2.3.6] 3.2.3.7. Observations shall be made to detect heave in accordance with paragraph 3.2.3.4. After piles are driven, the driving head or any excess pile above the cutoff elevation shall be removed in accordance with paragraph 3.2.4.

**3.2.3.3.1 Scale**

A scale (inches) shall be fixed to the hammer's ram guide and a pointed indicator on the ram, near the scale, to allow a reading of the ram drop (see example diagram at the end of Section 02315). Installation of both scale and indicator shall be in such a manner that the drop of the ram can be read by observing the highest and the lowest position of the indicator and scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. The Contractor shall record in

the pile driving record the ram drop of the pile hammer when recording the blows per foot as specified in paragraph 3.2.3.3.

#### 3.2.3.4 Heaved Piles

When driving piles in clusters or under conditions of relatively close spacing, observations shall be made to detect heave of adjacent piles. Heaved piles shall be driven to the original penetration criteria.

#### 3.2.3.5 Pulled Piles

Piles damaged or impaired for use during driving shall be pulled and replaced with new piles, or shall be cut off and abandoned and new piles driven as directed. The Contracting Officer may require that any pile be pulled for inspection. Piles pulled at the direction of the Contracting Officer and found to be in suitable condition shall be redriven at a directed location.

#### 3.2.3.6 Jetting

Jetting shall be used to assist driving 20" x 20" PPC piles through Strata that can not be penetrated practically by use of hammer alone. Driving shall be restricted to a static weight while water is being injected to prevent inducing tensile stresses in the piles. Side jets shall not be permitted. The jetting operation shall not be deeper than elevation -40.0 NAVD and in not case deeper than 10 feet above the proposed tip elevation. The piles shall be installed using an impact hammer. The jet flow shall be regulated such that the piles are advanced at 8 to 10 blows per foot with recommended hammer.

#### 3.2.3.7 Preboring

Preboring to remove soil will be permitted at the discretion of the Contracting Officer for 12" x 12" PPC piles. The diameter of the hole should not exceed two-thirds the width of the pile. Prebored piles shall be driven not less than 10 feet below the bottom of the prebored hole, unless otherwise authorized, and shall be firmly seated by the application of a number of reduced energy hammer blows.

#### 3.2.3.8 Void Backfill

Voids occurring around piles as a result of pile driving and abandoned holes for piles that have been pulled shall be filled to within 3 feet of the adjacent ground surface with a thick tremie-placed slurry (from bottom to top of hole). The slurry shall consist of one part Portland cement, two parts bentonite, and six parts sand mixed with enough water to produce a slurry viscous enough to thoroughly fill the voids. The upper 3 feet of the void shall be earth filled and compacted to the same density as the surrounding soil.

**3.2.4 Cutting of Piles**

The proposed method for cutting of piles for removal of driving heads must be approved and shall not damage the pile concrete or reinforcement steel left in place. The use of explosives will not be permitted. Driving heads shall not be removed until heaved piles are redriven to the original penetration criteria. Cut off sections of piles shall be removed from the site upon completion of the work.



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## SECTION 02381 - RIPRAP

### PART 1 GENERAL

#### 1.1 SCOPE

The work provided for herein consists of furnishing all plant, labor, equipment and materials, and performing all operations in connection with riprap erosion protection as shown on the contract drawings, in accordance with these specifications.

#### 1.2 MEASUREMENT AND PAYMENT

##### 1.2.1 General

No separate measurement or payment will be made for furnishing inspection service, surveying, making reports and performing other services in connection with the Contractor Quality Control Inspection System, and site preparation including preparing and clearing the base. All costs in connection therewith shall be included in other items for which payment is to be made.

##### 1.2.2 Riprap

###### 1.2.2.1 Measurement

**The unit of measurement for stone satisfactorily placed in accordance with the details shown on the contract drawings will be the ton (2,000 pounds). Quantities will be computed to the nearest whole ton.** If delivered by truck and stockpiled, riprap will be measured for payment, in the presence of the Engineer, by being weighed on site on approved, accurately calibrated scales furnished by and at the expense of the Contractor just prior to being placed. Weight certificates furnished by a public weighmaster will be acceptable if delivered without stockpiling prior to placing in lieu of the above procedure when authorized by the Engineer. The determination of satisfactorily placed stone shall be based on survey cross sections. 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 payment will be made for any unauthorized use of the stone.

###### 1.2.2.2 Payment

**Payment for stone will be at the contract unit price per ton for "Riprap". Price and payment shall include all costs of furnishing, hauling, handling, testing, placing and maintaining the stone and the geofabric material.**

#### 1.3 REFERENCES

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

**LOUISIANA STANDARD SPECIFICATIONS FOR ROADS  
AND BRIDGES (2000 EDITION)**

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

C 127 (2001) Density, Relative Density (Specific Gravity)  
and Absorption of Coarse Aggregate

**1.4 QUALITY CONTROL**

**1.4.1 General**

The Contractor shall establish and maintain quality control for all riprap operations to ensure compliance with contract requirements, and shall maintain records of the quality control for all construction operations. All information pertaining to inspection and quality control shall be included in the quality control reports to be furnished to the Contracting Officer including, but not limited to, the following:

- (1) Submission of riprap samples for quality testing, if from other than an approved source.
- (2) Inspection of materials before they are incorporated into the work to insure compliance with contract requirements.
- (3) Cleanliness of riprap.
- (4) Gradation of riprap.
- (5) Quantity of riprap delivered and placed each day.
- (6) Compliance Survey. The Contractor will be required to take cross sections at 25 foot intervals over each phase of construction between the limits of riprap placement. No separate payment will be made for this survey work. Prior to placing geotextile, compliance cross sections shall be taken. The Contractor shall furnish the Engineer plotted cross sections and original field notes taken over the embankment material prior to placement of geotextile and riprap and plotted cross sections and original field notes taken after placement of riprap within seven days of placement.

**1.4.2 Reporting**

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

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Riprap

##### 2.1.1.1 General

All stone shall be a hard, durable material as approved by the Engineer. 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. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, seams and other defects that would tend unduly to increase its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay and rock fines will not be permitted. 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 rounded in shape. Field stone, rectangular block stone, slabs, and rounded boulders will not be accepted. Gradation shall conform to the table below.

Riprap Gradation

Percent Lighter by Weight	Limits of Stone Weight (in Pounds)
Layer Thickness	18"
100	200-80
50	80-40
15	40-10

##### 2.1.1.2 Sources and Evaluation Testing

Riprap shall be obtained in accordance with the General Provision entitled "STONE SOURCES" (see General Requirements). If the Contractor proposes to furnish stone from a source not listed in "STONE SOURCES", the Contractor will make such investigations as necessary to determine whether acceptable stone can be produced from the proposed source. The cost of initial testing will be borne by the Contractor.

The tests to which the riprap may be subjected will include petrographic analysis, specific gravity, abrasion, unit weight, absorption, wetting and drying, freezing and thawing and such other tests as may be considered necessary by the Engineer. The following guidance is provided for use by the Contractor in analyzing a source of stone not listed in "STONE SOURCES". Stone that weighs less than 155 pounds per cubic foot or has more than 2 percent absorption will not be accepted unless other tests and service records show that the stone is satisfactory. The method of test for unit weight and absorption will be ASTM C 127 except 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 Engineer for testing and acceptance prior to delivery of any stone to the site of the work. Samples shall consist of at least seven 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 Engineer. The samples shall be shipped at the Contractor's expense to the testing laboratory at least 90 days in advance of the time of the placing of the stone is expected to begin. The tests will be conducted in accordance with applicable ASTM methods of tests. If, after initial testing, the Contractor selects a source not listed in "Stone Sources", the Owner may retest the riprap at the Owner's expense.

#### 2.1.1.3 Gradation of Riprap

Gradation tests of riprap 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 Owner's 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 the project. Each test sample shall be representative of the riprap being shipped. Percentage determinations shall be made for each stone weight specified in paragraph 2.1.1.1. 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. Certification and test results will represent stone shipped from the quarry and must be received by the Government Representative before the stone is used in the work. 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 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 for the gradation test method.

## 2.1.2 Geofabric

The geofabric shall conform to Class D per LSSRB.

## 2.2 MVN STANDARD TEST METHOD FOR GRADATION OF 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 riprap 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 specifications. After the test is plotted on a curve, then the gradation limits may be plotted. Overlapping gradations with this method are no problem. It is usually more convenient, however, to select points from the gradation limit, such as the minimum 50 percent size, the minimum 15 percent size, and one or two others, as separate 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 (see example) on which to run "individual weight larger than" test. Procedure is similar to the standard aggregate gradation test for "individual weight retained".
- (3) Determine the largest size stone in the sample. (100 percent 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 (heavier than) and cumulative percent retained and cumulative percent passing (lighter than). Plot percent passing, along with the specification limits on ENG Form 4055 and fill-in and document test on MVN Form 602-R.

EXAMPLE GRADATION	
SPECIFICATIONS	
STONE WEIGHT IN LBS.	PERCENT FINER BY WEIGHT
400 - 160	100
160 - 80	50
80 - 30	15

EXAMPLE WORKSHEET				
STONE WEIGHT IN LBS.	INDIVIDUAL WEIGHT RETAINED	INDIVIDUAL % RETAINED	CUMULATIVE % RETAINED	CUMULATIVE % PASSING
400	0	0	0	100
160	9,600	30	30	70
80	11,200	35	65	35
30	8,000	25	90	10
Less Than 30	3,200	10	100	0

TOTAL	32,000 lbs.
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NOTE: Largest stone 251 lbs.

### PART 3 EXECUTION

#### 3.1 SITE PREPARATION

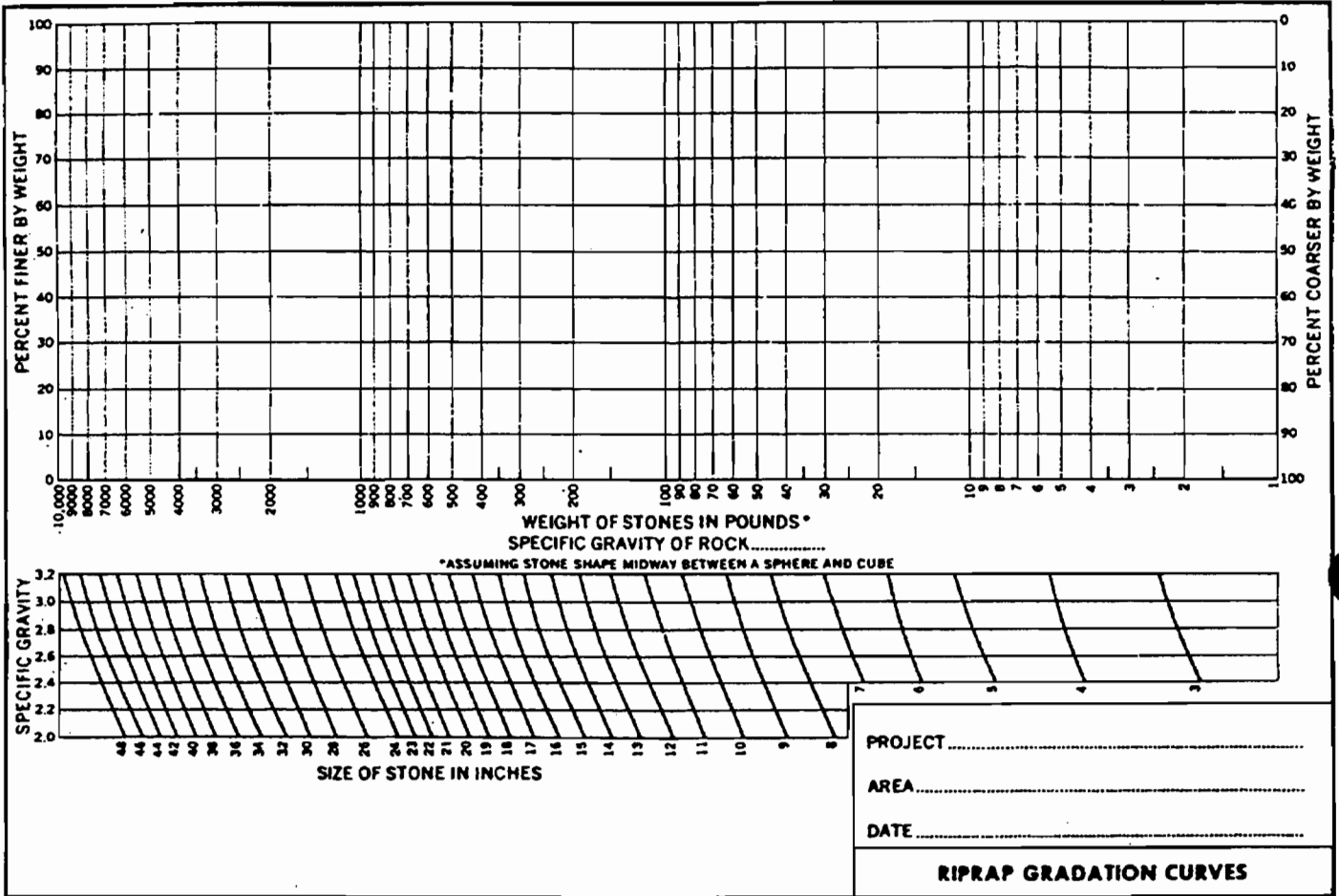
Areas on which riprap are to be placed shall be graded to the elevations shown on the drawings. Immediately prior to placing riprap, the geotextile shall be placed on the prepared surface. The geofabric shall be placed on the prepared slopes in accordance to Sub-section 203.11 (c) of LSSRB before placement of rip-rap. Geotextile shall be covered with riprap on a daily basis.

### 3.2 RIPRAP PLACEMENT

Riprap shall be placed within the limits shown on the contract drawings. All stone shall be placed in a manner which will produce a reasonably well graded mass of rock with the minimum practical percentage of voids and shall be constructed within the specified tolerance to the lines and grades shown on the drawings. A tolerance of plus or minus 6 inches from the slopes, lines and grades shown on the contract drawings will be allowed in the finished surface of the stone, except that the extreme of this tolerance shall not be continuous over an area greater than 25 square feet. . The Contractor will not be paid for stone placed outside the allowable tolerance. The larger stones shall be well distributed and the entire mass of stones in their final position shall be graded to conform to the gradation specified in paragraph 2.1.1.1. The finished stone shall be free from objectionable pockets of small stones and clusters of larger stones. Placing stone by dumping it at the top of the slope and pushing it down the slope will not be permitted. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source; by controlled dumping of successive loads during final placing; or by other methods of placement which will produce the specified results. Rearranging of individual stones by mechanical equipment will be required to the extent necessary to obtain a reasonably well-graded distribution of stone sizes as specified above. The Contractor shall maintain the stone until accepted and any material displaced prior to acceptance and due to the Contractor's negligence shall be replaced at his expense and to the slopes, lines and grades shown on the contract drawings.







ENG FORM 4055  
APR 67

PROJECT .....

AREA .....

DATE .....

**RIPRAP GRADATION CURVES**

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## SECTION 02411 - STEEL SHEET PILING

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials and performing all operations in connection with the installation of Contractor furnished steel sheet piling in accordance with these specifications and applicable drawings.

The sheet piling designations on the drawings are as follows:

Type PS 31	Sheet piling below the bridge abutments
Type PZ 22	Sheet piling below floodwalls in levee

Refer to the drawings for complete locations.

#### 1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS".

Section 05500, "MISCELLANEOUS METAL WORK".  
Section 09940, "PAINTING".

#### 1.3 QUANTITIES

The estimated quantities of sheet piling listed in the unit price schedule of the contract as to be furnished by the Contractor are given for bidding purposes only. Sheet piling quantities for payment shall consist of the square feet of piling acceptably installed. This quantity shall consist of the lengths of piles driven below the elevations indicated for the top of piles times the length along the wall alignment as shown on the drawings plus any additions thereto resulting from changes in design or alignment as provided in paragraph 3.1.1.2.

#### 1.4 MEASUREMENT AND PAYMENT

##### 1.4.1 Measurement

##### 1.4.1.1 Driven Steel Sheet Piling

**Measurement of driven steel sheet piling, except for fabricated piles (special corners, transitions, tee sections, etc.) and rolled corners, will be by the square foot of piling acceptably installed.** The length of each pile driven will be measured to the nearest tenth of a linear foot and converted to square feet for payment purposes. The square footage will be determined by multiplying the number of piles times the measured length acceptably driven below the cut-off elevation shown on the drawings times the theoretical driving width of the pile. The number of piles paid for shall not exceed the number of piles indicated on the approved shop drawings. When driven piles are directed to be cut off before reaching the penetration depth shown on the drawings, that portion cut off will be measured for payment on the basis of its total length, provided that the length is not greater than the difference between the total length of piles shown on the plans for that location and the length of piles driven below the cut-off elevation. No deduction will be made for holes cut for drains and utilities in computing the area of steel sheet pile structures. The portion of any pile driven below the tip elevation shown on the drawings will not be measured for payment unless overdriving is directed by the Contracting Officer.

#### 1.4.1.2 Pulled Piles

Piles ordered pulled will be measured for payment by the square foot. Square footage will be determined by multiplying the theoretical driving width of the pile by the length pulled above the cut-off elevation shown on the drawings. Redriving of such piles, when required, shall be measured for payment by the square foot, which shall be determined by multiplying the theoretical driving width of the pile by the length redriven below the cut-off elevation shown on the drawings.

#### 1.4.1.3 Miscellaneous Items

No separate measurement will be made for the fabricated piles and rolled corners, sheet piling void backfill, or painting sheet piling.

### 1.5 PAYMENT

#### 1.5.1 Sheet Piling

**Payment for steel sheet piling, acceptably installed and measured in accordance with above paragraph 1.4.1.1, will be made at the applicable contract unit price per square foot for "Piling, Steel Sheet, Type PS 31" and "Piling, Steel Sheet, Type PZ 22".** Price and payment shall constitute full compensation for delivering, fabricating, painting, furnishing, handling, driving, cutting holes, backfilling voids, and all other work incidental to acceptably installing the steel sheet piling.

## 1.5.2 Fabricated Piles and Rolled Corners

No separate payment will be made for the transition piles or the rolled corners and all costs associated with fabricating, furnishing, delivering, and installing them shall be included in the contract unit cost for "Piling, Steel Sheet, Type PZ 22".

## 1.5.3 Cut-Offs and Splices

Cut-offs and/or splices which are not required under the original terms of this contract but become necessary to construct the sheet pile structures as shown on the drawings and as specified herein, and which are necessitated due to Contractor negligence in any procedure required to install such structures shall be provided at no additional cost to the Government. Cut-offs and/or splices of this type which are required through no fault of the Contractor shall be paid for by lump sum payments of \$10.00 per cut-off and \$25.00 per splice. Additionally, the portion of a Contractor furnished pile which is cut off when the Contractor is deemed to be not at fault, shall be paid for at 75 percent of the applicable contract unit price for the amount measured in accordance with above paragraph 1.4.1.

## 1.5.4 Pulled Piles

Piles, which are directed to be pulled and found to be in good condition, will be paid for at the contract price for furnishing and driving the pile in its original position. The cost of pulling will be paid for at 25 percent of the contract unit price and when such piles are redriven, the cost of redriving will be paid for at 25 percent of the contract unit price for that portion of the pile acceptably redriven below the cut-off elevation. When piles are pulled and found to be defective and/or damaged due to Contractor negligence, no payment will be made for originally furnishing and driving such piles, nor for the operation for pulling. Piles replacing defective or damaged piles will be paid for at the applicable contract unit price. Piles which are pulled and found to be damaged through no fault of the Contractor, will be paid for at the applicable contract unit price for originally installing the damaged pile plus 25% of the applicable contract unit price for the cost of pulling. Subsequently, when a new pile is furnished and driven, it shall be paid for at the applicable contract unit price.

## 1.6 REFERENCES

The following standards of the issues listed below and referred to thereafter by basic designation only from a part of this specification to the extent indicated by the references thereto:

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)  
STANDARDS**

<b>ASTM A6/A6M-01</b>	<b>Standard Specifications of General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling</b>
<b>ASTM A 36</b>	<b>(2001) Standard Specifications for Carbon Structural Steel</b>
<b>ASTM A 572</b>	<b>(2001) Standard Specifications for High-Strength Low-Alloy Columbian-Vanadium of Structural Quality</b>

**1.7 QUALITY ASSURANCE**

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified herein and in Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS".

**1.7.1 Materials Tests**

Sheet piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site.

**1.8 SUBMITTALS**

The Contractor shall submit descriptions of sheet piling driving equipment, shop drawings, test procedures, test reports and certificates, sheet piling driving records and other submittals to the Contracting Officer for approval as required. Submittals and associated work not satisfactory to the Contracting Officer will be rejected.

**1.8.1 Equipment Descriptions**

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

**1.8.2 Shop Drawings**

Shop drawings for sheet piling, including fabricated sections, shall be submitted for approval and shall show complete piling dimensions and details, driving sequence and location of installed piling. Shop drawings shall include details and dimensions of templates and other temporary guide structures for installing piling, and shall provide



details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

### 1.8.3 Materials Test Certificates

Materials test certificates shall be submitted for each shipment and identified with specific lots prior to installing piling. Identification data should include piling type, dimensions, section properties, heat analysis number, chemical composition, mechanical properties and mill identification mark. Test reports should comply with ASTM A6, paragraph 18.13.

### 1.8.4 Driving Records

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

## 1.9 QUALITY CONTROL

### 1.9.1 General

The Contractor shall establish and maintain quality control for pile driving 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) Accurate location, alinement and plumbness of piling.
- (2) Full and proper engagement of interlocks.
- (3) Driving (pile hammer and rate of operation).
- (4) Final position; depth of penetration; tip and cut- off elevations.
- (5) Uplift and vertical tolerances after driving.
- (6) Location and elevation of any obstruction encountered and action directed by Contracting Officer.
- (7) Pulled piles and re-driving.
- (8) Manufacture and driving of fabricated sections.
- (9) Cutting and splicing (welding).

(10) Stockpiling and storage.

(11) Removal and disposal of damaged piles.

### 1.9.2 Reporting

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

### 1.10 DELIVERY, STORAGE AND HANDLING

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

## PART 2 MATERIALS

### 2.1 STEEL SHEET PILING

Steel for sheet piling shall conform to the requirements of ASTM A 572, Grade 50. Sheet piling, including special fabricated sections, shall be of the type and dimensions indicated on the drawings, and be of a design such that when in place they will be continuously interlocked throughout their entire length. All sheet piling shall be provided with standard pulling holes located approximately 4-inches below the top of the pile, unless otherwise shown or directed. Steel sheet piling shall be hot rolled and shall have the properties equivalent to those listed in the following table:

PROPERTIES OF SECTIONS

Type of section	Nominal web thickness (inches)	Section modulus (in <sup>3</sup> /ft of wall)	Moment of inertia (in <sup>4</sup> /ft of wall)	Nominal section depth (inches)	Minimum interlock strength (lbs/lin in)	theoretical driving width (inches)
PZ 22	0.375	18.1	84.4	9	N/A	22
PS 31	0.50	2.0	3.21	--	N/A	19.69

### 2.2 Sheet Piling Lengths

All new sheet piling shall be provided in full lengths.

### 2.3 Rolled Corners

Rolled corners, formed with new sheet piling, shall be of the types and dimensions shown on the drawings. Any proposed variations from the details shown on the drawings shall be submitted for approval of the Contracting Officer's Representative (COR). The sheet pile types shall be as required for the corners being manufactured and shall conform to the requirements of ASTM A 572 and all other requirements stated above for new piling.

### 2.4 Fabricated Sections

Fabricated sections, including special corners, transition piles and tee sections, shall conform to the requirements stated herein, the details shown on the drawings and the piling manufacturer's recommendations for fabricated sections. Metalwork fabrication for sheet piling sections shall conform to the requirements of Section 05501. Steel plates and angles used to fabricate the special sections shall conform to ASTM A 36.

## PART 3 EXECUTION

### 3.1 INSTALLATION

#### 3.1.1 Placing and Driving

##### 3.1.1.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be carefully located as shown on the drawings or directed by the Contracting Officer. Pilings shall be placed as true to line as possible. Suitable temporary wales, templates, or guide structures shall be provided to insure that the piles are placed and driven to the correct alignment. Piles shall be placed in a plumb position with each pile interlocked with adjoining piles for its entire length, so as to form a continuous diaphragm throughout the length of each run of piling wall. Interlocks shall be properly engaged. The Contractor's personnel shall not sit or place themselves on top of the sheet piling during the handling, installation, and removal of the piling.

##### 3.1.1.2 Driving

All piles shall be driven to the depths shown on the drawings and shall extend to the cut-off elevation indicated. A tolerance of 1½-inches above \*(or below) the indicated cut-off elevation will be permitted. Pilings shall be driven by approved methods so as not to subject the pilings to damage and to insure proper interlocking throughout their

lengths. Pile hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. A protecting cap shall be employed in driving, when required, to prevent damage to the tops of pilings. Pilings damaged during driving or driven out of interlock shall be removed and replaced. All piles shall be driven without the aid of a water jet, unless otherwise authorized. Adequate precautions shall be taken to insure that piles are driven plumb. Sheet piling shall not be driven more than 1/4-inch per foot out of plumb in the plane of the wall nor more than 1/8-inch per foot out of plumb perpendicular to the plane of the wall. If at any time the forward or leading edge of the piling wall is found to be out-of-plumb more than 1/4-inch per foot in the plane of the wall or 1/8-inch per foot perpendicular to the plane of the wall, the assembled piling shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures shall be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1 1/4-inch per foot of length. Unless specifically indicated otherwise, each run of piling wall shall be driven to grade progressively from the start and pilings in each run shall be driven alternately in increments of depth to the required depth or elevation. On each day of sheetpile driving, the Contractor shall stab only the number of piles that can be driven to grade by the end of the day, and all piling stabbed shall be driven to grade by the end of each working day except that the last two piles may remain tapered up to receive the next days piles. No pile shall be driven to a lower elevation than those behind it in the same run except when the piles behind it cannot be driven deeper or in areas where there will be wall penetrations or obstructions are encountered. In this case, piling will be allowed to remain above final grade until the obstruction is removed or the penetration is completed. Alternately, if it is determined that an obstruction cannot be removed, the Contractor shall make such changes in design alignment of the pile structure as may be deemed necessary by the Contracting Officer to insure the adequacy and stability of the structure. Payment for the additional labor and materials necessitated by such changes will be made at the applicable contract prices. If the piling next to the one being driven tends to follow below final grade, it may be pinned to the next adjacent piling. \*(The Contractor is advised that buried stumps or similar debris may be encountered periodically on the sheet pile wall alignment and appropriate consideration should be given to hard driving conditions should they occur.)\* Piles shall not be driven nor pulled within 100-feet of concrete less than 7 days old nor within 30- feet of concrete less than 28 days old.

### 3.1.2 Emergency Locking System on Pile Driving Head

All pile driving equipment shall be equipped so as to prevent piles from falling when a single or multiple power failure occurs after the pile driving head is attached to the pile. The jaws of vibratory hammers shall be equipped with devices such that upon loss of hydraulic pressure, the jaws will not release the pile.

### 3.1.3 Cutting Off and Splicing

Piles extending above grade in excess of the specified tolerance, and which cannot be driven deeper, shall be cut off to the required grade. The Contractor shall also trim the tops of piles excessively battered during driving, when directed to do so, at no cost to the Government. Cut-offs shall become the property of the Contractor and shall be removed from the worksite. Piles driven below the elevations indicated for the top of piles and piles which, because of damaged heads, have been cut off to permit further driving and are then too short to reach the required top elevation, shall be extended to the required top elevation by welding an additional length, when directed, without cost to the Government. Should splicing of additional lengths be necessary, the splice shall consist of an approved butt joint with a weld that fully penetrates the web. Welded extensions shall be a minimum of 6-inches in length. Piles adjoining spliced piles shall be full length unless otherwise approved. When piles are to be driven in sections and spliced together, they shall be delivered on site in full lengths and cut for splicing only after delivery. Only those portions of the originally uncut pile shall be spliced together to form the final in-place full-length pile. Splices for these piles shall conform to the details shown on the drawings. Welding of splices shall conform to the requirements of Section 05501. Ends of pilings to be spliced together shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips or camber at the abutting interlocks. Spliced pilings shall be free sliding and able to obtain the maximum swing with contiguous pilings. The Contractor may cut holes in the piles for bolts, rods, drains or utilities at locations and of sizes shown on the drawings or as directed. All cutting shall be done in a neat and workmanlike manner. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods, which will not damage the remaining metal. Holes, other than bolt holes, shall be reasonably smooth and of the proper size for rods and other items to be inserted.

#### 3.1.4 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be damaged or driven out of interlock shall be removed and replaced.

#### 3.1.5 Pulling and Redriving

The Contractor may be required to pull selected piles after driving, for test and inspection, to determine the condition of the piles. Any pile so pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed from the work and the Contractor shall furnish and drive a new pile to replace the damaged pile. Piles pulled and found to be in satisfactory condition shall be redriven.

#### 3.1.6 Void Backfill

Where voids adjacent to the steel sheet piling are induced by pile driving or pulling operations, the Contractor shall pump out all seepage and rain water and backfill with a tremie-placed slurry. The slurry shall consist of one part cement, two parts bentonite, and six parts sand mixed with enough water to produce a slurry viscous enough to thoroughly fill the voids.

### 3.1.7 Painting

Piling shall be painted as indicated on the drawings shall be done in accordance with Section 09940. The unpainted portion of sheet piling which are to be embedded in concrete shall be free from surface contaminants such as oil, loose particles, or similar debris that would prohibit bonding between the concrete and sheet piling.

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## SECTION 02501 - INCIDENTAL PAVING

### PART 1 GENERAL

#### 1.1 SCOPE

This section includes furnishing all material, labor and tools and equipment and performing all incidental paving including asphalt concrete overlay and asphaltic concrete roadway patching. Asphaltic concrete pavement shall conform to the requirements of Section 501 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition.

#### 1.2 MEASUREMENT

**Asphaltic concrete pavement patching with asphaltic binder course will be measured per ton. Asphaltic concrete wearing course will be measured by the ton.**

#### 1.3 PAYMENT

Payment for asphaltic concrete pavement patching will be made at the contract unit price per ton for "Asphaltic Concrete Binder Course Type 3 (Roadway Patching)". Payment for asphaltic concrete wearing course will be made at the contract unit price per ton for "Asphaltic Concrete Wearing Course". Price for those items shall constitute full compensation for furnishing all plant, labor, materials and equipment to cold plane existing asphaltic concrete pavement, and to construct the asphaltic binder course for pavement patching and to construct the asphaltic concrete wearing course of the roadway transitions.

#### 1.4 REFERENCES

The current issues of the publications listed below, but referred to thereafter by basic designation only, from a part of this specification to the extent indicated by the reference thereto:

TESTING PROCEDURES MANUAL LOUISIANA DEPARTMENT OF  
TRANSPORTATION AND DEVELOPMENT (LDOTD), VOLUME 2

TR 304	Percent Voids and Percent Voids Filled with Asphalt
TR 305	Marshall Stability

LOUISIANA STANDARD SPECIFICATIONS FOR  
ROADS AND BRIDGES (LSSRB), 2000 EDITION



Section 501	Asphaltic Concrete Mixtures
Section 503	Asphaltic Concrete Equipment and Processes
Section 504	Asphaltic Tack Coat
Section 505	Asphaltic Prime Coat
Section 507	Asphaltic Surface Treatment
Section 1019	Geotextile Fabrics and Geocomposite Systems
Section 1002	Asphaltic Materials

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

D698	Moisture Density Relations of Soils and Soil Aggregate Mixture
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### 1.5 QUALITY CONTROL

#### 1.5.1 General

The Contractor shall establish and maintain quality control for paving 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.

- (1) Check excavated and cold planned elevations. lines and grades.
- (2) Check asphaltic concrete and aggregate materials and job mix for compliance with control requirements and inspect the plan mixes in accordance with the applicable LDOTD specifications..
- (3) Verify the trench backfill is ready and compacted to receive the asphaltic concrete.
- (4) Check coverage rate of application of primer, tack coat .and paving material.

#### 1.5.2 Reporting

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

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Asphaltic Concrete Binder Course and Wearing Courses

Asphaltic concrete binder and wearing courses shall be Type 3 meeting the requirements of LSSRB 501.

#### 2.1.2 Asphaltic Tack Coat

Asphaltic tack coat shall be as specified in LSSRB 504, except that only cut back asphalt, Grade RC-70 or RC-250, shall be used.

#### 2.1.3 Asphaltic Prime Coat

Asphaltic prime coat shall be as specified in LSSRB 505, except that only cut back asphalt, Grade MC-30 or MC-70, shall be used.

### 2.2

2.2.1 Asphalt. Samples and testing will be handled at the Contractor's expense by an independent testing laboratory acceptable to the Contracting Officer. Inspection and testing services will be required for design and control of plant mixes (using Marshall method) and field density in order to determine compliance with specified provisions herein.

2.2.1 Testing Quality Control. At least one series of plant tests shall be conducted on every fifty tons or fraction thereof of asphalt run, or each day's run of lesser amount. Each series of tests shall consist of Marshall Stability and Flow (according to TPM TR 305) and Percent Voids (% Voids) and Percent Voids Filled with Asphalt (% VFA) (according to TPM TR 304), performed on 4 different samples. Briquettes shall be molded to be used in density tests computations. The results of these tests shall conform with the requirements of Table 1 in the LSSRB, Section 501 for Type 1 or 3 mix, respectively. The results shall be submitted to the Contracting Officer. In the event that the results show deviations from the standards, the Contractor shall be responsible for the necessary adjustments.

2.2.3 Testing for Acceptance. Upon completion of compaction, pavement samples shall be obtained within the area represented by that run, in accordance with LSSRB, Section 501.09. The density requirements for the average of the two samples will be as shown in Table 1 of LSSRB, Section 501.

## **PART 3 EXECUTION**

### **3.1 ASPHALTIC CONCRETE PATCH**

Subsequent to the installation of the drain line and compacting of the backfill material to 95% of maximum dry density at optimum moisture content in accordance with ASTM D 698, the asphaltic concrete patch as detailed on the drawing shall be constructed. The asphaltic concrete binder course, Type 3, shall be in accordance with LSSRB Section 501.

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SECTION 02520 - PORTLAND CEMENT CONCRETE PAVEMENT AND CURBS

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, materials, tools and labor for constructing portland cement concrete pavement including concrete roadway pavements, concrete sidewalks and driveways, incidental concrete, and concrete curbs. Included in this section is all placing and grading of the base course material, embankment material, granular base and topsoil, all as shown on the drawings and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 02221 – Selective Demolition.”

Section 02318 – Preparation of Roadway Pavement Subgrade and Roadway Excavation.

Section 02845 – Permanent Pavement Markings, Markers and Signing.

Section 03301 - Cast-In-Place Structural Concrete.

Section 02075 - Geotextile and Geogrid Reinforcement

1.3 MEASUREMENT AND PAYMENT

1.3.1 Concrete Roadway Pavement

**Measurement for concrete roadway pavement will be by the square yard. Payment for concrete roadway pavement will be at the contract unit price for “Portland Cement Concrete Pavement (9” Thick)”.**

1.3.2 Concrete Pavement

**Concrete pavement for driveways, sidewalks, handicap ramps and incidental pavement will be paid for at the concrete unit price per square yard under the following items:**

Concrete Sidewalk (4”) Including Reinforcement

Concrete Driveway (6”) Including Reinforcement

Sidewalk at Intersection including Handicap Ramps (6”) and Reinforcement

*NO  
MEASUREMENT*

Sidewalk in Median Including Handicap Ramps and Reinforcement

4" Incidental Concrete Pavement Including Reinforcement

1.3.3 Concrete Cubs

**Concrete curbs will be measured per linear foot. Payment will be made under the contract unit price per linear foot under the following items:**

Concrete Mountable Curb with or without Dowels (Straight, Circular or Depressed)

6" Concrete Barrier Curb with or without Dowels (Straight, Circular or Depressed)

1.3.4 Base Course

**Base course will be measured by the cubic yard (net section). Payment will be under the contract unit price per cubic yard for "Class II Base Course (Net Section)".**

1.3.5 Subbase Course

**Subbase course will be measured per cubic yard (net section). Payment will be under the contract unit price per cubic yard for "Subbase Course (Net Section)".**

1.4 REFERENCES

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

GENERAL SPECIFICATIONS FOR STREET PAVING (GSSP), 1995 EDITION, CITY OF NEW ORLEANS, DEPARTMENT OF PUBLIC WORKS. Note: Substitute all references to "Director" with "Contracting Officer."

C 203	Preparation of Roadway Pavement Subgrade
C 302	Base and Subbase Course
C 601	Portland Cement Concrete Pavement
C 706	Driveways and Sidewalks
C 707	Curbs and Gutters

C 723 Granular Material

C 743 Testing Laboratory Services

**LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES  
(LSSRB), 2000 EDITION, LOUISIANA DEPARTMENT OF  
TRANSPORTATION AND DEVELOPMENT (LDOTD)**

302 Class II Base Course

601 Portland Cement Concrete Pavement

706 Concrete Walks, Drives and Incidental Paving

707 Curbs and Gutters

715 Topsoil

1003 Aggregates

1005 Joint Materials for Pavements and Structure

1019 Geotextile Fabric and Geocomposite Systems

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

ASTM A 185 (1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement

ASTM A 615 (1996) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C 31 (1998) Making and Curing Concrete Test Specimens in the Field

ASTM C 33 (1999) Concrete Aggregates

ASTM C 39 (1999) Compressive Strength of Cylindrical Concrete Specimens

ASTM C 94 (2000) Ready-Mixed Concrete

ASTM C 136 (1996a) Sieve Analysis of Fine and Coarse Aggregates



ASTM C 143	(1998) Slump of Hydraulic Cement Concrete
ASTM C 150	(1999a) Portland Cement
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 231	(1997) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2000) Air-Entraining Admixtures for Concrete
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	(1999a) Chemical Admixtures for Concrete
ASTM C 618	(1999) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM D 75	(1997) Sampling Aggregates
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> )
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1994) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

CORPS OF ENGINEERS (COE)

COE 400	(1963) Water for Use in Mixing or Curing Concrete
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## 1.5 QUALITY CONTROL

### 1.5.1 Material Certification

The Contractor shall provide material documentation to certify that all materials conform to the requirements of these specifications.

### 1.5.2 Mix Design

The Contractor shall provide mix design for 3800 psi and 4200 psi concrete. The Contractor shall submit proposed mix design of each class of concrete to the Contracting Officer for review and approval prior to commencement of work.

### 1.5.3. Testing

#### 1.5.3.1 Base Course

The roadway base course shall be sampled and tested to determine compliance with the specifications. A sample of base course material shall be taken in accordance with ASTM D 75. A sieve analysis of the base material shall be made in accordance with ASTM C 136. Moisture-density relations shall be developed in accordance with ASTM D 698. Liquid limit and plasticity index for compacted subbase backfill material shall be determined in accordance with ASTM D 4318. In-place density tests for compacted subbase backfill material shall be made in accordance with ASTM D 2922 (Nuclear Method) or ASTM D 1556 (Sand Cone Method). Frequency of field density tests shall conform to GSSP C743.04(c).

#### 1.5.3.2 Concrete Pavement

The Government will sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75 and tested in accordance with ASTM C 136. Concrete will be sampled in accordance with ASTM C 172. When cylinders are molded, slump and air content will be determined in accordance with ASTM C 143 and ASTM C 231, respectively. Test samples for each class of concrete will be taken by the Contractor at least once every 8-hour shift or in accordance with the frequency specified in GSSP C743.02(c)(5), whichever requires more samples. From each sample, four compression test specimens will be made in accordance with ASTM C 31. Compression test specimens will be protected and cured while in the field in accordance with paragraphs 2.4.1 and 2.4.2 of ASTM C 31. If cylinders are not delivered to the testing laboratory within 24 to 48 hours after molding, they will be submerged in a water tank provided by the Contractor, where the surrounding water temperature is maintained by the Contractor at  $73.4 \pm 3$  degrees F. Cylinders will be

transported by the Contractor to the U.S. Army Corps of Engineers Engineering Division Materials Processing Unit with cushioning material and in accordance with ASTM C 31. Compression testing will be performed by the Government in accordance with ASTM C 39. Two cylinders will be tested at 7 days for information and two will be tested at 28 days for acceptance.

#### 1.5.4 Records

The Contractor shall maintain records of concrete items, including date, location of placement, quantity, air temperature and test samples taken.

### 1.6 ENVIRONMENTAL REQUIREMENTS

The Contractor shall not place concrete when base surface temperature is less than 40 degrees F or surface is wet or frozen.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Form Materials

Form Materials shall conform to GSSP C601.05.

#### 2.1.2 Reinforcement

Reinforcing steel shall conform to GSSP C601.04(g) (second one). Welded steel wire fabric shall be plain type unfinished flat sheets conforming to ASTM A 185. Dowels shall conform to GSSP C601.04(k).

#### 2.1.3 Concrete Materials

##### 2.1.3.1 Cement

shall conform to ASTM C 150, Type I or II, low alkali, except the maximum amount of  $C_3A$  in Type I cement shall be 15 percent.

##### 2.1.3.2 Fine Aggregate

Fine aggregate shall be clean natural sand conforming to ASTM C 33.

2.1.3.3 Coarse Aggregate

Coarse Aggregate shall be clean, hard, durable, gravel or crushed stone conforming to the requirements of ASTM C 33, Gradation No. 467 or 57.

2.1.3.4 Water

Water for mixing and curing shall be fresh, clean, drinkable and free of oil, acid, salt, sugar, or alkali, except that undrinkable water may be used if it meets the requirements of CRD-C 400.

2.1.3.5 Admixtures

2.1.3.5.1 Air-Entraining Admixtures

Air-Entraining Admixtures shall conform to the requirements of ASTM C 260. Acceptable air content range and testing methods shall conform to paragraph 03301-2.1.3.1.

2.1.3.5.2 Water Reducing Admixtures

Water Reducing Admixtures and Water Reducing, Retarding Admixtures shall conform to the requirements of ASTM C 494.

2.1.3.5.3 High Range Water Reducers

High Range Water Reducers (if used) shall conform to the requirements of ASTM C 494 Type F or G.

2.1.3.5.4 Fly Ash

Fly Ash shall conform to ASTM C 618, Class C, with the multiple factor and effectiveness in controlling Alkali-Silica reaction requirements of Table 3.

2.1.3.6 Joint Material

2.1.3.6.1 Expansion Joint Filler

Expansion joint filler shall conform to GSSP C601.04(f) (first one).

#### 2.1.3.6.2 Joint Sealants

Joint sealing compound shall be preformed elastomeric compression joint seals conforming to LSSRB 1005.03 for expansion joints, and shall be combination joint former/sealer conforming to LSSRB 1005.04 for contraction joints. All joint sealing compounds shall also conform to the applicable provisions of GSSP C601.04(g) (first one).

#### 2.1.3.7 Curing Compound

Curing compound shall conform to ASTM C 309, Type 2.

#### 2.1.4 Base Course

Base course under concrete roadway paving shall be crushed stone or crushed concrete in accordance with the drawings and LSSRB Section 302 and subsections 1003.03 (d) and 1003.03 (e)

#### 2.1.5 Geotextile

Geotextile for roadbed stabilization shall be in accordance with Section 2025.

#### 2.1.6 Embankment

Embankment material shall be in accordance with GSSP C723.02 and LSSRB 1003.07.

#### 2.1.7 Granular Subbase

Granular material under concrete pavement shall be in accordance with GSSP C723.02 and LSSRB 1003.07.

#### 2.1.8 Topsoil

Topsoil shall be in accordance with LSSRB 715.02. The source of topsoil will be inspected by the Contracting Officer to determine the acceptability of the topsoil.

### 2.2 CONCRETE PROPERTIES AND PROPORTIONS

Concrete properties and proportions shall conform to GSSP C601.07, except as amended herein.

#### 2.2.1 Proportioning

Mixture proportions (except for strength requirements), documentation of strength and standard deviation, and submittals shall conform to Section 03301.

## 2.2.2 Strength Criteria

### 2.2.2.1 Sidewalks

Sidewalks, 3000 psi at 28 days.

### 2.2.2.2 Roadways, Driveways, Curbs, Incidental Pavement

Roadways, driveways, and curbs 4000 psi at 28 days.

## 2.2.3 Accelerating Admixtures

The Contractor shall use non-chloride accelerating admixtures in cold weather only when approved by Contracting Officer. Use of admixtures will not relax cold weather placement requirements.

## 2.2.4 Set Retarding Admixtures

The Contractor shall use set retarding admixtures as required in 03301 only when approved by the Contracting Officer.

# PART 3 EXECUTION

## 3.1 EXECUTION

### 3.1.1 General

Except where modified hereinafter, construction of concrete pavement shall conform to GSSP C601, construction of driveways shall conform to GSSP C706.01, construction of sidewalks shall conform to GSSP C706.02, and construction of curbs shall conform to GSSP C707.

### 3.1.2 General Examination

Prior to placing of concrete the Contractor shall:

- (1) prepare the roadway pavement subgrade in accordance with GSSP C203.01 through C203.05 and place geotextile in accordance with GSSP C203.06,
- (2) verify compacted base is acceptable and ready to support paving and imposed loads,

- (3) verify gradients and elevations of base are correct,
- (4) moisten base to minimize absorption of water from fresh concrete,
- (5) coat surfaces of manhole catch basin and drop inlet frames with oil to prevent bond with concrete pavement, and
- (6) notify Contracting Officer 48 hours prior to commencement of concreting operations.

### 3.1.3 Base Course Placement

The Contractor shall prepare the underlying course by cleaning previously graded subgrade or underlying course of foreign substances. The Contractor shall correct ruts or soft yielding spots, areas having inadequate compaction and deviations of the surface from the requirements specified reshaping and recompacting the affected areas to line and grade, and to the specified density requirements. Grade control shall be maintained by means of grade stakes, steel pins or forms, spaced so that string lines or check boards may be placed between the stakes, pins or forms. Completed base courses shall conform to the lines, grades, cross sections and dimensions indicated on the drawings. The thickness of the base course shall be as indicated on the details of the drawings. The Contractor shall compact the base course using approved mechanical compaction equipment until it reaches a minimum of ninety-five percent (95%) density at or near optimum moisture content as determined in accordance with ASTM D 698.

### 3.1.4 Forming

Forming shall conform to GSSP C601.05. The Contractor shall:

- (1) place and secure forms to correct location, dimension, profile, and gradient,
- (2) assemble form work to permit easy stripping and dismantling without damaging concrete, and
- (3) place preformed expansion joint filler material at the locations shown on the drawings in straight lines. The expansion joint filler material shall be adequately secured to the form work to prevent movement during concrete placement.

### 3.1.5 Reinforcement

The Contractor shall:

- (1) submit for approval a reinforcement layout,
- (2) place reinforcement as indicated,
- (3) interrupt reinforcement at contraction and expansion joints, and
- (4) place dowel reinforcement to achieve pavement and curb alignment as detailed.

### 3.1.6 Placing Concrete

The Contractor shall place concrete roadway pavement in accordance with GSSP C601.09, driveways in accordance with GSSP C706.01 and sidewalks in accordance with GSSP C706.02 and curbs in accordance with GSSP C707. The Contractor shall ensure reinforcement, inserts, embedded parts, formed joints and are not disturbed during concrete placement. The Contractor shall place concrete continuously over the full width of the panel and between predetermined construction joints. The Contractor shall not break or interrupt successive placements such that cold joints occur.

### 3.1.7 Joints

Joints shall conform to GSSP C601.06, except as noted below. The Contractor shall:

- (1) submit for approval a joint layout,
- (2) place expansion, longitudinal and contraction joints as indicated on the drawings. Align curb, gutter, and sidewalk joints,
- (3) place preformed expansion joint filler between paving components and buildings or other appurtenances. Dowels shall not be used. The top of filler shall be recessed 1/4 inch for sealant placement. Sealant shall conform to the requirements of LSSRB 1005.03.
- (4) provide scored or sawed joints as indicated on the contract drawings between sidewalks and curbs. Depth of scoring or sawing shall be or at least 1/4 the thickness of the concrete, and
- (5) place joint filler in pavement placement sequence.



### 3.1.7.1 Joint Seal

Joints shall be cleaned and sealed in accordance with the drawings. The Contractor shall separate pavement from vertical surfaces with 3/4 inch thick joint filler. Combination joint filler/sealer shall be installed in at contraction joints in accordance with the drawings and LSSRB 601.09(c)(3).

### 3.1.8 Finishing

(1) Concrete roadway pavement shall be finished in accordance with GSSP C601.09.

(2) Driveway paving and curbs shall be finished in accordance with GSSP C706.01 and GSSP C707, respectively.

(3) Sidewalk paving shall be finished in accordance with GSSP C706.02.

### 3.1.9 Embankment

The Contractor shall place embankment material to the lines and grades shown on the drawings and compact as required.

### 3.1.10 Topsoil

The Contractor shall place approved topsoil material to the lines and depths shown on the drawings and compact as required.

## 3.2 OPENING FOR TRAFFIC

The roadway shall be opened for traffic once the concrete strength reaches its required strength or when approved by the Contracting Officer. No traffic shall be allowed on the pavement until all joints have been cleaned and sealed.

## 3.3 ACCEPTANCE CRITERIA

Concrete roadway pavement cores shall be taken in accordance with GSSP C601.12(a). If core thickness indicates pavement thickness is more than 0.2 inches below specified pavement thickness, or compression testing indicates that average concrete pavement compressive strength is less than 3,800 psi, the Contractor shall remove and replace the concrete roadway pavement at no additional expense to the Government.

### 3.4 CONCRETE MIXING AND DELIVERY

The Contractor shall mix and deliver concrete in accordance with ASTM C 94.

### 3.5 CURING AND PROTECTION

Concrete roadway pavement and concrete curbs shall be cured and protected in accordance with GSSP C 601.10 and GSSP C707, respectively. Concrete driveways and sidewalks shall be cured in accordance with GSSP C706. Immediately after placement, the Contractor shall protect pavement and curbs from premature drying, excessive hot or cold temperatures, and mechanical injury.

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## SECTION 02632 – STORM DRAINS

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials required to perform the operations for installation of catch basins and PVC pipe and adjustments to the existing drainage pipe system. The work specified herein includes installation of new pipe including excavation and backfill, installation of new catch basins, connecting to existing catch basins as shown on the drawings and all other incidental work necessary for the storm drainage. All work in this section shall be in accordance with Section C701, Supplemental Specification for Section C701, "Culverts and Storm Drains" (Revised) by the Sewerage and Water Board of New Orleans included in the appendix of these specifications.

#### 1.2 MEASUREMENT AND PAYMENT

**Storm drain pipes shall be measured per linear foot in place.** The length shall be determined by measuring from center to center of manholes or other subsurface drainage structures, square or round. **Wyes and fees shall be measured per each.** **Payment for installation of the drain lines and fittings will include all costs for excavation, bedding material, foundation lumber, engineering fabric, pipe installation, joining drain pipe to catch basins and manholes (existing or new), shoring, pumping as necessary, and placing and compacting backfill.** Price and payment will constitute full compensation for furnishing all plant, labor, materials and equipment to complete the work as specified herein and as shown on the drawings. **Payment for storm drains will be made under the following unit price items:**

- Reinforced Concrete Pipe (12")
- Reinforced Concrete Pipe (15")
- Reinforced Concrete Pipe (18")
- Reinforced Concrete Pipe (24")
- Reinforced Concrete Pipe (30")
- Reinforced Concrete Pipe (36")
- Reinforced Concrete Pipe (48")
- Reinforced Concrete Arch Pipe (28" x 18") or 24" Equivalent
- Reinforced Concrete Wye or Arch Equivalent New (12" x 15")
- Reinforced Concrete Wye or Arch Equivalent New (15" x 15")
- Reinforced Concrete Wye or Arch Equivalent New (12" x 18")
- Reinforced Concrete Wye or Arch Equivalent New (8" x 24")
- Reinforced Concrete Wye or Arch Equivalent New (12" x 24")
- Reinforced Concrete Wye or Arch Equivalent New (12" x 30")
- Reinforced Concrete Wye or Arch Equivalent New (12" x 36")
- Reinforced Concrete Wye or Arch Equivalent New (12" x 48")

Reinforced Concrete Wye or Arch Equivalent New (15" x 36")  
Reinforced Concrete Wye or Arch Equivalent New (15" x 48")  
Drain House Connections from New Drain Line to BOC

### 1.3 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)

M 145-91            The classification of Soils and Soil-Aggregate  
                         Mixtures for Highways Construction Purposes

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

ASTM D 448            (1986) Standard Classification for Sizes of Aggregate  
                         for Road and Bridge Construction

ASTM D 698            (1991) Laboratory Compaction Characteristics of Soil  
                         using Standard Effort (12,400 ft. – lbf/ff3)

ASTM D 2216            (1990) Laboratory Determination of Water (Moisture) Content  
                         of Soil and Rock

ASTM D 1556            (1990) Density of Soil in place by the Sand-Cone Method

ASTM D 2922            (1991) Density of Soil and Soil Aggregate in Place by Nuclear  
                         Methods (Shallow Depth)

ASTM D 3017            (1993) Water Content of Soil and Rock in Place by Nuclear  
                         Methods (Shallow Depth)

#### GENERAL SPECIFICATIONS BY THE SEWERAGE AND WATER BOARD OF NEW ORLEANS

C701                    Supplemental Specifications for Culverts and  
                         Storm Drains (Revised)

## 1.4 SUBMITTALS

### 1.4.1 Manufacturer's Recommendations

Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Contracting Officer prior to installation. Installation of the item will not be allowed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

### 1.4.2 Certification

Certified copies of test reports demonstrating conformance to applicable pipe specifications shall be delivered to the Contracting Officer before pipe is installed.

## 1.5 QUALITY CONTROL

### 1.5.1 General

The Contractor shall establish and maintain quality control for excavation and backfill, installing the drainage pipes and appurtenances. He/She shall maintain records of its quality control for all construction operations and checking materials to be used including, but not limited to the following:

- (1) Equipment. Type, size and suitability for construction of the prescribed work.
- (2) Submission of bedding and backfill samples for quality testing, if from other than approved sources.
- (3) Quality of materials meets the requirements specified.
- (4) Quality of materials delivered and placed each day.
- (5) Quality Assurance. The Contracting Officer may direct additional testing of material furnished to the worksite if the material appears, by visual inspection, to be of questionable gradation or quality.
- (6) Construction. Layout, maintaining existing drainage, thickness of layers, spreading and compacting.
- (7) Foundation Preparation. Surface preparation as required in advance of bedding construction, and during the bedding placement when necessary, and drainage of foundation.
- (8) Materials. Suitability.

(9) Grade and Cross Section. Width, side slopes, and grades.

(10) Grade Tolerances. Check bedding, pipe and backfill placement to determine if placement conforms to prescribed grades and cross section.

(11) Control Testing.

(a) Contracting Testing. The Contractor shall perform all control testing such as water content, control compaction curves, and in-place density. The contractor shall perform as a minimum, the specified number of each of the tests to demonstrate compliance with contract requirements to the satisfaction of the Contracting Officer. No additional payment will be made for control testing required in this paragraph. All cost in connection therewith shall be included in all associated bid items requiring testing. The Government approved testing agency or organization shall also perform control and compliance testing. The following tests are required to provide adequate control:

1. In Place Density Tests. In place density tests for compacted non-plastic bedding and backfill shall be made in accordance with ASTM D 1556 or ASTM D 2922, and shall be made at a frequency of a minimum of one density test per material per pipe structure. The location of the test shall be representative of the area being tested. The result of each in place density test shall be furnished to the Contracting Officer prior to placement of additional material in the area represented by the test.
2. Control Compaction Curves. Control compaction curves shall be established in accordance with ASTM D 698 (Standard Proctor Density Tests). Two control compaction curves will be required for each type of random material from each source.
3. Moisture Content Tests. Moisture content tests at each density test location shall be taken to assure compliance with requirements for fill placement within the design sections. Determination of moisture content shall be performed in accordance with ASTM D 2216 or ASTM D 3017, as applicable.
4. In addition to the above frequency of tests, additional tests are required as follows:
  - (a) Where the Contracting Officer has reason to doubt the adequacy of the compaction or moisture control.
  - (b) Where the Contractor is concentrating fill operations over a

relatively small area.

- (c) Where special compaction procedures are being used.
- (d) Areas not meeting the specified density shall be retested at no additional costs to the Government, after corrective measures have been applied.

### 1.5.2 Reporting

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

## 1.6 QUALITY OF WORK

- (1) All excavation and backfill required for adjustments to existing utilities shall conform to the applicable provisions of this section.
- (2) The elevations, slopes, and dimensions of the existing utilities shall not be changed unless directed by the Contracting Officer.
- (3) All work shall be inspected and approved by the Contracting Officer before covering with backfill.
- (4) The drain lines shall be located as shown on the drawings. Any deviation in routing shall be approved by the Contracting Officer in advance of placing these lines.

## 1.7 DELIVERY, STORAGE AND HANDLING

### 1.7.1 Delivery and Storage

Materials delivered to the site shall be inspected for damage, unloaded, and stored with a minimum of handling. Damaged materials will not be accepted. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight.



## 1.7.2 Handling

Materials shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

Gasket and plastic materials that are not to be installed immediately shall not be stored in the direct sunlight.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Bedding Materials

Bedding materials shall be pumped sand free of all roots, weed, clay lumps, and other deleterious materials and should have no more than 10% by weight of material passing a U.S. Standard No. 20 mesh sieve.

#### 2.1.2 Pipe

All storm drain pipe shall be reinforced concrete pipe (round or arch equivalent) in accordance with the supplemental specifications Section C701, Culverts and Storm Drains (Revised by the Sewerage and Water Board of New Orleans).

#### 2.1.3 Non Plastic Backfill

Backfill shall be select pumped sand material free of all wood, roots, clay lumps, and any other deleterious materials and should have no more than 10 percent (by weight) of material passing a U.S. Standard No. 200 mesh sieve.

#### 2.1.4 Timber

The timber foundation shall be rough cut No. 2 common yellow pine, oak, gum or equal and suitable for the purpose and shall be installed as shown on the Standard Drawings by the Sewerage and Water Board of New Orleans.

## PART 3 EXECUTION

### 3.1 EXCAVATED MATERIAL DISPOSAL

Excavated material shall be disposed of off-site in accordance with Section 01100, Paragraph 22 of these specifications.

## 3.2 BEDDING MATERIAL

Non plastic bedding material shall be placed in 6 inch layers and compacted by hand tamping.

## 3.3 PLACING

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering section so pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid in trench conditions or weather unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected by the Contracting Officer before backfilling, and those pipes damaged during placement shall be removed and replaced.

### 3.3.1 Pipe

Reinforced concrete pipe shall be received, stored, handled and installed strictly in accordance with the manufacturer's instructions.

#### 3.3.1.1 Laying Pipe

All pipes shall be laid true to alignment and grade in accordance with Section C701, Culverts and Storm Drains (revised) by the Sewerage and Water Board of New Orleans. Required horizontal or vertical deflection shall not exceed the maximum recommended by the pipe manufacturer. Each section of pipe and each fitting shall be examined for defects before lowering into the trench. Any defective or damaged material shall be rejected and removed from the work site. All pipe and accessories shall be carefully lowered into the trench in such a manner as to prevent damage. Under no circumstances shall pipe or accessories be dumped or dropped into the trench. Holes for couplings or bell holes shall be cut for all pipes regardless of type of pipe used. The barrel of the pipe shall rest evenly on the trench from end to end except for coupling or bell holes. If the trench bottom will not support the weight of the fitting, a foundation of select earth or crushed stone shall be installed. Holes shall be sufficiently large to allow proper makeup of joint so those joints do not support the pipe weight.

#### 3.3.1.2 Pipe Condition

All pipe and material shall be kept clean during and after laying. The Contracting Officer reserves the right to suspend pipe laying operations when unsuitable trench conditions exist.

### 3.4 JOINING PIPE

Pipe joints shall be constructed as specified in Section C701, Culverts and Storm Drains (revised) by the Sewerage and Water Board of New Orleans.

### 3.5 PIPE INSPECTION

The installation of drainage systems shall be inspected by the Contractor for compliance with approved plans and specifications. Any misaligned pipe or defective joints shall be corrected by the Contractor at no additional cost to the Government. Prior to final acceptance, the pipe shall be cleaned of all debris and soil.

### 3.6 NON PLASTIC BACKFILL

#### 3.6.1 Placement and Compaction

The non plastic backfill for the pipe trenches shall be placed and compacted to 95% maximum dry density in accordance with ASTM D 1557 in accordance with Section C701, paragraph C701.12 of the Supplemental Specification for Culverts and Storm Drains (Revised) by the Sewerage and Water Board of New Orleans. The backfill shall be placed in 12 inch layers and compacted with approved mechanical equipment or placed in layers not exceeding 3 feet and thoroughly flooded.

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SECTION 02717 – COLD PLANING ASPHALT PAVEMENT

PART 1 GENERAL

1.1 SCOPE

This work consists of removing asphaltic concrete surfacing by cold planing in accordance with Section C509 of the GSSP.

1.2 MEASUREMENT

Measurement will be made by the square yard of asphaltic concrete surfacing satisfactorily removed.

1.3 PAYMENT

Payment for cold planing asphaltic pavement will be made at the contract unit price per square yard for "Cold Planing Asphaltic Concrete Pavement (Avg. 2.5" Thick)".

1.4 REFERENCES

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS  
AND BRIDGES (LSSRB), 2000 EDITION,  
LOUISIANA DEPARTMENT OF TRANSPORTATION  
AND DEVELOPMENT (LDOTD)

509 Cold Planing Asphaltic Pavement

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.1 EXECUTION

3.1.1 General

All work required for cold planing the existing asphaltic pavement shall be in accordance with Section C509 of the GSSP.

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## SECTION 02722 – DRAINAGE STRUCTURES

### PART 1 GENERAL

#### 1.1 SCOPE

The work provided for in this section consists of the construction of drainage structures (drop inlets, catch basins, manholes, etc.), and adjustment of existing drainage structures (manholes, catch basins, etc.) all in accordance with these specifications and drawings. Unless otherwise shown, drop inlets, and manholes shall be constructed in accordance with General Specifications and Standard Plans of the Sewerage and Water Board of New Orleans and the General Specifications for Street Paving, 1995 Edition, City of New Orleans, Department of Public Works.

#### 1.2 REFERENCES

The following publications are specified for the placement and testing of the bedding materials. The issues listed below, but referred to thereafter by basic designation only, form a part of this specifications to the extend indicated by the references thereto:

**GENERAL SPECIFICATIONS AND STANDARD PLANS OF THE SEWERAGE AND WATER BOARD OF NEW ORLEANS**

**GENERAL SPECIFICATIONS FOR STREET PAVING (GSSP), 1995 EDITION  
CITY OF NEW ORLEANS DEPARTMENT OF PUBLIC WORKS,  
NOTE: Substitute all references to "Director" with "Contracting Officer".**

**C702 MANHOLES, CATCH BASINS, DROP INLETS AND  
CLEANOUTS**

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

**ASTM D 698-91 Test Methods for Moisture-Density Relations of Soils  
and Soil-Aggregate Mixtures, Using 5.5-lb. Rammer  
and 12-in.**

### 1.3 MEASUREMENT AND PAYMENT

#### 1.3.1 Standard Drain Manholes

**Manholes will be measured per foot of vertical height. Payment will be made under the contract unit price per foot of vertical height under the following items:**

- No. 1 Standard Drain Manhole
- No. 2 Standard Drain Manhole
- No. 3 Standard Drain Manhole

#### 1.3.2 Special Drain Manhole

**Special drain manholes will be measured per each. Payment will be made under the contract unit prices per each for "Special Drain Manhole" and "Special Conflict Manhole".**

#### 1.3.3 Catch Basins and Drop Inlets (New and Adjusted)

**New catch basins and inlets and existing catch basins and inlets to be adjusted will be measured for payment per each. Payment will be made at the contract unit price bid per each for the following items:**

- Special Drain Manhole
- Special Conflict Manhole
- No. 1 Standard Catch Basin
- Double No. 1 Catch Basin
- No. 2 Standard Catch Basin
- 24" x 30" Clear Opening Standard Drop Inlet
- Single Mountable Catch Basin
- Type "A" Catch Basin Adjustment
- Adjust Manhole or Drop Inlet up to 6" with Brick and Mortar
- Adjust Manhole or Drop Inlet over 6" with Brick and Mortar

## PART 2 PRODUCTS

### 2.1 MATERIALS

Brick structures or cast-in-place structures shall be permitted for the manholes and drop inlets.

### 2.2 CONCRETE

Concrete shall be in accordance with Section 03301 of these specifications.

### 2.3 BEDDING



Bedding for drainage structures shall be twelve (12) inch thick compacted in-place layer of crushed concrete or crushed stone in accordance with GSSP, 1995 Edition, C302.03(d) and C302.03(e) respectively.

## 2.4 BACKFILL

Backfill shall be select granular material. The select granular materials, shall be non-plastic and free of all wood, roots, clay lumps, and any other deleterious materials, with at least 75 percent passing the No. 4 sieve, and shall not contain more than 10 percent (by weight) of material passing a U.S. Standard No. 200 mesh sieve.

## 2.5 GRATES

Grates and Frames shall be in accordance with the General Specifications and Standard Drawings of the Sewerage and Water Board of New Orleans.

# PART 3 EXECUTION

## 3.1 INSTALLATION.

### 3.1.1 Drainage Structures

Work for drainage structures shall be done in accordance with the specifications, drawings, and Section C702 of the GSSP, 1995 Edition. The outside and inside faces of all drainage structures shall be plastered with a coat of mortar one-quarter (1/4") inch thick. All details for drainage structures construction shall be in accordance with the Standard Drawings of the Sewerage and Water Board of New Orleans. Bricks must be laid in full, close, shove joints or mortar, according to the best work standards. Castings shall be properly set in mortar to grade as shown on the drawings. Bells shall be set into the masonry to provide a hinged joint at all pipe entrances. After drain lines are in place, the Contractor shall install all drainage structures to dimensions and grades shown on the drawings. A minimum of 24 hours after concrete is poured, forms may be removed and backfilling operations may commence. Granular backfill shall be placed around the completed structures in 12 inch layers and compacted to 95 percent of maximum density in accordance with ASTM D 698-91.

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## SECTION 02830 - CHAIN LINK FENCING AND GATES

### PART 1 GENERAL

#### 1.1 SCOPE

This section covers the furnishing of all materials, labor, tools and equipment and performing all work required to install a totally new galvanized coated chain link safety fence and gates as located and detailed on the drawings and as specified herein. The work also includes relocation of the safety fence to accommodate all phases of construction.

#### 1.2 MEASUREMENT AND PAYMENT

**New chain link safety fencing and gates will not be measured for payment. Payment will be made at the contract lump sum price for "Chain Link Safety Fencing and Gates".** Price and payment shall constitute full compensation for furnishing all plant, labor, material, and equipment for relocating the fence to accommodate construction and construction of chain link safety fence and gates as described in these specifications and as shown on the plans.

#### 1.3 REFERENCES

##### CHAIN LINK FENCE MANUFACTURER'S INSTITUTE (CLFMI)

Fence & Fabric	Standard Guide for Metallic-Coated Steel Chain Link
and Accessories	Industrial Steel Guide for Fence Rails, Posts, Gates

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

ASTM A 121	(1992a) Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 392	(1991b) Zinc-Coated Steel Chain Link Fence Fabric
ASTM C 150	(1994) Portland Cement
ASTM F 567	(1993) Installation of Chain Link Fence
ASTM F 626	(1991) Fence Fittings

ASTM F 669 (1992) Strength Requirements for Metal Posts and Rails for Industrial Chain Link Fence

ASTM F 1083 (1993) Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Use

ASTM F 1234 (1993) Protective Coatings for Steel Framework on Fences

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (LSSRB), 2000 EDITION

Section 901 Portland Cement Concrete for Minor Structures

1.4 SYSTEM DESCRIPTION

Chain link fencing system shall be comprised of all or a combination of post (terminal and intermediate), post with mounting plate, fencing, gate framework and fabric, braces, rails, stretcher bars, truss rods, tension wire, tension bars, gate rollers, gate latches, gate stops, gate keepers, post caps, stretcher bar bands, cross bracing wires or posts, clips, post extension arms and barbed wire.

1.5 SUBMITTALS

The Contractor shall submit for information only, manufacturer's detailed technical data and specifications for materials, fabrication and installation. Include catalog cuts for gate hardware, post caps and extension arms.

1.7 QUALITY CONTROL

The Contractor shall provide chain link fences and gates as complete units produced by a single manufacturer including necessary erection accessories, fittings and fastenings.

1.8 SEQUENCING AND SCHEDULING

The Contractor shall install the safety fence system prior to commencing work. The fence system shall be removed and relocated as required to accommodate the construction phases.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fabric

Fabric shall comply with CLFMI "Standard Guide for Metallic-Coated Steel Chain Link Fence and Fabric", "Standard Industrial Usage" latest standards.

Mesh Size: Two (2) in. Mesh; 34½ Diamond Count; 96 inches High with Twisted Edges.

#### 2.1.2 Fence Rails, Posts, Gates and Accessories

Fence framework and accessories shall comply with CLFMI "Industrial Steel Guide for Fence Rails, Posts, Gates, and Accessories", and shall be as specified below and conform to the latest requirements of ASTM F 626; F 669; and F 1234:

Line Posts: Type I, round  
2.375 inch O.D. (3.65 lbs. per ft.)  
End Corner or Pull Posts: Type I, round  
2.375 inch O.D. (3.65 lbs. per ft.)  
Gates Frames: Type I, round  
2.375 inch O.D. (3.65 lbs per ft.)

The Contractor shall provide steel elbow riveted joints with 5/16 inch minimum nominal diameter truss rods. Gates may be welded only if galvanized after fabrication.

Top Rail and Post Braces: 2.375 inch O.D. (3.65 lbs. per ft.).

The Contractor shall provide top rail on all fencing.

#### 2.1.3 Post Anchorage

See details on the drawings.

#### 2.1.4 Barb Wire

Three closely twisted strands of 12½ gauge steel wire with 4-point barbs space on 5-inch centers; hot dip galvanized after fabrication, minimum coating to be 1.2 oz. per square foot of wire surface.

#### 2.1.5 Extension Arms

Line post extension arms shall be capable of withstanding a minimum down pull weight of 450 lbs. from end of arm, and shall be made of pressed steel or malleable iron base with pressed steel extension riveted and hot dip galvanized after assembly. Retaining wire shall not be hot dip galvanized.

### PART 3 EXECUTION

## 2.2 EXAMINATION

The Contractor shall examine the conditions under which the fence and gates are to be installed, and shall not proceed with the work until unsatisfactory conditions have been corrected.

## 2.3 INSTALLATION

The Contractor shall install fencing in accordance with ASTM F567 and as follows:

### 2.3.1 Setting Posts

Check each post for vertical and top alignment, and hold in position during placement and finishing operations. In places where the fence system is located in existing roadways, the existing pavement shall be removed as required to install the concrete foundation and set the posts.

### 2.3.2 Post Spacing

Posts shall be spaced as shown on the drawings.

### 2.3.3 Top Rails

Run rail continuously through post caps. Provide expansion couplings as recommended by fencing manufacturer.

### 2.3.4 Brace Assemblies

Install braces so posts are plumb when diagonal rod is under proper tension.

### 2.3.5 Tension Wire

Install tension wires by weaving through the fabric and tying to each post with not less than 6 ga. galvanized wire, or by securing the wire to the fabric.

### 2.3.6 Fabric

Leave approximately two (2) inches between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

### 2.3.7 Stretcher Bars

Thread through or clamp to fabric 4 inches o.c., and secure to post with metal bands spaced 15 inches o.c.

### 2.3.8 Gates

Install gates plumb, level, and secure for full opening without interference. Install anchors as shown on the drawings. Adjust hardware for smooth operation and lubricate where necessary. The swing gate hinges shall accommodate a 180° rotation.

### 2.3.9 Tie Wires, Line Post

Use U-shape wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two (2) full turns. Bend wire to minimize hazard to persons or clothing.

### 2.3.10 Fasteners

Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

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SECTION 02922 - FERTILIZING AND SLAB SODDING

PART 1 GENERAL

1.1 SCOPE

The work provided for herein consists of furnishing all plant, labor, equipment, and materials, and performing all operations necessary for finished dressing, fertilizing and slab sodding areas as specified herein and as indicated on the drawings. Slab sodding shall be in accordance with Section 714 and fertilizing in accordance with Section 718 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition.

1.2 RESERVED

1.3 MEASUREMENT AND PAYMENT

**Measurement for fertilizer and slab sodding will be by the square yard along the surface of completed sodding. There will be no measurement for water.**

**Payment for fertilizer and slab sodding will be made under the contact unit price for "Fertilizing" and "Slab Sodding" and shall include water.**

1.4 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.

LOUISIANA STANDARD SPECIFICATIONS  
FOR ROADS AND BRIDGES, 2000 EDITION (LSSRB)

714	Slab Sodding
718	Fertilizer and Agricultural Lime

1.5 SUBMITTALS

The Contractor shall submit the following items in accordance with the General Provision entitled Section 01330, "SUBMITTAL PROCEDURES".

### 1.5.1 Fertilizer

Duplicate signed copies of invoices from suppliers shall be furnished. Invoices shall show quantities and percentage of nitrogen, phosphorus, and potash. Upon completion of the project, a final check of the total quantity of fertilizer used will be made against total area treated, and if minimum rates of application have not been met, an additional quantity of material sufficient to make up the minimum application rate shall be distributed as directed.

### 1.5.2 Sod

The Contracting Officer shall be furnished duplicate signed copies of statements certifying that each slab of sod delivered is at least equal to the requirements specified in paragraph 2.1.3. This certification shall be obtained from the supplier and shall be furnished on or with all copies of slab sod.

## 1.6 QUALITY CONTROL

### 1.6.1 General

The Contractor shall establish and maintain quality control for finished dressing, fertilizing, and slab sod operations and shall maintain records of his quality control for all construction operations including, but not limited to, the following:

#### (1) Preparation of Ground Surface

Location and quality of finished dressing, including necessary clearing, filling, or dressing out of washes, smoothness and uniformity of surfaces, and time of year.

#### (2) Fertilizing

Quality of materials. Areas fertilized quantity applied, and method of application.

#### (3) Slab Sod

Quality and type of slab sod and area covered.

#### (4) Maintenance and Repair

Location and type of maintenance problems and remedial treatment performed.

### 1.6.2 Reporting

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

## 1.7 AREAS TO BE TREATED

Fertilizing and slab sodding shall be performed on areas designed on the plans.

## 1.8 COMMENCEMENT, PROSECUTION, AND COMPLETION

### 1.8.1 General

Preparation of the ground surface and slab sodding shall be in accordance with Section 714 of the LSSRB. Fertilizing shall be in accordance with Section 718 of the LSSRB.

### 1.8.2 Sequence of Work

The sequence of operations for work prescribed in this section, except mowing, shall be as follows:

- (1) Preparation of Ground Surface, Including Pulverizing.
- (2) Fertilizing.
- (3) Slab Sodding.
- (4) Rolling and Watering.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Fertilizer

Fertilizer shall be uniform in composition and free flowing. The fertilizer shall meet the requirements for commercial fertilizer and shall contain, per acre, 60 pounds of available nitrogen, 60 pounds of available phosphorous, and 60 pounds of available potash. The fertilizer shall be delivered to the site in bags or other convenient containers or delivered in bulk. If delivered in bags or containers, the fertilizer shall be fully labeled in accordance with the applicable state fertilizer laws and shall bear the name, tradename or trademark, and warranty of the producer. Should the commercial fertilizer be furnished in bulk, the Contractor shall furnish certified weight tickets and a certified quantitative analysis report, in triplicate, from a recognized testing laboratory certifying the nutrient ratio of the materials.

### **2.1.2 Soil for Repairs**

For fill of areas to be repaired, soil shall be of a quality at least equal to that which exists in areas adjacent to the area to be repaired. Soil used shall be relatively free from roots, stones, and other materials that hinder grading, planting, and maintenance operations and shall be free from objectionable weed seeds and toxic substances.

### **2.1.3 Slab Sod**

Slab sod shall be either field grown grass or nursery grown grass in accordance with Section 714 of LSSRB.

## **PART 3 EXECUTION**

### **3.1 PREPARATION OF GROUND SURFACE**

#### **3.1.1 General**

Equipment, in good condition, shall be provided for the proper preparation of the ground and for handling and placing all materials. Equipment shall be approved by the Contracting Officer before work is started.

#### **3.1.2 Clearing**

Prior to grading and tilling, vegetation and debris that may interfere with fertilizing and slab sod operations shall be mowed, grubbed, and raked; and shall be disposed of satisfactorily, as specified in Section 02231-3.4.

#### **3.1.3 Grading**

Previously established grades and slopes shall be maintained in a true and even condition on the areas to be fertilized and slab sodded. Necessary repairs to previously graded areas shall be repaired. Where grades have not been established, the areas shall be graded as shown, or as directed by the Contracting Officer, and all surfaces shall be left in a true and even condition.

#### **3.1.4 Pulverizing**

Areas to receive slab sodding shall be pulverized to a depth of at least 3 inches in accordance with Section 714 of the LSSRB.

### **3.2 APPLICATION OF FERTILIZER**

Fertilizer, as specified in paragraph 2.1.1, shall be distributed uniformly over areas to be sodded.

### **3.3 SLAB SODDING**

#### **3.3.1 General**

Slab sod shall be handled, cut, planted, rolled and watered in accordance with Section 714 LSSRB.

#### **3.3.2 Damage to Sodding**

The Contractor shall be fully responsible for any damage to the sodded areas caused by his operations. Areas that become damaged as a result of poor workmanship or failure to meet the requirements of the specifications may be ordered repaired and reseeded to specification requirements, without additional cost to the Government.

### **3.4 MOWING**

The sodded areas shall be mowed with approved mowing equipment to a height of 3 to 4-inches whenever the height of vegetation becomes 6 to 8-inches. When the amount of cut grass is heavy, it shall be removed to prevent destruction of the underlying turf. The Contractor shall perform periodic and final grass mowing within the limits of work for the duration of this contract.

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## SECTION 02923 – LANDSCAPING

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered under this section consists of furnishing all plant, equipment, labor and materials and performing all operations in connection with tree protection, trimming, and pruning. All work shall be in accordance with Section 719 of the GSSP.

#### 1.2 MEASUREMENT

**Landscaping items shall be measured as follows:**

1.2.1 Tree protection shall be measured per each.

1.2.2 Tree trimming shall be measured per lump sum.

1.2.3 Root pruning shall be measured per each.

#### 1.3 PAYMENT

**Payment will be made at the contract unit price under:**

1.3.1 Tree protection.

1.3.2 Tree trimming.

1.3.3 Root pruning.

#### 1.4 REFERENCES

GENERAL SPECIFICATIONS FOR STREET PAVING (GSSP), 1995 EDITION, CITY OF NEW ORLEANS DEPARTMENT OF PUBLIC WORKS; NOTE: Substitute all references to "Director" with Contracting Officer.

C719

Landscaping

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS  
AND BRIDGES (LSSRB), 2000 EDITION,  
LOUISIANA DEPARTMENT OF TRANSPORTATION  
AND DEVELOPMENT (LDOTD)

719

Landscaping

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.1 EXECUTION

3.1.1 General

All work required for tree protection, tree trimming and root pruning shall be in accordance with Section C719 of the GSSP.



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## SECTION 03101 - FORMWORK FOR CONCRETE

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all materials and equipment and performing all labor for the forming of concrete in the structures included in these specifications.

#### 1.2 RELATED WORK SPECIFIED ELSEWHERE

Cast-In-Place Structural Concrete, Section 03301

Reinforcing Steel, Section 03210

Expansion Joints, Section 03150

Strip Seal Joints, Section 03151

Contractor Quality Control, Section 01451

#### 1.3 REFERENCES

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

##### ACI INTERNATIONAL (ACI)

ACI 347R (1994) Guide for Formwork for Concrete

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

ASTM C 29 (1997) Bulk Density (Unit Weight) and Voids in Aggregate

ASTM C 31 (2000) Making and Curing Concrete Test Specimens in the Field

ASTM C 39 (2001) Compressive Strength of Cylindrical Concrete Specimens

ASTM C 1074 (1998) Estimating Concrete Strength by the Maturity Method

ASTM C 1077

(2002) Laboratories Testing Concrete and Concrete  
Aggregates for Use in Construction and Criteria for  
Laboratory Evaluation

**DEPARTMENT OF COMMERCE (DOC)**

DOC PS 1

(1983) Construction and Industrial Plywood

**DEPARTMENT OF TRANSPORTATION & DEVELOPMENT  
STATE OF LOUISIANA (LDOTD)**

Louisiana Standard Specifications for Roads and Bridges

**1.4 MEASUREMENT AND PAYMENT**

No separate measurement or payment will be made for formwork and all costs in connection therewith shall be included in the contract prices for the items of work to which the work is incidental.

**1.5 DESIGN REQUIREMENTS**

The design, engineering, and construction of the formwork shall be the responsibility of the Contractor. The formwork shall be designed for anticipated live loads, lateral loads, and environmental loads per AC 347, Chapter 2. The shop drawings shall include the design value of live load, rate of placement, temperature, height and drop off concrete; weight of moving equipment which may be operated on the formwork and camber diagram. The formwork shall comply with the tolerances specified in Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE, paragraph CONSTRUCTION TOLERANCES. However, for surfaces with an ACI Class A surface designation, the allowable deflection for facing material between studs, for studs between walers and walers between bracing shall be limited to 0.0025 times the span. The formwork shall be designed as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others. The adequacy of formwork design and construction shall be monitored prior to and during concrete placement as part of the Contractor's approved Quality Control Plan.

**1.6 SUBMITTALS**

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

**1.6.1 Materials; GA**

Manufacturer's literature shall be submitted for plywood, concrete form hard board, form accessories, prefabricated forms, form coating, and form-lining materials.

#### 1.6.2 Shop Drawings, GA

Drawings and design computations for all formwork required shall be submitted at least 45 days either before fabrication on site or before delivery of prefabricated forms. If reshoring is permitted, the method, including location, m order, and time of erection and removal shall be submitted for review. The drawings shall be approved by Professional Engineer licensed in the State of Louisiana.

#### 1.6.3 Inspection, FIO

The Contractor shall submit field inspection reports for concrete forms and embedded items.

##### 1.6.3.1 Formwork Not Supporting the Weight of Concrete; GA

If forms are to be removed in less than 24 hours on formwork not supporting the weight of concrete, the evaluation and results of the control cylinder tests shall be submitted to and approved before the forms are removed.

### 1.7 SHOP DRAWINGS

The shop drawings and data submitted shall include the type, size, quantity, and strength of all materials of which the forms are made, the plan for jointing of facing panels, details affecting the appearance, and the assumed design values and loading conditions.

### 1.8 QUALITY CONTROL

#### 1.8.1 General

Forms, embedded items, ties and other accessories as specified in paragraph 2.2, shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that they are ready to receive concrete. Inspection of forms for concrete shall include a detailed evaluation of leakage control measures, type and application of release agent, and form cleanliness to avoid dirt transfer to the concrete.

#### 1.8.2 Reporting

The results of each inspection shall be reported in writing and shall include, but not be limited to, the following:

- (1) Removal of extraneous material from forms.

- (2) Check of joints for mortar tightness.
- (3) Type of form material required for the concrete finish.
- (4) Falsework and/or bracing.
- (5) Alignment, tolerances, and dimensions.
- (6) Chamfering.
- (7) Form coating.

The original and two copies of these reports, as well as corrective action taken, shall be furnished to the Government daily. The format of these reports shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

#### **2.1.1 Forms and Form Liners**

Forms and form liners shall be fabricated with facing materials that will produce a finish meeting the specified construction tolerance requirements and the following surface classifications as defined in ACI 347R.

##### **2.1.1.1 Class "A" Finish**

This class of finish shall apply to all exterior formed surfaces and extend 6 inches below final grade. The form facing material shall be composed of new, well-matched tongue and groove lumber or new plywood panels conforming to NIST Product Standard PS-1, Grade B Concrete Form, Class I; High Density Overlay, all Exterior Type. The Grade B Side shall be stamped as such and shall face the concrete.

##### **2.1.1.2 Class "B" Finish – Not Used**

##### **2.1.1.3 Class "C" Finish –Not Used**

##### **2.1.1.4 Class "D" Finish**

This class of finish shall apply to all unexposed surfaces. The form facing may be of wood or steel.

#### **2.1.2 Form Coating**

Form coating shall be commercial formulation that will not bond with, stain, cause deterioration, or any other damage to concrete surfaces. The coating 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. If special form liners are to be used, the Contractor shall follow the recommendation of the form coating manufacturer.

## 2.2 ACCESSORIES

Ties and other similar form accessories to be partially or wholly embedded in the concrete shall be of a commercially manufactured type. After the ends or end fasteners have been removed, the embedded portion of metal ties shall terminate not less than 2 inches from any concrete surface either exposed to view or exposed to water. Plastic snap ties may be used in locations where the surface will not be exposed to view. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete. Safety factors for form ties, anchors and hangers shall comply with the standards of ACI 347R, Table 2.4. The use of tapered ties is not allowed.

## PART 3 EXECUTION

### 3.1 INSTALLATION

#### 3.1.1 Form Construction

Forms shall be constructed true to the structural design and required alignment. The form surface and joints shall be mortar tight and supported to achieve safe performance during construction, concrete placement, and form removal. The Contractor shall continuously monitor the alignment and stability of the forms during all phases to assure the finished product will meet the required surface class specified in paragraph FORMS AND FORM LINERS and tolerances specified in paragraph DESIGN REQUIREMENTS. Failure of any supporting surface either due to surface texture, deflection or form collapse shall be the responsibility of the Contractor as will the replacement or correction of unsatisfactory surfaces. When forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be re-used if there is any evidence of defects which would impair the quality of the resulting concrete surface. All surfaces of used forms shall be cleaned of mortar and any other foreign material before reuse.

#### 3.1.2 Chamfering

All exposed joints, edges and external corners shall be chamfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. Chamfered joints shall not be permitted where earth or rockfill

is placed in contact with concrete surfaces. Chamfered joints shall be terminated twelve inches outside the limit of the earth or rockfill so that the end of the chamfers will be clearly visible.

### 3.1.3 Coating

Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The use of waste oil or used oil as a form-release agent or form oil is prohibited. The coating shall be used as recommended in the manufacturer's instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that, in cold weather when freezing temperatures are anticipated, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete. Coatings that discolor concrete or are incompatible with the concrete materials are prohibited.

## 3.2 FORM REMOVAL

Forms shall not be removed without approval. The minimal time required for concrete to reach a strength adequate for removal of formwork without risking the safety of workers or the quality of the concrete depends on a number of factors including, but not limited to, ambient temperature, concrete lift heights, type and amount of concrete admixture, and type and amount of cementitious material in the concrete. It is the responsibility of the Contractor to consider all applicable factors and leave the forms in place until it is safe to remove them. In any case forms shall not be removed unless the minimum time or minimum compressive strength requirements below are met, except as otherwise directed or specifically authorized. When conditions are such as to justify the requirement, forms will be required to remain in place for a longer period. All removal shall be accomplished in a manner which will prevent damage to the concrete and ensure the complete safety of the structure. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements. Form removal shall be scheduled so that all necessary repairs can be performed as specified in Section 03301, paragraph 3.43. Evidence that concrete has gained sufficient strength to permit removal of forms shall be determined by tests on control cylinders. All control cylinders shall be stored in the structure or as near the structure as possible so they receive the same curing conditions and protection methods as given those portions of the structure they represent. Control cylinders shall be removed from the molds at an age of no more than 24 hours. All control cylinders shall be prepared and tested in accordance with ASTM C 31 and ASTM C 39 at the expense of the Contractor by an independent laboratory that complies with ASTM C 1077 and shall be tested within 4 hours after removal from the site

### 3.2.1 Formwork Not Supporting Weight of Concrete

Formwork for walls, columns, sides of beams, gravity structures, and other vertical type formwork not supporting the weight of concrete shall not be removed in less than 24 hours after concrete placement is completed. Form removal before 24 hours will be allowed for simple floor slab, sidewalks, and driveways provided the ambient temperature during this period has not fallen below 50 degrees F at any time since placement and evidence from compressive tests on field-cured concrete control cylinders indicates that the concrete has attained a compressive strength of at least 500 psi. Control cylinders shall be prepared for each set of forms to be removed before 24 hours. The stability of the concrete shall be evaluated by a structural engineer prior to removal of the forms.

### 3.2.2 Formwork Supporting Weight of Concrete

Formwork supporting weight of concrete and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported concrete may be subjected. As a minimum, forms shall be left in place until control concrete test cylinders indicate evidence the concrete has attained at least 75 percent of the compressive strength required for the structure in accordance with the quality and location requirements of Section 03301, paragraph 1.71.

### 3.3 INSPECTION OF CONCRETE PLACEMENT

The Contractor shall place the first monolith in its entirety and remove the formwork as indicated in paragraph 3.2 prior to placing concrete in any other monolith. The Contractor shall notify the Contracting Officer's representative immediately after the forms are removed so that an on-site inspection of the concrete work can be made. Curing operations shall not be altered. Recommendations, as a result of the inspection, shall be made part of the Contractor's Quality Control for all future concrete work.



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EXPANSION AND CONSTRUCTION JOINTS AND WATERSTOPS IN CONCRETE

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SECTION 03150 -  
EXPANSION AND CONSTRUCTION JOINTS AND WATERSTOPS IN  
CONCRETE

PART 1 GENERAL

1.1 SCOPE

This section covers the materials, techniques and workmanship requirements for forming expansion and construction joints and waterstop joints in concrete.

1.2. RELATED WORK SPECIFIED ELSEWHERE

Major requirements for concrete work are specified in Section 03301, "CAST-IN-PLACE STRUCTURAL CONCRETE".

1.3 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)

C 920-01 (2002)	Elastomeric Joint Sealants
D 1752-84 (1996)	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
D 2628-91 (1998)	Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
D 2835-89 (1998)	Lubricant for Installation of Preformed Compression Seals in Concrete Pavements

## CORPS OF ENGINEERS (COE)

CRD-C 513-74 Rubber Waterstops

CRD-C 572-74 Polyvinylchloride Waterstop

### 1.4 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for expansion joints and waterstops as specified in this section. All costs in connection therewith shall be included in the contract prices for the items to which the work is incidental thereto.

### 1.5 SUBMITTALS

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

1.5.1 Premolded Expansion Joint Filler Strips; FIO

1.5.2 Waterstops; FIO

1.5.2.1 Samples

Waterstop materials and splice samples shall be submitted for inspection and testing and shall be identified to indicate manufacturer, type of material, size and quantity of material and shipment represented. Each material sample shall be a piece not less than 12 inches long cut from each 200 feet of finished waterstop furnished, but not less than a total of four linear feet of each type and size furnished. For spliced segments of waterstops to be installed in the work, one spliced sample of each size and type for every 50 splices made in the factory and every 10 splices made at the job site shall be furnished for inspection and testing. The spliced 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 spliced sample shall be not less than 12 inches long.

### 1.5.2.2 Splicing Waterstops; GA

Procedures for splicing waterstops shall be submitted.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Preformed Expansion Joint Filler Strips

Preformed expansion joint filler strips shall conform to ASTM D 1752, Type I. Wood, cork, or other cellulose-based material shall not be used.

#### 2.1.2 Joint Seals and Sealants

##### 2.1.2.1 Field Molded Sealants and Primer

Field molded sealants and primer shall conform to ASTM C 920, Type M, Grade NS, Class 25, use NT for non-horizontal joints and Type M, Grade P, Class 25, use T for horizontal joints. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The back-up material shall be compressible, nonshrink, nonreactive with sealant, and nonabsorptive material type such as extruded butyl or polychloroprene foam rubber.

##### 2.1.2.2 Compression Seals and Lubricant

Compression seals shall conform to ASTM D 2628; lubricant for installation shall conform to ASTM D 2835.

#### 2.1.3 Waterstops

##### 2.1.3.1 Non-Metallic Waterstops

Rubber waterstops shall conform to COE CRD-C 513. Polyvinylchloride waterstops shall conform to COE CRD-C 572.

### 2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

#### 2.2.1 Materials Tests

### 2.2.1.1 Field-Molded Sealants

Samples of sealant and primer, when use of primer is recommended by the manufacturer, as required in paragraph 2.1.2.1, shall be tested by and at the expense of the Government for compliance with paragraph 2.1.2.1. If the sample fails to meet specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor at a rate of \$8,000 per sample.

### 2.2.1.2 Non-Metallic Waterstops

Samples of materials and splices as required in paragraph 1.5.2 shall be visually inspected and tested by and at the expense of the Government for compliance with COE CRD-C 513 or COE CRD-C 572 as applicable. If a sample fails to meet the specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor at the rate of \$920.00 (for materials complying with CRD-C-513) or \$810.00 (for materials complying with CRD-C-572) per material sample retested and \$150.00 per splice sample retested.

### 2.2.2 Splicing Waterstops

#### 2.2.2.1 Procedure and Performance Qualifications

Procedure and performance qualifications for splicing waterstops shall be demonstrated in the presence of the Contracting Officer.

#### 2.2.2.2 Non-Metallic Waterstops

Procedure and performance qualifications for splicing non-metallic waterstops shall be demonstrated by the manufacturer at the factory and the Contractor at the job site by each making three spliced samples of each size and type of finished waterstop.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Joint locations and details, including materials and methods of installation of joint fillers and waterstops, shall be as specified, as shown, and as directed. In no case shall any fixed metal be continuous through an expansion joint.

### 3.1.1 Expansion Joints

Preformed expansion joint filler shall be used at bents for slab spans and at joints between curtain wall panels. The filler shall extend the full slab depth, unless otherwise indicated. The edges of the joint shall be neatly finished with an edging tool of 1/8 inch radius. Where the joint is to receive a sealant, the filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed and oiled wood strip temporarily secured to the top to form a recess to the size shown on the drawings. The wood strip shall be removed after the concrete has set. No wood, cork, or other cellulose-based material shall remain in the joints. The Contractor may 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.

#### 3.1.1.1 Joints With Field-Molded Sealant

Joints shall not be sealed when the sealant, air or concrete temperature is less than 40 degrees F. Immediately prior to installation of field molded sealants, the joint shall be cleaned of all debris and further cleaned using water, chemical solvents or other means as recommended by the sealant manufacturer. The joints shall be dry prior to filling with sealant. Bond breaker and back-up material shall be installed where required. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

#### 3.1.1.2 Joints With Preformed Compression Seals

The joint seals shall be installed with equipment which shall be capable of installing joint seals to the prescribed depth without cutting, nicking, twisting, or otherwise distorting or damaging the seal and with no more than five percent stretching of the seal. The sides of the joint and, if necessary, the sides of the compression seal shall be covered with a

coating of lubricant, and the seal shall be installed to the depth indicated with joint installation equipment. Butt joints shall be coated with liberal applications of lubricant.

### 3.1.2 Construction Joints

1. The construction joints are to be provided with a keyway wherever shown on the plans. Unless a keyway is specifically shown, the construction joint shall be plain faced.
2. When concrete is being placed at a point where construction joint is to be made, the showing edge of the joint is to be brought to a neat line by being either formed, trimmed or finished.
3. Concrete surfaces to which other concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by cleaning with either air-water cutting, sandblasting, or high pressure water jet. The surfaces of construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete.
4. At least two (2) hours must elapse after depositing concrete in the columns or walls before depositing in beams, girders or slabs supported thereon.
5. All construction joints shall be finished flush unless chamfer grooves are called for on the drawings.
6. Premolded filler strips shall have to be accurately positioned and secured against displacement to clean, smooth concrete surfaces. Material used to secure premolded fillers to concrete shall not harm the concrete. The groove shall be thoroughly cleaned of all laitance, curing compound, foreign materials, and protrusions of hardened concrete. Any dust shall be blown out of the groove with oil-free compressed air.

### 3.1.3 Waterstops

Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. Adequate provision shall be made to support and protect the waterstops during the progress of work. Any waterstop punctured or damaged shall be replaced or repaired at the Contractor's expense. The concrete shall be

thoroughly consolidated in the vicinity of the waterstop. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued.

### 3.1.3.1 Splices

Joints in waterstops shall be spliced together by qualified splicers using the approved splicing procedures to form a continuous watertight diaphragm. Splices shall be as followed:

- a. **Non-Metallic Waterstops** - All splices shall be made on a bench in a temporary shop provided at the site of the installation or at the manufacturer's plant. A miter guide and portable power saw shall be used to cut the ends to be joined to insure good alignment and contact between joined surfaces. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis, protrusions and the like) shall be maintained across the splice.
- b. **Rubber Waterstops** - Splices shall be vulcanized in accordance with the manufacturer's recommendations.
- c. **Polyvinylchloride Waterstops** - Splices shall be made by heat sealing the adjacent surfaces in accordance with the approved procedure. A thermostatically controlled electrical heat source shall be used to make all splices. The correct temperature at which splices should be made will differ with the material concerned but the applied heat should be sufficient to melt but not char the plastic. Waterstops shall be reformed at splices with a remolding iron with ribs or corrugations to match the pattern of the waterstop. The spliced area, when cooled and bent by hand in as sharp an angle as possible, shall show no sign of separation.



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## SECTION 03151 - STRIP SEAL JOINTS

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all equipment, materials and labor for providing and installing strip seal joints in accordance with these specifications and the contract drawings.

#### 1.2 RELATED WORK SPECIFIED ELSEWHERE.

Cast-In-Place Structural Concrete, Section 03301

Miscellaneous Metalwork, Section 05501.

#### 1.3 REFERENCES

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent listed by references thereto.

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES  
(LSSRB) 2000 EDITION, STATE OF LOUISIANA, DEPT. OF  
TRANSPORTATION AND DEVELOPMENT (LDOTD).

1005.05

Strip Seal Joint

#### 1.4 MEASUREMENT AND PAYMENT

**Strip seal joints will be measured for payment on the basis of length. All costs associated therewith shall be per linear foot for "Strip Seal Joints".** Payment shall constitute full compensation for furnishing all plant labor, equipment and materials, and performing the work in accordance with these specifications.

#### 1.5 SUBMITTALS

##### 1.5.1 Drawings

The Contractor shall submit shop drawings for strip seal joints to the Contracting Officer for approval prior to fabrication.

## 1.5.2 Certificates

The Contractor shall provide material documentation certifying compliance with the requirements of LSSRB Section 1005.05 and those given in the strip seal drawings. Manufacturer's documentation and installation information shall be provided to the Contracting Officer for approval of strip seal joint system.

## PART 2 PRODUCTS

### 2.1 FABRICATION

Fabrication of strip seal joint brackets shall be in accordance with the shop drawings and comply with the requirements of Section 05501.

## PART 3 EXECUTION

### 3.1 INSTALLATION

#### 3.1.1 General

Joints shall be free of loose rust, and shall be thoroughly clean and dry at the time of installation. Joint seal glands shall be installed in accordance with the manufacturer's recommendations. Lubricant-adhesive shall comply with the manufacturer's recommendations.

#### 3.1.2 Stretching

Stretching of the seal gland shall be minimal. When the installation procedures appear to cause stretching, random checks shall be made. Frequency and thoroughness of checks shall be as directed by the Contracting Officer. Maximum allowable stretch shall be 5%. When maximum limits are exceeded, and the lubricant-adhesive has chemically set, the seal shall be completely removed and cleaned, the joint re-cleaned and reinstallation made at no additional cost to the Government.

#### 3.1.3 Lubricant-Adhesive

The lubricant-adhesive shall be applied just prior to installation of the joint gland and shall be sufficient to completely cover the contact surfaces of the steel extrusion and the seal glands. Installation shall be done in a manner that least disturbs the lubricant-adhesive. Dilution of the lubricant-adhesive shall not be allowed.

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SECTION 03210 – REINFORCING STEEL

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## SECTION 03210 – REINFORCING STEEL

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all equipment, materials and labor for providing and placing steel bars, steel welded wire fabric, and accessories for concrete reinforcement.

#### 1.2 RELATED WORK SPECIFIED ELSEWHERE

Formwork, Section 03101

Joints, Section 03150

Concrete, Section 03301

#### 1.3 REFERENCES

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

##### ACI INTERNATIONAL (ACI)

ACI 315	(1999) ACI Detailing Manual: Section Details and Detailing of Concrete Reinforcement
ACI 318/318R	(1999) Building Code Requirements for Reinforced Concrete
ACI SP-66	(1994) Detailing Manual

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

ASTM A 185	(2001) Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A 615	(2001a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM E 8	(2001a) Tension Testing of Metallic Materials

#### 1.4 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for reinforcement bars and accessories. Payment for furnishing and placing reinforcement bars and accessories shall be included in the contract prices for the items of work to which the reinforcement bars and accessories are incidental.

## 1.5 SUBMITTALS

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

### Drawings

#### 1.5.1 Fabrication and Placement; FIO.

The Contractor shall prepare and submit complete shop drawings to the Contracting Officer for approval in accordance with specified requirements. Shop drawings shall include the details of bar supports including types, sizes, spacing and sequence.

### Reports

#### 1.5.2 Materials; FIO. Tests, Inspections, and Verifications; FIO.

Certified tests reports of reinforcement steel showing that the steel complies with the applicable specifications shall be furnished for each steel shipment and identified with specific lots prior to placement.

### Records

#### 1.5.3 Material; FIO.

A system of identification, which shows the disposition of specific lots of approved materials in the work, shall be established and submitted before completion of the contract.

## 1.6 QUALITY CONTROL

#### 1.6.1 Materials Tests

The Contractor shall have required material tests performed by an approved laboratory to demonstrate that the materials are in conformance with the specifications. Tension tests shall be performed on full cross section specimens in accordance with ASTM E 8, using a gage length that spans the extremities of specimens with welds or sleeves included. Tests shall be at the Contractor's expense.

## 1.6.2 General

The Contractor shall establish and maintain quality control for proper installation of all work covered in this section 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) Minimum concrete cover of reinforcement steel.
- (2) Number, size, and location of placement.
- (3) Maintain adequate splicing lengths where required.

## 1.6.3 Reporting

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

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Reinforcing Steel

##### 2.1.1.1 Billet-Steel Bars

Billet-steel bars shall conform to ASTM A 615, Grade 60 for bar sizes 3 through 11, including the following requirements:

- (1) Tension test specimens shall be bars of full cross section as rolled for all sizes.
- (2) The bend test requirements shall be based upon 180 degree bends of full size bars for all grades of steel. The bend diameters for bend tests shall be as indicated in the following table and shall be measured on the inside of bars:

<u>Bar Size</u>	<u>Maximum Diameter</u>
#3, #4 and #5	4 bar diameters
#6, #7 and #8	5 bar diameters
#9, #10 and #11	5 bar diameters

##### 2.1.1.2 Welded Wire Reinforcement

Welded wire reinforcement shall conform to ASTM 185, with yield stress of 65,000 psi.

## 2.1.2 Accessories

### 2.1.2.1 Bar Supports

Bar supports shall conform to ACI Publication SP-66. Supports for bars in concrete with formed surfaces exposed to view or to be painted shall be plastic-coated wire, stainless steel or precast concrete supports. Precast concrete supports shall be wedged-shaped, not larger than 3-1/2 by 3-1/2 inches, of thickness equal to that indicated for concrete cover and have an embedded hooked tie-wire for anchorage. Bar supports used in precast concrete with formed surfaces exposed to view shall be the same quality, texture and color as the finish surfaces.

### 2.1.2.2 Wire Ties

Wire ties shall be 16 gage or heavier black annealed wire.

## PART 3 EXECUTION

### 3.1 PLACEMENT

Reinforcement steel and accessories shall be placed as specified and shown and approved shop drawings. Holes cut in steel sheet piling for passing reinforcing bars shall not exceed 2 inches in diameter. Where holes fall in the web of the steel sheet pile, the hole shall be slotted 4 inches horizontally to accommodate passing the reinforcing bars. Placement details of steel and accessories not specified or shown shall be in accordance with ACI Publication SP-66 or ACI 315 and ACI 318/318R. Steel reinforcement shall be fabricated to shapes and dimensions shown, placed where indicated within specified tolerances and adequately supported during concrete placement. At the time of concrete placement all steel shall be free from loose, flaky rust, scale (except tight mill scale), mud, oil, grease or any other coating that might reduce the bond with the concrete.

#### 3.1.1 Hooks and Bends

Reinforcement bars shall be mill or field-bent. All steel shall be bent cold unless authorized. No steel bars shall be bent after being partially embedded in concrete unless indicated or authorized. No steel bars partially embedded in concrete shall be field bent unless indicated on the drawings or otherwise authorized. All hooks or bends shall be in accordance with ACI 318.

#### 3.1.2 Placing Tolerances

##### 3.1.2.1 Spacing of Bars



Bars shall be spaced as indicated on the drawings or as otherwise directed. The spacing between adjacent bars and the distance between layers of bars may not vary from the indicated position by more than one bar diameter nor more than 1 inch, whichever is less.

### 3.1.2.2 Concrete Cover

The minimum and maximum concrete cover of main reinforcement steel shall be as indicated on the drawings. The concrete tolerances shall be as follows:

MINIMUM COVER	VARIATION
6 inch	plus 1/2 inch
4 inch	plus 3/8 inch
3 inch	plus 3/8 inch
2 inch	plus 1/4 inch
1-1/2 inch	plus 1/4 inch
1 inch	plus 1/8 inch
3/4 inch	plus 1/8 inch

### 3.1.3 Splicing

Splices in reinforcement steel shall be as specified, shown on the drawings or as directed by the Contracting Officer. Bars may be spliced at alternate or additional locations at no additional cost to the Government, subject to the approval of the Contracting Officer. Except as provided herein, all splicing shall be in accordance with approved splicing procedures and the requirements of ACI 318. Bars larger than No. 11 shall be spliced with mechanical connectors or butt welded in accordance with ACI 318. The splice shall be submitted to the Contracting Officer for approval.

#### 3.1.3.1 Lap Splices

Lap Splices shall be used only for bars smaller than size #14. Bar laps may be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete, but shall not be spaced farther apart than one-fifth the required length of lap nor 6-inches. Lengths of laps for bars shall conform to the requirements of ACI 318, except when otherwise shown on the drawings.

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**SECTION 03301 - CAST-IN-PLACE STRUCTURAL CONCRETE**  
**(Nov 2001)**

**PART 1 GENERAL**

**1.1 SCOPE**

The work covered by this section consists of furnishing all plant, labor, materials, and performing all operation in connection with furnishing and placing cast-in-place concrete as indicated on drawings and specified herein for Bridge substructure, superstructure, curtain walls, standard barrier and pedestrian rails, approach slabs, I-wall cap, stepped walkway and retaining wall.

**1.2 RELATED WORK SPECIFIED ELSEWHERE**

Expansion and Construction Joints in Concrete, Section 03150

Reinforcing Steel, Section 03210

Formwork for Concrete, Section 03101

**1.3 REFERENCES**

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

**ACI INTERNATIONAL (ACI)**

117/117R	(1990) Standard Tolerances for Concrete Construction and Materials
211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
214	(1977) Evaluation of Strength Test Results of Concrete
303R	(1991) Cast-in-Place Architectural Concrete Practice
305R	(1999) Hot Weather Concreting
318/318R	(1999) Building Code Requirements for Reinforced Concrete

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

C 29	(1997) Bulk Density ("Unit Weight") and Voids in Aggregate
C 31	(2000e1) Making and Curing Concrete Test Specimens in the Field
C 33	(2002a) Concrete Aggregates
C 39	(2001) Compressive Strength of Cylindrical Concrete Specimens
C 42	(1999) Obtaining and Testing Drilled Cores and Sawed Beam of Concrete
C 94	(2000e2) Ready-Mixed Concrete
C 127	(2001) Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
C 128	(2001) Density, Relative Density (Specific Gravity) and Absorption of Fine Aggregate
C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
C 143	(2000) Slump of Hydraulic Cement Concrete
C 150	(2002a) Portland Cement
C 171	(1997a) Sheet Materials for Curing Concrete
C 172	(1999) Sampling Freshly Mixed Concrete
C 192	(2002) Making and Curing Concrete Test Specimens in the Laboratory
C 231	(1997e1) Air Content of Freshly Mixed Concrete by the Pressure Method
C 260	(2001) Air-Entraining Admixtures for Concrete
C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
C 494	(1999ae1) Chemical Admixtures for Concrete
C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying

- C 595 (2002a) Blended Hydraulic Cement
- C 597 (1997) Pulse Velocity Through Concrete
- C 618 (2001) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
- C 803 (1997e1) Penetration Resistance of Hardened Concrete
- C 805 (2002) Rebound Number of Hardened Concrete
- C 1059 (1999) Latex Agents for Bonding Fresh to Hardened Concrete
- C 1064 (2001) Temperature of Freshly Mixed Portland Cement Concrete
- C 1077 (2002) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
- C 1107 (2002) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- D 75 (1997) Sampling Aggregates

**CORPS OF ENGINEERS (CE)**

- CRD-C 94 (1995) Surface Retarders
- CRD-C 100 (1975) Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
- CRD-C 104 (1980) Calculation of the Fineness Modulus of Aggregate
- CRD-C 143 (1962) Meters for Automatic Indication of Moisture in Fine Aggregates
- CRD-C 400 (1963) Water for Use in Mixing or Curing Concrete
- CRD-C 521 (1981) Frequency and Amplitude of Vibrators for Concrete

**U.S. GENERAL SERVICES ADMINISTRATION (GSA)**

- CCC-C-467C (Feb 8, 1972) Cloth, Burlap, Jute (or Kenaf)



NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44 (2000) Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100 (1990) Concrete Plant Standards

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (LSSRB) 2000 EDITION, STATE OF LOUISIANA, DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LDOTD)

1003.02 Aggregates for Portland Cement Concrete and Mortar

1.4 MEASUREMENT AND PAYMENT

**No measurement will be made for concrete. Payment for concrete will be made at the contract lump sum price for "Reinforced Concrete Substructure", "Reinforced Concrete Superstructure", "Reinforced Concrete Curtain Walls, including Footings", "Reinforced Concrete Standard Barrier Rail and Pedestrian Rails, including Barrier Rail Transition", "Reinforced Concrete Approach Slabs", "Reinforced Concrete I Walls", "Reinforced Concrete Stepped Walkway", "Reinforced Concrete Retaining Wall" and "Concrete Slope Paving under Bridge". Price and payment shall include the cost of all labor, materials, formwork, reinforcing steel and the use of all equipment and tools required to complete the concrete work and furnishing and installing all miscellaneous metal. Reinforced concrete substructure consists of Intermediate bent cap and end bents for the canal bridge and bent caps for the slab span bridge. Reinforced concrete superstructure consists of bridge deck slab over the canal bridge, deck slab for the slab span bridge and the bridge floodwalls including water stops, elastomeric bearing pads at the end bents, asphalt saturated felt bearings for the slab spans. Reinforced concrete standard barrier rail and pedestrian rails consists of the concrete part of the items. Reinforced concrete approach slab consists of aggregate fill, geofabric, under drains and the bolster block. Reinforced concrete I-walls consist of stabilization slabs, water stops and expansion joint filler. Reinforced concrete stepped walkway consists of geofabric, the aggregate backfill, perforated pipe and hooking up with the drainage. All above items include excavation backfill and all other components incidental to finish the work.**

1.5 SUBMITTALS

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

#### 1.5.1 Concrete Mixture Proportioning; GA.

Concrete mixture proportions shall be determined by the Contractor, in accordance with the requirements in paragraph 2.2, and submitted for approval. The concrete mixture quantities of all ingredients per cubic yard and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan and ground granulated blast-furnace (GGBF) slag when used, and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077, which show that proportions thus selected will produce concrete of the qualities indicated. The submission shall provide information specified in paragraph 2.2.8, and if applicable, paragraph 2.2.6. No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

#### 1.5.2 Batch Plant; FIO.

The Contractor shall submit batch plant data to the Contracting Officer for review for conformance with paragraphs 3.1.1 and 3.1.2.

#### 1.5.3 Concrete Mixers; FIO.

The Contractor shall submit concrete mixer data, which includes the make, type, and capacity of concrete mixers for review of conformance with paragraphs 3.1.1 and 3.1.3.

#### 1.5.4 Conveying Equipment and Methods; FIO.

The conveying equipment and methods for transporting, handling, and depositing the concrete shall be submitted for review for conformance with paragraphs 3.1.1 and 3.1.4.

#### 1.5.5 Placing Equipment and Methods; FIO.

All placing equipment and methods shall be submitted for review for conformance with paragraph 3.1.1 and 3.3.

#### 1.5.6 Testing Technicians; FIO. Concrete Construction Inspector; FIO.

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the requirements of paragraph 3.7.

**1.5.7 Construction Joint Treatment; GA.**

The method and equipment proposed for joint treatment and waste disposal shall be submitted for review for conformance with paragraph 3.2.4.

**1.5.8 Curing and Protection; GA.**

The curing medium and methods to be used shall be submitted for review for conformance with paragraph 3.5.

**1.5.9 Cold-Weather Placing; GA.**

If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection meeting the requirements of paragraph 3.3.4 shall be submitted for review.

**1.5.10 Hot-Weather Placing; GA.**

If concrete is to be placed under hot-weather conditions, the proposed materials and methods, meeting the requirements of paragraph 3.3.5 and paragraph 3.4, shall be submitted for review.

**1.5.11 Aggregate ; GA.**

Information identifying the aggregate source to be used along with gradation tests for fine and coarse aggregates shall be submitted for approval. The gradation test for fine aggregate shall include the No. 8 and No. 30 sieve sizes. Specific gravity and absorption of fine and coarse aggregates determined by ASTM C 128 and ASTM C 127, respectively shall also be submitted.

Samples of materials for Government testing and approval shall be submitted as required in paragraph 1.6.1.

**1.5.12 Uniformity of Concrete Mixing; FIO.**

The results of the initial mixer uniformity tests as required in paragraph 3.7.2.13 shall be submitted at least 5 days prior to the initiation of placing.

**1.5.13 Tests and Inspections; FIO.**

Test results and inspection reports shall be submitted daily and weekly as required in paragraph 3.7.3.

**1.5.14 Cementitious Materials; GA.**

Cementitious Materials, including Cement and Pozzolan, will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished. Certification and mill test reports shall be from samples taken from the particular lot furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious materials will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. Material not meeting specifications shall be promptly removed from the site of work.

#### 1.5.15 Impervious-Sheet Curing Materials; FIO.

Impervious-Sheet Curing Materials shall be certified for compliance with all specification requirements.

#### 1.5.16 Air-Entraining Admixture; FIO.

Air-Entraining Admixture shall be certified for compliance with all specification requirements.

#### 1.5.17 Other Chemical Admixtures; FIO. .

Other Chemical Admixtures shall be certified for compliance with all specification requirements.

#### 1.5.18 Membrane-Forming Curing Compound; FIO.

Membrane-Forming Curing Compound shall be certified for compliance with all specification requirements.

#### 1.5.19 Latex Bonding Compound; FIO

Latex Bonding Compound shall be certified for compliance with all specification requirements.

#### 1.5.20 Nonshrink Grout; FIO.

Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

### 1.6 GOVERNMENT TESTING AND SAMPLING

The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples of aggregates and concrete. Concrete and aggregate

requirements in this paragraph and its subparagraphs do not relieve the Contractor of the requirements outlined in paragraph 3.7.

#### 1.6.1 Aggregates

The aggregate sources listed in 01100-12 have been tested and at the time testing was performed, these sources were capable of producing materials of a quality acceptable for this project provided suitable processing was performed. If the Contractor proposes to furnish aggregates from a source not listed in 01100-12, samples consisting of not less than 500 pounds of each size coarse aggregate and 300 pounds of fine aggregate taken under the supervision of the Contracting Officer in accordance with CRD-C 100 shall be delivered to the Waterways Experiment Station (3909 Halls Ferry Road) in Vicksburg, MS within 15 days after notice to proceed. Sampling and shipment of samples shall be at the Contractor's expense. The cost of testing one source for each size aggregate will be borne by the Government. If the Contractor selects more than one source for each aggregate size or selects a substitute source for any size aggregate after the original source was tested, the cost of that additional testing will be borne by the Contractor. From 90 to 120 days will be required to complete evaluation of the aggregates. Testing will be in accordance with applicable CRD or ASTM test methods. Tests to which aggregate may be subjected are specific gravity, absorption, cycles of freezing and thawing in concrete, alkali-aggregate reaction, organic impurities, and any other test necessary to demonstrate that the aggregate is of a quality that is at least equivalent to those sources listed in 001100-12.

#### 1.6.2 Concrete

The Government will determine when concrete shall be sampled. The Contractor shall cast, protect and deliver concrete cylinders and determine slump and air content. The person conducting the tests shall meet the Concrete Field Testing Technician requirements contained in paragraph 3.7.1. Concrete shall be sampled in accordance with ASTM C 172. When cylinders are molded, slump and air content shall be determined in accordance with ASTM C143 and ASTM C 231, respectively. Test samples for each class of concrete shall be taken at least once every 8-hour shift or for every 150 cubic yards placed, whichever requires more samples. From each sample, three 6-inch by 12-inch compression test specimens shall be made in accordance with ASTM C 31. Compression test specimens shall be labeled and cured while in the field in accordance with paragraph 9.1 of ASTM C 31. If cylinders are not delivered to the testing laboratory within 24 to 48 hours after molding, they shall be submerged in a water tank provided by the Contractor, where the surrounding water temperature is maintained by the Contractor at 73.4 plus or minus 3 degrees F. Cylinders shall be transported in accordance with ASTM C 31 (with cushioning material) and unloaded in the Government designated location. Compression testing will be performed by the Government in accordance with ASTM C 39. One cylinder will be tested at 7 days for information and two cylinders will be tested at 28 days (90 if pozzolan or slag is used) for acceptance.

### 1.6.3 Concrete Strength

Compressive strength test specimens required in paragraph 1.6.2 will be used to determine compliance. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength  $f'_c$  and no individual test result falls below the specified strength  $f'_c$  by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

#### 1.6.3.1 Investigation of Low-Strength Test Results

When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

#### 1.6.3.2 Testing of Cores

When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

#### 1.6.3.3 Load Tests

If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318/318R. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contracting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance

with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

## 1.7 DESIGN REQUIREMENTS

### 1.7.1 Concrete Strength

Specified compressive strength  $f_c$  shall be as follows:

Compressive Strength (PSI)	Structure Or Portion Of Structure
3,200 @ 28 *days	All structures

\* 90 days if pozzolan is used.

### 1.7.2 Maximum Water-Cementitious Materials (W/CM) Ratio

Maximum W/CM shall be as follows:

W/CM, By Mass	Structure Or Portion Of Structure
0.45	All Features

## 1.8 CONSTRUCTION TOLERANCES

### 1.8.1 General

The definitions of the terms used in the following tables shall be as defined in ACI 117/117R. 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. Tolerances are not cumulative. The most restrictive tolerance control. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment, and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A tolerance without sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction.

#### TOLERANCES FOR FOUNDATIONS

##### (1) Lateral alignment

Eccentricity measured from the center of gravity of footing as cast to the center of gravity

as specified; 0.02 times width  
of footing in direction of  
misplacement but not more than ..... 2 in.

(2) Level alignment

in. Top of footings supporting curtain walls and retaining wall. .... 1/2

(3) Cross-sectional dimensions

Horizontal dimension of formed members ..... +2 in.  
..... -1/2 in.

Vertical dimension (thickness) ..... -5 percent

(4) Relative alignment

Slope of footing side and top  
surfaces with respect to  
the specified plane ..... 1 in. per 10 ft

**TOLERANCE FOR FINISHED FORMED CONCRETE SURFACES**

(1) Vertical alignment

Formed surfaces slope with  
respect to the specified plane

Vertical alignment of outside  
corner of exposed corner  
columns and control joint  
grooves in concrete exposed  
to view ..... 1/4 in. in 10 ft

All other conditions ..... 3/8 in. in 10 ft

(2) Abrupt variation

The offset between concrete  
surfaces for the following  
classes of surface:

Class A ..... 1/8 in.  
Class D ..... 1 in.



(3) Gradual variation

Surface finish tolerances as measured by placing a freestanding (unleveled), 5-ft straightedge for plane surface or curved template for curved surface anywhere on the surface and allowing it to rest upon two high spots within 72 hr after concrete placement. The gap at any point between the straightedge or template and the surface shall not exceed:

\*Class A [(including Class AHV)] ..... 1/8 in.  
Class D ..... 1 in.]

TOLERANCES FOR BRIDGES, EROSION-PROTECTION STRUCTURES,  
AND SMALL HYDRAULIC STRUCTURES

(1) Vertical alignment

Exposed surfaces ..... 3/4 in.  
Concealed surfaces ..... 1-1/2 in.

(2) Lateral alignment

Centerline alignment ..... 1 in.

(3) Level alignment

Profile grade ..... 1 in.

Top of other concrete surfaces and horizontal grooves.

Exposed ..... 3/4 in.  
Concealed ..... 1-1/2 in.

Mainline pavements in longitudinal direction, the gap below a 10-ft unleveled straightedge resting on high spots shall not exceed ..... 1/8 in.

Mainline pavements [and slabs]  
in transverse direction,  
the gap below a 10-ft unlevelled  
straightedge resting on  
high spots shall not exceed ..... 1/4 in.

Ramps, sidewalks, and intersections,  
in any direction, the  
gap below a 10-ft unlevelled  
straightedge resting on  
high spots shall not exceed ..... 1/4 in.

(4) Cross-sectional dimensions

Bridge slab thickness ..... plus 1/4 in.  
..... minus 1/8 in.

Members such as columns, beams,  
piers, walls, and others  
(slabs—thickness only) ..... plus 1/2 in.  
..... -minus 1/4 in.

Openings through concrete members ..... 1/2 in.

(5) Relative alignment

Location of openings  
through concrete members ..... 1/2 in.

Formed surface slope with  
respect to the specified plane

Watertight joints ..... 1/8 in. in 10 ft  
Other exposed surfaces ..... 1/2 in. in 10 ft  
Concealed surfaces ..... 1 in. in 10 ft

Unformed exposed surfaces  
slopes with respect to the  
specified plane ..... 1/4 in. in 10 ft  
..... 3/8 in. in 20 ft

## 1.8.2 Appearance

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is approved by the Contracting Officer.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Cementitious Materials

Cementitious materials shall be portland cement, portland-pozzolan cement, or portland cement in combination with pozzolan and shall conform to appropriate specifications listed below. Use of cementitious materials in architectural concrete shall be restricted to one color, one source and one type.

##### 2.1.1.1 Portland Cement

ASTM C 150, Type I or II, low alkali, except that the maximum amount of  $C_3A$  in Type I cement shall be 8 percent.

##### 2.1.1.2 High Early Strength Portland Cement

ASTM C 150 Type III, low alkali shall not be used.

##### 2.1.1.3 Pozzolan, Other than Silica Fume

Pozzolan shall conform to ASTM C 618, Class C-or F, with the multiple factor and the effectiveness in controlling Alkali-Silica reaction requirement of Table 3.

##### 2.1.1.4 Blended Hydraulic Cement

Portland-pozzolan cement shall conform to ASTM C 595, Type IP.

#### 2.1.2 Aggregates

Concrete aggregate shall be produced from the sources in 01100-12. Fine and coarse aggregates shall conform to the grading requirements of ASTM C 33 or

LSSRB 1003.02. The quality of all aggregates shall conform to ASTM C 33. The nominal maximum size shall be as listed in paragraph 2.2.2.

### 2.1.3 Chemical Admixtures

Chemical admixtures to be used, when required or permitted, shall conform to the appropriate specification listed.

#### 2.1.3.1 Air-Entraining Admixture

The air-entraining admixture shall conform to ASTM C 260 and shall consistently cause the concrete to have an air content in the specified ranges under field conditions.

#### 2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

#### 2.1.3.3 Water-Reducing or Retarding Admixture

a. Water-Reducing or Retarding Admixtures: ASTM C 494, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

b. High-Range Water Reducing Admixture: ASTM C 494, Type F or G, except that the 6-month and 1-year strength requirements shall be waived. The admixture may be used only when approved by the Contracting Officer, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan.

### 2.1.4 Curing Materials

#### 2.1.4.1 Impervious-Sheet Curing Materials

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

#### 2.1.4.2 Membrane-Forming Curing Compound

The membrane-forming curing compound shall conform to ASTM C 309, Type 1-D or 2, Class B.

#### 2.1.4.3 Burlap

Burlap used for curing shall conform to GSA CCC-C-467C .

### 2.1.5 Water

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

### 2.1.6 Nonshrink Grout

Nonshrink grout shall conform to ASTM C 1107 and shall be a commercial formulation suitable for the application proposed.

### 2.1.7 Latex Bonding Compound

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

### 2.1.8 Cementitious Paint

Cementitious paint shall conform to Federal Specification AA-1555, 1981.

## 2.2 CONCRETE MIXTURE PROPORTIONING

### 2.2.1 Quality of Mixture

For each portion of the structure, mixture proportions shall be selected so that the strength and W/CM requirements listed in paragraph 1.7 are met.

### 2.2.2 Nominal Maximum-Size Coarse Aggregate

Nominal maximum-size coarse aggregate shall be 1-1/2 inches or 1 inch except 3/4 inch nominal maximum-size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 7-1/2 inches; the depth of the slab is less than 4 inches; the minimum clear spacing between reinforcing and sheet piling is less than 2-1/4 inches; or the minimum clear spacing between reinforcing is less than 2-1/4 inches.

### 2.2.3 Air Content

Air content as delivered to the forms and as determined by ASTM C 231 shall be between 4 and 7 percent except that when the nominal maximum-size coarse aggregate is 3/4 inch, it shall be between 4-1/2 and 7-1/2 percent.

### 2.2.4 Slump

The slump shall be determined in accordance with ASTM C 143 and shall be within the range of 1 to 4 inches. Where placement by pump is approved, the slump shall not exceed 6 inches and shall remain within a 3-inch band.

#### 2.2.5 Pozzolan Content

If pozzolan is used, it shall range from 15 to 35 percent by weight of the total cementitious materials.

#### 2.2.6 Determining Standard Deviation

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214. Test records from which a standard deviation is calculated shall:

- (1) represent materials, quality control procedures, and conditions similar to those expected at the proposed work;
- (2) not be from a project where the allowable changes in materials and/or proportions were more restricted than for the proposed work;
- (3) represent concrete produced to meet a specified strength or strengths,  $f_c$ , within 1000 psi of that specified for the proposed work;
- (4) be from consecutive tests;
- (5) be from different batches;
- (6) be the average of strengths from two cylinders made from the same sample of concrete and tested at the age indicated in paragraph 1.7.1; and
- (7) be from concrete that was produced within one year of the time when concrete placement is expected to begin for the proposed work.

##### 2.2.6.1 For 30 or More Test Records

Use an unmodified standard deviation and calculate  $f_{cr}$  as specified in paragraph 2.2.7.1.

##### 2.2.6.2 For 15 to 29 Test Records

Where a concrete production facility does not have 30 test records, but does have a record based on 15 to 29 consecutive tests, a modified standard deviation may be established as the product of the standard deviation based on 15 to 29 tests and modification factor from the following table. Calculate  $f_{cr}$  as specified in paragraph 2.2.7.1.

<u>Number of Records *</u>	<u>Modification Factor for Standard Deviation</u>
15	1.16
20	1.08
25	1.03
30 or more	1.00

\*Interpolate for intermediate numbers of records.

### 2.2.6.3 For Less Than 15 Test Records

No standard deviation is needed. Calculation of  $f_{cr}$  shall be as specified in paragraph 2.2.7.2.

### 2.2.7 Required Average Compressive Strength, $f_{cr}$ .

In meeting the strength requirements specified in paragraph 1.7.1, the selected mixture shall have proportions so as to produce an  $f_{cr}$  exceeding  $f'_c$  as indicated in paragraph 2.2.7.1 or 2.2.7.2.

#### 2.2.7.1 For 15 or More Test Records

If a standard deviation is calculated as specified in paragraph 2.2.6,  $f_{cr}$  shall be determined based on the value of  $f'_c$  and the standard deviation,  $S$ , as follows:

<u>Standard Deviation, S</u>	<u>Required Average Compressive Strength, <math>f_{cr}</math> (psi)</u>
Less than or equal to 505	$f'_c + 1.34 S$
Greater than 505	$f'_c + 2.33 S - 500$

#### 2.2.7.2 For less than 15 Test Records

When a concrete production facility does not have field strength test records for calculation of standard deviation,  $f_{cr}$  shall be determined based on the value of  $f'_c$  as follows:

<u>Specified Compressive Strength, <math>f'_c</math> (psi)</u>	<u>Required Average Compressive Strength, <math>f_{cr}</math> (psi)</u>
Less than 3000	$f'_c + 1000$
3000-5000	$f'_c + 1200$
Greater than 5000	$f'_c + 1400$

## 2.2.8 Documenting Average Strength

Documentation that proposed concrete proportions produce the required average strength,  $f_{cr}$ , determined in paragraph 2.2.7 shall be based on previous field experience (paragraph 2.2.8.1) or laboratory trial batches (paragraph 2.2.8.2). Test reports shall be from tests performed on concrete produced from the submitted mixture. Test reports shall be from tests performed on concrete produced from the submitted mixture proportions.

### 2.2.8.1 Field Experience

Required average strength can be documented by field experience if compressive strength test records consisting of not less than 10 consecutive tests and encompassing a period of not less than 60 days are used. Test records shall represent similar materials to those proposed and similar conditions to those expected. Changes in materials, conditions, and proportions within the test record shall not have been more closely restricted than those for the proposed work.

### 2.2.8.2 Laboratory Trial Batches

The laboratory used to develop information required by this section shall comply with ASTM C 1077.

#### 2.2.8.2.1 Delivery of Samples

Representative samples for all concrete materials proposed for this project and a copy of this section of the contract specifications entitled "CAST-IN-PLACE STRUCTURAL CONCRETE" shall be delivered to the laboratory that performs the concrete proportioning at least 60 days (120 when pozzolan [or slag] is used) before concrete placement is expected to begin. Samples of approved aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by manufacturer's test reports indicating compliance with applicable specification requirements. When all of these materials have been delivered, the name, address, and phone number of this laboratory and a list of the sources and types of all concrete materials shall be submitted to the Contracting Officer.

#### 2.2.8.2.2 Trial Mixtures

Trial mixtures having proportions, consistencies, maximum slump and maximum air content suitable for the work shall be made based on ACI 211.1, using at least three different water- cementitious materials ratios which will produce a range of strengths encompassing those required for the work. The target water- cementitious materials ratios required in paragraph 1.7.2 include the total weight of cement plus pozzolan converted from absolute volume as described in ACI 211.1. Trial mixtures shall be



designed in accordance with the procedure in ACI 211.1, Chapter 6, using the absolute volume basis for determining the required amount of fine aggregate. The dry rodded weight per cubic foot of the coarse aggregate determined according to ASTM C 29; the fineness modulus of the fine aggregate determined according to CRD-C 104; and the yield, slump and air content shall be reported. For each water-cementitious materials ratio at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested in accordance with ASTM C 39 at 7 and 28 days (also 90 if pozzolan is used). From these test results a curve shall be plotted and submitted showing the relationship between water-cementitious materials ratio and strength at design age. Concrete mixtures shall have a slump and air content within plus or minus 3/4 inch and plus or minus 0.5 percent respectively of the maximum permitted.

## **PART 3 EXECUTION**

### **3.1 EQUIPMENT**

#### **3.1.1 Capacity**

The batching, mixing, conveying, and placing equipment shall have a capacity of at least 30 cubic yards per hour.

#### **3.1.2 Batch Plant**

Batch plant shall conform to the requirements of NRMCA CPMB 100 and as specified; however, rating plates attached to batch plant equipment are not required.

##### **3.1.2.1 Batching Equipment**

The batching controls shall be semiautomatic, or automatic. The semiautomatic batching system shall be provided with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with an accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Separate bins or compartments shall be provided for each size group of aggregate and cement and pozzolan. Aggregates shall be weighed either in separate weigh batchers with individual scales or cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cement, or pozzolan. If both cement and pozzolan are used, they may be batched cumulatively provided that the portland cement is batched first. If measured by mass, the mass of the water shall not be weighed cumulatively with another ingredient. Water batcher filling and discharging valves shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. An accurate mechanical device for measuring and dispensing each admixture shall be provided. Each dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and discharged automatically in a manner to obtain uniform distribution throughout

the batch in the specified mixing period. Admixtures shall not be combined prior to introduction in water. The plant shall be arranged so as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment. All filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

**3.1.2.2 Scales**

The equipment for batching by mass shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Tests shall be made at the frequency required in paragraph 3.7, and in the presence of a government inspector.

**3.1.2.3 Batching Tolerances**

**a. Weighing Tolerances**

MATERIAL	PERCENT OF REQUIRED MASS
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

**b. Volumetric Tolerances** - For volumetric batching equipment, the following tolerances shall apply to the required volume of material being batched:

- Water: ..... Plus or minus 1 percent.
- Chemical admixtures: ..... Zero to plus 6 percent.

**3.1.2.4 Moisture Control**

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched. An electric moisture meter complying with the provisions of CE CRD-C 143 shall be provided for measuring moisture in the fine aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the sand bin or in the sand batcher.

**3.1.3 Concrete Mixers**

The concrete mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

### 3.1.3.1 Stationary Mixers

Concrete plant mixers shall be tilting, nontilting, horizontal-shaft, vertical-shaft, or pugmill and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixing time and uniformity shall conform to all the requirements in ASTM C 94 applicable to central-mixed concrete.

### 3.1.3.2 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it will be possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

### 3.1.4 Conveying Equipment

The conveying equipment shall conform to the following requirements.

#### 3.1.4.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least five times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 2 square feet. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 2 cubic yards shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

#### 3.1.4.2 Transfer Hoppers

Concrete may be charged into nonagitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and have conical-shaped discharge features. The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external

vibration to effect complete discharge. Concrete shall not be held in nonagitating transfer hoppers more than 30 minutes.

#### 3.1.4.3 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 may be used for transporting plant-mixed concrete over a smooth road 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.

#### 3.1.4.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes 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.

#### 3.1.4.5 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 36 inches. The belt speed shall be a minimum of 300 feet per minute and a maximum of 750 feet per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant trunk that is long enough to extend through the reinforcing bars.

#### 3.1.4.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three 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.

#### 3.1.4.7 Capacity

The conveying equipment shall have a capacity of at least 30 cubic yards per hour.

#### 3.1.5 Vibrators

Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

Application	Head Diameter	Frequency	Amplitude
	Inches	VPM	Inches
Thin walls, beams, etc.	1-1/4 to 2-1/2	9,000 to 13,500	0.02 to 0.04
General construction	2 to 3-1/28	8,000 to 12,000	0.025 to 0.05

The frequency and amplitude shall be determined in accordance with CE CRD-C 521.

### 3.2 PREPARATION FOR PLACING

#### 3.2.1 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Embedded items shall be free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding, including tack welding, will not be permitted on embedded metals within 2 feet of the surface of the concrete.

#### 3.2.2 Concrete on Earth Foundations

Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with Section 02222.

#### 3.2.3 Concrete on Rock Foundations – Not Used

#### 3.2.4 Construction Joint Treatment

Construction joint treatment shall conform to the following requirements.

##### 3.2.4.1 Joint Preparation

Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance

and inferior concrete so that clean, well bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. The surface shall be washed clean as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed. The initial test results submitted shall not be more than three months old. Additional tests shall be conducted and submitted within six months of previous tests. Uniformity testing shall continue until all concrete is placed.

#### 3.2.4.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 90 to 110 psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a retarder complying with the requirements of CE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in applications. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

#### 3.2.4.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 3,000 psi may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin of mortar is removed and there is no undercutting of coarse-aggregate particles. If the water jet is incapable of a uniformly exposing coarse aggregate, the surface shall be cleaned by sandblasting.

#### 3.2.4.4 Wet Sandblasting

This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

#### 3.2.4.5 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

### 3.3 PLACING

### 3.3.1 Placing Procedures

The surfaces of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete. Surfaces may be dampened immediately before placement if necessary. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. Concrete shall be deposited as close as possible to its final position in the forms and, in so depositing, 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 may be effectively consolidated in horizontal layers 2.0 feet or less in thickness with a minimum of lateral movement. The amount deposited in each location shall be that which can be readily and thoroughly consolidated. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed. Concrete shall be placed by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper that is conical in shape. The concrete shall not be dropped vertically more than 5 feet, except where a properly designed and sized elephant truck with rigid drop chute bottom section is provided to prevent segregation and where specifically authorized. In no case will concrete be discharged to free-fall through reinforcing bars.

### 3.3.2 Placement by Pump

When concrete is to be placed by pump, the nominal maximum-size coarse aggregate shall not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms. Grout used to lubricate the pumping equipment at the beginning of the placement will not be incorporated into the placement.

### 3.3.3 Time Interval Between Mixing and Placing

Concrete shall be placed within 30 minutes after discharge into nonagitating equipment. When concrete is truck-mixed or when a truck mixer or agitator is used for transporting concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours after introduction of the cement to the aggregates. When the length of haul makes it impossible to deliver truck-mixed concrete within these time limits, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site.

### 3.3.4 Cold-Weather Placing

When cold-weather placing of concrete is likely to be subjected to freezing temperatures before the expiration of the curing period, it shall be placed in accordance with procedures previously submitted in accordance with paragraph 1.5. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be above 32 degrees F. The placing temperature of the concrete having a minimum dimension less than 12 inches shall be between 55 and 75 degrees F when measured in accordance with ASTM C 1064. The placing temperature of the concrete having a minimum dimension greater than 12 inches shall be between 50 and 70 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

### 3.3.5 Hot-Weather Placing

Concrete shall be properly placed and finished with procedures previously submitted in accordance with paragraph 1.5. The concrete-placing temperature shall not exceed 90 degrees F when measured in accordance with ASTM C 1064. Cooling of the mixing water and aggregates, or both, may be required to obtain an adequate placing temperature. A retarder shall be used to facilitate placing and finishing when concrete temperatures exceed 85 degrees F. Steel forms and reinforcement shall be cooled 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.

### 3.3.6 Consolidation

Immediately after placement, each layer of concrete, including flowing concrete, shall be consolidated by internal vibrating equipment. Vibrators shall not be used to transport concrete within the forms. Hand spading may be required, if necessary, with internal vibrating along formed surfaces permanently exposed to view. Form or surface vibrators shall not be used unless specifically approved. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding unhardened layer if such exists. It shall be held stationary until there is a general cessation in escape of large bubbles of entrapped air at the surface of the concrete (generally 5 to 15 seconds) then withdrawn slowly at about 3 inches per second.

## 3.4 FINISHING

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 40 degrees F. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be



expected to exceed 0.2 pounds per square foot per hour, provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow. All unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish. Additional finishing shall be as specified below and shall be true to the elevation shown in the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

### 3.4.1 Unformed Surfaces

#### 3.4.1.1 Float Finish

Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing operation. The concrete, while still green but sufficiently hardened to bear a man's weight without more than about a ¼ inch indentation, shall be floated to a true and even plane. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be made of magnesium or aluminum.

#### 3.4.1.2 Bridge Deck Finish

Class 6 Bridge Deck finish shall be applied to the bridge deck and approach slabs in accordance with LSSRB 805.13 (d).

#### 3.4.1.3 Sidewalk Finish

Class 7 Finish shall be applied to sidewalks in accordance with LSSRB 805.13(e).

#### 3.4.1.4 Concrete Bent Cap (Slab Span) Finish

Class I Ordinary Surface Finish shall be applied to concrete bent caps for slab spans in accordance with LSSRB 805.13(a).

#### 3.4.1.5 Special Surface Finish

All visually exposed surfaces of barrier rail, pedestrian rail, bridge floodwall, levee floodwall, outside face of slab and vertical faces of caps at canal bridge shall receive Class 2A finish in accordance with LSSRB 805.13(b).

### 3.4.2 Formed Surfaces

Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired as described in paragraph 3.4.3.

TYPES OF FINISH	STRUCTURE OR PORTION OF STRUCTURE
Textured	Exposed Surface of Curtain Walls
Cementitious Paint Finish	<ul style="list-style-type: none"><li>a. Top and both sides of the exposed floodwall surfaces to 6" below final grade (except on the fins).</li><li>b. Top and both sides of standard barrier rails and guard rails.</li><li>c. Top and both sides of bridge floodwalls.</li><li>d. Edge of bridge deck and slab spans.</li></ul>

Unless painting of surfaces is required, uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement, with joints between panels planned in approved relation to openings, corners, and other architectural features. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

#### 3.4.2.1 Textured Finish

This type of finish shall be applied where specified to conform to details shown in the drawings by use of approved textured form liners. Liner panels shall be secured in the forms by methods recommended by the manufacturer but not by methods that will permit impressions of nail heads, screw heads, washers, or the like to be imparted to the surface of the concrete. Edges of textured panels shall be sealed to each other to prevent grout leakage. The sealant used shall be nonstaining to the surface. The finish shall be similar to and shall closely match the finish on the sample panel.

#### 3.4.2.2 Cementitious Paint Finish

As approved by the Contracting Officer and after all required patching, cleaning, and correction of major imperfections have been completed, the concrete surfaces identified above shall be given a cementitious paint finish as hereinafter described. The finish shall not be applied before the initial 7 day moist curing period is complete. The temperature of the air adjacent to the surface shall not be less than 50 degrees F for 24 hours prior to and following the application of the finish. If the temperature of

the air adjacent to the surface is above 90 degrees F, the surface shall be cooled prior to the application of the finish by hosing with clean water until it reaches a temperature of 85 degrees F. The finish for any area shall be completed in the same day and the limits of the finished area shall be made at corners or monolith joints. The surfaces to be finished must be structurally sound, clean and free from dirt, form marks, loose mortar particles, paint, films, protective coatings, efflorescence, laitance, etc. The surface shall be dampened ahead of the cementitious paint application with clean water. As a base coat, cementitious paint shall be applied at a rate of two pounds per square yard of surface area. The coating shall be uniform, completely filling all pits, air bubbles, and surface voids. Cementitious paint shall be prepared and applied in accordance with the manufacturer's written recommendations. The mixing liquid for cementitious paint shall contain one part "Acryl 60" or equal, to three parts of clean water. Two coats of acrylic emulsion paint shall then be applied over the base coat. The cementitious paint finish shall match the texture and color of the adjacent existing floodwall. Uniform color shall be maintained by use of only one mixture without any changes in materials or proportions for any structure or portion of structure which is exposed to view or on which a special finish is required.

### 3.4.3 Formed Surface Repair

After removal of forms, all ridges, lips, and bulges on surfaces permanently exposed shall be removed. All repairs shall be completed within 48 hours after form removal.

#### 3.4.3.1 Class A Finishes

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class A finishes shall have surface defects repaired as follows: defective areas, voids, and honeycombs smaller than 16 square inches in area and less than 1/2 inch deep and bug holes exceeding 1/2 inch in diameter shall be chipped and filled with dry-packed mortar. Holes left by removal of tie rods shall be reamed and filled with dry-packed mortar as specified in paragraph 3.4.3.4. Defective and unsound concrete areas larger than described shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern with lines parallel to the formwork, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with a latex bonding agent meeting the requirements of paragraph 2.1.7, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph 3.4.3.4.

#### 3.4.3.2 Reserved

#### 3.4.3.3 Class D Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class D finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs greater than 48 square inches in area or more than 2 inches

deep shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping and the void repaired with replacement concrete. The prepared area shall be brush-coated with a latex bonding agent meeting the requirements of paragraph 2.1.7, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph 3.4.3.4.

#### 3.4.3.4 Material and Procedure for Repairs

The cement used in the dry-packed mortar or replacement concrete shall be a blend of the cement used for production of project concrete and white portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be used to determine the proportions required to match colors. Dry-packed mortar shall consist of one part cement to two and one-half parts fine aggregate. The fine aggregate shall be that used for production of project concrete. The mortar shall be remixed over a period of at least 30 minutes without addition of water until it obtains the stiffest consistency that will permit placing. Mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. and struck off to match adjacent concrete. Replacement concrete shall be produced using project materials and shall be proportioned by the Contracting Officer. It shall be thoroughly compacted into the prepared void by internal vibration, tamping, rodding, ramming, etc. and shall be struck off and finished to match adjacent concrete. Forms shall be used to confine the concrete. If an expanding agent is used in the repair concrete, the repair shall be thoroughly confined on all sides including the top surface. Metal tools shall not be used to finish permanently exposed surfaces. The repaired areas shall be cured for 7 days. The temperature of the in situ concrete, adjacent air, and replacement mortar or concrete shall be above 40 degrees F during placement, finishing, and curing. Other methods and materials for repair may be used only when approved in writing by the Contracting Officer. Repairs of the so called "plaster-type" will not be permitted.

### 3.5 CURING AND PROTECTION

#### 3.5.1 Duration

The length of the curing period shall be determined by the type of cementitious material, as specified below. Concrete shall be cured by an approved method.

Type I portland cement \_\_\_\_\_ 7 days

Type II portland cement \_\_\_\_\_ 14 days

Portland cement blended with  
25 percent or less pozzolan \_\_\_\_\_ 14 days

Portland cement blended with more than  
25 percent pozzolan \_\_\_\_\_ 21 days

Immediately after placement, concrete shall be protected from premature drying, extremes in temperature, rapid temperature change, and mechanical damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours and from flowing water for 14 days. No fire or excessive heat including welding shall be permitted near or in direct contact with concrete or concrete embedments at any time.

### 3.5.2 Moist Curing

Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period. Vertical surfaces shall be cured using soaker hoses, fog sprayers or sprinklers. Burlap may be used to assist moist curing provided that the wall and burlap are kept continuously saturated, including nights and weekends, and the burlap is kept in contact with the concrete being cured. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required in paragraph 1.8.4. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of 2 inches of continuously saturated sand, or by covering with saturated nonstaining burlap or cotton mats. Horizontal construction joints may be allowed to dry for 12 hours immediately prior to the placing of the following lift.

### 3.5.3 Membrane-Forming Curing Compound

Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface on which a cementitious paint finish is to be applied or other concrete is to be bonded, on any surface containing protruding steel reinforcement, or any surface maintained at curing temperature by use of free steam. A pigmented-type curing compound shall not be used on surfaces that will be exposed to view when the project is complete. Concrete cured with nonpigmented curing compound must be shaded from the sun for the first 3 days when the ambient temperature is 90 degrees F or higher.

#### 3.5.3.1 Application

The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. The surfaces shall be thoroughly

moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as free water has disappeared and bleeding has stopped. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 75 psi, at a uniform coverage of not more than 400 square feet per gallon for each coat, and the second coat shall be applied perpendicular to the first coat. Concrete surfaces that have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

#### **3.5.4 Evaporation Retardant**

The following concrete surfaces may be cured using sheet material:

##### **Horizontal Surfaces Only.**

Sheet curing shall not be used on vertical or near-vertical surfaces. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper or polyethylene-coated burlap having the burlap thoroughly water-saturated before placing. 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.

#### **3.5.5 Cold-Weather Curing and Protection**

When the daily outdoor low temperature is less than 32 degrees F, the temperature of the concrete shall be maintained above 40 degrees F for the first 7 days after placing. In addition, 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 observation of ambient and concrete temperatures indicated 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 at such locations as may be directed.

### **3.6 SETTING OF BASE PLATES AND BEARING PLATES**

#### **3.6.1 Setting of Plates**

After being plumbed and properly positioned, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be provided with full bearing with nonshrink grout. The space between the top of concrete or masonry-bearing surface and the bottom of the plate shall be approximately 1/24 of the width of the plate, but not less than 1/2 inch for plates less than 12 inches wide. Concrete surfaces shall be rough, clean, and free of oil, grease, and laitance, and they shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

### 3.6.2 Nonshrink Grout Application

Nonshrink grout shall conform to the requirements of paragraph 2.1.6. Water content shall be the minimum that will provide a flowable mixture and fill the space to be grouted without segregation, bleeding, or reduction of strength.

#### 3.6.2.1 Mixing and Placing of Nonshrink Grout

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be of size to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry-bearing surface and the plate shall be filled solid with the grout. Forms shall be of wood or other equally suitable material for retaining the grout and shall be removed after the grout has set. If grade "A" grout as specified in ASTM C 1107 is used, all surfaces shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be under pressure with a grout pump. Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 65 to 85 degrees F until after setting.

#### 3.6.2.2 Treatment of Exposed Surfaces

After the grout has set, those types containing metallic aggregate shall have the exposed surfaces cut back 1 inch and immediately covered with a parge coat of mortar proportioned by mass of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

#### 3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph 3.5.

## 3.7 TESTS AND INSPECTIONS

Tests and inspections shall conform to the following requirements.

### 3.7.1 General

The Contractor shall perform the inspections and tests described below, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall conform with ASTM C 1077. The individuals who sample and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technician, Grade I. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Construction Inspector, Level II. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077.

### 3.7.2 Testing and Inspection Requirements

#### 3.7.2.1 Fine Aggregate

a. Grading - At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and CE CRD-C 104 for the fine aggregate or for each size range of fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. Results of tests shall be reported in writing.

b. Corrective Action for Fine Aggregate Grading - When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer.

c. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing foreman. When the electric moisture meter is operating



satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.

d. **Moisture Content Corrective Action** - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device) if necessary to maintain the specified slump.

### 3.7.2.2 Coarse Aggregate

a. **Grading** - At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control which are coarser than the specification limits for samples taken at locations other than as delivered to the mixer to allow for degradation during handling. Results of tests shall be reported in writing.

b. **Corrective Action for Grading** - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of five tests are outside specification limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

c. **Coarse Aggregate Moisture Content** - A test for moisture content of each size group of coarse aggregate shall be made at least twice per week. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified above for fine aggregate, until the difference falls below 1.0 percent.

d. **Coarse Aggregate Moisture Corrective Action** - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted if necessary to maintain the specified slump.

### 3.7.2.3 Deleterious Substances

When in the opinion of the Contracting Officer a problem exists in connection with deleterious substances in fine or coarse aggregates, test shall be made in accordance with ASTM C 33 at a frequency not less than one per week. Results of tests shall be reported in writing.

#### 3.7.2.4 Scales

a. **Weighing Accuracy** - The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every 3 months for conformance with the applicable requirements of paragraph 3.1.2. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors.

b. **Batching and Recording Accuracy** - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph 3.1.2 for checking the accuracy of dispensed admixtures are operating properly.

c. **Scales Corrective Action** - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

#### 3.7.2.5 Batch-Plant Control

The measurement of all constituent materials including each cementitious material, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during plant operation.

#### 3.7.2.6 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 quality assurance representative. 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. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single test result reaches either the upper or lower action limit a second test shall immediately be made. The results of the two tests shall be averaged and this average used as the air content of the batch to plot on both the control chart for air content and the control chart for range, and for determining the need for any remedial action. The result of each test, or average as noted in the previous sentence, shall be plotted on a separate chart for each mixture on which an "average line" is set at the midpoint of the specified air content range from paragraph 2.2.3. An upper warning limit and a lower warning limit line shall be set 1.0 percentage point above and below the average line. An upper action limit and a lower action limit line shall be set 1.5 percentage points above and below the average line, respectively. The range between each two consecutive tests shall be plotted on a control chart for range where an upper warning limit is set at 2.0 percentage points and an upper action limit is set at 3.0 percentage points. Samples for air content may be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated air content. If the Contractor's materials or transportation methods cause air content loss between the mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the air content at the mixer controlled as directed.

b. Air Content Corrective Action - Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as is practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the control chart range reaches the warning limit, the admixture dispenser shall be recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted. All this shall be at no extra cost to the Government.

c. 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. Also, additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government's quality assurance representative. Test results shall be plotted on control charts which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single slump test reaches or goes

beyond either the upper or lower action limit, a second test shall immediately be made on the same batch of concrete. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control chart for percent air and the chart for range, and for determining the need for any remedial action. An upper warning limit shall be set at 1/2 inch below the maximum allowable slump on separate control charts for percent air used for each type of mixture as specified in paragraph 2.2.4, and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at 2 inches. Samples for slump shall be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the slump at the mixer controlled as directed.

d. Slump Corrective Action - Whenever points on the control chart for slump reach the upper warning limit, an adjustment shall be immediately made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum W/CM specified, based upon aggregates which are in a saturated surface-dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting operation shall immediately be halted and the Contractor shall take appropriate steps to bring the slump under control. Also, additional slump tests shall be made as directed. All this shall be at no additional cost to the Government.

e. 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.

f. Compressive-Strength Specimens - At least one set of test specimens shall be made each day on each different concrete mixture placed during the day. Additional sets of test cylinders shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A random sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased

manner. A set of test specimens for concrete with a 28-day specified strength per paragraph 1.7 shall consist of four cylinders, two to be tested at 7 days and two at 28 days. A set of test specimens for concrete with a 90-day strength per specified paragraph 1.7 shall consist of six cylinders, two tested at 7 days, two at 28 days, and two at 90 days. Test specimens shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. All compressive-strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength tests, moving average for strength, and moving average for range for each mixture. The charts shall be similar to those found in ACI 214.

### 3.7.2.7 Inspection Before Placing

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

### 3.7.2.8 Placing

a. **Placing Inspection** - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement.

b. **Placing Corrective Action** - The placing foreman shall not permit batching and placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

### 3.7.2.9 Vibrators

a. **Vibrator Testing and Use** - The frequency and amplitude of each vibrator shall be determined in accordance with CE 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 at the same time the vibrator is operating in concrete with the tachometer 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.

b. **Vibrator Corrective Action** - Any vibrator not meeting the requirements of paragraph 3.1.5 shall be immediately removed from service and repaired or replaced.

#### 3.7.2.10 Curing

a. **Moist-Curing Inspections** - At least once each shift, and once per day on non-work days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. **Moist-Curing Corrective Action** - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

c. **Membrane-Curing Inspection** - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square feet per gallon. He shall note whether or not coverage is uniform.

d. **Membrane-Curing Corrective Action** - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. **Sheet-Curing Inspection** - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. **Sheet-Curing Corrective Action** - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

#### 3.7.2.11 Cold-Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

### **3.7.2.12 Cold-Weather Protection Corrective Action**

When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended 1 day.

### **3.7.2.13 Mixer Uniformity**

a. **Stationary Mixers** - Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 75,000 cubic yards of concrete placed, whichever results in the longest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94.

b. **Truck Mixers** - Prior to the start of concrete placing and at least once every 6 months, uniformity of concrete shall be determined in accordance with ASTM C 94. The truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer, the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory.

### **3.7.2.14 Mixer Uniformity Corrective Action**

When a mixer fails to meet mixer uniformity requirements, either the mixer shall be removed from service on the work, the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

### **3.7.3 Reports**

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all test and inspection records.

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SECTION 04204 – EXISTING BRICK PATIO STONE SIDEWALK

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all labor, equipment and materials and performing all operations in connection with the removal and reconstruction of the existing brick patio and stone walkway to the limits shown on the drawings.

1.2 MEASUREMENT AND PAYMENT

**No measurement will be made for the removal and reconstruction of the brick and stone sidewalk. Payment will be made at the lump sum price for "Remove and Reset Existing Brick Patio Stone Sidewalk".**

PART 2 PRODUCTS – NOT APPLICABLE

2.1 BRICK AND STONE

The existing brick and stone shall be used for the reconstruction of the patio and walkway.

2.2 CONCRETE BASE

The concrete base slab shall have a compressive strength of 3000 psi in 29 days and shall conform to the requirements of Section 03301.

2.3 REINFORCEMENT

Steel reinforcement shall be 60,000 psi in conformance with Section 03210.

2.4 GRANULAR BASE MATERIAL

Granular base material shall be in accordance with Section 02222.

## PART 3 EXECUTION

### 3.1 GENERAL

The Contractor shall remove and stockpile the existing brick and stone to be used to reconstruct the patio and walkway. The Contractor shall protect the existing patio and stone walkway to remain and shall be responsible for any damage caused by the construction. All work shall conform to the plan details.

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## SECTION 05500 - MISCELLANEOUS METALWORK

### PART 1 GENERAL

#### 1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, materials and equipment, and furnishing and installing the miscellaneous metalwork as shown on the drawings and specified herein and shall include, but is not limited to, the following items:

##### 1.1.1 Corrosion Resistant Steel (C.R.S.)

Settlement reference bolts.

Identification tag for reference bolts.

Bolts, hex cap screws, anchor bolts, threaded studs, washers, nuts and set screws.

##### 1.1.2 Galvanized Anchor Bolts

#### 1.2 FABRICATED STEEL

Bicycle and Pedestrian Aluminum Railings over Bridge

Aluminum Hand Rail at Stepped Walkway

Strip Seal Support Brackets

H Piles at End Bents

Slip joint, I-wall to bridge floodwall.

#### 1.3 MANUFACTURED PRODUCTS

Flexible bonding jumpers for bonding of piling as specified in Section 16640, "CATHODIC PROTECTION".

Galvanized 18 gage steel sheet metal.

#### 1.4 REFERENCES

The following publications of the issues listed below but referred to thereafter by basic designation only form a part of this specification to the extent indicated by the references thereto or as required.

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

A 36	(2001) Carbon Structural Steel
A 27	(2000) Steel Casting, Carbon, for General Application
A 47	(1999) Ferritic Malleable Iron Casting
A 325	(2002) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum
A 123	(2002) Zinc (Hot Dip-Galvanized) Coatings on Iron and Steel Products
A 276	(2002a) Stainless and Heat-Resisting Steel Bars and Shapes
B 308	(2002) Aluminum Alloy 6061-T6 Standard Structural Profiles
F 593	(2002) Stainless Steel Bolts, Hex Cap Screws, and Studs
F 594	(2002) Stainless Steel Nuts

**FEDERAL SPECIFICATIONS (FED. SPEC.).**

FF-N-836D(3)	Nut: Square, Hexagon, Cap Slotted, Castle, Knurled, Welding and Single Ball Seat
FF-S-200A(2)	Set Screws: Hexagon Socket, Spine Socket, Head Less

FF-S-325

Shield Expansion; Nail, Expansion; and Nail, Drive  
Screw (Devices, Anchoring, Masonry)

FF-W-92B

Washers, Flat (Plain)

Department of Transportation and Development  
State of Louisiana  
Louisiana Standard Specifications for Roads & Bridges, 2000 Edition

## 1.5 QUALITY CONTROL

### 1.5.1 General

The Contractor shall establish and maintain quality control for proper fabrication and installation of all work covered in this section 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) Fabrication.
- (2) Protective coating.
- (3) Placement and protection.
- (4) Material compliance with plans and specifications.

### 1.5.2 Reporting

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

## 1.6 SUBMITTALS

### 1.6.1 Shop Drawings

The Contractor shall prepare and submit for approval, complete shop drawings and descriptive literature showing details of all auxiliary items required as indicated herein or on the contract drawings. Shop drawings shall indicate computed weights of structural steel and approval of shop drawings will constitute acceptance of the computed weights shown on these drawings.

### 1.6.2 Manufacturer's Certification

The galvanizing compound shall be certified for compliance with all specification requirements.

## 1.7 MEASUREMENT AND PAYMENT

Unless otherwise specified herein, any materials or operations used in conjunction with installation or as part of metalwork which is not included in the cost of other items of work listed in the bidding schedule **shall not be measured for payment. Payment for miscellaneous metalwork will be made at the contract lump sum prices for "Miscellaneous Metalwork".** Price and payment shall constitute full compensation for furnishing and installing all miscellaneous metalwork indicated on the drawings and/or herein specified which is not specified to be paid for under other items of work listed on the bidding schedule.

## PART 2 PRODUCTS

### 2.1 FABRICATED AND MANUFACTURED ITEMS

Fabrication and placement of all fabricated items shall be as indicated on the drawings and shall conform to the applicable provisions of Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS".

#### 2.1.1 Corrosion Resistant Steel

Corrosion resistant steel shall conform to ASTM 276, Type 304. Corrosion resistant steel bolts, nuts and washers shall conform to the applicable provisions of paragraph 05501-2.1.2 except that the material shall be corrosion-resistant steel.

#### 2.1.2 Stainless Steel Bolts, Hex Cap Screws, Nuts, Washers, and Set Screws

##### 2.1.2.1 Stainless Steel Bolts and Hex Cap Screws

Stainless steel bolts and hex cap screws shall conform to ASTM F 593, Group 2, Alloy 316, Condition CW.

#### 2.1.2.2 Stainless Steel Nuts

Stainless steel nuts shall conform to ASTM F 594, Group 2, Alloy 316, Condition CW.

#### 2.1.2.3 Stainless Steel Washers

Stainless steel washer shall conform to Fed. Spec. FF-W-92B, Type A, Grade 1 (Sizes: Light and Heavy), Class B (Alloy 316).

#### 2.1.2.4 Stainless Steel Set Screws

Stainless steel set screws shall conform to Fed. Spec. FF-S-200A(2), Type I, Style 1, Alloy 304.

#### 2.1.3 Expansion Anchors

Expansion anchors shall meet the requirements of Fed. Spec. FF-S-325, Group II, Type 4, Class 1. Nail driven types will not be acceptable. Anchors shall be galvanized unless otherwise indicated.

#### 2.1.4 Aluminum Railing

a. Aluminum railing for bicycle railing and pedestrian railing shall have minimum 3 ½" outside diameter and minimum wall thickness 0.216" complying with 6061 T6 conforming to ASTM B308.

b. Aluminum railing for stepped walkway shall have a minimum 1.90" outside diameter and minimum wall thickness of 0.145" complying with 6061 T6 Conforming to ASTM B 308.

All work shall be done in accordance with latest Louisiana Standard Specifications for Roads and Bridges.

#### 2.1.5 Grout

The non-shrink grout specified on the drawings shall be EMBECO or an approved equal.



## **PART 3 EXECUTION**

### **3.1 WORKMANSHIP**

All metalwork fabrication and machine work shall comply with the applicable provisions of Section 05501. All parts shall be properly fabricated, assembled and installed to conform to the shapes, sizes and dimensions indicated on the contract drawings and approved shop drawings.

#### **3.1.1 Settlement Reference Bolts**

Upon installation of the settlement reference bolts the Contractor shall determine elevations of each bolt and submit his results to the Contracting Officer.

#### **3.1.2 Transition from I-wall to Bridge Floodwall**

The steel sheet piling slip joint shall be surrounded by 18 gage steel sheet metal, as shown on the drawings. The space between the sheet metal and the steel sheet piling shall be filled with a plastic sealant, as shown on the drawings and as specified in paragraph 4.2.8.

#### **3.1.3 Shop Painting**

Corrosion-resistant and galvanized steel items shall not be painted. Corrosion-resistant steel shall be cleaned as specified in section 05501. Anchors to be bedded in concrete shall not be painted. All other ferrous metal shall be cleaned and shop painted before delivery to the project site. Requirements governing cleaning and painting are as specified in Section 09940, "PAINTING".

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**SECTION 05501 - METALWORK FABRICATION, MACHINE WORK,  
AND MISCELLANEOUS PROVISIONS  
(Jan 2002)**

**PART 1 GENERAL**

**1.1 SCOPE**

This section specifies general workmanship requirements, applicable to the fabrication, assembly and testing of various items of metalwork and machine work to insure conformance with the specifications. These requirements are in addition to those contained in the specification sections covering the specific items of work or indicated on the drawings.

**1.2 MEASUREMENT AND PAYMENT**

No separate measurement and payment will be made for the material and work covered under this section and all costs in connection therewith shall be included in the applicable contract price for the items to which the work pertains.

**1.3 REFERENCES**

The following publications of the issues listed below but referred to thereafter by basic designation only form a part of this specification to the extent indicated by the references thereto or as required.

**AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)**

**B4.1 (1967) Preferred Limits and Fits for Cylindrical Parts**

**B46.1 (1995) Surface Texture (Surface Roughness, Waviness and Lay)**

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

**A 123 (2002) Zinc (Hot Dip-Galvanized) Coatings on Iron and Steel Products**

**A 276 (2002) Standard Specifications for Stainless Steel Bars and Shapes**

**A 325 (2002) Structural Bolts, Steel Heat Treated 120/105 ksi Minimum Tensile Strength**

**A 380 (1999) Cleaning and Descaling Stainless Steel Parts,**

**Equipment, and Systems**

- A 490 (2002) Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
- A 514 (2000a) High Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
- F594 (2002) Standard Specifications for Stainless Steel Nuts

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE (ASME BPVC)**

**Section IX Welding and Brazing Qualifications**

**AMERICAN WELDING SOCIETY, INC. (AWS) CODE**

- D 1.1 (2000) Structural Welding Code, Steel

**FEDERAL SPECIFICATIONS (FED. SPEC.)**

- FF-S-85C(3) Screw, Cap, Slotted and Hexagon head  
FF-B-575C Bolts, Hexagon and Square  
TT-P-645A Primer, Paint, Zinc-Chromate Alkyd Type  
FF-W-92B Washers, Metal, Flat (Plain)  
FF-N-836D(1) Nuts, Square, Hexagon, Cap Slotted, Castle, Knurled, Welding and Single Ball Seat

**DEPARTMENT OF DEFENSE (DOD)**

- DOD-P-21035 Paint, High Zinc Dust Content, Galvanizing Repair (Navy) (Metric)

**RESEARCH COUNCIL ON RIVETED AND BOLTED STRUCTURAL JOINTS OF THE ENGINEERING FOUNDATION (RCRBSJ)**

**Specification for Structural Joints Using ASTM A 325 or A 490 Bolts**

**1.4 SUBMITTALS**

Contractor submittals shall be in accordance with the specifications and as herein specified.

**1.4.1 Shop Drawings**

Shop drawings shall be submitted for approval in accordance with the Contract Clauses. Drawings shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of materials as appropriate.

#### 1.4.2 Lists of Materials

The Contractor shall furnish the Contracting Officer 3 copies of all purchase and mill orders, shop orders for materials and work orders, including all new orders placed by Contractors and old orders extended by each supplier. The Contractor, at the time of submittal of shop drawings, shall furnish a list designating the material to be used for each item. Where mill tests are required, purchase orders shall contain the test site address and the name of the testing agency.

#### 1.4.3 Schedule of Welding Procedures

A complete schedule of welding procedures as described in paragraph 3.3.1.3 shall be submitted to the Contracting Officer and approved before fabrication commences.

#### 1.4.4 Certificates

Certificates for material tests, examinations, and welding procedure and operator qualifications shall be submitted for approval as specified.

### 1.5 QUALITY CONTROL

#### 1.5.1 Tests of Materials

The Contractor shall, at his expense, perform analyses and tests to demonstrate that all materials are in conformity with the specifications. Should the Contractor desire to use stock materials not manufactured specifically for the work covered by these specifications, he shall submit evidence, satisfactory to the Contracting Officer, that such material conforms to the requirements of the specifications. Detailed tests of these materials will then not be required, if so approved by the Contracting Officer. Tests, except where modified, shall be made as indicated in the respective detailed specifications or on the drawings and, unless otherwise authorized, in the presence of the Contracting Officer. The Contractor shall furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Specimens and samples shall be properly labeled and prepared for shipment.

#### 1.5.2 Special Test Requirements

##### 1.5.2.1 Nondestructive Testing

When doubt exists as to the soundness of any material part such part may be subjected to any form of nondestructive testing determined by the Contracting Officer. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government. Any defects will be cause for rejection and rejected parts shall be replaced and retested at the Contractor's expense.

#### 1.5.2.2 Tests of Machinery and Structural Units

Each complete machinery and structural unit, as required by other sections of these specifications, shall be erected and tested in the shop in the presence of the Contracting Officer, unless otherwise directed by the Contracting Officer. Waiving of tests, however, will not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site each complete machinery or structural unit shall be operated through a sufficient number of complete cycles to demonstrate to the satisfaction of the Contracting Officer that it meets the specified operational requirements in all respects. The details for tests on the various machinery and structural units shall conform to the requirements of the applicable sections of these specifications.

#### 1.5.3 Workmanship

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

#### 1.5.4 Quality Control

The Contractor shall establish and maintain a quality control system to assure compliance with the contract requirements and shall maintain records of all quality control operations covered by these specifications.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

##### 2.1.1 General

All nuts shall be equipped with washers where indicated on the drawings. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

##### 2.1.2 Bolts, Nuts, Screws, And Washers

The finished shank of each bolt shall be long enough to provide full bearing and washers shall be used to provide full grip when the nut is tightened.

#### 2.1.2.1 Bolts

Anchor bolts for bent caps shall conform to ASTM A 325, Type 3. Type 3 bolts shall have "A 325" mark underlined on the bolt.

Anchor bolts for handrail shall conform to ASTM F 593.

#### 2.1.2.2 Nuts

Nuts for A 325 bolts shall conform to ASTM A 325, Type 3. Type 3 nuts shall have manufacturer's mark and symbol DH3 on nut.

Nuts for A 276 bolts shall conform to ASTM F 594.

#### 2.1.2.3 Cap Screws

Cap screws shall conform to the applicable provisions of Federal Specification FF-S-85, Type I, Style 2s, or Type II, Style 10p, standard thread unless indicated otherwise on the drawings or in another section of the specifications.

#### 2.1.2.4 Washers

Washers shall conform to the applicable provisions of Federal Specifications FF-W-92, Type A, Grade 1, Class A, unless indicated otherwise or in another section of specifications.

### PART 3 EXECUTION

#### 3.1 STRUCTURAL FABRICATION

##### 3.1.1 Material

Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except, where welding is definitely specified, indicated on the drawings, or otherwise approved. Bends, except for minor details, shall be made by approved dies, press brakes or bending rolls. Where heating is required precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner as not to destroy the original properties of the metal. Flame cutting of material other than structural steel shall be subject to approval and, where proposed, shall be indicated on shop drawings submitted to the Contracting Officer. Shearing shall be accurately done and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown on the drawings. Re-entrant cuts shall be



filleted to a minimum radius of 3/4-inch unless otherwise approved. Finished members shall be free from twists, bends and open joints. Bolts, nuts and screws shall be tight.

### 3.1.2 Dimensional Tolerances for Structural Work

Dimensions shall be measured by means of an approved calibrated steel tape of approximately the same temperature as the material being measured at the time of measurement. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings. An allowable variation of 1/32-inch is permissible in the overall length of component members with both ends milled; individual component members without milled ends shall not deviate from the dimensions shown on the drawings by more than 1/16-inch for members 30-feet or less in length and by more than 1/8-inch for members over 30-feet in length.

### 3.1.3 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand guided torches provided an accurate profile with a smooth surface which is free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1, Subsection 3.2. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand guided cuts not exposed to view. Hand guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

## 3.2 PATTERNS

In the construction of patterns, care shall be taken to avoid sharp corners or abrupt changes in cross section, and ample fillets shall be used. The Contractor shall add such draft and increases in pattern thicknesses as will conform to his standard foundry practice and as may be necessary to insure that all metal thicknesses of the finished castings conform to the dimensions shown on the drawings, within the tolerances specified in paragraph 3.1.2. All patterns will remain the property of the Contractor.

## 3.3 WELDING

### 3.3.1 Structural Steel

#### 3.3.1.1 General

Unless otherwise authorized or specified, welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the

molten metal. Welding, unless otherwise specified or authorized shall conform to the applicable provisions of AWS D1.1, Sections 1 thru 7, 9, 10 and 11.

### 3.3.1.2 Welding Equipment

All items of welding equipment shall conform to the requirements of AWS D1.1.

### 3.3.1.3 Welding Procedures

The Contractor shall prepare for submission to the Contracting Officer a complete schedule of welding procedures which shall consist of detailed procedure specifications for each structure to be welded and tables or diagrams showing the procedure to be used for each required joint. The schedule shall conform to the provisions of AWS D1.1, Sections 2, 3, 4, 7 and 9 and applicable provisions of Section 10, include filler metal requirements, preheat and interpass temperature requirements and any stress relief heat treatment, and show types and locations of welds designated on the drawings and/or in the specifications to receive nondestructive examination. The procedures shall be such as to minimize residual stresses and distortion of the completed weldment. Procedures shall be qualified by tests as prescribed in AWS D1.1, Section 5 except for prequalified procedures described in AWS D1.1, Subsection 5.1. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish the joint welding procedure as prequalified. Each procedure shall be clearly identified as being either prequalified or qualified by tests. The test welding and specimen testing must be witnessed and the test report document signed by a representative of the Contracting Officer. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contracting Officer. Approval of any procedure, however, will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications.

### 3.3.1.4 Qualification of Welders and Welding Operators

Welding operators, welders, and tack welders shall be qualified and requalified if necessary for the particular type of work to be done. Qualification shall be in accordance with AWS D1.1, Section 5 or the ASME BPVC, Section IX.

The Contractor shall certify by name to the Contracting Officer the welders and welding operators so qualified, including the date of qualification and code and procedures under which qualified. Prior qualification may be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. The Contractor shall require the welder and welding operators to repeat the qualifying tests when, in the opinion of the Contracting Officer, his work indicates a reasonable doubt as to proficiency. In such cases, he shall be recertified, as above, if he successfully passes the retest; otherwise, he shall be

disqualified until he has successfully passed a retest. All expenses in connection with qualification and requalification shall be borne by the Contractor.

### **3.3.1.5 Technique**

#### **3.3.1.5.1 Filler Metal**

The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures to be furnished by the Contractor. To maintain low moisture of low hydrogen electrodes, a controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1, Subsection 4.5.

#### **3.3.1.5.2 Preheat and Interpass Temperature**

Preheating shall be performed as required by AWS D1.1, Subsection 4.2 and 4.3 or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

#### **3.3.1.5.3 Stress-Relief Heat Treatment**

Where stress relief heat treatment is specified or shown on the drawings, it shall be in accordance with the requirements of AWS D1.1, Subsection 4.4, unless otherwise authorized or directed by the Contracting Officer.

### **3.3.1.6 Workmanship**

Workmanship for welding shall be in accordance with AWS D1.1, Section 3 and other applicable requirements of these specifications.

#### **3.3.1.6.1 Preparation of Base Metal**

Prior to welding, the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1, Subsection 3.2.

#### **3.3.1.6.2 Temporary Welds**

Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed herein for permanent work. All temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for

permanent work as specified elsewhere in these specifications. Preheat furnished for temporary welds shall be as required by AWS D1.1 for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds, arcs shall not be struck in other than weld locations. Each temporary weld shall be removed after serving its purpose and ground flush with adjacent surfaces.

#### 3.3.1.6.3 Tack Welds

Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds. Preheating shall be performed as specified above for temporary welds. Such tack welds shall be cleaned and fused thoroughly with the permanent welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

#### 3.3.1.7 Inspection

Welding shall be subject to inspection by the Contracting Officer to determine conformance with the requirements of AWS D1.1, and the approved welding procedures and provisions stated elsewhere in these specifications. The Contracting Officer will require nondestructive examination of designated welds and may require supplemental examination of any joint or coupon cut from any location in any joint. The Contractor shall maintain an approved inspection system and perform required inspections in accordance with the Contract Clause entitled "CONTRACTOR INSPECTION SYSTEM".

##### 3.3.1.7.1 Visual Examination

Prior to any welding, the Contractor shall visually inspect the preparation of material for welding to assure compliance with Section 3 of AWS D1.1. All completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement, and other surface defects to insure compliance with the requirements of AWS D1.1, Section 3 and Section 9, Part D. Defects shall be corrected as provided in paragraph 3.3.1.7.4.

##### 3.3.1.7.2 Test Coupons

The Government reserves the right to require the Contractor to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive examination. Should any two coupons cut from the work of any welder show strengths under test, less than that specified for the base metal it will be considered evidence of negligence or incompetence and such welder shall be removed from the work. When coupons are removed from any part of a structure, the members cut shall be repaired in a neat workman like manner with joints of the proper type to develop the full strength of the members, with peening as approved or directed to relieve residual stress. The expense for removal and testing of the coupons, repair of

cut members and the performance of nondestructive examination of repairs shall be assigned to the Government or the Contractor in accordance with the Contract Clause entitled "INSPECTION AND ACCEPTANCE".

#### 3.3.1.7.3 Supplemental Examination

The Government reserves the right to perform supplemental nondestruction examinations as deemed necessary when the soundness of any weld is in doubt and to detect cracking or similar defects that might occur during shipment or erection and before final acceptance by the Government. The cost of such inspection will be borne by the Government. The repairs and the reexamination of repairs will be performed by the Contractor at no additional cost to the Government.

#### 3.3.1.7.4 Repairs

Defective weld metal shall be removed by air carbon-arc or oxygen gouging to sound metal. Oxygen gouging shall not be used on ASTM A 514 steel. The surfaces shall be thoroughly cleaned before welding. The resulting cavities shall be rewelded in compliance with Article 6.6 of AWS D1.1. When deemed necessary by the Contracting Officer, the Contractor shall submit a welding repair plan for approval before repairs are made. Welds that have been repaired shall be retested by the same methods used in the original inspection. All costs of repairs and testing shall be borne by the Contractor, except for repair of members cut to remove test coupons which were found to contain acceptable welds.

#### 3.3.1.7.5 Oxygen Cutting

In all oxygen cutting, flame shall be so adjusted and manipulated as to avoid cutting beyond the prescribed lines. Cut surfaces and edges shall be left free of slag.

### 3.4 NOT USED

## 3.5 BOLTED CONNECTIONS

### 3.5.1 Structural Steel Connections

Bolts, nuts and washers shall be of the type specified or indicated on the drawings. All nuts shall be equipped with washers except for high strength bolts. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated on the drawings, the materials, workmanship and installation shall conform to the applicable provisions of the RCRBSJ Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

### 3.5.1.1 Bolt Holes

Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical.

#### 3.5.1.1.1 Regular Bolt Holes

Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16- inch larger than the diameter of the bolt.

#### 3.5.1.1.2 Fitted Bolt Holes

Holes for fitted bolts shall be match-reamed or drilled in the shop. Burrs resulting from reaming shall be removed. The threads of bolts shall be entirely outside of the holes. The body diameter of bolts shall have tolerances as recommended by ANSI B4.1 for the class of fit specified. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

#### 3.5.1.1.3 High Strength Bolt Holes

Holes for high strength bolts shall have diameters of not more than 1/16-inch larger than the bolt diameters. If the thickness of the material is not greater than the diameter of the bolts the holes may be punched. If the thickness of the material is greater than the diameter of the bolt, the holes may be drilled full size or subpunched or subdrilled at least 1/8-inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting done during assembly shall not distort the metal or enlarge the holes. For slight mismatching, reaming to a larger diameter of the next standard size bolt will be allowed.

## 3.6 SHOP ASSEMBLY

Unless otherwise specified, each machinery and structural unit furnished shall be assembled in the shop to determine the correctness of the fabrication and matching of the component parts. The tolerances shall not exceed those shown on the drawings and each unit assembled shall be closely checked to insure that all necessary clearances have been provided and that binding does not occur in any moving part. Assembly in the shop shall be in the same position as final installation (closed position) in the field unless otherwise specified. Assembly and disassembly work shall be performed in the presence of the Government Inspector, unless waived in writing by the Contracting Officer. Errors or defects disclosed shall be immediately remedied by the Contractor without cost to the Government. Before disassembly for shipment, each piece of a machine or structure shall be match-marked to facilitate erection in the field. The location of match-marks shall be indicated by circling with a ring of white paint after the shop coat of paint has been applied, or as otherwise directed.

## 3.7 MISCELLANEOUS PROVISIONS

### 3.7.1 Metallic Coatings

#### 3.7.1.1 Zinc Coatings

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. In all cases where zinc coatings are destroyed by cutting, welding or other causes, the affected areas shall be regalvanized by the following methods. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating. Coatings less than 2 ounces shall be regalvanized by a repair compound conforming to DOD-T-21035.

#### 3.7.2 Cleaning of Corrosion-Resisting Steel

After fabrication, oil, paint and other foreign substances shall be removed from corrosion-resisting steel surfaces. Cleaning shall be done by vapor degreasing or by the use of cleaners of the alkaline, emulsion or solvent type. After the surfaces have been cleaned, they shall be given a final rinsing with clean water followed by a 24-hour period during which the surfaces are intermittently wet with clean water and then allowed to dry for the purpose of inspecting the clean surfaces. The surfaces shall be visually inspected for evidence of paint, oil, grease, welding slag, heat treatment scale, iron rust or other forms of contamination. If evidence of foreign substance exist, the surface shall be cleaned in accordance with the applicable provisions of Section 6 of ASTM A 380. The proposed method of treatment shall be furnished for approval. After treatment the surfaces shall be visually reinspected. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles. Any contamination occurring subsequent to the initial cleaning shall be removed by one or more of the methods indicated above.

#### 3.7.3 Protection of Finished Work

##### 3.7.3.1 Machined Surfaces

Machined Surfaces shall be thoroughly cleaned of foreign matter. All finished surfaces shall be protected by suitable means. Unassembled pins and bolts shall be oiled and wrapped with moisture resistant paper or protected by other approved means. Finished surfaces of ferrous metals to be in bolted contact shall be washed with a rust inhibitor and coated with an approved rust resisting compound for temporary protection during fabrication, shipping and storage periods. Finished surfaces of metals which will be exposed after installation shall be painted as specified in Section 09900, "PAINTING", except that painting of corrosion resisting

steel or nonferrous metals will not be permitted unless specifically authorized or specified.

### 3.8 INSTALLATION

#### 3.8.1 General

All parts to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Holes and grooves for lubrication shall be cleaned. Enclosed chambers or passages shall be examined to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected by a representative of the Contracting Officer prior to installation. Disassembly, cleaning and lubrication will not be required except where there is indication that such work is necessary to place the assembly in a clean and properly lubricated condition. Pipe wrenches, cold chisels, or other tools likely to cause damage to the surfaces of rods, nuts or other parts shall not be used for assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly, but care shall be taken not to over stress the threads. When a half nut is used for the purpose of locking a full nut, the half nut shall be placed first and followed by the full nut. Threads of all bolts, except high strength bolts, nuts and screws shall be lubricated by graphite and oil before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with an approved anti-galling compound. Driving and drifting bolts or keys will not be permitted.

#### 3.8.2 Blocking and Wedges

All blocking and wedges used during installation for the support of parts to be grouted in foundations shall be removed before final grouting unless otherwise directed by the Contracting Officer. Blocking and wedges left in the foundations with the approval of the Contracting Officer shall be of steel or iron.

#### 3.8.3 Expansion Joint Covers

Expansion joint covers shall be set in formwork before pouring concrete and protected from damage and soil.

### 3.4 STUD WELDING

Stud welding, unless otherwise specified shall conform to the applicable provisions of section 7, part F of AWS D1.1.

#### 3.4.1 Stud Materials

The type, size and length of studs shall be as indicated on the drawings. The Contractor shall furnish for approval the manufacturer's certified test reports and



certification that the studs conform to the applicable requirements of AWS D1.1, Subsections 7.2 and 7.3.

#### 3.4.2 Stud Base Application Qualification

As a condition of approval, the Contractor shall furnish, a certified report giving data, procedures and results of tests performed in accordance with the provisions of Article 7.4 of AWS D1.1. The test specimens shall be prepared using suitable specimen plates of the same base metal to which the studs are to be welded.

#### 3.4.3 Workmanship

The studs shall be welded in accordance with the provisions of Article 7.4 of AWS D1.1. Studs on which a full 360 degree weld fillet is not obtained may, at the option of the Contractor, be repaired by adding a 3/16-inch fillet, using shielded metal arc process with low-hydrogen welding electrodes. If the reduction of the length of studs becomes less than normal as they are welded, welding shall be stopped immediately and not resumed until the cause has been corrected.

#### 3.4.4 Inspection

The welding of stud connectors will be subject to visual inspection by the Government's Inspector. Each stud connector that does not show a full 360 degree weld fillet, that has been repaired by welding, or the reduction in length due to welding is less than normal shall be tested in accordance with the requirements for testing of one in every 100 stated in paragraph 3.4.5.

#### 3.4.5 Testing

Prior to starting welding operation and at the beginning of each day's operation, two stud connectors shall be welded in the same general position (flat, vertical, overhead, sloping) to a separate piece of material of similar thickness and composition as the member to which the studs are to be welded. After being allowed to cool, these studs shall be tested by bending to an angle of 30 degree by striking the stud with a hammer. If failure occurs in the weld zone of either stud, the procedure shall be corrected and two successive studs successfully welded and tested before any studs are welded to the member. The foregoing testing shall be performed after any change in the welding procedure. If failure occurs in the stud shank, an investigation shall be made to ascertain and correct the cause before further welds are made. In addition to the foregoing tests at least one stud in every 100 shall be struck with a hammer and bent to an angle of 15 degree or if threaded shall be torque tested with a calibrated torque wrench as indicated in Figure 7.6.6 of AWS D1.1. If the stud fails, two more of the existing studs shall be bent or torque tested. If either of these two studs fails, all of the studs represented by the tests shall be rejected. Studs under

testing that crack either in the weld, the base metal, or the shank shall be rejected and replaced by the Contractor at no additional cost to the Government.

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**SECTION 09940 - PAINTING  
(Sept 2001)**

**PART 1 GENERAL**

**1.1 SCOPE**

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances, and materials and performing all operations in connection with preparation of surfaces and application of paint and other specified materials. This work shall be accomplished in complete and strict accordance with the specifications and the applicable drawings and shall be subject to the terms and conditions of the contract.

**1.1.1 Work Performance**

Work shall be performed in accordance with the requirements of 29 CFR 1910, 29 CFR 1926, EM 385-1-1, and other references as listed herein. Matters of interpretation of the standards shall be submitted to the Contracting Officer for resolution before starting work. Where the regulations conflict, the most stringent requirements shall apply.

**1.2 MEASUREMENT AND PAYMENT**

No separate measurement or payment will be made for painting. Payment for all painting work performed and for all materials furnished under the section of the specifications for painting will be included in the contract unit or lump sum prices for which the work is incidental to.

**1.3 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 NATIONAL STANDARDS INSTITUTE (ANSI)**

Z87.1a (1997) Occupational and Educational Eye and Face Protection

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

D 843 (2001) Nitration Grade Xylene

D 1186 (2001) Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base

D 4417 (1999) Measurement of Surface Profile of Blast Cleaned Steel

**CODE OF FEDERAL REGULATIONS (CFR)**

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1910.20 Access to Employee Exposure and Medical Records

29 CFR 1910.94 Ventilation

29 CFR 1910.134 Respiratory Protection

29 CFR 1910.146 Permit-required Confined Spaces

29 CFR 1910, Subpart I Personal Protective Equipment

29 CFR 1926 Safety and Health Regulations for Construction

40 CFR 50.6 National Primary and Secondary Ambient Air Quality Standards for Particulate Matter

40 CFR 58, App E Probe Siting Criteria for Ambient Air Quality Monitoring

40 CFR 60, App A, Mtd 22 Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares

40 CFR 261 Identification and Listing of Hazardous Waste

40 CFR 262 Standards Applicable to Generators of Hazardous Waste

40 CFR 262.22 Number of Copies

40 CFR 263 Standards Applicable to Transporters of Hazardous Waste

49 CFR 171, Subchapter C Hazardous Materials Regulations

**ENGINEERING MANUAL (EM)**

EM 385-1-1 (1996)U.S. Army Corps of Engineers Safety and Health Requirements Manual(3 Sep 96 Edition)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999)National Electrical Code

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 98-119 (1998; 4th Ed., 2nd Supplement) NIOSH Manual of Analytical Methods

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC).

Paint 16 (1991) Coal Tar Epoxy-Polyamide Black (or Dark Red) Paint

SP 1 (1982) Solvent Cleaning

SP 5 (2000) White Metal Blast Cleaning

SP 7 (2000) Brush-Off Blast Cleaning

1.4 SUBMITTALS

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

1.4.1 Statements

1.4.1.1 Qualifications and Experience; GA

The Contractor shall submit certification pursuant to paragraph 5 for all job sites. Submittal of the qualifications and experience of any additional qualified and competent persons the CIH, IH, CSP employs to provide on-site safety and health will also be provided. Acceptance of this submission must be obtained prior to the submission of other required safety and health submittal items.

1.4.1.2 Accident Prevention Plan; GA



The Contractor shall submit an Accident Prevention Plan in accordance with the requirements of Section 01 of EM 385-1-1.. The plan shall be prepared for all sites and shall include, but is not limited to, each of the topic areas listed in Appendix A therein and the requirements of paragraph 7; each topic shall be developed in a concise manner to include management and operational aspects.

#### 1.4.1.3 Confined Space Procedures; GA

The Contractor shall submit detailed written standard operating procedures for confined spaces for all job sites in accordance with 29 CFR 1910.146 and EM 385-1-1 and as further described in this paragraph.

##### 1.4.1.3.1 Certificates of Calibration

The Contractor shall supply certificates of calibration for all testing and monitoring equipment. The certificates of calibration shall include: type of equipment, model number, date of calibration, firm conducting calibration, and signature of individual certifying calibration.

##### 1.4.1.3.2 Methods of Inspection

The procedures shall include methods of inspection of personal protective equipment prior to use.

##### 1.4.1.3.3 Work Practices

The procedures shall include work practices and other engineering controls designed to reduce airborne hazardous chemical exposures to a minimum.

##### 1.4.1.3.4 Specification of the Design

The procedures shall include specification of the design and installation of ventilation systems which shall provide adequate oxygen content and provide for the dilution of paint solvent vapor, lead, and other toxic particulates within the confined space. In addition, the Contractor shall include plans to evaluate the adequacy of air flow patterns.

#### 1.4.1.4 Respiratory Protection Program; GA

The Contractor shall submit a comprehensive written respiratory protection program for all job sites in accordance with 29 CFR 1910.134, 29 CFR 1926.62, and Section 05.E of EM 385-1-1.

#### 1.4.1.5 Airborne Sampling Plan; GA

The Contractor shall submit an Airborne Sampling Plan for all job sites detailing the NIOSH Pub No. 98-119, Factory Mutual, or Underwriters Laboratories approved equipment, equipment calibration procedures, sampling methods, sampling to be performed, and analytical procedures to be used based on the type of work to be performed and anticipated toxic contaminants to be generated. The Contractor shall include the name of the accredited laboratory, listed by the American Industrial Hygiene Association (AIHA), to be used to conduct the analysis of any collected air samples. In addition, the Contractor shall provide the Contracting Officer with a copy of the test results from the laboratory within 5 working days of the sampling date and shall provide results from direct-reading instrumentation on the same day the samples are collected.

**1.4.1.6 Ventilation Assessment; GA**

The Contractor shall submit a plan to provide ventilation assessment for all job sites as required by paragraph 1.7.4.1.

**1.4.1.7 Medical Surveillance Plan; GA**

The Contractor shall submit a plan to provide medical surveillance to the workforce for all job sites as required in paragraph 8 and provide a statement from the examining physician indicating the name of each employee evaluated and any limitations which will preclude the employee from performing the work required. The statement shall include the date of the medical evaluation, the physician's name, signature, and telephone number. Medical records shall be maintained as required by 29 CFR 1910.20.

**1.4.1.8 Waste Classification, Handling, and Disposal Plan; GA**

The Contractor is responsible for assuring the proper disposal of all hazardous and nonhazardous waste generated during the project. Therefore, the Contractor shall submit a Waste Classification, Handling, and Disposal Plan for all job sites in accordance with the requirements of 40 CFR 261 and 40 CFR 262 and paragraph 1.10.1.

**1.4.1.9 Reserved**

**1.4.1.10 Ambient Air Monitoring Plan for Particulate Emissions; GA**

For all jobs requiring tight control on emissions where lead is not present, the Contractor shall submit a plan for monitoring emissions of particulate matter 10 microns or less in size (PM-10). The plan shall comply with the requirements of EPA regulation 40 CFR 50.6 and paragraph 1.10.3.1 and shall include provisions for halting work and correcting the containment in the event unacceptable emissions occur.

#### 1.4.1.11 Visible Emissions; GA

For all jobs requiring tight control on emissions where lead is not present, the Contractor shall submit a Visible Emissions Monitoring Plan in accordance with paragraph 1.10.2. The plan shall also include the provisions for halting work and correcting the containment in the event unacceptable emissions are observed. General statements shall not be used; specific methods, procedures, and details are required.

#### 1.4.2 Samples

##### 1.4.2.1 Special Paint Formulas; GA

Samples of special paint of the formula, listed in paragraph 2.2 shall be submitted. The ingredient samples shall be clearly identified by commercial name, trade designation, manufacturer, batch or lot number, and such other data as may be required. For all epoxy type paints submitted for laboratory testing, a list of ingredient raw materials identifying commercial name, trade designation, manufacturer, batch or lot number, and such other data as may be required shall be furnished.

##### 1.4.2.2 Proprietary paints

When the required quantity of a particular type or color of a paint is 10 gallons or less, a proprietary, name-brand, shelf item paint of the same type and with similar properties to the material specified may be proposed without sampling. Proprietary paints are any which do not follow the formulas in paragraph 2.2, or the complete specification requirements of Federal and Military specifications, and The Society For Protective Coatings. To receive consideration, a statement from the supplier that the paint is appropriate as to type, color, and gloss and is a premium grade of paint shall be furnished.

##### 1.4.2.3 Thinners; GA

Samples shall be submitted of the thinners which are those solvents used to reduce the viscosity of the paint.

#### 1.4.3 Records

##### 1.4.3.1 Inspections and Operations; GA

The Contractor shall document and submit records of inspections and operations performed in accordance with paragraph 21. Submittals shall be made on a daily basis.

##### 1.4.3.2 PM-10 Monitoring Report

The Contractor shall submit reports of the PM-10 monitoring tests as described in paragraph 1.10.3.1.

#### 1.4.3.3 TSP Monitoring Report

The Contractor shall submit reports of the TSP monitoring tests as described in paragraph 1.10.3.2

#### 1.4.3.4 Airborne Sampling Report

The Contractor shall submit reports of airborne sampling tests as required by paragraph 1.7.5.1.

### 1.5 QUALIFICATIONS

Qualifications and experience shall comply with the following.

#### 1.5.1 Certified Professional

The Contractor shall provide a person who is qualified and competent as defined in Section 01 of EM 385-1-1, to develop the required safety and health submittal, and to be responsible for on-site safety and health during the contract period. The person shall be a Certified Industrial Hygienist (CIH), an Industrial Hygienist (IH), or a Certified Safety Professional (CSP) with a minimum of 3 years of demonstrated experience in similar related work. The Contractor shall certify that the Certified Industrial Hygienist (CIH) holds current and valid certification from the American Board of Industrial Hygiene (ABIH), that the IH is considered board eligible by written confirmation from the ABIH, or that the CSP holds current and valid certification from the American Board of Certified Safety Professionals. The CIH, IH, or CSP may utilize other qualified and competent persons, as defined in EM 385-1-1, to conduct on-site safety and health activities as long as these persons have a minimum of 3 years of demonstrated experience in similar related work and are under the direct supervision of the CIH, IH, or CSP.

#### 1.5.2 Certified Laboratory

The Contractor shall provide documentation which includes the name, address, and telephone number of the laboratories to be providing services.

### 1.6 SAMPLING AND TESTING

The Contractor shall allow at least 30 days for sampling and testing. Sampling may be at the jobsite or source of supply. The Contractor shall notify the Contracting Officer when the paint and thinner are available for sampling. Sampling of each batch shall be

witnessed by the Contracting Officer unless otherwise specified or directed. A 1-quart sample of paint and thinner shall be submitted for each batch proposed for use. The sample shall be labeled to indicate formula or specification number and nomenclature, batch number, batch quantity, color, date made, and applicable project contract number. Testing will be performed by the Government. Costs for retesting rejected material will be deducted from payments to the Contractor at the rate of \$300.00 dollars for each sample retested.

## 1.7 SAFETY AND HEALTH PROVISIONS

Paragraph 1.7 supplements the requirements of EM 385-1-1, paragraph (1). In any conflict between Section 01 of EM 385-1-1 and this paragraph, the provisions herein shall govern.

### 1.7.1 Abrasive Blasting

The Contractor shall comply with the requirements in Section 06.H of EM 385-1-1.

#### 1.7.1.1 Hoses And Nozzles

In addition to the requirements in Section 20 of EM 385-1-1, hoses and hose connections of a type to prevent shock from static electricity shall be used. Hose lengths shall be joined together by approved couplings of a material and type designed to prevent erosion and weakening of the couplings. The couplings and nozzle attachments shall fit on the outside of the hose and shall be designed to prevent accidental disengagement.

#### 1.7.1.2 Workers Other Than Blasters

Workers other than blasting operators working in close proximity to abrasive blasting operations shall be protected by utilizing MSHA/NIOSH-approved half-face or full-face air purifying respirators equipped with high-efficiency particulate air (HEPA) filters, eye protection meeting or exceeding ANSI Z87.1 and hearing protectors (ear plugs and/or ear muffs) providing at least 20 dBA reduction in noise level, or as needed to provide adequate protection.

### 1.7.2 Cleaning with Compressed Air

Cleaning with compressed air shall be in accordance with Section 20.B.5 of EM 385-1-1 and personnel shall be protected as specified in 29 CFR 1910.134.

### 1.7.3 Cleaning with Solvents

#### 1.7.3.1 Ventilation

Ventilation shall be provided where required by 29 CFR 1910.146 or where the concentration of solvent vapors exceeds 10 percent of the Lower Explosive Limit (LEL). Ventilation shall be in accordance with 29 CFR 1910.94, paragraph (c)(5).

#### 1.7.3.2 Personal Protective Equipment

Personal protective equipment shall be provided where required by 29 CFR 1910.146 and in accordance with 29 CFR 1910, Subpart I.

#### 1.7.4 Paint Application

##### 1.7.4.1 Ventilation

When using solvent-based paint in confined spaces, ventilation shall be provided to exchange air in the space at a minimum rate of 5,000 cubic feet per minute per spray gun in operation. It may be necessary to install both a mechanical supply and exhaust ventilation system to effect adequate air changes within the confined space. All air-moving devices shall be located and affixed to an opening of the confined space in a manner that assures that the airflow is not restricted or short circuited and is supplied in the proper direction. Means of egress shall not be blocked. Ventilation shall be continued after completion of painting and through the drying phase of the operation. If the ventilation system fails or the concentration of volatiles exceeds 10 percent of the LEL (except in the zone immediately adjacent to the spray nozzle), painting shall be stopped and spaces evacuated until such time that adequate ventilation is provided. An audible alarm that signals system failure shall be an integral part of the ventilation system. The effectiveness of the ventilation shall be checked by using ventilation smoke tubes and making frequent oxygen and combustible gas readings during painting operations. Exhaust ducts shall discharge clear of the working areas and away from possible sources of ignition.

##### 1.7.4.2 Explosion Proof Equipment

Electrical wiring, lights, and other equipment located in the paint spraying area shall be of the explosion proof type designed for operation in Class I, Division 1, Group D, hazardous locations as required by the NFPA 70. Electrical wiring, motors, and other equipment, outside of but within 20 feet of any spraying area, shall not spark and shall conform to the provisions for Class I, Division 2, Group D, hazardous locations. Electric motors used to drive exhaust fans shall not be placed inside spraying areas or ducts. Fan blades and portable air ducts shall be constructed of nonferrous materials. Motors and associated control equipment shall be properly maintained and grounded. The metallic parts of air-moving devices, spray guns, connecting tubing, and duct work shall be electrically bonded and the bonded assembly shall be grounded.

### **1.7.4.3 Further Precautions**

- a. Workers shall wear nonsparking safety shoes.**
- b. Solvent drums taken into the spraying area shall be placed on nonferrous surfaces and shall be grounded. Metallic bonding shall be maintained between containers and drums when materials are being transferred.**
- c. Insulation on all power and lighting cables shall be inspected to ensure that the insulation is in excellent working condition and is free of all cracks and worn spots. Cables shall be further inspected to ensure that no connections are within 50 feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.**

### **1.7.4.4 Ignition Sources**

**Ignition sources, to include lighted cigarettes, cigars, pipes, matches, or cigarette lighters shall be prohibited in area of solvent cleaning, paint storage, paint mixing, or paint application.**

### **1.7.5 Health Protection**

#### **1.7.5.1 Air Sampling**

**The Contractor shall perform air sampling and testing as needed to assure that workers are not exposed to contaminants above the permissible exposure limit. In addition, the Contractor shall provide the Contracting Officer with a copy of the test results from the laboratory within five working days of the sampling date and shall provide results from direct-reading instrumentation on the same day the samples are collected.**

#### **1.7.5.2 Respirators**

**During all spray painting operations, spray painters shall use approved SCBA or SAR (air line) respirators, unless valid air sampling has demonstrated contaminant levels to be consistently within concentrations that are compatible with air-purifying respirator Assigned Protection Factor (APF). Persons with facial hair that interferes with the sealing surface of the facepiece to faceseal or interferes with respirator valve function shall not be allowed to perform work requiring respiratory protection. Air-purifying chemical cartridge/canister half- or full-facepiece respirators that have a particulate prefilter and are suitable for the specific type(s) of gas/vapor and particulate contaminant(s) may be used for nonconfined space painting, mixing, and cleaning (using solvents). These respirators may be used provided the measured or anticipated concentration of the contaminant(s) in the breathing zone of the exposed worker does not exceed the APF for the respirator and the gas/vapor**

has good warning properties or the respirator assembly is equipped with a NIOSH-approved end of service life indicator for the gas(es)/vapor anticipated or encountered. Where paint contains toxic elements such as lead, cadmium, chromium, or other toxic particulates that may become airborne during painting in nonconfined spaces, air-purifying half-and full-facepiece respirators or powered air-purifying respirators equipped with appropriate gas vapor cartridges, in combination with a high-efficiency filter, or an appropriate canister incorporating a high-efficiency filter, shall be used.

### **1.7.5.3 Protective Clothing and Equipment**

All workers shall wear safety shoes or boots, appropriate gloves to protect against the chemical to be encountered, and breathable, protective, full-body covering during spray-painting applications. Where necessary for emergencies, protective equipment such as life lines, body harnesses, or other means of personnel removal shall be used during confined-space work.

## **1.8 MEDICAL STATUS**

Prior to the start of work and annually thereafter, all Contractor employees working with or around paint systems, thinners, blast media, those required to wear respiratory protective equipment, and those who will be exposed to high noise levels shall be medically evaluated for the particular type of exposure they may encounter. The evaluation shall include:

- a. Audiometric testing and evaluation of employees who will work in the noise environments.
- b. Vision screening (employees who use full-facepiece respirators shall not wear contact lenses).
- c. Medical evaluation shall include, but shall not be limited to, the following:
  - (1) Medical history including, but not limited to, alcohol use, with emphasis on liver, kidney, and pulmonary systems, and sensitivity to chemicals to be used on the job.
  - (2) General physical examination with emphasis on liver, kidney, and pulmonary system.
  - (3) Determination of the employee's physical and psychological ability to wear respiratory protective equipment and to perform job-related tasks.



(4) Determination of baseline values of biological indices for later comparison to changes associated with exposure to paint systems and thinners or blast media, which include: liver function tests to include SGOT, SGPT, GGPT, alkaline phosphates, bilirubin, complete urinalysis, EKG (employees over age 40), blood urea nitrogen (bun), serum creatinine, pulmonary function test, FVC, and FEV, chest x-ray (if medically indicated), blood lead (for individuals where it is known there will be an exposure to materials containing lead), other criteria that may be deemed necessary by the Contractor's physician, and Physician's statements for individual employees that medical status would permit specific task performance.

## 1.9 CHANGE IN MEDICAL STATUS

Any employee whose medical status has changed negatively due to work related chemical and/or physical agent exposure while working with or around paint systems and thinners, blast media, or other chemicals shall be evaluated by a physician, and the Contractor shall obtain a physicians statement as described in paragraph 1.8 prior to allowing the employee to return to those work tasks. The Contractor shall notify the Contracting Officer in writing of any negative changes in employee medical status and the results of the physicians reevaluation statement.

## 1.10 ENVIRONMENTAL PROTECTION

In addition to the requirements of section 01352 the Contractor shall comply with the following environmental protection criteria.

### 1.10.1 Waste Classification, Handling, and Disposal

The Contractor shall be responsible for assuring the proper disposal of all hazardous and nonhazardous waste generated during the project. Waste generated from abrasive blasting lead-containing paints with recyclable steel or iron abrasives shall be disposed of as a hazardous waste or shall be stabilized with proprietary pre-blast additives regardless of the results of 40 CFR 261, App II, Mtd 1311. Where stabilization is preferred, the contractor shall employ a proprietary blast additive, that has been blended with the blast media prior to use. Hazardous waste shall be placed in properly labeled closed containers and shall be shielded adequately to prevent dispersion of the waste by wind or water. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken. Nonhazardous waste shall be stored in closed containers separate from hazardous waste storage areas. All hazardous waste shall be transported by a licensed transporter in accordance with 40 CFR 263 and 49 CFR 171, Subchapter C. All nonhazardous waste shall be transported in accordance with local regulations regarding waste transportation. In addition to the number of manifest copies required by

40 CFR 262.22, one copy of each manifest will be supplied to the Contracting Officer prior to transportation.

### 1.10.2 Visible Emissions Monitoring

The time of emissions shall be measured in accordance with 40 CFR 60, App A, Mtd 22. Visible emissions shall be monitored for not less than 15 minutes of every hour. Visible emissions for each hour shall be calculated by extrapolation. In no case shall visible emissions extend greater than 150 feet/45 meters in any direction horizontal from the containment. In no case shall visible emissions be observed in the area of any sensitive receptor. If such emissions occur the job shall be shut down immediately and corrective action taken. The foreman shall be notified whenever visible emissions exceed [40] [200] seconds in a 1 hour period. The foreman shall be notified and the job shall be shut down and corrective action taken whenever visible emissions exceed [75] [300] seconds in a 2 hour period. Total observed visible emissions from the containment shall not exceed [1] [5] percent of the work day. Shutdown and corrective action shall be taken by the Contractor to prevent such an occurrence. The Contractor shall document each time that the work is halted due to a violation of the visible emissions criteria. Documentation shall include the cause for shutdown and the corrective action taken to resolve the problem.

### 1.10.3 Air Quality Monitoring

#### 1.10.3.1 PM-10 Monitoring

The Contractor shall perform PM-10 monitoring. The positioning of air monitoring equipment shall be in accordance with 40 CFR 58, App E, Subpart (8). In addition, a minimum of two PM-10 monitors shall be used at the project site, one down wind from the project and one in the area of greatest public access (e.g., playground, school yard, or homeowner's yard). When the project is in an area where there are critical receptors nearby, monitoring shall be conducted throughout the entire period that abrasive blasting and cleanup operations are performed. Otherwise, monitoring shall be performed 4 of the first 8 days and on a regular basis thereafter for a sum total of 25 percent of the time surface preparation and debris cleanup are performed. Failure to meet air quality regulatory limits shall require air monitoring to be repeated immediately after corrective actions have been taken. The Contractor shall also conduct preproject PM-10 monitoring. The preproject PM-10 monitoring shall be conducted a minimum of 2 weeks prior to the beginning of the project. The monitoring shall continue for a minimum of 3 days to establish background levels. A report of the results shall be submitted to the Contracting Officer within 48 hours and shall include:

- (1) Name and location of jobsite.
- (2) Date of monitoring.

- (3) Time of monitoring (i.e., time monitoring begins and ends each day).
- (4) Identification and serial number of monitoring units.
- (5) Drawing showing specific location of monitoring units.
- (6) Drawing showing specific location of paint removal operation and the method of removal or work activity being performed.
- (7) Wind direction and velocity.
- (8) A flow chart verifying the rate of air flow across the filter throughout the sampling period.
- (9) Name and address of laboratory.
- (10) Laboratory test procedure.
- (11) Laboratory test results.
- (12) Signatures of field and laboratory technicians conducting the work.

#### 1.10.3.2 TSP Monitoring

The Contractor shall perform TSP monitoring. The positioning of air monitoring equipment shall be in accordance with 40 CFR 58, App E, Subpart (8). In addition, a minimum of two TSP monitors shall be used at the project site, one down wind from the project and one in the area of greatest public access (e.g. playground, school yard, or homeowner's yard). TSP-lead monitoring shall be conducted in accordance with 40 CFR 50, App B. When the project is in an area where there are critical receptors nearby, monitoring shall be conducted throughout the entire period that abrasive blasting and cleanup operations are performed. Otherwise, monitoring shall be performed 4 of the first 8 days and on a regular basis thereafter for a sum total of 25 percent of the time surface preparation and debris cleanup are performed. Failure to meet air quality regulatory limits shall require air monitoring to be repeated immediately after corrective actions have been taken. The Contractor shall also conduct preproject TSP monitoring. The preproject TSP monitoring shall be conducted a minimum of 2 weeks prior to the beginning of the project. The monitoring shall continue for a minimum of 3 days to establish background levels. A report of the results shall be submitted to the Contracting Officer within 48 hours and shall include:

- (1) Name and location of jobsite.

(2) Date of monitoring.

(3) Time of monitoring (i.e., time monitoring begins and ends each day).

(4) Identification and serial number of monitoring units.

(5) Drawing showing specific location of monitoring units.

(6) Drawing showing specific location of paint removal operation and the method of removal or work activity being performed.

(7) Wind direction and velocity.

(8) A flow chart verifying the rate of air flow across the filter throughout the sampling period.

(9) Name and address of laboratory.

(10) Laboratory test procedure.

(11) Laboratory test results.

(12) Signatures of field and laboratory technicians conducting the work.

## 1.11 QUALITY CONTROL

### 1.11.1 General

The Contractor shall establish and maintain quality control for painting 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) Cleaning and preparation of surfaces.

(2) Paint and formulations.

(3) Number of coats and rates of applications.

(4) Protection of painted surfaces.

(5) Safety and Industrial Hygiene monitoring.

### 1.11.2 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. Format of this report shall be as prescribed in Section 01451, "Contractor Quality Control".

### 1.12 PAINT PACKAGING, DELIVERY, AND STORAGE

Paints shall be processed and packaged to ensure that within a period of one year from date of manufacture, they will not gel, liver, or thicken deleteriously, or form gas in the closed container. Paints, unless otherwise specified or permitted, shall be packaged in standard containers not larger than 5 gallons, with removable friction or lug-type covers. Each container of paint or separately packaged component thereof shall be labeled to indicate the purchaser's order number, date of manufacture, manufacturer's batch number, quantity, color, component identification and designated name, and formula or specification number of the paint together with special labeling instructions, when specified. Paint shall be delivered to the job in unbroken containers. Paints that can be harmed by exposure to cold weather shall be stored in ventilated, heated shelters. All paints shall be stored under cover from the elements and in locations free from sparks and flames.

## PART 2 PRODUCTS

### 2.1 SPECIAL PAINT FORMULAS

Special paints shall have the composition as indicated in the formulas listed herein. Where so specified, certain components of a paint formulation shall be packaged in separate containers for mixing on the job. If not specified or otherwise prescribed, the color shall be that naturally obtained from the required pigmentation.

### 2.2 PAINT FORMULATIONS

Formula C-200a, Coal Tar-Epoxy (Black) Paint shall conform to SSPC Paint 16 manufactured with Type 1 pitch. In addition to standard labeling, container labels shall include the term, Corps of Engineers Formula C-200a.

### 2.3 INGREDIENTS FOR SPECIAL PAINT FORMULAS

Xylene shall conform to ASTM D 843.

### 2.4 TESTING

## 2.4.1 Chromatographic Analysis

Solvents in epoxy paints and thinners shall be subject to analysis by programmed temperature gas chromatographic methods and/or spectrophotometric methods, employing the same techniques that give reproducible results on prepared control samples known to meet the specifications. If the solvent being analyzed is of the type consisting primarily of a single chemical compound or a mixture of two or more such solvents, interpretation of the test results shall take cognizance of the degree of purity of the individual solvents as commercially produced for the paint industry.

## PART 3 EXECUTION

### 3.1 CLEANING AND PREPARATION OF SURFACES TO BE PAINTED

#### 3.1.1 General Requirements

Surfaces to be painted shall be cleaned before applying paint or surface treatments. Deposits of grease or oil shall be removed in accordance with SSPC SP 1, prior to mechanical cleaning. Solvent cleaning shall be accomplished with mineral spirits or other low toxicity solvents having a flashpoint above 100 degrees F. Clean cloths and clean fluids shall be used to avoid leaving a thin film of greasy residue on the surfaces being cleaned. Items not to be prepared or coated shall be protected from damage by the surface preparation methods. Machinery shall be protected against entry of blast abrasive and dust into working parts. Cleaning and painting shall be so programmed that dust or other contaminants from the cleaning process do not fall on wet, newly painted surfaces, and surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Welding of, or in the vicinity of, previously painted surfaces shall be conducted in a manner to prevent weld spatter from striking the paint and to otherwise reduce coating damage to a minimum; paint damaged by welding operations shall be restored to original condition. Surfaces to be painted that will be inaccessible after construction, erection, or installation operations are completed shall be painted before they become inaccessible.

#### 3.1.2 Ferrous Surfaces Subject to Severe Exposure

Ferrous surfaces subject to extended periods of immersion or as otherwise required shall be dry blast-cleaned to SSPC SP 5. The blast profile, unless otherwise specified, shall be 1.5 to 2.5 mils as measured by ASTM D 4417, Method C. Appropriate abrasive blast media shall be used to produce the desired surface profile and to give an angular anchor tooth pattern. If recycled blast media is used, an appropriate particle size distribution shall be maintained so that the specified profile is consistently obtained. Steel shot or other abrasives that do not produce an angular profile shall not be used. Weld spatter not

dislodged by blasting shall be removed with impact or grinding tools and the areas reblasted prior to painting. Surfaces shall be dry at the time of blasting. Blast cleaning to SSPC SP 5 shall be done in the field and, unless otherwise specifically authorized, after final erection. Within 8 hours after cleaning, prior to the deposition of any detectable moisture, contaminants, or corrosion, all ferrous surfaces blast cleaned to SSPC SP 5 shall be cleaned of dust and abrasive particles by brush, vacuum cleaner, and/or blown down with clean, dry, compressed air, and given the first coat of paint. All abrasives used in sandblasting operations shall contain less than 1% silica, unless approved in writing by the Contracting Officer.

## 3.2 PAINT APPLICATION

### 3.2.1 General

The finished coating shall be free from holidays, pinholes, bubbles, runs, drops, ridges, waves, laps, excessive or unsightly brush marks, and variations in color, texture, and gloss. Application of initial or subsequent coatings shall not commence until the Contracting Officer has verified that atmospheric conditions and the surfaces to be coated are satisfactory. Each paint coat shall be applied in a manner that will produce an even, continuous film of uniform thickness. Edges, corners, crevices, seams, joints, welds, rivets, corrosion pits, and other surface irregularities shall receive special attention to ensure that they receive an adequate thickness of paint. Spray equipment shall be equipped with traps and separators and where appropriate, mechanical agitators, pressure gauges, pressure regulators, and screens or filters. Air caps, nozzles, and needles shall be as recommended by the spray equipment manufacturer for the material being applied. Airless-type spray equipment may be used only on broad, flat, or otherwise simply configured surfaces, except that it may be employed for general painting if the spray gun is equipped with dual or adjustable tips of proper types and orifice sizes.

### 3.2.2 Mixing and Thinning

Paints shall be thoroughly mixed, strained where necessary, and kept at a uniform composition and consistency during application. Paste or dry-powder pigments specified to be added at the time of use shall, with the aid of powered stirrers, be incorporated into the vehicle or base paint in a manner that will produce a smooth, homogeneous mixture free of lumps and dry particles. Where necessary to suit conditions of the surface temperature, weather, and method of application, the paint may be thinned immediately prior to use. Thinning shall generally be limited to the addition of not more than 1 pint per gallon of the proper thinner; this general limitation shall not apply when more specific thinning instructions are provided. Paint that has been stored at low temperature, shall be brought up to at least 70 degrees F before being mixed and thinned, and its temperature in the spray tank or other working container shall not fall below 60 degrees F during the application. Paint that has deteriorated in any manner to a degree that it cannot be

restored to essentially its original condition by customary field-mixing methods shall not be used and shall be removed from the project site. Paint and thinner that is more than 1 year old shall be resampled and resubmitted for testing to determine its suitability for application.

### 3.2.3 Atmospheric and Surface Conditions

Paint shall be applied only to surfaces that are above the dew point temperature and that are completely free of moisture as determined by sight and touch. Paint shall not be applied to surfaces upon which there is detectable frost or ice. Except as otherwise specified, the temperature of the surfaces to be painted and of air in contact therewith shall be not less than 45 degrees F during paint application nor shall paint be applied if the surfaces can be expected to drop to 32 degrees F or lower before the film has dried to a reasonably firm condition. During periods of inclement weather, painting may be continued by enclosing the surfaces and applying artificial heat, provided the minimum temperatures and surface dryness requirements prescribed previously are maintained. Paint shall not be applied to surfaces heated by direct sunlight or other sources to temperatures that will cause detrimental blistering, pinholing, or porosity of the film.

### 3.2.4 Time Between Surface Preparation and Painting

Surfaces that have been cleaned and/or otherwise prepared for painting shall be primed as soon as practicable after such preparation has been completed but, in any event, prior to any deterioration of the prepared surface.

### 3.2.5 Method of Paint Application

Unless otherwise specified, paint shall be applied by brush or spray to ferrous and nonferrous metal surfaces. Special attention shall be directed toward ensuring adequate coverage of edges, corners, crevices, pits, rivets, bolts, welds, and similar surface irregularities. Other methods of application to metal surfaces shall be subject to the specific approval of the Contracting Officer.

### 3.2.6 Measurement on Ferrous Metal

Film thickness or spreading rates shall be as specified hereinafter. Where no spreading rate is specified, the paint shall be applied at a rate normal for the type of material being used. In any event, the combined coats of a specified paint system shall completely hide base surface and the finish coats shall completely hide undercoats of dissimilar color. Where dry film thickness requirements are specified for coatings on ferrous surfaces, measurements shall be made with one of the thickness gages listed below. They shall be calibrated and used in accordance with ASTM D 1186. They shall be calibrated using plastic shims with metal practically identical in composition and surface preparation to that



being coated, and of substantially the same thickness (except that for measurements on metal thicker than 1/4 inch, the instrument may be calibrated on metal with a minimum thickness of 1/4 inch). Frequency of measurements shall be as recommended for field measurements by ASTM D 1186 and reported as the mean for each spot determination. The instruments shall be calibrated or calibration verified prior to, during, and after each use. Authorized thickness gages:

- a. Mikrotest, Elektro-Physik, Inc.
- b. Inspector Gage, Elcometer Instruments, Ltd.
- c. Positest, Defelsko Corporation
- d. Minitector, Elcometer Instruments, Ltd.
- e. Positector 2000, Defelsko Corporation

### 3.2.7 Progress of Painting Work

Where field painting on any type of surface has commenced, the complete painting operation, including priming and finishing coats, on that portion of the work shall be completed as soon as practicable, without prolonged delays. Sufficient time shall elapse between successive coats to permit them to dry properly for recoating, and this period shall be modified as necessary to suit adverse weather conditions. Paint shall be considered dry for recoating when it feels firm, does not deform or feel sticky under moderate pressure of the finger, and the application of another coat of paint does not cause film irregularities such as lifting or loss of adhesion of the undercoat. All coats of all painted surfaces shall be unscarred and completely integral at the time of application of succeeding coats. At the time of application of each successive coat, undercoats shall be cleaned of dust, grease, overspray, or foreign matter by means of airblast, solvent cleaning, or other suitable means. Cement and mortar deposits on painted steel surfaces, not satisfactorily removed by ordinary cleaning methods, shall be brushoff blast cleaned and completely repainted as required. Undercoats of high gloss shall, if necessary for establishment of good adhesion, be scuff sanded, solvent wiped, or otherwise treated prior to application of a succeeding coat. Field coats on metal shall be applied after erection except as otherwise specified and except for surfaces to be painted that will become inaccessible after erection.

### 3.2.8 Contacting Surfaces

When riveted or ordinary bolted contact is to exist between surfaces of ferrous or other metal parts of substantially similar chemical composition, such surfaces will not be required to be painted, but any resulting crevices shall subsequently be filled or sealed

with paint. Contacting metal surfaces formed by high-strength bolts in friction-type connections shall not be painted. Where a nonmetal surface is to be in riveted or bolted contact with a metal surface, the contacting surfaces of the metal shall be cleaned and given three coats of the specified primer. Unless otherwise specified, corrosion-resisting metal surfaces, including cladding therewith, shall not be painted.

### 3.2.9 Drying Time Prior to Immersion

Minimum drying periods after final coat prior to immersion shall be at least 7 days. Minimum drying periods shall be increased twofold if the drying temperature is below 65 degrees F and/or if the immersion exposure involves considerable abrasion.

### 3.2.10 Protection of Painted Surfaces

Where shelter and/or heat are provided for painted surfaces during inclement weather, such protective measures shall be maintained until the paint film has dried and discontinuance of the measures is authorized. Items that have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is fully dry and hard. All metalwork coated in the shop or field prior to final erection shall be stored out of contact with the ground in a manner and location that will minimize the formation of water-holding pockets; soiling, contamination, and deterioration of the paint film, and damaged areas of paint on such metalwork shall be cleaned and touched up without delay. The first field coat of paint shall be applied within a reasonable period of time after the shop coat and in any event before weathering of the shop coat becomes extensive.

### 3.2.11 Coal Tar-Epoxy (Black) Paint (Formula C-200a)

#### 3.2.11.1 Mixing

Component B shall be added to previously stirred Component A and thoroughly mixed together with a heavy-duty mechanical stirrer just prior to use. The use of not more than 1 pint of xylene thinner per gallon of paint will be permitted to improve application properties and extend pot life. The pot life of the mixed paint, extended by permissible thinning, may vary from 2 hours in very warm weather to 5 or more hours in cool weather. Pot life in warm weather may be extended by precooling the components prior to mixing; cooling the mixed material; and/or by slow, continuous stirring during the application period. The mixed material shall be applied before unreasonable increases in viscosity take place.

#### 3.2.11.2 Application

Spray guns shall be of the conventional type equipped with a fluid tip of approximately 0.09 inch in diameter and external atomization, seven-hole air cap. Material shall be supplied to the spray gun from a bottom withdrawal pot or by means of a fluid pump; hose

shall be 1/2 inch in diameter. Atomization air pressure shall not be less than 80 psi. High-pressure airless spray equipment may be used only on broad, simply configured surfaces. Brush application shall be with a stiff-bristled tool heavily laden with material and wielded in a manner to spread the coating smoothly and quickly without excessive brushing. The coverage rate of the material is approximately 110 square feet per gallon per coat to obtain 20 mils (dry thickness) in a two-coat system. The paint shall flow together and provide a coherent, pinhole-free film. The direction of the spray passes (or finish strokes if brushed) of the second coat shall be at right angles to those of the first where practicable.

### 3.2.11.3 Subsequent Coats

Except at the high temperatures discussed later in this paragraph, the drying time between coal tar-epoxy coats shall not be more than 72 hours, and application of a subsequent coat as soon as the undercoat is reasonably firm is strongly encouraged. Where the temperature for substrate or coating surfaces during application or curing exceeds or can be expected to exceed 125 degrees F as the result of direct exposure to sunlight, the surfaces shall be shaded by overhead cover or the interval between coats shall be reduced as may be found necessary to avoid poor intercoat adhesion. Here, poor intercoat adhesion is defined as the inability of two or more dried coats of coal tar-epoxy paint to resist delamination when tested aggressively with a sharp knife. Under the most extreme conditions involving high ambient temperatures and sun-exposed surfaces, the drying time between coats shall not exceed 10 hours, and the reduction of this interval to a few hours or less is strongly encouraged. Where the curing time of a coal tar-epoxy undercoat exceeds 72 hours of curing at normal temperatures, 10 hours at extreme conditions, or where the undercoat develops a heavy blush, it shall be given one of the following treatments before the subsequent coat is applied:

- a. Etch the coating surface lightly by brushoff blasting, using fine sand, low air pressure, and a nozzle-to-surface distance of approximately 3 feet.
- b. Remove the blush and/or soften the surface of the coating by wiping it with cloths dampened with 1-methyl-2-pyrrolidone solvent or with Bitumastic 2CB solvent marketed by the Kopcoat, Inc or an approved equal. The solvents may be applied to the surface by fog spraying followed by wiping, but any puddles of solvent must be mopped up immediately after they form. The subsequent coat shall be applied in not less than 15 minutes or more than 3 hours after the solvent treatment.

### 3.2.11.4 Ambient Temperature

Coal tar-epoxy paint shall not be applied when the receiving surface or the ambient air is below 50 degrees F nor unless it can be reasonably anticipated that the average ambient

temperature will be 50 degrees F or higher for the 5-day period subsequent to the application of any coat.

### **3.2.11.5 Safety**

In addition to the safety provisions in paragraph 7, other workmen as well as painters shall avoid inhaling atomized particles of coal tar-epoxy paint and contact of the paint with the skin.

## **3.3 PAINT SYSTEMS APPLICATION**

The required paint systems and the surfaces to which they shall be applied are shown in this paragraph, and/or in the drawings. Supplementary information follows.

### **3.3.1 Fabricated and Assembled Items**

Items that have been fabricated and/or assembled into essentially their final form and that are customarily cleaned and painted in accordance with the manufacturer's standard practice will be exempted from equivalent surface preparation and painting requirements described herein, provided that:

- a. Surfaces primed (only) in accordance with such standard practices are compatible with specified field-applied finish coats.
- b. Surfaces that have been primed and finish painted in accordance with the manufacturer's standard practice are of acceptable color and are capable of being satisfactorily touched up in the field.
- c. Items expressly designated herein to be cleaned and painted in a specified manner are not coated in accordance with the manufacturer's standard practice if different from that specified herein.

### **3.3.2 Surface Preparation**

The method of surface preparation and pretreatment shown in the tabulation of paint systems is for identification purposes only. Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with detailed requirements previously described.

### **3.3.3 System No. 6**

Paint shall be spray or brush applied with a minimum of two coats to provide a minimum total thickness at any point of 16 mils. The specified film thickness shall be attained in any

event, and any additional (beyond two) coats needed to attain specified thickness shall be applied at no additional cost to the Government.

### 3.4 PAINTING SCHEDULES

#### 3.4.1 System No. 6

Items or surfaces to be coated:

(a) Steel Sheet Piling All sheet piling for a depth of ten (10) feet from cut-off, excluding the portion encased in concrete. Interlock grooves of the sheet piling shall not be painted. The unpainted portions of sheet piling which are to be embedded in concrete shall be free from surface contaminants such as oil, loose particles or similar conditions that would prohibit bonding between the concrete and sheet piling.

(b) Steel H Piles. Top ten (10) feet of H piles below the portion which are to be embedded in concrete shall be painted in accordance with these specifications. The unpainted portion of H piles to be embedded in concrete shall be free from surface contamination such as oil, loose particles or similar conditions that would prohibit bonding between concrete and H piling.

(c) All manhole covers, drainage gates and steel pipe sleeves exposed.

(d) All Damaged Metal Surfaces. Damaged part of prepainted items shall be recoated in accordance with the manufacturers recommendation and all sheet pile shall be coated with coal tar epoxy.

<u>SURFACE PREPARATION</u>	<u>1st COAT</u>	<u>2nd COAT</u>	<u>3rd COAT</u>
White metal blast cleaning	Coal tar-epoxy C-200a (black)	Coal tar-epoxy C-200a (black)	Coal tar-epoxy C-200a (black) (if needed to attain required thickness)

#### 3.4.2 Strip Seal Extrusion

Strip Seal Extrusion. All metal surfaces not embedded in concrete shall be painted with two coats of paint per LADOTD Standards.

### 3.5 PROTECTION OF NON-PAINTED ITEMS AND CLEANUP

Walls, equipment, fixtures and all other items in the vicinity of the surfaces being painted shall be maintained free of damage by paint or painting activities. Prompt cleanup of any paint spillage and prompt repair of any painting activity damage shall be required.

### 3.6 INSPECTION

The Contractor shall inspect, document, and report all work phases and operations on a daily basis. As a minimum the daily report shall contain the following:

- a. Inspections performed, including the area of the structure involved and the results of the inspection.
- b. Surface preparation operations performed, including the area of the structure involved, the mode of preparation, the kinds of solvent, abrasive, or power tools employed, and whether contract requirements were met.
- c. Thinning operations performed, including thinners used, batch numbers, and thinner/paint volume ratios.
- d. Application operations performed, including the area of the structure involved, mode of application employed, ambient temperature, substrate temperature, dew point, relative humidity, type of paint with batch numbers, elapsed time between surface preparation and application, elapsed time for recoat, condition of underlying coat, number of coats applied, and if specified, measured dry film thickness or spreading rate of each new coating.

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## SECTION 16520 – EXTERIOR LIGHTING

### 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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C78.1350	(1990) Electric Lamps – 400-Watt, 100-Volt, S51 Single-Ended High-Pressure Sodium Lamps
ANSI C80.1	(1995) Rigid Steel Conduit – Zinc Coated
ANSI C82.4	(1992) Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
ANSI C119.1	(1986; R 1997) Sealed Insulated Underground Connector Systems Rated 600 Volts
ANSI C136.2	(1996) Luminaires, Voltage Classification Roadway Lighting Equipment
ANSI C136.3	(1995) Roadway Lighting Equipment-Luminaire Attachments
ANSI C136.6	(1997) Roadway Lighting Equipment – Metal Heads and Reflector Assemblies – Mechanical and Optical Interchangeability
ANSI C136.9	(1990) Roadway Lighting – Socket Support Assemblies for use in Metal Heads – Mechanical Interchangeability
ANSI C136.10	(1996) Roadway Lighting – Locking – Type Photocontrol Devices and Mating Receptacles – Physical and Electrical Interchangeability and Testing
ANSI C136.11	(1995) Multiple Sockets for Roadway Lighting Equipment
ANSI C136.15	(1986) Roadway Lighting, High-Intensity-Discharge and Low-Pressure Sodium Lamps in Luminaires

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

ASTM A 123/A 123M (1997a) Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products

ASTM A 153/A 153M (1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware

**INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)**

IEEE C2 (1997) National Electrical Safety Code

**NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)**

NEMA TC 6 (1990) PVC AND ABS Plastic Utilities Duct for Underground Installation

NEMA TC 9 (1990) Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation

**NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

NFPA 70 (1999) National Electrical Code

**UNDERWRITERS LABORATORIES (UL)**

UL 6 (1997) Rigid Metal Conduit

UL 98 (1994; Rev. thru June 1998) Enclosed an Dead-Front Switches

UL 467 (1993, Rev. Aug 1996) Grounding and Bonding Equipment

UL 486A (1997; Rev. thru Dec 1998) Wire Connectors and Soldering Lugs for Use with Copper Conductors

UL 651 (1995; Rev thru Oct. 1998) Schedule 40 and 80 Rigid PVC Conduit

UL 651A (1995; Rev. thru Apr. 1998) Type EB and A Rigid PVC Conduit and HDPE Conduit

UL 1029 (1994; Rev. thru Dec. 1997) High-Intensity-Discharge Lamp Ballasts

## 1.2 SYSTEM DESCRIPTION

### 1.2.1 Lighting System and Warning Sign Relocation

The lighting system and warning sign relocation shall be configured as specified and shown. The system shall include all fixtures, hardware, poles, cables, connectors, adapters and appurtenances needed to provide a fully functional lighting system.

### 1.2.2 Electrical Requirements

The equipment shall operate from a 120/240 Volt Single Phase source as shown, plus or minus 10 percent, and 60 Hz, plus or minus 2 percent.

### 1.2.3 Standard Products

Materials and equipment shall be standard products of manufacturer regularly engaged in the manufacturer of such products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "F10" designation are for information only. The following shall be submitted in accordance with section 01330 "SUBMITTAL PROCEDURE".

### 1.3.1 Data

#### 1.3.1.1 Equipment and Materials

Data published by the manufacturer of each item on the list of equipment and material, to permit verification that the item proposed is of the correct size, properly rated or applied, or is otherwise suitable for the application and fully conforms to the requirements specified.

#### 1.3.1.2 Spare Parts

Spare parts data for each item of material and equipment specified, after approval of detail drawings for materials and equipment, and not later than 4 months before the date of beneficial occupancy. The data shall include a complete list of parts, special tools, and supplies, with current unit prices and sources of supply.

## 1.3.2 Drawings

### 1.3.2.1 Lighting System; GA

Detail drawings for the complete system and for lighting fixtures, bracket arms, cable boxes, hand holes, transformers and controllers.

### 1.3.2.2 As-Built Drawings

Final as-built drawings shall be finished drawings on Mylar or vellum and shall be delivered with the final test report.

## 1.3.3 Reports

### 1.3.3.1 Lighting System Operation and Maintenance Manuals

A draft copy of the operation and maintenance manuals, prior to beginning the tests for use during site testing. Final copies of the manuals as specified bound in hardback, loose-leaf binders, within 30 days after completing the field test. The draft copy used during site testing shall be updated with any changes required, prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of each subcontractor installing equipment and systems, and nearest service representatives for each item of equipment for each system. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. The final copies delivered after completion of the field test shall include modifications made during installation checkout and acceptance.

## 1.4 MEASUREMENT AND PAYMENT

### 1.4.1 Electric Utility Coordination

**No measurement will be made for the work specified in this section. Payment will be made at the contract lump sum price for "Electric Utility Coordination".** This item shall include all the necessary coordination and reasonable adjustment in the contractor's work schedule for Entergy (Electric) to perform certain items of work with minimum disruption to service. Items of work include the following:

1. Accurately marking in the field all existing Entergy underground power lines prior to construction.
2. De-energizing all facilities which call for removal.
3. Connecting and de-energizing all new underground electrical services.

4. Coordinate with Entergy to minimize shut-down time.
5. Relocation of Entergy owned poles.

#### 1.4.2 Light Poles, Luminaires, Service Cabinet, and Hand Holes

Light Poles, Luminaires, Service Cabinet And Hand Holes will be measured per each as shown on the drawings. Payment will be made at the contract unit price per each for "Light Pole", "Luminaire", "Service Cabinet" and "Hand Hole". Price and payment shall constitute full compensation for furnishing all labor, materials, equipment, installation, etc., for all lighting and associated wiring as specified herein and as shown on the drawings.

#### 1.4.3 Street Light Conductors and Conduits

Street Light Conductors and Conduits will be measured per linear foot as shown on the drawings. Payment will be made at the contract unit price per linear foot for "Street Light Conductors", 3#4, 1#6G", "Street Light Conductors 6#4, 2#6G", "Conduit 2" PVC", SCH 40 for Street Lights", "Conduit (2 - 2/12") PVC, SCH 40 from Service Cabinet to Existing Electrical Manhole", and "Conduits 2" RGS for Bridge". Price and payment shall constitute full compensation for furnishing all labor, materials, equipment, trenching and backfilling, etc., for all lighting and associated wiring as specified herein and as shown on the drawings.

## PART 2 PRODUCTS

### 2.1 STANDARD PRODUCT

Material and equipment shall be the standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Items of the same classification shall be identical including equipment, assemblies, parts and components.

### 2.2 CABLE

The Contractor shall provide all wire and cable not indicated as government furnished equipment. Wire and cable components shall be able to withstand the jobsite environment for a minimum of 20 years. Medium hard drawn copper conductors shall conform to ASTM B 2 and ASTM B 8.

### 2.3 CABLE SPLICES AND CONNECTORS

Cable splices and connectors shall conform to UL 486A. Underground splices and connectors shall also conform to the requirements of ANSI C119.1.

## 2.4 PULL BOXES

Pull boxes shall be Quazite PCI 730 BA12 with "Electric Logo" or approved equal similar to SK.1.

## 2.5 CONDUIT, DUCTS AND FITTINGS

### 2.5.1 Conduit, Rigid Steel

Rigid steel conduit shall conform to ANSI C80.1 and UL 6.

### 2.5.2 Fittings for Conduit and Outlet Boxes

UL 514B.

### 2.5.3 Fittings, PVC, for Use with Rigid PVC Conduit and Tubing

UL 514B.

### 2.5.4 Non-Metallic Duct

Non-metallic duct lines and fittings utilized for underground installation shall be suitable for the application. Duct shall be thick-wall, single, round-bore type. Material of one type shall be used. Acrylonitrile-butadiene-styrene (ABS) duct shall conform to NEMA TC 6 and NEMA TC 9. High-density conduit shall conform to UL 651A. Schedule 40 polyvinyl chloride (PVC) shall conform to UL 651. Plastic utility duct and fittings manufactured without a UL label or listing shall be provided with a certification as follows: "The materials are suitable for use with 167 degree F wiring. No reduction of properties in excess of that specified for materials with a UL label or listing will be experienced if samples of the finished product are operated continuously under the normal conditions that produce the highest temperature in the duct".

## 2.6 GROUND RODS

Ground rods shall be of copper clad steel conforming to UL 467 not less than 5/8 inch in diameter by 10 feet in length of the sectional type driven full length into the earth.

## 2.7 ILLUMINATION

### 2.7.1 General Lighting

Luminaires, ballasts, lamps and control devices required for general area lighting shall be in accordance with Contract Drawings.

## 2.8 LAMPS AND BALLASTS, HIGH INTENSITY DISCHARGE (HID) SOURCES

## 2.8.1 High-Pressure Sodium

Lamps shall conform to ANSI C78.1350. Ballasts shall conform to ANSI C82.4, or UL 1029. High-pressure sodium lamps shall be clear.

## 2.9 LUMINAIRE COMPONENTS

Luminaire components shall conform to the following: attachments, ANSI C136.3; voltage classification, ANSI C136.2; field identification marking, ANSI C136.15; interchangeability, ANSI C136.6 and ANSI C136.9; and sockets, ANSI C136.11.

## 2.10 LIGHTING CONTROL EQUIPMENT

### 2.10.1 Photo-Control Devices

Photo-control devices shall conform to ANSI C136.10. Each photo-control element shall be a replaceable, weatherproof, plug-in or twist-lock assembly adjustable operation range of approximately 0.5 to 5.0 foot-candles.

### 2.10.2 Manual Control Switches

Manual control switches shall conform to UL 98. The switches shall be the heavy-duty type and shall be suitable for operation on a 120 volt, 60 Hz system. The number of poles and ampere rating shall be as indicated. Switch construction shall be such that a screwdriver will be required to open the switch door when the switch is on. The selector switch shall have a minimum of three positions: ON, OFF and AUTOMATIC. The automatic selection shall be used when photoelectric or timer control is desired. The selector switch shall interface with the lighting system magnetic contractor and control its activity.

## PART 3 EXECUTION

### 3.1 GENERAL

The Contractor shall install all system components, including government furnished equipment, and appurtenances in accordance with the manufacturer's instructions, IEEE C2, and contract documents, and shall furnish necessary hardware, fixtures, cables, wire, connectors, interconnections, services, and adjustments required for a complete and operable system.

#### 3.1.1 Current Site Conditions

The Contractor shall verify that the site conditions are in agreement with the design package. The Contractor shall report all changes to the site or conditions that will affect

performance of the system to the Government. The Contractor shall not take any corrective action without written permission from the Government.

## 3.2 PREVENTION OF CORROSION

### 3.2.1 Aluminum

Aluminum shall not be used in contact with earth or concrete, and where connected to dissimilar metal, shall be protected by approved fittings and treatment.

### 3.2.2 Steel Conduits

Steel conduits shall not be installed within concrete slabs-on-grade. Steel conduits installed underground or under slabs-on-grade, or penetrating slabs-on-grade, shall be field wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50 percent overlap, or shall have a factory-applied plastic resin, epoxy coating. Zinc coating may be omitted from steel conduit which has a factory-applied epoxy coating.

### 3.2.3 Cold Galvanizing

Field welds and/or brazing on factory galvanized boxes, enclosures, conduits, etc. shall be coated with a cold galvanized paint containing at least 95 percent zinc by weight.

## 3.3 INSTALLATION

Cable and all parts of the cable system such as splices and terminations shall be rated not less than 600 volts. The size and number of conductors and the number of cables shall be as indicated. Conductors larger than No. 8 AWG shall be stranded. Each circuit shall be identified by means of fiber or nonferrous metal tags, or approved equal, in each junction box, and at each terminal.

### 3.3.1 Splices

There shall be no splices below grade. Splices above grade shall be made with sealed insulated pressure connectors and shall provide insulation and jacket equal to that of the cable. In order to prevent moisture from entering the splice, jackets shall be cut back to expose the required length of insulation between the jacket and the tapered end of the insulation.

### 3.3.2 Service Cabinet

This item shall include the distribution panel, ground rod, cabinet, associated conduit and wiring, concrete pad, supports and excavation and fill.

Payment for the supply of materials, equipment and labor to perform the work will be made under "Service Cabinet" per each.



### 3.3.3 Hazard Beacon Relocation

Removal and relocation of "Relocated Hazard Beacon" will be measured per each. This item will include disconnect and reconnect electric feed, removal of support, foundation signal heads and controller. Provide new support assembly and foundation per drawing. New foundation shall be complete with excavation, fill, concrete, necessary hardware and site restoration. Install heads, sign, controller and make operable. Contractor shall test beacon before removal and report to owner any deficiencies. Removed equipment shall be stored at Contractor's warehouse.

### 3.3.4 Hand Hole

This item includes installation of pull boxes for light standard feeder, complete with weather proof splices, as necessary. Pull boxes shall be Quazite PC 1730 BA12 with "Electric" logo or approved equal.

Payment for the supply of materials, equipment and labor to perform the work will be made under "Hand Hole" per each.

### 3.3.5 Specific Requirements for Removal of Street Light Pole, Fixture and Hazard Beacon

1. Disconnect electric feed to existing service pole.
2. Remove light fixture and pole and turn over light fixtures to owner. Dispose of wood pole at contractor's expense.
3. Remove hazard beacon assembly. Store at Contractor's secure storage area, at Contractor's expense, for future installation.
4. Complete remove the existing foundation and backfill with non-plastic material.
5. Provide new foundation as shown on drawings.
6. Restore site.
7. Disconnect and abandon existing underground lines.

### 3.3.6 Specific Requirements for Trenching

The Contractor shall perform the following work:

1. To the required depth.

2. Width of the trench shall be determined by the Contractor as his own conditions dictate, provided that the width is at least nine inches (9") minimum at the bottom foot depth and permits placement of conduits in a reasonable straight line.
3. Contractor shall make continuous checks and necessary adjustments to ensure that required depth is strictly adhered to.
4. Trenches which do not permit conduit location and depth specified shall be adjusted as required for the installation of conduit at the specified location and depth.
5. After placement of conduit has been checked by the Engineer, the trench shall be backfilled with select materials removed during excavation provided brickbats, pieces of pipe, and other objects capable of causing damage to conduit are removed. Where conduits are placed beneath roadways, sidewalks, etc., the trenches shall be backfilled with granular material.
6. Restore site.
7. Install wires as required by drawings in conduit after conduit is in place, secured and trench is backfilled.

### 3.3.7 Specific Requirements for Conduit Installation

The Contractor shall perform the following work:

1. Install PVC conduit in accordance with drawings.
2. Thoroughly clean, dry, then solvent weld all PVC conduit joints.
3. Adequately secure conduits at their prescribed location and elevation to assure it is not displaced during placement of concrete.

### 3.3.8 Wire Installation

1. Install wires in conduit only after conduit is properly secured and cast in place.
2. Unless otherwise noted on drawings, wires for each circuit shall be continuous without splices between lights and between lights and points of supply.
3. Seal buried end of conduits with duct seal after installation of street light wires.

### 3.3.9 Cable Connection and Splicing

1. In base of street poles connect #4 and #12 copper wires with fused disconnect taps as indicated on drawings. Wires up each pole shall be #12.

2. Install #4 copper ground wire between metal pole ground nut and ground rod.
3. Splicing in hand holes shall be with water proof splices.

#### 3.3.10 Wire Splicing Hand Holes

Wire splicing within hand holes shall be made where required only and with water proof splice kits only, at no direct cost.

#### 3.3.11 Pole, Bracket and Fixture Assembly

1. On metal poles, install pole cap and brackets.
2. Install 2#12, 1#12G, insulated wires from pole's hand holes to pole top.
3. Install and connect luminaries.
4. Level fixtures after poles have been set and verified for plumb.
5. Install and connect fixtures per manufacture's instruction.

#### 3.3.12 Site Restoration

The Contractor shall perform the following work:

1. Restore the site to a condition equal to or better than original as directed by the Engineer.

#### 3.3.13 Material Damage

The Contractor shall be responsible for all damage to and loss of materials furnished by the Owner after they have been placed in the custody of the Contractor. Responsibility in these instances shall be considered as beginning at the time he signs receipt for the materials and ending when the Contract is fulfilled.

#### 3.3.14 Service

Service to street lights is 120/240V, 3 wire, single phase. Wire fixtures from phase to ground (120V) or phase to phase (240V), as shown on plans. Street light wire shall be in accordance to IPCEA Publication No. S-19-81 and S-61-402.

### 3.4 GROUNDING

Grounding shall be in conformance with NFPA 70, the contract drawings, and the following. Grounding conductors shall be soft-drawn, stranded copper. Ground rods

shall be driven into the earth so that after the installation is complete, the top of the ground rod will be approximately 1 foot below finished grade, except in hand holes.

#### 3.4.1 Items to be Grounded

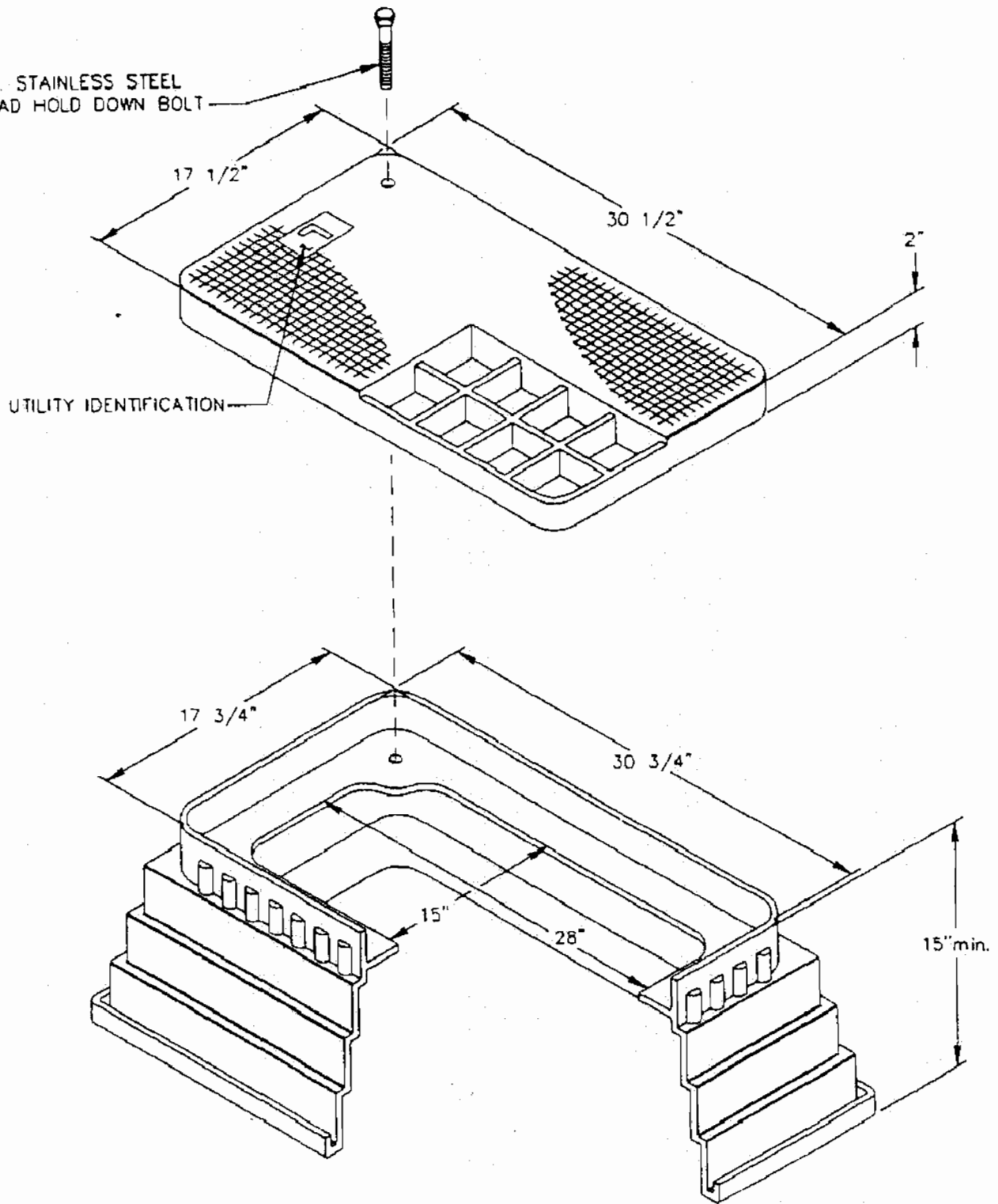
Ground conductors, metallic conduits, junction boxes and non-current-carrying metallic parts of equipment shall be grounded. Connections above grade shall be made with solderless connectors and those below grade shall be made by a fusion-welding process.

### 3.5 TESTS

#### 3.5.1 Operating Test

After the installation is completed and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements specified. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish instruments and personnel required for the test, and the Government will furnish the necessary electric power.

3/8" DIA. STAINLESS STEEL  
PENTAHEAD HOLD DOWN BOLT



NOTE:  
ALL DIMENSIONS ARE APPROXIMATE

TYPICAL JUNCTION BOX, SPLICE BOX, HANDHOLE, OR PULL BOX  
FOR RESIDENTIAL URD SERVICE

SCALE: N.T.S.

SK-01

**APENDIX**

**SUPPLEMENTAL SPECIFICATIONS AND DRAWINGS**

**BY THE**

**SEWERAGE AND WATER BOARD OF NEW ORLEANS**

**SUPPLEMENTAL SPECIFICATIONS**

**BY**

**THE SEWERAGE AND WATER BOARD OF NEW ORLEANS**

**SECTION C701 CULVERTS AND STORM DRAINS (REVISED)**

Section C701 of the General Specifications shall be amended as follows:

Culverts and storm drains shall conform to all of the requirements of the General Specifications and Standard Plans of the Sewerage & Water Board (S&WB) of New Orleans (the latest revision) except as noted herein.

**C701.01 GENERAL:**

- (a) The Contractor shall furnish all materials, equipment, labor and supervision to remove the existing deteriorated main, install new mains and fittings, including appurtenances such as tie-ins to existing system, lumber foundation, bedding, backfilling, necessary dewatering and bypass pumping during the execution of this contract.
- (b) All workmanship, material and tests shall conform with Section E of the General Specifications of the S&WB and S&WB Standard Drawing No. 7260-SWD except as noted herein.
- (c) The Contractor shall notify the Chief of Engineering of the S&WB in writing not less than three or more than ten working days in advance of starting the job so as to schedule the inspection of the work. Failure to do so prior to starting work will result in the Contractor being required to expose the bedding on all pipe previously installed. Copies of the notice to start work shall be sent to the Gravity Systems Superintendent.
- (d) The Contractor may use more than one crew in performing work in various sections of a system at a given time, provided he has the approval of the Director.
- (e) The Contractor performing work under this contract shall be required to coordinate his operations with the S&WB and other utilities prior to making any excavation. The Contractor shall exercise caution in making excavations to avoid damage to these services and other utilities.
- (f) The Contractor will be furnished a list of the locations of water and sewer house connections. It will be the Contractor's responsibility to verify the location of these so as to avoid damage. Furnishing this information should not be construed as a waiver of the Contractor's liability, but rather as an attempt on the part of the Board to minimize the Contractor's hazard. The existing house connections submitted in the list are from S&WB records and could vary from the actual location. Any damage to the existing water, sewer and drain connections resulting from negligence shall be repaired by the S&WB at the

expense of the Contractor. The Contractor is also responsible for damage to other utilities and the property of others.

- (g) Existing drain house connections shall be tied into the new mains. No new drain house services shall be installed.

**C701.02 INSTALLATION:**

Where the entire drain line is replaced between manholes, the drain pipe shall be reinforced concrete pipe conforming to Section C of the General Specifications of the S&WB and to the Standard City Plans, unless otherwise noted. Bedding and foundation lumber for drain lines shall be in accordance with S&WB Standard Drawings No. D-3809, No. D-3810, No. D-3933 and D-3934, except that pumped sand may be used as a bedding material in place of clam shell.

The new drain lines and house connections, where required, shall be installed at the elevations and locations indicated, unless changed by the Director. The Contractor shall schedule his work so that the drain lines and catch basin connections between two manholes are completed before moving to another location.

Backfill material shall be pumped sand and shall be placed at or near optimum moisture content and compacted according to one of the following procedures:

1. Backfill material shall be placed in layers not to exceed 12 inches. Each layer shall be compacted to a minimum of 95 percent of maximum density in accordance with ASTM D 1557 using approved mechanical compaction equipment, or:
2. Backfill material may be placed in layers not exceeding 3 feet by thoroughly flooding and compacting each layer to a minimum of 95 percent maximum density in accordance with ASTM D 1557, prior to placing a subsequent layer. During placement, backfill materials shall be thoroughly saturated with water and satisfactory drainage of materials shall be provided. The above backfill material compaction procedures shall be applied also for any service connections and point repairs.

Filter cloth around the joints of drain lines shall be non-woven conforming to Section 1019, class B. The fabric shall be wrapped around the entire joint with a twelve-inch minimum overlap and a twelve-inch minimum on each side of the joint and shall be secured to the pipe in a manner acceptable to the S&WB.

**C701.03 DRAIN HOUSE CONNECTIONS:**

All existing drain house connections shall be removed and replaced with new PVC pipe from the new drain line to one (1') foot behind the curb where it will be tied to the existing drain house connection pipe.

The new house connection pipe will be connected to the new reinforced concrete pipe by drilling the concrete pipe and by using a rubber boot (Kor-n-Seal boot or approved equal) or sand impregnated PVC bell grouted in the concrete pipe, to connect the new PVC pipe.

The need for replacing existing drain house connections from the back of the curb to the



property line (or any point between) shall be determined by the S&WB after field inspection or as indicated on the drawings. The new pipe will be tied to the existing pipe at that point.

If the existing drain line is being removed and not replaced, or if the S&WB determines it is necessary, an alternate method may be utilized by connecting the existing drain house connections into a PVC collector line located behind the curb and tied into the catch basins or manholes, as directed by the S&WB.

No bends greater than 45 degrees will be allowed in drain house connection pipe.

No drain house connection shall be installed in the corners of catch basins. All connections shall be in the side or back of the catch basin.

All pipes and fittings shall be approved by the S&WB. The connection of any two dissimilar house connection materials shall be accomplished by the installation of a "No-Hub" coupling consisting of a neoprene sleeve and bushing adapter and two stainless steel bands. The coupling shall be manufactured in strict accordance with Cast Iron Soil Pipe Institute Specifications C-301, latest revision, as manufactured by Tyler Pipe Company, Mission Clay Products Corp., Femco, or approved equal.

Where it is necessary to connect the drains to existing manholes, catch basins, or canals, the existing short bell pieces remaining in the wall of the structure shall be inspected. If in bad condition, the short bell pieces shall be broken out and new short bell pieces inserted to the full thickness of the walls and permanently grouted (see S&WB Dwg. 6178-B-6). The annular space between the concrete pipe and the wall of the structure shall be grouted with a type three, high early strength cement, or quick setting EMBECO or similar material.

If a PVC pipe is to be connected to a manhole or other concrete or brick drainage structure, the Contractor shall use a sand-impregnated PVC stub, grouted with cement grout as specified above, for the manhole connection.

Drain house connections shall be backfilled as described herein for drain lines.

#### **C701.04 POINT REPAIRS OF EXISTING DRAIN LINES - NOT USED**

#### **C701.05 INSPECTION:**

At the completion of the point repair or replacement of mains between manholes, and prior to final acceptance, the Board may inspect the mains with a remote controlled television unit or by visual inspection of large lines. The Contractor will be required to repair, at his expense and in an approved manner, all defects in his workmanship disclosed by these tests and inspections before final acceptance.

#### **C701.06 AS BUILT DRAWINGS:**

The Contractor shall furnish a set of "as built" drawings upon completion of the work and prior to final inspection. These drawings shall be a legibly marked set of prints of the Contract Drawings, revised to show clearly all field changes.

## **SECTION C741 - WATER MAINS UP TO 12" IN DIAMETER (REVISED)**

Water mains shall conform to all of the requirements of the General Specifications and Standard Plans of the Sewerage and Water Board (S&WB) of New Orleans (the latest revision), except as noted.

### **C741.01 GENERAL:**

- a. The Contractor shall furnish all labor, supervision, materials and equipment required for the replacement of existing water mains with new mains, including house connections, valves, manholes, hydrants, and making necessary offsets, as required.
- b. All workmanship and materials shall conform with Section F of the General Specifications of the S&WB and Dwg. No. 7260-SWD except as noted herein.
- c. The Contractor shall notify the Chief of Engineering of the Sewerage and Water Board in writing a minimum of three working days and not more than ten working days in advance of starting the job. Copies of the notice shall be sent to the Pressure Systems Superintendent.
- d. All tie-ins to the existing water mains shall be made by the Contractor. The S&WB Forces shall assist in closing valves and witnessing the tests and chlorination of the mains. Contractors shall not operate S&WB valves. Prior to making tie-ins, the Contractor shall notify residents 24 hours in advance of interruption of service.
- e. The existing utilities shown are approximate. The Contractor shall verify the location of utilities in the field and shall protect them from damage.
- f. Water and sewer services which are damaged by the Contractor shall be repaired by the Board at the Contractor's expense. The Contractor will be furnished a list of the locations water and sewer house connections. This listing is from S&WB records and the listed locations could vary from the actual locations. It is the Contractor's responsibility to verify the location of these services and to protect them from damage. Furnishing this information should not be construed as a waiver of the Contractor's liability, but rather an attempt on the part of the Board to minimize the Contractor's hazards.

### **C741.02 MATERIALS AND METHODS:**

- a. All water mains, unless otherwise noted, shall be Class 150 Polyvinyl Chloride (PVC) pipe manufactured in accordance with AWWA C900, latest edition, and shall be U.L. listed. Pipe shall be furnished in standard lengths (min. 16 feet) with integral cast bells or couplings using elastomeric gaskets conforming with the C900 specification. Fittings shall be of ductile iron conforming to ANSI A 21.10 with rubber gasketed joints conforming to A 21.11. Where fittings and valves with mechanical joints are used the bolts and nuts shall be stainless steel.

- b. No direct tapping of the new pipe will be permitted for making house service connections. Service saddles suitable to use with PVC pipe shall be used; i.e., Clow No. 3407 (all bronze) or JCM 407 Series (stainless steel) with 2 bolts, or J. Jones J-966 (all bronze). The Contractor shall use only shell type hole cutter that will retain the coupon or chips and is designed to accommodate walls equal to pressure class 200.
- c. The installation of the PVC pipe shall conform with the manufacturer's recommendations and the applicable requirements of Section F of the S&WB General Specifications. The trench bottom shall be relatively smooth and free from roots, rocks, etc. The pipe shall be laid on a smooth bed of pumped sand six inches in depth for the full width of the trench and extending to the top of the pipe. The sand should be placed and consolidated under the pipe haunches to provide adequate side support to the pipe while avoiding displacement and misalignment. The remainder of the trench should be filled with pumped sand well compacted to the grade as required by subsection 201 (j).
- d. At points of tie-ins, offsets and other locations where the use of other types of pipe materials are justified, the Contractor shall furnish AWWA C150, Special Thickness Class 52 ductile iron pipe with rubber gasketed joints, (as recommended by the pipe manufacturer). All pipe used in fittings shall be ductile iron pipe. All ductile iron pipe shall have cement mortar lining and shall be wrapped with 8 mils polyethylene wrap in accordance with AWWA C105. This tubular wrap shall cover all ductile iron pipe and fittings, including joints, and shall be overlapped a minimum of six inches between sections and sealed with black polyethylene tape.
- e. Offsets in water mains over or under drain lines shall be made by the Contractor with ductile iron fittings or ductile offset fittings. All ductile iron fittings shall be mechanical-joint with retainer glands. All ductile iron pipe and fittings shall be wrapped with 8 mils polyethylene wrap conforming with AWWA C105. Where offsets are made over the drain, there shall not be less than 2.5 feet of cover over the offset piping unless authorized by the S&WB. Before the backfilling of trench, the offsets shall be subjected to an in service visual inspection in the presence of the S&WB.
  - 1. Water line offsets in the new main that are indicated on the drawings or are required to avoid conflicting utilities that are indicated on the drawings are considered main line fittings and payment is included in the price of the new water main.
  - 2. Water line offsets that are required in existing water mains or that are required in the new main to avoid conflicts not indicated on the drawings are to be paid at the bid price for water line offsets.
- f. All fittings, bends, tees, offsets, etc., must have restrained joints in accordance with and for the length recommended by the manufacturer.
- g. Valves and hydrants shall be procured by the Contractor.

- h. Valves shall conform to: (1) American-Darling Co.'s Dwg. No. 93-16039 (S&WB Dwg. No. 7091-F-2). (2) Mueller Co.'s Dwg. No. 6143 (S&WB Dwg. No. 6737-F-2). U.S. Pipe and Foundry Dwg. No. 860036 (S&WB Dwg. No. 6908-F-2, for valves 2" through 8" only). Valves shall have raised pattern letters "SEWERAGE AND WATER BOARD" on the body of the valve. Valves must turn clockwise to open. For details of valve box manholes, castings, etc., see S&WB Drawing 6179-F-2. Existing valves that are replaced or no longer needed, shall be removed and delivered to S&WB Central Yard, 2900 Peoples Avenue.
- i. Hydrants shall conform to: (1) American-Darling Co.'s B62B Dwg. No. 94-14106 (S&WB Dwg. No. 6868-F-2, Revised 6/77). (2) R.D. Wood's Mathews Modernized M620 Dwg. No. F24-93258 (S&WB Dwg. No. 6372-F-2). (3) U.S. Pipe and Foundry Dwg. No. 960021 (S&WB Dwg. No. 6802-F-2). For details of setting hydrants, see S&WB Dwg. No. 6179-F-2. Hydrants shall have lugs and other requirements conforming with the General Specifications. Hydrant leads shall be solid wall PVC pipe Class 150 (AWWA C900). Provide a lugged tee with tie-rods, nuts and washers at all hydrants in addition to the wood blocking. As an alternative, restrained joints may be utilized in accordance with manufacturer's recommendations. Existing hydrants that are removed shall be delivered to the S&WB Central Yard, 2900 Peoples Avenue.
- j. Backfill material shall be pumped sand and shall be placed at or near optimum moisture content and compacted according to one of the following procedures:
  - 1. Backfill material shall be placed in layers not to exceed 12 inches. Each layer shall be compacted to a minimum of 95% of maximum density using approved mechanical compaction equipment, or:
  - 2. Backfill material may be placed in layers not exceeding 3 feet by thoroughly flooding to compact each layer to a minimum of 95 percent maximum density prior to placing a subsequent layer. During placement, backfill materials shall be thoroughly saturated with water and satisfactory drainage of materials shall be provided.

The above backfill material and compaction procedures shall be applied also for any service connections, offsets, etc.

### **C741.03 SERVICE CONNECTIONS:**

- a. All existing lead water house service connections shall be replaced with new polyethylene pipe and fittings from the new or existing main (if not being replaced) to the meter (see S&WB Dwg. No. 7134).
- b. Existing services that are not being replaced (i.e., services that are not lead and that are in good condition) shall be tied into new mains using a service saddle and corporation cock. The new tap and cock shall be the same size as the existing connection, unless otherwise noted. Existing services that require lengthening shall be replaced. There shall be no splicing allowed of new or existing water house service connections.

#### **C741.04 INSPECTION:**

- a. Preliminary acceptance of the water system is contingent upon the system passing inspection. Final acceptance of the water system is contingent upon 90-day maintenance period following satisfactory testing of the system.
- b. The Contractor shall make a hydrostatic test of the main when the entire main has been laid, and all apparent defects in the main, coating, joints, etc., have been repaired as described in Paragraph F-15 of the General Specifications. Testing of only a portion of the main will be done only with the approval of the S&WB. The Contractor shall provide all the equipment and all the labor required for filling and emptying the main, measuring the pressure and leakage. The Contractor shall apply for a construction meter at the Board's House Connection Department to be installed by the Board on a hydrant, and he shall pay the required deposit; the Board will furnish the water free.
- c. All valves in the system shall be wide open so that pressure will come on the flanges and the test plugs which close the ends of the main and its branches, and not on the valve discs.
- d. The main shall be filled from the nearest hydrant to the flange outlet in the test plug (see S&WB Drawing 7004-W, Rev. 3). The Contractor shall provide the necessary hook up piping. When the main is completely filled with water to the satisfaction of the Engineer, the Contractor shall close the air cocks. He shall apply a hydrostatic pressure of 100 psi on the water main system and shall maintain this pressure for a period of twenty-four continuous hours. During this period the total leakage shall not exceed fifty gallons per inch of internal diameter for each mile of pipe.
- e. If greater leakage than said quantity develops, the Contractor shall locate the leaks and repair them, working only from outside the main and using only such methods as approved in advance by the Board's Engineer.
- f. It is the intent of these specifications and of the contract based thereon, that all pipe joints be water tight under all service conditions even though the total leakage of any test is within permissible limits as stated herein. Any and all leaks from improperly laid or defective joints which are discovered during the leakage test or tests, or at any time prior to the elapse of ninety days following the final acceptance by the Board of the entire work, will be repaired by and at the expense of the Contractor.
- g. All concrete reaction blocking and anchorages shall be installed before any test section is initially filled with water.
- h. All pipe to be tested should be filled with water a minimum of twenty-four hours prior to testing in order to minimize absorption of water by the inner surface.
- i. Test plugs shall be furnished and installed by the Contractor for testing purpose in accordance with S&WB Dwg. No. 7004-W, Rev. 3. The test plugs are to be caps or plugs as required and shall be secured to the pipe ends. The test plugs become the Contractor's property after their use.

**C741.05 CHLORINATION:**

- a. Chlorination of water mains shall be performed by the S&WB in accordance with Paragraph F-16 of the General Specification after the Hydrostatic test has been successfully completed. Prior to chlorination, the Contractor shall provide and install the materials required by S&WB Dwgs. 7004-W, Rev. 3, and flush the mains with maximum flow through a 2.5" hose. The Contractor will be responsible for the cleanliness of the main at all times until completion of the work and final acceptance of the Contract. During construction, the Contractor shall keep the main free from dirt, trench water, debris, rodents, etc. At the end of each day's work or stoppage of work the Contractor must provide an approved temporary water tight wing nut test plug (Model A-902 Climax or equal) at each open end. When the work is resumed, the trench must be free of water and dirt before the plug is removed.
- b. The Contractor shall notify the S&WB one week in advance of the desired chlorination date. The Board Forces will require approximately four working days, weather permitting, to conduct tests and give approval and acceptance of the system. A single disinfection will provide satisfactory results if the pipe is kept clean and properly flushed prior to chlorination. If the initial disinfection does not produce satisfactory samples the process shall be repeated and the Contractor shall be assessed as indicated below.
- c. The Board will perform the normal chlorination of the mains at no charge to the Contractor provided the system is in good, clean condition. If, during the chlorination, it is observed that Contractor has not taken proper precautionary measures to prevent contamination, the Board will cease operation until the system is flushed and made clean by the Contractor. The Contractor will be assessed the total cost to the Board for each revisit required to obtain satisfactory results.

**C741.06 AS-BUILT DRAWINGS:**

Prior to final inspection and testing of the system, the Contractor shall submit to the Board "as-built" drawings, showing any change in line or grade from the original drawings and location of house service connections as per S&WB requirements.

**SECTION C742 - SEWER LINES (REVISED)**

**C742.01 SEWERAGE CONSTRUCTION.** The work shall be in accordance with the Sewerage and Water Board Specifications and Standard Plans except as noted herein.

**C742.02 GENERAL.**

- a. The Contractor shall furnish all labor, materials, equipment and supervision required for:
  1. Installation of new sewer mains, sewer house connections and manholes.
  2. Replacement of damaged sewer house connections and manholes.
- b. All work to be done on Sewerage Systems will be as shown on the plans and as directed by the Director. All workmanship, materials and tests shall conform with Section D of the General Specifications of the Sewerage and Water Board and Sewerage and Water Board Standard Drawing No. 7260-SWD, except as noted hereinafter. The Contractor shall notify the Chief of Networks of the Sewerage and Water Board in writing not less than three or more than ten working days in advance of starting the job, in order to allow for scheduling the inspection of the work. Failure to do so prior to starting work will result in the Contractor being required to expose the bedding on all pipe previously installed without Sewerage and Water Board inspection. Copies of the notice to start work shall be sent to the Gravity Systems Superintendent.
- c. All workmanship and materials required to perform this work, shall conform to the current General Specifications of the Sewerage and Water Board and the Department of Public Works except as noted hereinafter.
- d. The Contractor performing work covered in this section shall be required to coordinate his operations with the Sewerage and Water Board and other utilities prior to making any excavation. The Contractor shall exercise caution in making excavations to avoid damage to these services and other utilities.
- e. The Contractor will be furnished with a list of the locations of water and sewer house connections from the Sewerage and Water Board. It will be the Contractor's responsibility to verify the location of these so as to avoid damage. Furnishing this information should not be construed as a waiver of the Contractor's liability, but rather an attempt on the part of the Board to minimize the Contractor's hazard. The existing house connections submitted in the lists are from S&WB records and could vary from the actual location. Any damage to the existing water, sewer and drain connections resulting from negligence will be repaired by the S&WB at the expense of the Contractor. The Contractor is also responsible for damage to other utilities and the property of others.
- f. Existing sewer house connections shall be tied into the new mains and replaced with new connections where required.

## **C742.03 INSTALLATION AND REHABILITATION OF SEWER MAINS.**

### **a. GENERAL:**

Work under this section shall consist of furnishing all labor and materials for the replacement, relocation and/or installation of sewer mains, installing new or replacing house connections, point repairs and performing all operations required for improving the sewer system. The Contractor shall provide the necessary dewatering and bypassing required during execution of this work at no direct pay.

- b. MATERIALS AND METHODS.** Pipe material for sewer mains shall be solid wall polyvinyl chloride (PVC) pipe. The solid wall PVC pipe 6" through 15" shall be manufactured in accordance with ASTM D-3034 specifications for a special gravity sewer pipe dimensions ratio (SDR) of 26. The fittings (tees, wyes, etc.) and bell stock for solid wall PVC pipe shall have a thickness not less than that of the SDR-35 solid wall PVC pipe of the same inside diameter. PVC Sewer Mains sizes 18" through 27" shall be solid wall, PVC pipe conforming to ASTM F-679, Class T-1. PVC pipe shall be type PSM Vinyl Chloride (PVC) standard lengths with integral cast bells and elastomeric gaskets as recommended by the manufacturer and ASTM D-3212. The Sewerage & Water Board reserves the right to approve the type of material.

1. The maximum allowed deflection for installed PVC sewer pipe is 7.5% reduction in its actual vertical inside diameter not the minimum allowed by the ASTM Specification. Pipe exceeding this allowed deflection at any time prior to acceptance, shall be removed and replaced with new pipe and reinstalled as per the above specifications at the Contractor's expense. The S&WB reserves the right to mandrel any and/or all of the PVC pipe installed. The Contractor will install the pull lines and pass the mandrel through the mains selected by the S&WB. Tests will be witnessed by the Contractor and the S&WB. The Sewerage and Water Board will provide the mandrels for all tests and will have the option of passing the mandrels at any time after installation and final backfill of the trenches and before final acceptance. The Contractor shall bear the cost of retesting if required and will be assessed \$100.00 for each occurrence in each section between manholes.
2. Bedding and foundation for mains shall conform with S&WB Drawing No. 4697-E5A, Rev. 9 and No. 6187-E5, Rev 2, except as noted below. Backfill and drainage fabric for mains shall be as noted below. Standard sheeting and bracing shall comply with DWG. 4697-E5A, Rev 9 and with the S&WB General Specifications. The same type and size pipe material must be installed between manholes.
3. Installation of the solid wall PVC pipe shall conform with Section D of the Sewerage and Water Board General Specifications, "The Construction of Sewer"



and the Plastic Pipe Association Specification UNI-B 78, "Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Sewer Pipe." The trench bottom shall be relatively smooth and free from rocks, roots, etc. After the sheeting and/or foundation lumber is placed, the pipe shall be laid on a smooth bed of approved bedding material mentioned below, compacted to a density of not less than 75% relative density, six inches deep for the full width of the trench.

4. The bedding material shall be extended to six inches above the top of the pipe, well compacted (hand or mechanical) in six inch layers to not less than 75% relative density, as shown on the Standard Plans of the Department of Public Works. The bedding material shall be placed and consolidated under the pipe haunches to provide maximum side support to the pipe while avoiding displacement and misalignment of the pipe.
5. Bedding material shall Class 1A Angular Material (1/4" to 1 1/2") conforming to ASTM D2321, i.e., crushed concrete or crushed stone. The Sewerage and Water Board reserves the right to approve the type of bedding material.
6. Backfill material shall be pumped sand and shall be placed at or near optimum moisture content and compacted according to one of the following procedures:

Backfill material shall be placed in layers not to exceed 12 inches. Each layer shall be compacted to a minimum of 95% of maximum density using approved mechanical compaction equipment. Or,

Backfill material may be placed in layers not exceeding three (3') feet by thoroughly flooding and compacting each layer to a minimum of 95% maximum density, prior to placing a subsequent layer. During placement, backfill materials shall be thoroughly saturated with water and satisfactory drainage of materials shall be provided.

7. The above backfill material and the compaction procedures shall be applied also for any service connections, and point repairs.
8. Drainage fabric shall be installed according to the following specifications and according to the plan details. Drainage fabric shall be nonwoven pervious sheets of plastic yarn, constructed so that yarns will retain their relative position with respect to each other. Edges of fabric shall be finished to prevent the outer yarn from pulling away from the fabric. The fabric shall be installed as follows:

After the trench is excavated, the foundation lumber shall be placed in the bottom of the trench as required. The filter fabric shall be cut to the needed width including allowances for "loose" placement in the trench and a double-top

overlap on top of the bedding material after placement. The fabric shall be laid over the foundation lumber in the trench along its alignment with an 18" minimum overlap at the ends of subsequent lengths. Care should be taken to place the fabric tightly against the soil so that no voids occur behind the fabric. Also, wrinkles or folds should be avoided. The sides of the fabric which will be used as a double-top overlap should temporarily be pinned to the sides of the trench.

After installing the fabric, an initial 6" layer of bedding material shall be placed and compacted to the proper grade before placing the sewer pipe. The remainder of the bedding material shall then be placed around and above the pipe and compacted. Compaction is required to seat the fabric and bedding material against the trench wall and to reduce settlement.

After compaction, the two edges of the filter fabric shall be unfastened and overlapped on top of the bedding material. The backfill material shall then be placed and compacted as required. Drainage fabric shall conform to section C1019.

9. The Contractor shall provide the Engineer with a sample of the fabric to be used on the project along with a copy of the manufacturer's minimum requirement specifications prior to the start of construction.
10. Drainage fabric shall be installed around the bedding and under the sand backfill according to the Standard plans.

- c. **REPLACEMENT AND RELOCATION OF EXISTING SEWER MAINS, INSTALLATION OF NEW SEWER MAINS BETWEEN MANHOLES - NOT USED**
- d. **POINT REPAIRS OF EXISTING SEWER MAINS - NOT USED**

e. SEWER HOUSE CONNECTIONS:

1. New or replacement sewer house connections, where required, shall be six (6") inch pipe extended from the main to the curb or to a point directed by the Director. Bedding and foundations required under sewer mains are not required under six (6") inch sewer house connections, but 6" of compacted pumped sand is required as bedding under 6" sewer house connections. Backfill is required the same as described herein for sewer mains.
2. The use of saddles to connect the house service to the main will not be permitted; all such connections shall be made using wye to tee fittings.
3. All existing sewer house connections connected to sewer lines that are being replaced shall be removed and replaced from the new sewer line to one (1') foot behind the curb and tied to the existing service at that point.
4. The need for replacing existing sewer house connections that are connected to existing sewer lines that are not being replaced shall be as directed by the Sewerage & Water Board after field inspection or as indicated on the Drawings. These services will be removed and replaced from the existing sewer line to one (1') foot behind the curb and tied to the existing service at that point.
5. The need for replacing existing sewer house connections from the back of curb to the property line (or any point between) shall be determined by the Sewerage & Water Board after field inspection or as indicated on the Drawings and the new pipe will be tied into the existing pipe at that point.
6. New sewer house connections shall be installed from an existing, new, or "removed and replaced" sewer main to one (1') foot behind the curb at locations where no service presently exists as directed by the Sewerage & Water Board or as indicated on the Drawings.
7. All pipe and fittings shall be of the same material as the main, unless approved by the S&WB. The connection of any two dissimilar materials shall be accomplished by the installation of a "No-Hub" coupling, consisting of a neoprene sleeve and bushing adaptor and two stainless steel bands with stainless steel screws. The coupling shall be manufactured in strict accordance with Cast Iron Soil Pipe Institute Specifications C-301, latest revision, as manufactured by Tyler Pipe Company, Mission Clay Products Corps., Fernco, or approved equal.

8. Where existing or proposed subsurface facilities conflict with existing sewer house connections, these same connections shall be adjusted to provide for adequate clearance in accordance with the S&WB Standard Specifications. No syphons will be permitted. Adjustment of sewer house connections shall comply with the above specifications for replacement of sewer house connections.

f. SANITARY SEWER MANHOLE - NOT USED

g. INSPECTION.

At the completion of the point repair or installation of mains between manholes, and prior to final acceptance, the Board may inspect the mains with a remote control television unit. The Contractor shall assist by notifying the residents to refrain from use of these services during the inspection. The Contractor will be required to repair at his expense and in an approved manner, all defects in his workmanship disclosed by these tests and inspections before final acceptance.

## SUPPLEMENTAL DRAWINGS AND SPECIFICATIONS

The following drawings and specifications shall be part of the contract documents and shall govern the construction for all drainage, water and sewer systems.

1. Sewerage and Water Board of New Orleans Standard Drawings as follows:
  1. D-870 General Plan of Manhole
  2. D-871 General Plan of Manhole Frame and Cover
  3. D-873 Single Vertical Catch Basin Nos. 1, 2, 3, 4 and 5
  4. D-873-A Double Vertical Catch Basin
  5. D-1358 Clean-out of House Drain
  6. D-1359 Details of Steps for Concrete and Brick Manholes and Walls
  7. D-2508 Ring and Cover Type Manhole Frame and Cover
  8. D-3143-E-1 Details of Sewer and Water Manhole Castings
  9. D-3264 24" x 30" Clear Opening Drop Inlet
  10. D-3340 Standard Manhole Large Circular Pipe
  11. D-3431-A Single Drive-Over Catch Basin
  12. D-3431-B Double Drive-Over Catch Basin
  13. D-3809 Typical Sections of Concrete Pipe Lines from 15" to 42" Pipe.
  14. D-3810 Typical Sections of Concrete Pipe Lines from 48" to 72" Pipe.
  15. D-3933 Typical Sections of Reinforced Concrete Arch Pipe from 22" x 13" to 65" x 40"
  16. D-3937 Standard Manholes for Large Concrete Arch Pipe.
  17. 4697-E-5-A Standard Sheeting Bracing, Foundation Lumber and Shells for Sewer Pipe Foundation
  18. 6071-B-6 Aluminum or Reinforced Fiberglass Step
  19. 6178-B-6 Typical Brick and Pre-cast Concrete Manholes, Castings and Steps
  20. 6179-F-2 Hydrant Setting, Details of Valve Box, Details of Manhole over 4" to 12" Valve and Frame and Cover
  21. 6187-E-5 Non-standard Trench Sewer House Connections, Single and Double
  22. 6312-E-5 Installation and Construction Details for PVC Solid Wall and Truss Sewer Pipe
  23. 6517-B-6 Detail Sheet for Bedding Foundation, Crop. Crocks and Welding Details for Steel and Concrete Mains
  24. 6942 Water Meter Service Connection "N.O. Fixed Box" - A. C. or C. I.
  25. 7004-W Test Connection on New Water Mains (4" to 16") Flushing and Chlorination.
  26. 7134 Water Meter Service Connection "N.O. Fixed Box" - PVC
  27. 7332-W 1 1/2 to 2" Meter Service Connection

This list of standard drawings from the Sewerage and Water Board of New Orleans is included for information for the convenience of the Contractor. This listing is not intended to be all inclusive, and other Sewerage and Water Board Standard Plans may apply. All standard plans can be obtained from the Sewerage and Water Board.

2. General Notes on Sewerage, Water and Sub-surface Drainage.  
(STANDARD DWG. NO. 7260-SWD)

**PART V - APPENDICES**

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