



January 9, 2018

**BRAZOS RIVER AUTHORITY  
East Williamson County Water Treatment Plant  
Production Well Pipeline  
RFB # 18-12-1054**

**ADDENDUM NO. 2**

Bidders on this project are hereby notified that this Addendum shall be attached to and made a part of the above named project identified as RFB # 18-12-1054, dated December 22, 2017.

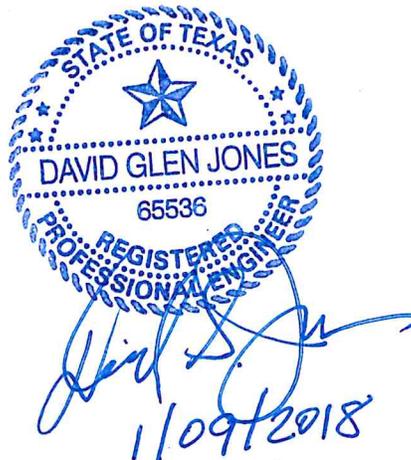
The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the Contract Documents and Drawings. These items shall have the full force and effect as the Contract Documents and Drawings and cost involved shall be included in the bid prices. Bidders shall acknowledge receipt of this Addendum in the space provided on the Bid Form.

**CONTRACT DOCUMENT REVISIONS:**

A2-1 Section 31 23 23.33 Flowable Fill

- a. Add the attached specification Section 31 23 23.33 Flowable Fill.

**END OF SECTION**



**31 23 23.33 FLOWABLE FILL**

**1.00 GENERAL**

**1.01 WORK INCLUDED**

Furnish labor, materials, equipment and incidentals necessary to place and mix a flowable mortar fill, consisting of Portland Cement, fine aggregate, fly ash, and water in the proper proportions as specified hereinafter. Controlled Low-Strength Material (Flowable Fill) shall be used to bed and backfill around piping and utilities where indicated.

**1.02 QUALITY ASSURANCE**

**A. DESIGN CRITERIA: CONCRETE PROPORTIONS AND CONSISTENCY**

Concrete shall be proportioned to give the necessary workability and strength and shall conform to the following governing requirements.

28 Day Compressive Strength - psi	Min. Cement Lbs. per Cu. Yd.	Fine Aggregate Lbs. Per Cu. Yd.	Max. Water Lbs. Per Cu. Yd.	Max. Fly Ash Lbs. Per Cu. Yd.
70 - 150	50	2,720	290	150

Fluidity of the flowable mortar shall be measured by the Corps of Engineers flow cone method, according to their specification CRD-C611-80. Prior to filling the cone with flowable mortar the mixture shall be passed through a 3-inch screen. Time of efflux shall be approximately 12 seconds.

**B. FACTORY TESTING**

The Contractor shall be responsible for the design of the material. A trial mix shall be designed by an independent testing laboratory, retained by the Contractor. The testing laboratory shall submit verification that the materials and proportions of the trial mix design meets the requirement of the specifications. Concrete mix additive such as "Darafill" manufactured by Grace Construction Products or equal products may be required to achieve the low strength and the flow ability requirements. In lieu of trial mix design, Contractor may submit a mix design used successfully in previous similar work, for similar materials for approval by Engineer. The Contractor shall not make changes in materials, either gradation, source, or brand, or proportions of the mixture after having been approved, except by specific approval of the Engineer.

**C. PRE-JOB TESTING**

Pre-job testing for excavatability with actual equipment and intended configuration of concrete sample is required. The testing equipment and configuration of concrete sample shall be determined by the Owner's representative.

**D. OWNER TESTING**

It is the responsibility of the Contractor to achieve and maintain the quality of material required by this section of the specifications. However, the Owner may secure the services of an independent testing laboratory to verify the quality of the concrete. The Owner shall

have the right to require additional testing, strengthening, or replacement of concrete which has failed to meet the minimum requirements of this section.

1.03 SUBMITTALS

1.04 STANDARDS AND REFERENCES

Materials shall meet recommendation for mix design and placement, as published by National Ready Mixed Concrete Association.

The applicable provisions of the following references and standards shall apply to this section as if written herein in their entirety.

A. American Society of Testing and Materials (ASTM) Publications:

ASTM C-33	“Specifications for Concrete Aggregates”
ASTM C-40	“Test Method for Organic Impurities in Fine Aggregate for Concrete”
ASTM C-150	“Specification for Portland Cement”
ASTM C-618	“Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as Mineral Admixture in Portland Cement Concrete”

B. Federal Specifications (Fed Spec):

COE	CRD-C611-80
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**2.00 PRODUCTS**

2.01 MATERIALS

- A. CEMENT: Portland Cement conforming to the specifications and test for Type I Portland Cement of the American Society for Testing and Materials, Designation C-150.
- B. FINA AGGREGATE: Fine aggregate consisting of natural, washed, and screened sand having clean, hard, strong, durable, uncoated grains complying with the requirements for ASTM C-33. The shall generally be of such size that all will pass a 3/8” sieve, at least 95% pass a 1/4” screen and at least 80% pass a No. 8 sieve. Aggregate shall not contain strong alkali, or organic material which gives a color darker than the standard color when tested in accordance with ASTM Specification Designation C-40.
- C. FLY ASH/POXXOLANS: Fly ash shall be an ASTM C-618, Class “C” fly ash. The fly ash may be used in controlled low-strength material.
- D. WATER: Water for concrete shall be clean and free from oil, acid, alkali, organic matter or other harmful impurities. Water which is suitable for drinking or for ordinary household use will be acceptable for concrete. Where available, water shall be obtained from mains of a waterworks system.
- E. ADDITIVE: “Darafill” may be required to meet these specifications.

## 2.02 MIXES

- A. In the determination of the amount of water required for mix, consideration shall be given to the moisture content of the aggregate. The net amount of water in the mix will be the amount added at the mixer; plus the free water in the aggregate; and minus the absorption of the aggregate, based on a thirty (30) minute absorption period. No water allowance shall be made for evaporation after batching.
- B. The methods of measurement of materials shall be such that the proportions of water to cement can be closely controlled during the progress of the work and easily checked at any time by the Owner's representative. To avoid unnecessary or haphazard changes in consistency, the aggregate shall be obtained from sources which will insure a uniform quality and grading during any single day's operation and they shall be delivered to the work and handled in such a manner that the variation in moisture content will not interfere with the steady production of concrete of reasonable degree of uniformity. Sources of supply shall be approved by the Owner's representative.
- C. All material shall be separately and accurately measured. Measurement may be made by weight or by volume, as determined by the Contractor; however, all equipment for measurement of materials shall be subject to approval by the Owner's representative.
- D. The proportions of the mix shall be such as to produce material that can be placed readily into the void area without spading or vibrating, and without segregation or undue accumulation of water or laitance of the surface.
- E. When additive is contained in the concrete mix, the additive ingredients, proportions and placement of the additive shall be per manufacturer's recommendation.

## 3.00 EXECUTION

### 3.01 INSTALLATION

- A. Contractor shall give the Owner's representative sufficient advance notice before starting to place material in any area, to permit inspection of the area, and preparation for pouring.
- B. Conduct the operation of depositing and compacting the material so as to form a compact, dense, impervious mass.
- C. Flowable mortar shall be uniformly placed to the depth shown on the plans. The fill shall be brought up uniformly to the top of excavation elevation. Placement of mortar fill shall then cease and the fill protected from traffic for a period of 72 hours.
- D. The material shall be placed against undisturbed trench walls, and shall not be placed on or against frozen ground.
- E. Material shall be placed in lifts or other measures shall be taken to prevent pipe floatation. Material shall be allowed to harden before placing next lift

**END OF SECTION**