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SPECIFICATIONS - DETAILED PROVISIONS
Section 02252 - Control Density Fill

CONTENTS

PART 1 - GENERAL	1
1.01 DESCRIPTION.....	1
1.02 UTILITY TRENCH CDF MIX DESIGN	1
PART 2 - PRODUCT	1
2.01 PORTLAND CEMENT	1
2.02 AGGREGATES	1
2.03 WATER	2
2.03 ADMIXTURES.....	2
2.04 FLY ASH	2
PART 3 - EXECUTION	2
3.01 MIXING	2
3.02 TESTING	2
3.03 PLACEMENT	2

Revised 12/12

**SECTION 02252
CONTROL DENSITY FILL**

PART 1 - GENERAL

1.01 DESCRIPTION

Control Density Fill (CDF) is used as a low strength, self consolidating fill material for confined spaces which can be easily excavatable at a later time. CDF is characterized by a high maximum slump of 8 inches. CDF is not a structural concrete and should not be used in such applications.

CDF may be used as a trench backfill, structural backfill, pipe bedding, or pipe filling for abandonment in place. CDF shall consist of Portland cement, aggregates, water and fly ash. Chemical admixtures and other mineral admixtures may be used.

The actual mix proportions and flow characteristics shall be determined by the producer of the CDF to meet site conditions. Mix designs and performance tests shall be submitted to the Engineer for approval.

1.02 UTILITY TRENCH CDF MIX DESIGN (PER CUBIC YARD)

- A. Cement 50 -max lbs
- B. Fly Ash (Type F) 50 -150 lbs
- C. Total Mix Water 35 gallons Max.
- D. Stable Air Content 20 -30%

CDF shall be hand excavatable and shall contain aggregate no larger than 3/8 inch and the 3/8 inch aggregate shall comprise no more than 20 percent of the total aggregate content.

PART 2 - PRODUCT

2.01 PORTLAND CEMENT

Portland cement shall conform to the requirements of Section 03300, Part 2.01 A of the WMWD Specifications.

2.02 AGGREGATES

Aggregates shall conform to the requirements of Section 03300, Part 2.01 B of the WMWD Specifications, except as follows. Aggregates shall be pretested in CDF mixtures similar to those anticipated for the work, confirming their ability to perform as required for the specific application. Aggregates not in conformance with Section 03300 may be used when approved by the Engineer, providing the material has a minimum sand equivalent of 20, the percentage passing the No. 200 sieve does not exceed 12 percent, and the fines are non-plastic.

Revised 12/12

2.03 WATER

Water shall be free of oils, acids, alkalies, organic matter or other deleterious substances.

2.04 ADMIXTURES

Admixtures shall conform to the requirements of Section 03300, Part 2.01 C of the WMWD Specifications.

2.05 FLY ASH

Fly ash shall conform to the requirements of ASTM C 618, Class F. Fly ash as a percent by weight of total cementitious material, shall not exceed 20 percent.

PART 3 - EXECUTION

3.01 MIXING

Mixing shall conform to the requirements of Section 03300, Part 2.03 of the WMWD Specifications, except for the one and one-half hour time limit specified in Paragraph B of Part 2.03. Unless otherwise specified, under conditions contributing to quick setting, the Engineer may specify a time limit, not to exceed two and one-half hours.

When CDF is used underneath a paved public right-of-way, the mixture shall contain a minimum of 25 pounds per cubic yard of cement when using washed concrete sand.

Adjustment of the mixture to achieve improved placement characteristics shall be through the use of chemical admixtures. No increase in water content or water to cement ratio will be allowed.

3.02 TESTING

CDF shall be tested for plastic unit weight. Plastic unit weight shall not deviate more than ± 10 percent of theoretical unit weight shown on the approved mix design. Unit weight shall be determined in accordance with ASTM C138.

CDF's consistency shall be tested by the slump method. The slump shall be measured in accordance with ASTM C143.

3.03 PLACEMENT

CDF may be placed by chutes, conveyors, buckets or pumps depending upon the application and accessibility.

For trench backfill, CDF shall be placed continuously. To contain CDF when filling long open trenches or open ended structures in stages, the end points shall be adequately bulkheaded to prevent movement. Methods may include bulkheading with sandbags, earth dams, forms or stiffer mixtures of CDF. CDF shall be placed from the centerline of mainline utilities to the bottom of the excavation.

Revised 12/12

For bedding, CDF shall be placed in a manner to prevent flotation or displacement of the embedded item. Methods of preventing flotation or displacement may include placement of CDF in lifts, faster setting CDF or lower slump CDF over the embedded item.

For backfilling of pipelines to be abandoned in place, CDF shall be pumped into the pipeline to be abandoned. It is intended that the disconnected ends of the pipeline shall be the primary means for injecting CDF into the pipeline. The Contractor may excavate for additional injection points along the pipeline. The pipeline shall be filled uniformly to within 90 percent of the pipe soffit. The lack of voids (other than the top 10 percent) shall be demonstrated to the Engineer by breaking out small sections of pipeline in various critical locations.

Pavement may be placed directly upon the CDF as soon as the surface will withstand the paving process without displacement or disruption. If the placement of the CDF is not completed in time to allow permanent paving to be completed the same day, the Contractor shall prevent traffic contact with the CDF until paving is completed.

END OF SECTION 02252