ITEM 433

CEMENT STABILIZED SAND BEDDING AND BACKFILL MATERIAL

433.1 Description. This item specifies cement stabilized sand to be used for backfill and bedding as called for on the drawings, in other parts of the specifications, or as directed by the Engineer.

433.2 Materials. Cement shall be Type I Portland cement conforming to ASTM C150.

Sand shall be clean durable sand containing not more than the following:

A. Deleterious Materials

Clay lumps, when tested in accordance with ASTM C142 shall be less than 0.5 percent.

Lightweight pieces, when tested in accordance with ASTM C123 shall be less than 5.0 percent.

Organic impurities when tested in accordance with ASTM C40, shall not show a color darker than the standard color.

B. The plasticity index shall be six (6) or less when tested in accordance with ASTM D4318.

C. Sand shall be free of organic matter and deleterious substances and shall meet the following gradation requirement.

Square Sieve Size	Percent Passing, By Weight
3/8"	100%
No. 200	5 -30%

Water shall be clean and clear, free of oils, acids, alkalis, organic matter or other deleterious substances and shall conform to the requirements of ASTM C94.

433.3 Sand-cement Mixture Product. The mixture shall consist of not less than 1.5 sacks of Portland cement per ton of material mixture as placed. The mixture shall contain sufficient water to hydrate the cement.

The cement, sand and water shall be mixed in a pug mill type mixer, which meets the approval of the Engineer. It shall be mixed for a minimum period of two minutes per batch.

433.4 Placing. The sand cement mixture shall be placed in maximum eight (8) inch thick lifts, loose measure around the pipe, boxes, structures, bridge approaches and paving sections. Placement and compaction shall be performed in a manner that will thoroughly fill all voids without placing undue strain on or displacement of the structure.

Cement stabilized sand backfill placed below the top of sewers, manholes, inlets or other structures shall be placed equally along all sides of the structure. Cement stabilized sand backfill/bedding shall be placed in a manner that will completely fill all voids in the trench. Hand operated tampers may be used for compaction.

Materials not placed and compacted within four (4) hours after mixing shall be rejected. Do not place or compact sand-cement mixtures in standing or free water.

Cement stabilized sand bedding and backfill placed in trenches shall be compacted in accordance with Items 430 “Construction of Underground Utilities” and 480 “Precast Reinforced Concrete Box Sewers.”

In-place density tests shall be taken at each location, each day, to test the placement of bedding/backfill material. The minimum number of tests per day shall be one (1) in-place density on the bedding and two (2) in-place densities on backfill. The minimum number of tests shall represent a placement of cement stabilized sand of 50 tons per day or less. For placements greater than 50 tons per day, tests shall be taken at each location at the rate of one (1) in-place density test per 200 linear feet (200 lf.) of bedding and one (1) in-place density test per 100 linear feet (100 lf.) of backfill per lift placed above the top of pipe. In-place densities shall be determined in accordance with ASTM D2922 or ASTM D1556.

433.5 Performance. The sand cement mixtures shall produce a minimum unconfined compressive strength of one hundred pounds per square inch (100 psi) in forty eight hours, when compacted to ninety five percent (95%) of Standard Proctor density (ASTM Method D558), without additional moisture control and when cured in plastic bags at a temperature of 73.4º F. at plus or minus 3º F. and tested in accordance with ASTM D1633.

Random samples of the delivered product will be taken in the field at the direction of the Engineer and tested at the City of Deer Park’s expense. A minimum of one (1) sample per week shall be taken at random to represent a production that is less than one hundred (100) tons per week. Two (2) samples per week shall be taken at random to represent a production greater

than one hundred (100) tons per week. The Engineer shall have the option to obtain additional samples for testing.

433.6 Notification. The Testing Laboratory's representative will notify the City of Deer Park, Engineer, Contractor and material supplier by facsimile of all tests indicating results falling below specified strength requirements.

433.7 Measurement. Cement stabilized sand shall be measured by the **square yard** of material, furnished and compacted in place to the thickness specified, **or** as shown in the plans or acceptable material mixture, as specified by this item, shall be measured by the **ton** of 2,000 pounds. Measurement shall be made by tickets delivered to the Engineer. The dray tickets shall indicate the tare, gross and net weight of the load and the location of delivery.

If no separate Bid Item is provided on the Proposal, then "Cement Stabilized Sand Bedding and Backfill Material" is considered a **subsidiary** item for construction of the Project and there will be no separate measurement.

433.8 Payment.

A. The payment for cement stabilized sand, complete and in-place, shall be at the contract unit price per **square yard** of the specified thickness, which unit price shall include all costs of materials, furnished, hauled, dumped, spread, shaped, and compacted.

B. Where the bid sheet specifies FOB the job, materials shall be transported to the job site specified on the bid sheet, and paid for by the **ton** of 2,000 pounds.

C. When the Project Manual, plans or other specifications indicate the use of cement stabilized sand is **incidental** to another pay item, no direct payment for the material will be made.

If no separate Bid Item is provided on the Proposal for "Cement Stabilized Sand Bedding and Backfill Material", then include cost of same in Contract prices bid for item of which it is a component.

END OF ITEM 433