ITEM #0601073A – CLASS "S" CONCRETE

SECTION 6.01 – CONCRETE FOR STRUCTURES is supplemented to provide for a Class "S" super-plasticized concrete:

Article 6.01 - Description: Class "S" concrete is to be used to fill and repair voids in horizontal and vertical surfaces of concrete areas greater than four (4) square feet and one inch (1") deep (exclusive of deck slabs) as detailed on the plans or as directed by the Engineer.

Work under this item shall consist of removing loose concrete, deteriorated concrete, and concrete overlaying hollow areas, and patching these areas as well as spalled and scaled areas with Class "S" Concrete formed to the original contour. Work under this item shall also consist of removing sound concrete beneath stirrups in order to properly anchor the Class "S" repair material in place. The work shall also include any saw cutting or chiseling, sandblasting and cleaning of all areas. Work under this item shall also include sandblasting and cleaning any exposed reinforcing steel, and coating the exposed reinforcing steel with zinc-rich primer prior to placing concrete.

The Contractor shall not perform any repair work without prior approval by the Engineer for location and limits.

Article 6.01.02-Materials: Materials shall conform to Section M.03 as modified herein below:

M.03.01 – Component Materials

1 - Coarse Aggregate:
(c) Gradation: Add the following: Coarse Aggregate for the Class "S" concrete shall meet the following gradation requirements:

For Class "S": The required grading shall be obtained by using 100 percent 3/8" coarse aggregate.

3 - Cement: Add the following:
Type I or II Portland Cement shall be used for Class "S" Concrete.

5- Admixtures: Add the following:

(c) Superplasticizing Admixtures: The superplasticizer admixture shall be a high-range water reducer (HRWR) capable of increasing the slump of the mix from approximately 2.5" to 6.5" upon the addition of the amount recommended by the respective manufacturer. The HRWR shall conform to ASTM C494 Type F or Type G and shall be approved by the Engineer. The use of this material shall be in strict accordance with the respective manufacturer's written instructions and procedures.

M.03.02 – Mix Design Requirements is supplemented to include Class "S" Superplasticized concrete.

TYPE	28 DAY MIN. COMPR. STR	PROPORT. BY WT. APPROX.	WATER PER BAG MAX.	CEM. FACTOR
Class "S"	4000 PSI	1:2.16:2.20	5.7 (Gals.)	7.0 (Bags/C.Y.)

M.03.04 – Curing Materials

3. Liquid Membrane-Forming Compound: Add the following:
No liquid membrane forming compound shall be used for Class "S" concrete.

Add the following:
5. Zinc Primer: The single component zinc primer shall conform to Federal Specification TT-P-641, Type 1 and shall be brush applied in two successive coats.

Article 6.01.03 - Construction Methods:

Article 6.01.03 is supplemented by adding the following test. Where this specification deviates from the Standard Specifications for Roads, Bridges and incidental Construction, Form 816, the intent of this special provision shall govern.

Composition:
Class "S" concrete shall conform to the requirements as specified in M.03.01 as amended herein. Class "S" concrete shall contain not less than 6.5 percent and not more than 8.5 percent entrained air at the time of placement.

Consistency:
Class "S" concrete shall have a slump range of 2 inches to 4 inches prior to the addition of the HRWR and from 6 inches to 8 inches slump after the addition of the HRWR. The addition rates of the air-entraining admixture (A.E.A.) and the HRWR will vary. Frequent field testing of the air content and slump prior to and after addition of the HRWR will be the determining factor of actual addition rates for each admixture.

Mixing Concrete:
For hand mixing of Class "S" concrete, the Contractor shall provide scale(s) approved by the Engineer in which cement and aggregate can be accurately weighed for the required mix proportions.

Note: The Contractor shall also have measuring graduates marked for the proportioning of the A.E.A. and the HRWR. Do not mix the A.E.A. and the HRWR together before adding to the mix; the resultant solution will not work. DO NOT add the A.E.A. and the HRWR at the mixer simultaneously; these admixtures must be added separately in the mixing cycle. All manufactured materials shall be stored, mixed and used in strict accordance with the written recommendations of the respective manufacturers.

Curing Concrete:
Concrete shall be cured by leaving forms on for seven (7) days and wetting them frequently.

Material Storage:
The Contractor shall store and maintain the A.E.A. and the HRWR materials in clean original containers as delivered by the manufacturer.

Work Procedure:
Before any concrete is removed, the Contractor shall determine, in the presence of the inspector, the exact limits and locations of all areas to be worked on under this item. The Contractor shall provide all scaffolding necessary to perform the required work. The limits of each area shall be suitably marked.

The perimeter of each patch shall be saw cut 1 inch deep. Care shall be taken not to cut existing reinforcing.

Loose and deteriorated concrete shall be chipped away back to sound concrete and at least 1" beneath the stirrups (typically #4 bars).

All surfaces of exposed concrete and reinforcing steel shall be thoroughly sandblasted and vacuumed immediately prior to forming. Following sandblasting, all surfaces shall be free of oil, solvent, grease, dirt, dust, bitumen, rust, loose particles and foreign matter.

Extreme care shall be taken, where reinforcing steel is uncovered, not to damage the steel. Pneumatic tools shall not be placed in direct contact with reinforcing steel. Maximum 30 lb. size hammers shall be used for general chipping and removal while maximum 15 lb. size shall be used behind reinforcing steel. Exposed reinforcing shall remain in place except where specifically indicated for removal by direction of the Engineer. Exposed reinforcing steel shall be sandblasted in accordance with SSPC-SP-6, Commercial Blast Cleaning, to remove all contaminants, rust and rust scale.

Where the existing reinforcing steel is severely corroded or damaged, new reinforcing steel shall be installed in accordance with the plans. Where existing steel is determined by the Engineer to have insufficient cover, the cover shall be increased to a minimum of 2 inches. New steel shall be attached to existing steel as directed by the Engineer.

When using sandblasting equipment, all work shall be shielded for the protection of the public.

All compressed air equipment used in cleaning shall have properly sized and designed oil separators, attached and functional, to assure the delivery of oil-free air at the nozzle.

Adequate measures shall be taken by the Contractor to prevent concrete chips, tools and/or materials from entering into adjacent roadway lanes or dropping to areas below the structure. All debris shall be promptly swept up and removed from the site. All materials removed shall be satisfactorily disposed of by the Contractor. The Contractor shall design, furnish, install and remove temporary demolition shields to prevent debris from dropping below as directed by the Engineer. The Contractor shall submit working drawings to the Engineer in accordance with Article 1.05.02. The debris shield shall remain in place during construction until the Engineer determine it is no longer needed. The Contractor is responsible for the integrity and maintenance of the shield during their use.

Forms and support systems shall be properly designed in accordance with 6.01.03-1. Forms shall be so designed that placement access shall be allowed at the top of the formwork assembly.

No bonding compounds shall be used before or during the placement of this concrete material. Concrete surfaces against which this material is to be placed shall be sound, tight, and thoroughly roughened by the removal and sandblasting procedures specified above. The exposed concrete surfaces shall be dampened with fresh water immediately prior to placement of the fresh concrete by "hosing" down the areas behind the forms as thoroughly as possible. Light rust formations on sandblasted reinforcing steel prior to concrete placement is normal and acceptable.

The minimum ambient and patch area surface temperature shall be 45 deg. Fahrenheit and rising at the time of concrete installation.

Prior to forming up vertical surfaces, reinforcing steel welded wire fabric shall be installed at the proper depth to those areas greater than 4 square feet and 1" deep as approved by the Engineer. The fabric shall be tied to any exposed reinforcing steel or anchored to sound concrete with powder actuated anchors as approved by the Engineer.

Placement of the fresh concrete shall be in the maximum height lifts possible under the circumstances and all freshly placed concrete shall be consolidated during placement with adequately sized and effective vibrators.

Following curing and stripping, the exposed faces of new concrete shall be finished off with the use of the appropriate tools to blend in the physical appearance to the

surrounding areas as much as possible.

Cured patches areas shall be sounded by the Engineer to detect the presence of any hollow spots. Such spots shall be removed and replaced by the Contractor at his own expense until a patch acceptable to the Engineer is in place.

Article 6.01.04 – Method of Measurement: Add the following:

Class "S" Concrete shall be measured for payment by the actual volume in cubic feet of concrete placed, and accepted by the Engineer. Reinforcing steel will not be measured for payment.

Article 6.01.05 – Basis of Payment: Add the following:

"Class "S" Concrete" will be paid for at the contract unit price per cubic foot, complete in place, which price shall include locating and removing unsound material, saw cutting or chiseling, sandblasting, cleaning, application of zinc primer on the existing reinforcing steel, welded wire fabric, forming, placing, curing, stripping and finishing new concrete, and all materials, equipment, tools, labor and clean-up incidental thereto.