STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

REVISED ADDENDUM

DATE: Tuesday, March 27, 2012

PROJECT: BP-5300J/ DO00104/ FORSYTH COUNTY BRIDGE #364 DECK OVERLAY WITH SUBSTRUCTURE REPAIR

The following revisions are hereby made part of the contract:

- The proposal has been revised for the following items:

  - Drums have been included as an item in the bid sheet (See Attachment)
  - The overlay shall be Latex Modified Concrete-Very Early Strength (See Attachment).

The attachments must be attached to the proposal in order for the bid to be considered.

Ec: Prospective Bidders
File

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
STRUCTURE MANAGEMENT UNIT
1581 MAIL SERVICE CENTER
RALEIGH NC 27699-1581

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CENTURY CENTER COMPLEX
BUILDING A
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

REVISED 3/26/12

ITEMIZED PROPOSAL FOR PROJECT NO. BP-5300J

The Contractor agrees to provide the services outlined in this proposal for the following fixed price:

Line No.	Item No.	Sec #	Description	Quantity	Unit Cost	Amount
1	0000100000-N	800	MOBILIZATION	LS	LS	
2	1245000000-E	SP	SHOULDER RECONSTRUCTION	0.05 SMI		
3	1330000000-E	607	INCIDENTAL MILLING	382 SY		
4	1519000000-E	610	ASPH CONC SURFACE COURSE, TYPE S9.5B	18 TON		
5	4400000000-E	1110	STATIONARY WORK ZONE SIGNS	370 SF		
6	4405000000-E	1110	PORTABLE WORK ZONE SIGNS	384 SF		
7	4410000000-E	1110	BARRICADE MOUNTED WORK ZONE SIGNS	38 SF		
8	4415000000-N	1115	FLASHING ARROW BOARD	4 EA		
9	4420000000-N	1120	CHANGEABLE MESSAGE SIGNS	8 EA		
10	4430000000-N	1130	DRUMS	150 EA		
11	4435000000-N	1135	CONES	40 EA		
12	4445000000-E	1145	BARRICADES (TYPE III)	144 LF		
13	4450000000-N	1150	FLAGGER (BY HOUR)	384 HR		
14	4480000000-N	1165	TMA	4 EA		
15	4510000000-N	SP	LAW ENFORCEMENT	128 HR		
16	4810000000-E	1205	PAINT (4”)	2480 LF		
17	4880000000-E	1205	CURING COMPOUND REMOVAL (LINES)	2480 LF		
18	8161000000-E	420	GROOVING BRIDGE FLOORS	7480 SF		
19	8217000000-E	425	REINFORCING STEEL	100 LB		
20	8664000000-E	SP	SHOTCRETE REPAIRS	46 CF		
21	8692000000-N	SP	FOAM JOINT SEALS	LS	LS	
22	8881000000-E	SP	GENERIC STRUCTURE ITEM- LATEX MODIFIED CONC OVERLAY-VERY EARLY STRENGTH	74 CY		
23	8882000000-E	SP	GENERIC STRUCTURE ITEM - CONCRETE REPAIRS	41 CF		
24	8893000000-E	SP	GENERIC STRUCTURE ITEM – HYDRODEMOLITION OF BRIDGE DECK	946 SY		
25	8893000000-E	SP	GENERIC STRUCTURE ITEM – PLACING AND FINISHING LATEX MODIFIED CONCRETE-VERY EARLY STRENGTH	946 SY		
26	8893000000-E	SP	GENERIC STRUCTURE ITEM - SCARIFYING BRIDGE DECK	946 SY		

ADDENDUM FOR LATEX MODIFIED CONCRETE-VERY EARLY STRENGTH

LATEX MODIFIED CONCRETE - VERY EARLY STRENGTH

SPECIAL

Description

This work consists of furnishing and placing an overlay of latex modified concrete-very early strength (LMC-VES) over conventional existing concrete or repair concrete on bridge decks. Unless otherwise indicated on the plans, groove the bridge floor in accordance with Article 420-14(B) of the *Standard Specifications*.

Materials

For equipment, proportioning and mixing of modified compositions, see Section 1000-8 of the *Standard Specification*s. Prior to beginning any work, obtain approval for all equipment to be used for deck preparation, mixing, placing, finishing, and curing the latex modified concrete.

For material of modified compositions, see Section 1000-8 of the *Standard Specifications* with the following modifications:

Page 10-10, Section 1000-8(A), add the following:

Cement – For latex modified concrete-very early strength, Cement shall be approximately 1/3 calcium sulfoaluminate (C4A3S) and 2/3 dicalcium silicate (C2S) or other hydraulic cement that will provide a Latex-Modified Concrete that meets the physical requirements for Latex-Modified Concrete as indicated in this special provision.

Page 10-11, Table beginning in paragraph 4, add the following:

Minimum compressive strength, normal setting concrete, 3000 psi at 7 days; very early strength concrete, 3000 psi at 3 hours.

Water-Cement Ratio by weight, normal setting concrete, maximum 0.40; very early strength concrete, maximum 0.42

Page 10-11, last paragraph of 1000-8, add the following:

Submit the latex modified concrete mix design, including laboratory compressive strength data for a minimum of six 4-inch by 8-inch cylinders at the appropriate age (7 days for normal setting concrete; 3 hours for very early strength concrete) to the Engineer for review. Include test results for the slump and air content of the laboratory mix. Perform tests in accordance with AASHTO T 22, T 119 and T 152.

System Quality Submittals

Past Performance Submittal: Prior to beginning work, the latex modified concrete overlay Contractor shall submit records demonstrating verifiable satisfactory performance utilizing very early strength latex modified concrete on at least five (5) bridges in any state with similar scope of work.

Construction Methods

(A) Preparation of Surface

Completely clean all surfaces within the 48 hours prior to placing the overlay unless otherwise approved.

Thoroughly soak the clean surface for at least 2 hours immediately prior to placing the latex modified concrete. After soaking the surface for at least 2 hours, cover it with a layer of white opaque polyethylene film that is at least 4 mils (0.100 mm) thick. Immediately prior to placing the latex modified concrete, remove standing water from the surface.

(B) Placing and Finishing

Prior to placing modified material, install a bulkhead of easily compressible material at expansion joints to the required grade and profile. Placing material across expansion joints and sawing it later is not permitted.

Place and fasten screed rails in position to ensure finishing the new surface to the required profile. Do not treat screed rails with parting compound to facilitate their removal. Prior to placing the overlay, attach a filler block sized for the plan overlay thickness to the bottom of the screed and pass it over the area to be repaired to check the thickness. Remove all concrete that the block does not clear.

Separate screed rails or construction dams from the newly placed material by passing a pointing trowel along their inside face. Carefully make this trowel cut for the entire depth and length of rails or dams after the modified composition has sufficiently stiffened and cannot flow back.

Brush a latex cement mixture onto the wetted, prepared surface. Carefully give all vertical and horizontal surfaces a thorough, even coating and do not let the brushed material dry before it is covered with the additional material required for the final grade. Remove all loose aggregate from the latex cement brushed surface prior to latex concrete placement (NOTE: Not required for surfaces prepared with hydro-demolition).

Place the latex modified concrete in one operation.

Provide a minimum overlay thickness of as shown in the plans and a final surface that is approximately the same as the original deck surface.

Construction joints other than those shown on the plans will be submitted to the Engineer for approval.

When a tight, uniform surface is achieved and before the concrete becomes non-plastic, further finish the surface of the floor by burlap dragging or another acceptable method that produces an acceptable uniform surface texture.

Promptly cover the surface with a single layer of clean, wet burlap as soon as the surface will support it without deformation. Wet cure only the surface for minimum 3 hours and until a compressive strength of 3000 psi is reached. Keep the curing material saturated during the wet cure period.

Field Testing Latex Modified Concrete-Very Early Strength

For projects with multiple bridges using the same mix design, or bridge decks with time constraints that require more than one night for placement, a relationship between the compressive strength and rebound hammer readings may be developed and used to obtain the three hour cylinder strength, in lieu of compressive strength testing. For the correct procedure, reference Document: PL11-LMC Rapid Set Overlays. Contact your local M&T representative for a copy of this document or see the following link: http://www.ncdot.org/doh/operations/materials/eforms.html under Physical Lab. Seven day concrete compressive strength sampling and testing is required in addition to the use of this method.

Do not place the latex modified concrete before the burlap is saturated and approved by the Engineer. Drain excess water from the wet burlap before placement.

As soon as practical, after the concrete has hardened sufficiently, test the finished surface with an approved rolling straightedge that is designed, constructed, and adjusted so that it will accurately indicate or mark all floor areas which deviate from a plane surface by more than 1/8 inch in 10 feet (3 mm in 3 m). Remove all high areas in the hardened surface in excess of 1/8 inch in 10 feet (3 mm in 3 m) with an approved grinding or cutting machine. Where variations are such that the corrections extend below the limits of the top layer of grout, seal the corrected surface with an approved sealing agent if required by the Engineer. If approved by the Engineer, correct low areas in an acceptable manner.

Vehicular traffic may travel across an un-grooved deck, however, complete the transverse sawed grooves across the entire deck area after the latex modified concrete achieves design strength and no later than seven days after placing the latex modified concrete.

(C) Limitations of Operations

The mixer will not be permitted on the bridge deck unless otherwise approved.

No traffic is permitted on the finished latex modified concrete surface until the total specified curing time is completed and until the concrete reaches the minimum specified compressive strength.

Do not place latex modified concrete if the temperature of the concrete surface on which the overlay is to be placed is below 40°F (4°C) or above 85°F (29°C). Measure the surface temperature by placing a thermometer under the insulation against the surface.

Prior to placing latex modified concrete, the Engineer determines the air temperature and wind speed. Do not place latex modified concrete if the ambient

air temperature is below 45°F (7°C) or above 85°F (29°C), or if the wind velocity is in excess of 10 mph (16 km/h). If working at night, provide approved lighting. Provide aggregates for use in the latex modified concrete that are free from ice, frost and frozen particles when introduced into the mixer.

Do not place latex modified concrete when the temperature of the latex modified concrete is below 45°F (7°C) or above 85°F (29°C).

If the rate of evaporation of surface moisture from the latex modified concrete exceeds 0.05 pounds per square foot per hour during placement, measures shall be taken to reduce the rate of evaporation. The evaporation rate is calculated using the following formula:

$E=(T_c^{2.5}-rT_a^{2.5})(1+0.4V)(10^{-6})$ where,

E=Evaporation Rate, T_c=Concrete Temp (^{0}F), r=Relative Humidity (%/100)

T_a=Air Temp (^{0}F), V=Wind Velocity (mph)

Stop all placement operations during periods of precipitation. Take adequate precautions to protect freshly placed latex modified concrete from sudden or unexpected precipitation. Keep an adequate quantity of protective coverings at the worksite to protect the freshly placed pavement from precipitation.

Measurement and Payment

Latex Modified Concrete Overlay-Very Early Strength will be measured and paid for in cubic yards of latex modified concrete satisfactorily placed in the completed deck.

Placing and Finishing of Latex Modified Concrete Overlay-Very Early Strength will be paid for at the contract unit price bid per square yard which price will be full compensation for furnishing all labor, materials, tools, equipment and incidentals required to complete the work in accordance with the contract documents.

Grooving Bridge Floors will be measured and paid for in accordance with Section 420 of the *Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Latex Modified Concrete Overlay-Very Early Strength	Cubic Yard
Placing and Finishing Latex Modified Concrete Overlay-Very Early Strength	Square Yard
Grooving Bridge Floors	Square Feet