

STATE OF NEBRASKA
DEPARTMENT OF ROADS
ADDENDUM NO. 2
PROJECT NO. IM-80-3(105)
CONTROL NO. 60975
CALL NO. 600
I-80, ROSCOE - PAXTON
LETTING DATE: JULY 22, 2010

The Special Provisions are amended to include the following:

**SPECIAL PROSECUTION AND PROGRESS
(Crush Concrete Pavement)**

The Contractor will be allowed to crush and stockpile the existing concrete pavement along the outside of the roadway under construction. These operations may be at various locations or along the length of the project. No crushing and stockpiling of the existing pavement will be allowed in the median.

All costs associated with the crushing and stockpiling of the existing pavement within the project right-of-way, and the maintenance and restoration of these areas shall be at no cost to the Department.

* * * * *

On plan sheet 2-N1, the last note in the NOTES column is amended to read as follows:

The Contractor will be required
to furnish borrow on this project.

* * * * *

The Special Provisions are amended to include the following:

CLASS 47B CONCRETE

The contractor may propose, in lieu of the 47B Specification as stated in the Standard Specifications and elsewhere in these special provisions, to utilize 47BR mix design as defined in this Provision.

Table 1002.02 has been revised to include the 47B Revised (47BR) Concrete Mix Design. The specifications for the aggregates for the 47BR Concrete Mixes are found below.

ENGLISH
TABLE 1002.02 CLASS 47BR CONCRETE AGGREGATES

| Concrete Mixes (Cubic Yard Batch) | | | | | | | | | | | | | | |
|-----------------------------------|--------------------|------------------------------|--|-------------------------|------------------------------|--------------------------|---|-------------------------|-------------------------|-----------------|--------------------------|-------------------------------|-----------------------------|----------------------------------|
| Class of Concrete (1) | Base Cement Type * | Portland Cement (Min. lb/cy) | Pre-Blended Class Fly Ash (Min. lb/cy) * | GGBFS Slag (Min. lb/cy) | Class C Fly Ash (Min. lb/cy) | Silica Fume (Min. lb/cy) | Total Cementitious Materials (Min. lb/cy) | Total Agg. (Min. lb/cy) | Total Agg. (Max. lb/cy) | Coarse Agg. (%) | Type of Coarse Aggregate | Air Content (% Min.-Max.) (2) | Water/Cement Ratio Max. (3) | Required Strength (Min. psi) (4) |
| 47BR** | 1PF | 423 | 141 | 0 | 0 | 0 | 564 | 2850 | 3150 | - | - | 7.5 – 10.0 | 0.48 | 3500 |
| 47BR*** | 1PF | 423 | 141 | 0 | 0 | 0 | 564 | 2850 | 3150 | - | - | 6.0 – 8.5 | 0.48 | 3500 |

(1) Each class shall identify the minimum strength requirement. (For example, 47BR-3500, where the last four digits indicate the strength in pounds per square inch. In the chart, strength of 3500 psi is indicated for 47BR-3500; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)
 All classes of concrete shall be air-entrained.
 A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.
 A water reducer admixture shall be used at the manufacturer’s recommendations.

(2) As determined by ASTM C 138 or ASTM C 231.
 FOR INFORMATION ONLY. The contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as, checking air content behind the paver.

(3) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38.

(4) For each class of concrete acceptance, refer to the specifications

(*) Mixes with Type 1PF and Class F fly ash designation are pre-blended or interground with Class F fly ash by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash is added at the batch plant.

(**) For slip form applications.

(***) For hand-pours and substructures applications.

Subsection 1033.01 and Paragraphs 1. 2. and 3. of Subsections 1033.02 of the Standard Specifications is void and superseded by the following:

1033.01 – Description

1. This combined aggregate gradation 47B Revised (47BR) is to optimize aggregate blends utilizing more locally available materials.

2. Mineral aggregates shall be crushed rock, broken stone, gravel, sand-gravel, crushed gravel, coarse sand, fine sand, crushed limestone, dolomite, granite, quartzite, or other ledge rock approved for the intended purpose by the Engineer. These materials shall be composed of clean, hard, durable, and uncoated particles.

3. Achieving a uniform gradation may require the use of two or more different aggregate. It is the responsibility of the contractor to consider additional material characteristics such as, but not limited to particle shape, cubicity, angularity, etc. when designing a mix.

1033.02 -- Material Characteristics

1. Sampling and Testing Procedures:

The Department will perform the sampling and testing in accordance with Table 1033.01. The material must be tested and approved by the Department for all material source locations and quarries prior to use.

Table 1033.01

| Sampling and Testing Procedures | |
|--|---------------|
| Procedure | Method |
| Sampling | NDR T 2 |
| Sieve Analysis | NDR T 27 |
| Clay Lumps, Shale, and Soft Particles | NDR T 504 |
| Abrasion | AASHTO T 96 |
| Freeze and Thaw Soundness | NDR T 103 |
| Specific Gravity and Absorption (course aggregate) | AASHTO T 85 |
| Specific Gravity and Absorption (fine aggregate) | AASHTO T 84 |
| Sodium Sulfate Soundness | AASHTO T 104 |
| Calcium Carbonate | NDR C 25 |
| Organic Impurities | AASHTO T 21 |
| Mortar-Making Properties | AASHTO T 71 |
| Reducing Field Samples of Aggregate to Testing Size | AASHTO T 248 |

2. Aggregate Properties:

a. Aggregates shall be free of dust, soft or flaky particles, loams, alkali, organic matter, paper, wood, or other deleterious matter as determined by the Engineer. The Department may reject a pit or aggregate stockpile because of deleterious material.

b. Dolomite as herein defined is a magnesium limestone containing calcium carbonate and magnesium carbonate in approximately a 4 to 3 ratio.

c. The calcium carbonate content of limestone shall be at least 80% (computed as CaCO₃ from the value determined for CaO).

d. Fine sand shall have at least 95% of its particles pass the No. 10 (2.0 mm) sieve and no more than 25% pass the No. 200 (75 μ m) sieve. This definition applies to the sodium sulfate soundness test.

e. Once an aggregate's soundness and abrasion quality has been determined, additional quality testing for soundness and abrasion loss will be at the Engineer's discretion.

f. Sand-Gravel Aggregate:

(1) Aggregate shall be washed and composed of clean, hard, durable, and uncoated particles.

(2) Aggregates produced from wet pits by pumping must adequately be washed by means approved by the Department.

(3) Aggregates from a dry pit shall have the method for washing approved by the Department.

(4) Aggregate for concrete shall have a soundness loss of not more than 10% by weight at the end of 5 cycles using Sodium Sulfate Soundness test AASHTO T 104.

(5) The weight of the aggregate shall not contain more than 0.5% clay lumps.

(6) Aggregate subjected to the colorimetric test for organic impurities which produces a color darker than the standard shall be further tested for its mortar-making properties (in accordance with AASHTO T 71).

(7) Aggregate, when subjected to the test for mortar-making properties, shall produce a mortar having a compressive strength at the age of 7 days equal to or greater than that developed by mortar of the same proportions and consistency made of the same cement and aggregate after the aggregate has been treated in a 3% solution of sodium hydroxide. Materials failing to produce equal or greater strength shall be unacceptable, except when determined to be acceptable under the provisions of Subsection 105.03.

g. Ledge Rock Aggregate:

(1) Aggregate shall consist of clean, hard, durable, and uncoated particles.

(2) The percent of clay lumps, shale, or soft particles shall not exceed the following amounts:

| | |
|---------------------|------|
| Clay Lumps..... | 0.5% |
| Shale..... | 1.0% |
| Soft Particles..... | 3.5% |

(3) Any combination of clay lumps, shale, and soft particles shall not exceed 3.5%.

(4) Aggregate for concrete shall be free of coatings that will inhibit bond and free of injurious quantities of loam, alkali, organic matter, thin or laminated pieces, chert, or other deleterious substances as determined by the Engineer.

(5) Aggregate for concrete shall not have a soundness loss greater than 8.0% by weight at the completion of 16 cycles of alternate freezing and thawing.

(6) Aggregates for concrete shall have a Los Angeles Abrasion loss percentage of not more than 40.

(7) All fractions passing the No.4 (4.75 mm) sieve shall meet quality requirement of soundness loss of not more than 10% by weight at the end of 5 cycles using sodium sulfate solution.

3. Acceptance Requirements:

a. Concrete Mix Design Submittal and Application:

(1) The Contractor is responsible for the design and control of the concrete mix.

(2) The combined blended aggregate shall meet the gradation requirement in Table 1033.02A.

Table 1033.02A

| Combined Aggregate Gradation Limits (Percent Passing) | | | | | | | | |
|---|-------|---------|------|------|-------|-------|--------|--------|
| Sieve Size | No.1" | No.3/4" | No.4 | No.8 | No.16 | No.30 | No. 50 | No.200 |
| Minimum | 92.0 | 98.0 | 45.0 | 31.0 | 17.0 | 10.0 | 3.0 | 0 |
| Maximum | 100 | 85.0 | 65.0 | 48.0 | 41.0 | 30.0 | 8.0 | 3.0 |

(3) The concrete mix design for the trial mix shall be submitted to the Engineer 6 weeks before beginning any concrete work. All testing must be performed by a qualified laboratory approved by the Department and submitted to the Engineer. The concrete mix design report shall include the following from a minimum of 4 cubic yards:

(i) Cover page.

- Contractor Name
- Project Number
- Date
- Location of ready mix or central mix plant
- Date submitted
- Signature of contractor representative

(ii) Material Source Information.

- Cement Manufacture
- Type of cement
- Aggregate pit or quarry location
- Percentage of each aggregate constituent within the combined aggregate gradation

(iii) Specific Gravity of Each Individual Aggregate.

(iv) Target combined gradation percent passing.

(v) Temperature of concrete at time of sampling.

(vi) Water/cement ratio.

(vii) The air content of plastic concrete, ASTM C 231.

(viii) Unit Weight of plastic concrete, ASTM C 138.

(ix) Sieve analysis of combined aggregate (Accumulative

Combined-Percent Passing).

- (x) 7, 14 and 28-day compressive strength test results - ASTM C 39. The minimum 28-day compressive strength is 3500 psi.
- (xi) 28 day Flexure Strength - Flexural Strength of Concrete Using Simple Beam with Third Point Loading, ASTM C 78. The results from the three beams will be averaged to determine the 28 day minimum flexure strength of 600 psi.

(a) The contractor shall make an additional three 28-day beams from a split sample for testing at NDR Central Lab. The beams will be delivered to the NDR Central lab prior to the 28-day test. The three beams will be averaged to determine the flexural strength.

(xii) Alkali-Silica Reactivity - ASTM C 1567. The maximum for the 28-day ASTM C 1567 test is 0.10% using the materials for the proposed mix design.

(4) The Department will issue approval of the mix design if all the requirements are met.

b. Trial Mix Approval:

For the purpose of this specification, a concrete trial mix shall mean a minimum of 4 cubic yard of concrete that meets the requirements of the approved mix design.

(1) The contractor shall notify the PCC Engineer a minimum of 35 days, to schedule the trial mix prior to the start of any concrete operations.

(i) The Department will perform the required sampling and testing for the trial mix. The trial mix shall not be paid for directly by the Department and shall be subsidiary to items which direct payment is made.

(ii) It is the contractor's responsibility to meet all the specification requirements and is responsible to provide other desirable mix properties in the design such as, but not limited to, workability, resistance to segregation, stable air void system, good finishing properties and good consolidation properties.

(iii) The trial mix will have a minimum compressive strength of 3500 psi in 28 days.

(iv) The maximum results for the 28-day ASTM C 1567 test of 0.10% using the materials for the proposed mix design. To account for multi-laboratory precision, ASTM C 1567 test results by NDR Central Lab must be less than or equal to 0.13%. If NDR Central Lab results for ASTM C 1567 are over 0.13% then the proposed mix design will be rejected.

(v) The PCC Engineer will notify the Contractor of the results for class 47BR concrete approval. Additional trial mixes may be required if unacceptable test results are obtained. The Contractor may choose to submit a new combined aggregate gradation to the PCC Engineer for concrete mix design and trial mix approval. The Contractor may perform additional testing at their discretion and may elect to do a trial mix concurrently with the Department.

4. Production and Testing:

a. Any change greater than 3% in the original verified constituent percentage of the combined aggregates gradation will be considered non-compliant. Any change of the combined gradation targets must remain within the Combined Aggregate Gradation Limits in Table 1033.2A. The contractor shall resubmit a new mix design if the material is deemed non-compliant in accordance with Subsection 1033.02, paragraph 3.

b. The blended gradation tolerance ranges from the approved mix design are established in Table 1033.02B.

(i) The Contractor shall assume the responsibility to cease operations when the specifications are not met. Production shall not be started again without the approval of the Engineer.

Table 1033.02B Blended Aggregate Production Tolerances

| Sieve Size | Tolerances |
|--|------------|
| No. 4 or greater (4.75 mm or greater) | $\pm 5\%$ |
| No. 8 to No. 30 (2.36 to 600 μm) | $\pm 4\%$ |
| No. 50 (300 μm) | $\pm 3\%$ |
| Minus No. 200 (75 μm) | $\pm 1\%$ |

* * * * *

Upon execution of the contract, the plans will be revised to reflect this change.

DEPARTMENT OF ROADS

Original Signed by Kendall Stege

for Claude Oie
Construction Engineer

Issued: July 20, 2010

CO:600AD207

NOTICE: Only the contractors issued bidding proposals receive this addendum and responsibility for notifying any potential subcontractors or suppliers remains with the contractor.