

## **2006 NCAT Pavement Test Track Reconstruction Placement of Experimental Mixes**

Alabama Department of Transportation Standard Specifications, 2002 Edition, will generally apply to the work described herein with amendment by the deletion of the contents of Article 106.09 and by the addition of a NEW SECTION 412 as follows:

### **SECTION 412 TEST TRACK PAVEMENT TEST SECTIONS**

#### **412.01 Description.**

The Contractor shall pave test sections of the National Center for Asphalt Technology (NCAT) test track in accordance with the requirements given in this Section and the requirements shown in contract documents. Several State Department of Transportation agencies (referred to hereafter as sponsors) will provide materials and paving mix designs to be used in the construction of test sections on the test track.

#### **412.02 Materials.**

Hot-mix asphalt will be delivered to the jobsite by a plant production contractor ready for placement either on the track (on experimental sections) or in an adjacent area (in the case of trial mix). The placement Contractor will not be held responsible for material defects associated with plant production (e.g., unacceptable gradation, undesirable volumetrics, etc.), unless the production Contractor and the placement Contractor are one and the same.

#### **412.03 Asphalt Mixes.**

##### **(a) GENERAL.**

All materials shall be incorporated into the mix supplied as stated on sponsors' mix designs unless substitutions are authorized beforehand by NCAT's track manager. The anticipated scope of work will involve approximately 25 trial mix runs that will be placed in designated areas at the prepared plant site and approximately 25 production mix runs that will be placed in approximately 35 lane-lift sublots on the surface of the track.

##### **(b) DESIGN MIXES.**

The job mix formula (JMF) will be provided to the plant production contractor, who will be expected to control the gradation and asphalt content within the allowable tolerances. The initial setting of the controls for all materials shall be those amounts shown on the job-mix formula, unless changes are authorized beforehand by NCAT at the sponsor's request. The Contractor shall make changes as necessary in order that the mixture will run as close as practical to the percentage designated on the job-mix formula. Changes to the target JMF may be authorized by NCAT on a case-by-case basis based upon trial mix runs, sponsors' research needs, etc.

##### **(c) TRIAL MIXES.**

At least twenty tons of uniform trial mix will be produced for each test section, which shall be dumped in the bed of a single haul truck to facilitate representative quality control sampling. The trial mix shall be placed by the Contractor

by spreader and compacted in the vicinity of the track at the thickness and location directed by NCAT. The wasting of trial mixes includes placement by spreader and compaction to the satisfaction of the Engineer.

(d) LAYOUT OF TEST SECTIONS.

Test sections will be up to fourteen inches thick and shall be placed in no more than five layers. All sections will be prepared and ready for the Contractor to tack and pave at the time work is scheduled to begin. Some test sections will be such that different layers will be of a different job mix formula. All test sections are to be approximately 200 feet in length, unless otherwise directed by the Engineer. The actual construction of each test section on the track surface shall be completed in the order designated in the contract documents unless directed otherwise by NCAT personnel. Once construction begins on the test sections, the contractor shall continuously and diligently pursue the completion of the work.

(e) QUALITY ASSURANCE.

1. ACCEPTANCE PROCEDURES.

All construction will be evaluated for acceptance through NCAT. NCAT will determine the locations for sampling and testing on the roadway for mat density testing. The Contractor shall provide a certified Roadway Technician to provide testing support and consultations during the placement of experimental mixes both on and off the track.

a. TEST SECTION COMPRISED OF MULTIPLE LAYERS.

A LOT is defined as all production of the same design job mix formula for an individual test section. Each lane lift of the same job mix of each layer will be defined as a subplot, thus yielding up to three sublots per LOT (based on the attached construction plan).

In-place density measurements will be taken at six sampling locations for each subplot. The mean absolute deviation of the density tests for each subplot shall not exceed 1.2 percent from 94 percent of TMD (Theoretical Maximum Density). Density testing may be waived for permeable surface mixes at the discretion of NCAT.

c. TEST SECTION COMPRISED OF A SINGLE LAYER.

A LOT is defined as the production of the design job mix formula for each test section.

In-place density measurements will be taken at six sampling locations for the LOT. The mean absolute deviation of the density tests for each LOT shall not exceed 1.2 percent from 94 percent of TMD.

2. ACCEPTANCE OR REJECTION.

The decision of the Engineer will be final as to the acceptance or rejection of each subplot and/or lot. Rejected sublots and/or lots shall be removed and replaced. If NCAT determines that Contractor error led to undesirable quality, no additional compensation will be provided.

If NCAT determines that the Contractor cannot or will not place experimental mixes in accordance with applicable specifications, the contract will be terminated and re-awarded to the next lowest bidder.

#### **412.04 Construction Requirements.**

##### **(a) GENERAL.**

In general, construction equipment will be provided for the Contractor by NCAT. A tack truck with an ample supply of ALDOT-approved tack material will be provided by the Contractor. All tools necessary for equipment maintenance and effective construction practices shall be considered incidental to the work and provided by the Contractor. In special cases where another crew may be brought in to place experimental mix, the Contractor must still provide ample resources to fulfill the specified level of effort.

The Contractor's crew must have experience placing ALDOT 420, 423 and 424 mixes (or comparable mixes in other jurisdictions). In order to qualify for bidding, interested vendors must register for Auburn University's online vendor system prior to the time the bids are opened. A resume must be submitted with the bid package so that NCAT can verify the Contractor's qualifications.

##### **(b) SEQUENCE OF CONSTRUCTION.**

The Contractor shall construct the test sections in accordance with the Sequence of Construction shown on the Plans. Low production rates should be expected due to testing, wasting trial mixes etc. No more than five plant production runs are allowed in any single day, and no more than three plant production runs of mix to be paved on the Track are permitted (e.g., the fourth and fifth runs can be Trial Mix). Additionally, no more than two plant production runs of unique "research sample" mix are allowed in a single day. For the purpose of this specification, "research sample" mix is defined as the last time a unique mix is placed on the Track in its uppermost layer. Track mixes can only be produced on weekdays between the hours of 6:00 AM and 6:00 PM (Central Time) unless special permission is obtained from the Engineer.

##### **(c) MIX TRANSFER EQUIPMENT.**

The asphalt mix shall be delivered to the spreader for the placement of the test sections by transfer equipment that is capable of remixing the material prior to the materials being placed in the spreader. Mix transfer equipment will be provided by NCAT.

##### **(d) SPREADERS.**

Hot mix asphalt spreaders will be self-contained and of sufficient size, power, and stability to receive, distribute, and strike off the asphalt material at thicknesses and widths consistent with the specified typical section requirements and details shown on the plans. At least one spreader will be provided by NCAT for use in placing trial mixes off the track and installing experimental test sections.

All hot mix asphalt spreaders used for mainline paving, including shoulders and interchange ramps, shall be operated with a full width vibratory, or other compactive type, screed. The augers used to move the material across the width of the screed shall extend within 1.5 feet of the edge of the screed.

When laying mixtures, the spreader shall be operated at forward speeds consistent with satisfactory laying of the mixture, providing a finished surface of the required evenness and texture without tearing, gouging or shoving of the mixture.

All hot mix asphalt spreaders shall be operated with automatic grade and slope controls unless otherwise directed by NCAT. Equipment operating together shall have the same type controls. The automatic controls may operate either from control

grade wires or ski; however, when a ski is used, the spreader shall have a ski of not less than 30 feet in length. Both grade and slope controls shall be in good working order at all times. In the event of a malfunction of the automatic control system, the spreading operation shall be discontinued until the equipment is repaired and restored to first class working order.

(e) COMPACTION.

At least three types of rollers will be provided by NCAT and available for compaction. These rollers will be a vibratory steel wheel roller, a rubber tire roller, and a static steel wheel roller. (The static roller may be the vibratory roller operated in static mode.)

The vibratory steel wheel roller shall be maintained in good condition and will weigh at least 10 tons. At least two vibratory steel wheel rollers will be provided by NCAT and manned by the Contractor to allow aggressive breakdown compaction.

The rubber tire roller shall be maintained in good condition and will weigh at least 15 tons. The tires shall be capable of being inflated to at least 90 psi. All tires shall be well-maintained and in good condition.

The static steel wheel roller shall be maintained in good condition and will weigh at least eight tons.

All test sections shall be compacted to a target density of ninety four percent of TMD. The mean absolute deviation shall not exceed 1.2 percent from 94 percent of the TMD as described in Subarticle 412.03(e).

(f) PERSONNEL.

The Contractor's price for mix placement will include all costs for at least an 8 man road crew, to include transportation to/from/within the site, all necessary hand tools required for paving, and tack truck with ample supply of liquid tack. The road crew will as a minimum consist of a paver operator, a screed operator, an assistant screed operator, 2 roller operators, 2 lute men and a joint man. One of these workers must be designated as the crew foreman, one must also be qualified to operate the tack truck, and one must also be a certified Roadway Technician. Resumes will be submitted for each man on the crew for prequalification, and as a group the crew must have experience placing ALDOT 420, 423 and 424 mixes (or comparable mixes in other jurisdictions).

**412.05 Layer, Surface and Edge Requirements.**

(a) PLACEMENT OF THE MIXTURES.

1. SPREADING.

Spreading of the hot mix asphalt mixture shall be performed by equipment provided by NCAT, except as noted herein. The Contractor will be allowed to bring in specialty equipment that will aid in the performance of the work. All sections will be prepared and ready for placement of experimental mixes at the time mix production begins.

For hot mix asphalt pavement test track layers, spreading operations shall be so correlated with plant and hauling equipment that the spreading operation, once begun, shall proceed at a speed as uniform and continuous as practical. The continual forward movement of the spreader requires the use of hauling vehicles capable of supplying the spreader with hot mix asphalt material while the spreader is in motion. Repetitive interruptions or stopping of the spreader shall be cause for the Engineer to stop the work until the Contractor evaluates the cause of the stoppage and has

provided a definite action plan for correction of the interruptions. Any interruption will require a thorough check of the area immediately under the spreader and any variances shall be corrected immediately or the material removed and replaced, as directed, without additional compensation.

Material placed in the spreader shall be immediately spread and screeded to such uniform depth that the specified placement thickness after compaction is secured. Alignment of the outside edges of the pavement shall be controlled by preset control lines, and shall be finished in conformity with these controls.

Any spreading operation which cannot produce acceptable joints within the surface tolerances and density requirements shall be cause for requiring the Contractor to modify his methods. NCAT may require that steel plates be utilized to shim the screed as the paver initially pulls away from a new transverse joint.

## 2. COMPACTION.

Mix shall be placed beyond the end of the test section approximately five to 10 feet. As soon as the mixture has been spread, the paver has lifted off and moved away, and excess mix has been removed with a backhoe or other approved equipment, rolling shall begin. A delay in the initial rolling will not be tolerated and the initial or breakdown rolling should, in general, be performed by rolling longitudinally, beginning at the sides and proceeding toward the center of the surface.

When paving abuts a previously placed lane, the longitudinal joint shall be rolled in the first pass. On superelevated curves, rolling shall begin at the low side and progress toward the high side. The roller shall not compact within six inches of the edge of the surface, where an adjacent lane is to follow, while the surface is still hot.

If any displacement occurs during rolling, it shall be corrected at once. To prevent adhesion of surface mixture to the rollers, the wheels shall be kept adequately moistened with water and a non-foaming detergent or approved diluted release agent, but an excess of water will not be permitted.

Adequate precaution shall be taken to prevent dropping of gasoline or oil on the pavement. In places inaccessible to a roller, compaction shall be obtained with hand or mechanical tampers of adequate weight to produce required density.

Sufficient personnel shall be provided by the Contractor to allow two rollers to be simultaneously operated throughout the compaction process.

## 3. JOINTS.

### a. GENERAL.

Placing of hot mix asphalt paving layers shall be as continuous as possible. All joints shall be made in a careful manner in such a way as to provide a smooth, well-bonded and sealed joint meeting the density and surface requirements given in this Section. Failure to meet requirements noted above shall be cause for ordering the removal and reconstruction of the joint without extra compensation.

The contact surface shall be treated with a thin coat of an ALDOT-approved tack material prior to construction of the joint.

### b. LONGITUDINAL.

Longitudinal joints in the wearing surface shall conform with the edges of proposed traffic lanes insofar as practical. Any necessary longitudinal joints in underlying layers shall be offset wherever possible so as to be at least six inches

from the joint in the next overlying layer. The Contractor shall use a mechanical saw provided by NCAT to saw the joints if the Engineer determines that the joints are improperly formed.

c. TRANSVERSE.

Transverse joints shall be carefully constructed. Rollers shall not pass over the unprotected edge of the freshly laid mixture unless laying operations are to be discontinued. To facilitate the expeditious removal of the plant mix joint when laying operations are resumed, the Contractor shall use NCAT -provided equipment to remove excess material and facilitate successful construction of a smooth joint.

Upon resumption of the work, a neat joint shall be formed by sawing back vertically into the previously laid material to expose the full depth of the layer. A 15-foot straight edge will be used to verify a smooth transition before sawing can commence. The fresh mixture shall be raked and tamped to provide a well-bonded and sealed joint meeting surface and density requirements. A thin coat of ALDOT-approved tack material shall be used to tack adjacent layers prior to placement.

When a section ends (at the far end) against a section that is not being replaced, mat thickness shall be targeted slightly on the high side. The ends of all milled sections shall be trimmed with a masonry saw to produce a vertical face to aid in compaction and smoothness.

(b) LAYER THICKNESS.

Each test section will be constructed with lift thicknesses indicated in the attached construction plan unless directed otherwise by NCAT. The final surveyed thickness of completed sections must average no more than 0.2 inches from the specified target with a standard deviation within the section of no more than 0.1 inches.

(c) SURFACE SMOOTHNESS.

1. GENERAL.

Surface smoothness and roadway section will be checked by the use of string, Engineer's level, straight edge, and an NCAT -provided longitudinal profiler(s).

The Contractor shall furnish string, straightedges, and the necessary personnel to handle them under the supervision of the Engineer. NCAT will be responsible for supplying, operating, and interpreting results from specialized longitudinal profiling equipment.

Surface smoothness tests shall be made continuously during and immediately after rolling so that irregularities may be eliminated to the extent possible by rolling while the material is still workable.

2. REQUIREMENTS FOR ALL SURFACES.

The finished surface of all base, binder, and wearing surface layers shall not vary more than 1/4 inch from the required section measured at right angles to the pavement centerline. The finished surface shall not vary more than 3/8 inch in any 25-foot section from a taut string applied parallel to the surface and roadbed centerline at the following locations: in the wheelpaths, at the centerline, and at other points as designated. The variance from the designated grade shall not increase or decrease more than 1/2 inch in 100 feet.

The surface shall not vary more than 1/4 inch from a 15-foot straightedge placed parallel to the centerline at points directed. A 15-foot rolling straightedge, equipped with marking capability, may be used in lieu of the fixed straightedge if approved by the Engineer.

(d) EDGE REQUIREMENTS.

Surface, binder, and leveling pavement edges not confined by curbing or other structures shall be lightly tamped, generally with a lute immediately behind the placement operation, to form an approximately 1:1 slope as a preventive measure against cracking and bulging during the rolling process. This procedure shall also be required on the initial edge of a longitudinal cold joint. These edges shall be neatly shaped to line behind the breakdown roller and shall be trimmed as necessary after final rolling, to an accurately lined string or wire providing a maximum tolerance of two inches outside the theoretical edge of pavement, with a maximum variation from a true line of 1/2 inch in 10 feet and a slope not flatter than 1:1. Edges that are distorted by rolling shall be corrected promptly.

(e) RIDEABILITY REQUIREMENTS.

Average roughness (as defined by the International Roughness Index, or IRI) within the middle 150 feet of any section shall not exceed 45 inches per mile (as the average of the left and right wheelpaths). The average roughness for the entire track (including the joints) shall not exceed 80 inches per mile. Conformance with this requirement will be determined by NCAT-provided longitudinal profiler(s).

**412.06 Defective or Deficient Areas.**

Areas of the test sections that are determined to be defective due to the operations of the Contractor shall be removed and replaced at no cost to NCAT.

**412.07 Method of Measurement.**

Mix placement will be measured per trial mix placed and test sections completed.

**412.08 Basis of Payment.**

(a) GENERAL.

Items of work will be paid for at the contract unit price. This price shall be full compensation for all materials, equipment (except equipment furnished to the Contractor), tools and labor required to complete the work. All-or-none conditional bidding will be accepted in accordance with ALDOT 102.08 for plant production and mix placement.

(b) MIX PLACEMENT.

The contract unit price for mix placement shall include the placement of the required paving mixes (for both trial and production purposes).

(c) PAYMENT WILL BE MADE UNDER ITEM NUMBER:

- 412A Paving Trial Mix – per run (Est. 25 runs)
- 412B Paving Mix Test Section – per section (Est. 11 sections)
- 412C Paving Structural Test Section – per section (Est. 5 sections)

The anticipated mix placement plan is attached for informational purposes.

