



**COMMONWEALTH OF KENTUCKY  
TRANSPORTATION CABINET**  
Frankfort, Kentucky 40622  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

**Matthew G. Bevin**  
Governor

**Greg Thomas**  
Secretary

October 26, 2016

CALL NO. 101  
CONTRACT ID NO. 161261  
ADDENDUM # 1

Subject: Adair County, NHPP 0802 (005)  
Letting October 28, 2016

- (1) Added - Special Note - Pages 1-4 of 4
- (2) Revised - Bid Items - Pages 152-153 of 153

Proposal revisions are available at <http://transportation.ky.gov/Construction-Procurement/>.

If you have any questions, please contact us at 502-564-3500.

Sincerely,

A handwritten signature in cursive script that reads "Rachel Mills".

Rachel Mills, P.E.  
Director  
Division of Construction Procurement

RM:ks  
Enclosures



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## SPECIAL NOTE FOR INTELLIGENT COMPACTION OF ASPHALT MIXTURES

This Special Note will apply when indicated on the plans or in the proposal. Section references herein are to the Department's Standard Specifications for Road and Bridge Construction current edition.

**1.0 DESCRIPTION.** Provide and use Intelligent Compaction (IC) Rollers for compaction of all asphalt mixtures.

**2.0 MATERIALS AND EQUIPMENT.** In addition to the equipment specified in Subsection 403.02, a minimum of one (1) IC roller is to be used on the project at all times. The Contractor may elect to only use one (1) IC roller for compaction as the breakdown or intermediate roller. All IC rollers will meet the following minimum characteristics:

- 1) Are self propelled double-drum vibratory rollers equipped with accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compactive effort. The IC rollers must have the approval of the Engineer prior to use. Examples of rollers equipped with IC technology can be found at [www.IntelligentCompaction.com](http://www.IntelligentCompaction.com).
- 2) Are equipped with non-contact temperature sensors for measuring pavement surface temperatures.
- 3) The output from the roller is designated as the IC-MV which represents the stiffness of the materials based on the vibration of the roller drums and the resulting response from the underlying materials.
- 4) Are equipped with integrated on-board documentation systems that are capable of displaying real-time color-coded maps of IC measurement values including the stiffness response values, location of the roller, number of roller passes, machine settings, together with the material temperature, speed and the frequency and amplitude of roller drums. Ensure the display unit is capable of transferring the data by means of a USB port.
- 5) Are equipped with a mounted Global Positioning System GPS radio and receiver either a Real Time Kinematic (RTK-GPS) or Global Navigational Satellite System (GNSS) units that monitor the location and track the number of passes of the rollers. Accuracy of the positioning system is to be a minimum of 12 inches.

**3.0 WORK PLAN.** Submit to the Engineer an IC Work Plan at the Preconstruction Conference and at least 2 weeks prior to the beginning construction. Describe in the work plan the following:

1. Compaction equipment to be used including:

- Vendor(s)
- Roller model(s),
- Roller dimensions and weights,
- Description of IC measurement system,
- GPS capabilities,
- Documentation system,
- Temperature measurement system, and
- Software.

2. Roller data collection methods including sampling rates and intervals and data file types.

3. Transfer of data to the Engineer including method, timing, and personnel responsible. Data transfer shall occur at minimum twice per day or as directed by the Engineer, and is to be either electronic or digital. If the contractor elects to use a proprietary real time cloud data collecting and distribution system (ex. Visionlink) the Cabinet requests an the ability to access the data through this service.

4. Provide the Engineer with a new laptop computer with the following minimum requirements: Windows 7 Pro 64bit, 2.0GHz processor, 32GB RAM, 500GB hard drive, DVD drive (reads and writes DVD/CD), and 14 inch display. **The Cabinet retains possession of the equipment upon completion of the project.**

5. Provide the Section Engineer the following new GPS survey equipment; this is a sole source item to ensure compatibility with the Cabinet’s existing equipment, **The Cabinet retains possession of the equipment upon completion of the project:**

Item	Part No.	Description	Quantity
1	R10-001-60	Trimble R10, internal 410-470 MHz radio	2
2	TSC3-01-1120	Trimble TSC3, w/Trimble Access, with internal radio QWERTY Keypad	1
3	SA-ROADS-P	Trimble Access – Roads Perpetual License	1
4	43169-00	Rod - 2.0m Carbon Fiber Range Pole with Bipod	1
5	82758-00	Trimble TSC3 Accessory - Range Pole Bracket	1
6	74450-14	TDL 450H Field Battery Charger Kit	1
7	74450-96	TDL 450H – 35W Radio System Kit; 450-470 MHz	1
8	12178	Tripod - Wooden Medium Duty	1
9	74450-50-70	Antenna kit with 1.8m mast	1
10	28959-00	Tripod-Adjustable height 2M for GPS base	1

6. Training plan and schedule for roller operators, project foreman, project surveyors, and Cabinet personnel; including both classroom and field training. Training should be conducted at least 1 week before beginning IC construction. The training is to be performed by a qualified representative(s) from the IC Roller manufacture(s) to be used on the project.

**4.0 CONSTRUCTION.** Do not begin work until the Engineer has approved the IC submittals and the IC equipment.

Follow requirements established in Section 400 for production and placement, materials, equipment, acceptance plans and adjustments except as noted or modified in this Specification. Provide the Engineer at least one day’s notice prior to beginning construction or prior to resuming production if operations have been temporarily suspended. Ensure paving equipment complies with all requirements specified in Section 400. The IC roller temperatures will be evaluated by the Department with the data from a Paver Mounted Infrared Temperature Gauge.

**A. Pre-Construction Test Section(s) Requirements**

1. Prior to the start of production, ensure the proper setup of the GPS, IC roller(s) and the rover(s) by conducting joint GPS correlation and verification testing between the Contractor, GPS representative and IC roller manufacturer using the same datum.

1. Ensure GPS correlation and verification testing includes the following minimum processes:

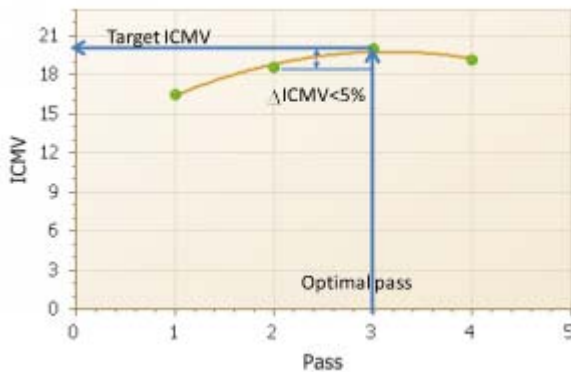
- a. Establish the GPS system to be used either one with a base station or one with mobile receivers only. Ensure all components in the system are set to the correct coordinate system; then,
- b. Verify that the roller and rover are working properly and that there is a connection with the base station; then,
- c. Record the coordinates of the two edges where the front drum of the roller is in contact with the ground from the on-board, color-coded display; then,

- d. Mark the locations of the roller drum edges and move the roller, and place the mobile receiver at each mark and record the readings; then,
2. Compare coordinates between the roller and rover receivers. If the coordinates are within 12.0 in. of each other, the comparison is acceptable. If the coordinates are not within 12.0 in., diagnose and perform necessary corrections and repeat the above steps until verification is acceptable.
3. Do not begin work until acceptable GPS correlation and verification has been obtained.
4. The Contractor and the Department should conduct random GPS verification testing during production to ensure data locations are accurate. The recommended rate is once per day with a requirement of at least once per week.
5. All acceptance testing shall be as outlined in Standard Specifications section 400.

B. Construction Test Section(s) Requirements

Construct test section(s) at location(s) agreed on by the Contractor and the Engineer within the project limits. The test section is required to determine a compaction curve of the asphalt mixtures in relationship to number of roller passes and to the stiffness of mixture while meeting the Department in-place compaction requirements. All rollers and the respective number of passes for each is to be determined via control strip each time a material change, equipment change or when the Engineer deems necessary.

Conduct test section(s) on every lift and every asphalt mixture. Ensure test section quantities of 500 to 1,000 tons of mainline mixtures. Operate IC rollers in the low to medium amplitude range and at the same settings (speed, frequency) throughout the section while minimizing overlapping of the roller, **the settings are to be used throughout the project with no changes**. After each roller pass, the qualified technician from the contractor observed by the Department will use a nondestructive nuclear gauge that has been calibrated to the mixture to estimate the density of the asphalt at 10 locations uniformly spaced throughout the test section within the width of a single roller pass. The density readings and the number of roller passes needed to achieve the specified compaction will be recorded. The estimated target density will be the peak of the average of the nondestructive readings within the desired compaction temperature range for the mixture. The IC roller data in conjunction with the Veda software will create an IC compaction curve for the mixture. The target IC-MV is the point when the increase in the IC-MV of the material between passes is less than 5 percent on the compaction curve. The IC compaction curve is defined as the relationship between the IC-MV and the roller passes. A compaction curve example is as follows:



Subsequent to the determination of the target IC-MV, compact an adjoining > 250 < 500 tons section using same roller settings and the number of estimated roller passes and allow the Department to verify the compaction with the same calibrated nondestructive nuclear gauge following the final roller pass. **The Department will obtain cores at 10 locations (No cores for calibration are to be taken in the surface layer, use non-destructive density results only!!)** uniformly spaced throughout the test section within the width of the single roller. Obtain GPS measurement of the core locations with a GPS rover. Use the Veda software to perform least square linear regression between the core data and IC-

MV in order to correlate the production IC-MV values to the Department specified in-place air voids. A sample linear regression curve example is as follows.



**C. Construction Requirements**

Use the IC roller on all lifts and types of asphalt within the limits of the project.

Ensure the optimal number of roller passes determined from the test sections has been applied to a minimum coverage of 80% of the individual IC Construction area. Ensure a minimum of 75% of the individual IC Construction area meets the target IC-MV values determined from the test sections.

Do not continue paving operations if IC Construction areas not meeting the IC criteria are produced until they have been investigated by the Department. Obtain the Engineer’s approval to resume paving operations. Non-IC rollers are allowed to be used as the third roller on the project; one of the breakdown or the finish rollers is to be equipped with IC technology.

IC Construction areas are defined as subsections of the project being worked continuously by the Contractor. The magnitude of the IC Construction areas may vary with production but must be at least 750 tons per mixture for evaluation. Partial IC Construction areas of < 750 tons will be included in the previous area evaluation. IC Construction areas may extend over multiple days depending on the operations.

The IC Construction Operations Criteria does not affect the Department’s acceptance processes for the materials or construction operations

**5.0 MEASUREMENT.** The Department will measure the total tons of asphalt mixtures compacted using the IC roller(s). Compaction is to be performed by a minimum of one IC roller, material compacted by rollers not equipped with properly functioning IC equipment will not be accepted for payment of the bid item asphalt mixtures IC rolled. Use of non-IC rollers can be accepted on small areas due to equipment malfunctions at the written approval of the Engineer. Paving operations should be suspended for equipment malfunctions that will extend over three days of operation.

**6.0 PAYMENT.** The Department will make payment for the completed and accepted quantities under the following:

1. Payment is full compensation for all work associated with providing IC equipped rollers, all required survey equipment and computer, transmission of electronic data files, two copies of IC roller manufacturer software, and training.
2. Delays due to GPS satellite reception of signals to operate the IC equipment or IC roller breakdowns will not be considered justification for contract modifications or contract extensions.

Code	Pay Item	Pay Unit
24781EC	Intelligent Compaction for Asphalt	TON

**PROPOSAL BID ITEMS**

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**Section: 0001 - PAVING**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00001		DGA BASE	300.00	TON		\$	
0020	00100		ASPHALT SEAL AGGREGATE	1,286.00	TON		\$	
0030	00103		ASPHALT SEAL COAT	154.00	TON		\$	
0040	00190		LEVELING & WEDGING PG64-22	1,500.00	TON		\$	
0050	00212		CL2 ASPH BASE 1.00D PG64-22	834.00	TON		\$	
0060	00214		CL3 ASPH BASE 1.00D PG64-22	171.00	TON		\$	
0070	00301		CL2 ASPH SURF 0.38D PG64-22	4,430.00	TON		\$	
0080	00336		CL3 ASPH SURF 0.38A PG76-22	17,903.00	TON		\$	
0090	02677		ASPHALT PAVE MILLING & TEXTURING	6,656.00	TON		\$	
0095	24781EC		INTELLIGENT COMPACTION FOR ASPHALT (ADDED: 10-26-16)	23,365.00	TON		\$	

**Section: 0002 - ROADWAY**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0100	00078		CRUSHED AGGREGATE SIZE NO 2	32.00	TON		\$	
0110	01000		PERFORATED PIPE-4 IN	672.00	LF		\$	
0120	01010		NON-PERFORATED PIPE-4 IN	432.00	LF		\$	
0130	01020		PERF PIPE HEADWALL TY 1-4 IN	24.00	EACH		\$	
0140	01691		FLUME INLET TYPE 2	1.00	EACH		\$	
0150	01982		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	554.00	EACH		\$	
0160	02165		REMOVE PAVED DITCH	426.00	SQYD		\$	
0170	02367		GUARDRAIL END TREATMENT TYPE 1	41.00	EACH		\$	
0180	02369		GUARDRAIL END TREATMENT TYPE 2A	41.00	EACH		\$	
0190	02381		REMOVE GUARDRAIL	40,187.50	LF		\$	
0200	02483		CHANNEL LINING CLASS II	500.00	TON		\$	
0210	02484		CHANNEL LINING CLASS III	200.00	TON		\$	
0220	02562		TEMPORARY SIGNS	420.00	SQFT		\$	
0230	02575		DITCHING AND SHOULDERING	36,168.00	LF		\$	
0240	02599		FABRIC-GEOTEXTILE TYPE IV	44.00	SQYD		\$	
0250	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
0260	02671		PORTABLE CHANGEABLE MESSAGE SIGN	2.00	EACH		\$	
0270	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		\$	
0280	02696		SHOULDER RUMBLE STRIPS-SAWED	144,672.00	LF		\$	
0290	02775		ARROW PANEL	2.00	EACH		\$	
0300	05950		EROSION CONTROL BLANKET	1,800.00	SQYD		\$	
0310	06401		FLEXIBLE DELINEATOR POST-M/W	218.00	EACH		\$	
0320	06404		FLEXIBLE DELINEATOR POST-M/Y	2.00	EACH		\$	
0330	06412		STEEL POST MILE MARKERS	14.00	EACH		\$	
0340	06549		PAVE STRIPING-TEMP REM TAPE-B	1,880.00	LF		\$	
0350	06550		PAVE STRIPING-TEMP REM TAPE-W	3,360.00	LF		\$	
0360	06551		PAVE STRIPING-TEMP REM TAPE-Y	3,360.00	LF		\$	
0370	10020NS		FUEL ADJUSTMENT	46,144.00	DOLL	\$1.00	\$	\$46,144.00
0380	10030NS		ASPHALT ADJUSTMENT	115,900.00	DOLL	\$1.00	\$	\$115,900.00
0390	20071EC		JOINT ADHESIVE	144,672.00	LF		\$	
0400	21802EN		G/R STEEL W BEAM-S FACE (7 FT POST)	40,187.50	LF		\$	

**PROPOSAL BID ITEMS**

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0410	22883EN		CONCRETE WEDGE CURB	2,602.00	LF		\$	
0420	23143ED		KPDES PERMIT AND TEMP EROSION CONTROL	1.00	LS		\$	
0430	24189ER		DURABLE WATERBORNE MARKING-6 IN W	90,420.00	LF		\$	
0440	24190ER		DURABLE WATERBORNE MARKING-6 IN Y	72,336.00	LF		\$	
0450	24489EC		INLAID PAVEMENT MARKER	920.00	EACH		\$	

**Section: 0003 - DRAINAGE**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0460	00464		CULVERT PIPE-24 IN	8.00	LF		\$	
0470	01208		PIPE CULVERT HEADWALL-24 IN	1.00	EACH		\$	
0480	01310		REMOVE PIPE	8.00	LF		\$	
0490	02625		REMOVE HEADWALL	1.00	EACH		\$	
0500	22660EN		REPLACE GRATE	396.00	LB		\$	

**Section: 0004 - DEMOBILIZATION &/OR MOBILIZATION**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0510	02568		MOBILIZATION	1.00	LS		\$	
0520	02569		DEMOBILIZATION	1.00	LS		\$	