STATE   **OF**   **TENNESSEE**

August 14, 2017   January 1, 2021
(Rev. 10-17-19)
(Rev. 11-5-21)

SPECIAL PROVISION

REGARDING

INTELLIGENT COMPACTION (IC) FOR HOT MIX ASPHALT (HMA)

Description

This work consists of the requirements for modification of standard HMA compaction equipment for the purpose of tracking and documenting location, and temperature. Compaction equipment and procedures shall meet all requirements listed in **407.07** and **407.15** except as modified herein.

Equipment

A. Rollers

Install Intelligent Compaction equipment meeting the requirements listed herein on the first (breakdown) and second (intermediate) roller in the roller train. Roller type(s) are to be as required in **Table 407.15 – Roller Requirements by Mix Type**. The IC systems may be either an integrated system or an added-on/retrofit systems.

B. Global Navigational Satellite System (GNSS)

Rollers shall be equipped with a GNSS units to monitor the equipment locations and track the number of roller passes utilizing the same reference system. GNSS system shall have a survey tolerance of not greater than 2.0 in in both the horizontal (x and y) directions.

GNSS receivers shall utilize the Universal Transverse Mercator (UTM) or Tennessee State Plane coordinate system. Once declared, the coordinate system utilized shall be the same for both rollers for the entire project.

   GNSS data shall be in the following format:

1. Time: Military, local time zone, hhmmss.ss
2. GNSS: Latitude/Longitude, degrees/minutes; ddmm.mmmmmmmm or
            decimal degrees; dd.dddddddd
3. Grid: Meters, 0.001 m

C. Temperature Measurement

Rollers shall be equipped with non-contact temperature sensors for both the forward and reverse directions for measuring pavement surface temperatures. Temperature sensor shall be accurate to ±3°F.

D. Integrated On-Board Documentation System

An on-board documentation system that is capable of displaying real-time color-coded maps of IC data as defined under Project IC Data.

The Intelligent Compaction System shall be capable of transferring the Project IC Data by means of cellular data upload to cloud storage during the day's production.

E. Cloud Storage and Cloud Computing

Provide a system of cloud storage and cloud computing. The cloud storage shall be sufficient to contain all Project IC Data associated with the contract and accessible to the Department. The cloud computing system shall support real-time visualization/mapping of the Project IC Data. Paving operations shall not begin until real-time access is granted to the Department.

Project IC Data is to be uploaded throughout the project in real-time if data cellular coverage allows, but not less than once per day otherwise. If cellular data coverage for uploading the data at the project site is unavailable, upload the data prior to the next day's production by other means.

Provide the Department with unlimited review access to the intelligent compaction records through cloud storage and cloud computing starting from the beginning of the project paving until project finalization.

Construction Requirements

A. Project IC Data

Track and record the Project IC Data for the contract. Project IC data shall consist of:
1. Location of the roller in real time,
2. Number of roller passes at a given gridded location,
3. Pavement surface temperatures associated with each roller pass, and
4. The roller speed associated with each roller pass.

All data is to be gridded in one foot by one foot grid.

At the end of the project, provide a copy of the final Project IC Data for each pavement layer in a separate digital file to the Department formatted in the most current version of Veta. Veta is available at www.intelligentcompaction.com.

Export the raw or gridded data:

1. Directly into Veta if a file format compatible with Veta is available, or

2. Through a direct transfer of data from cloud storage to Veta.

Ensure that the date/time stamp is reflective of the local time zone for both mapped and exported data.

B. System Failure

In the event that the intelligent compaction system does not work due to failure of the system, work may continue for the day's production. The Intelligent Compaction system must be operational prior to starting the next day's production.

Notify the Engineer if real time data cannot be uploaded to cloud storage due to lack of cellular data or satellite coverage. Notification must be made each day if real time uploading of data is unavailable. In instances where the file is not uploaded in real time to the cloud storage, it must be uploaded by other means prior to the next day's paving.

File Name

Name Veta project files (*.VETAPROJ) using filenames CNXXXX_ROUTE_HMA_YYY standardized format where XXXX is replaced by the contract number (e.g. Z999), YYY is replaced with the mix type (e.g. D, BM2, TLD, etc) and ROUTE is replaced with the five character State Route or Interstate designation (e.g. SR001 or I0040).

Method of Measurement & Basis of Payment

The Department will not measure and pay for Intelligent Compaction directly, and will consider such work incidental to other items of work relating to the placement of Asphalt.