THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY

January 4, 2022

CONSTRUCTION BULLETIN No. 22-01

SUBJECT: Update to Illinois Tollway Test Procedure (TTP) 005
Asphalt Mix Design Recertification

The Illinois Tollway has made updates to the submittal requirements for Asphalt Mixtures Design Verification Procedure (TTP) 005. These revisions are explained below.

Illinois Tollway Test Procedure 005 – Asphalt Mixtures Design Verification Procedure: The Illinois Tollway Asphalt Mixtures special provision and Illinois Tollway Test Procedure 005 requires redesigning asphalt mixtures based on the age of the original mix design. This bulletin revises that requirement and allows mix designs to be annually recertified when the mix design and construction test results meet the requirements in the attached information. No other changes have been made to the content of TTP 005.

Please note that while the attached information gives a January 15th submittal deadline, the submittal deadline for accepting this information for the 2022 construction season shall be February 15th, 2022.

Attached document:
Illinois Tollway Test Procedure (TTP) 005

The construction industry is here in directed to follow this construction bulletin with all Illinois Tollway contracts.

Manar Nashif

Manar Nashif, P.E.
Acting Chief Engineering Officer

01/05/2022

Date

Illinois Tollway Testing Procedure
Effective Date: 03/14/2019
Revised Date: 01/04/2022

Standard Method of Test
For

Asphalt Mixtures Design Verification Procedure

Illinois Tollway Test Procedure (TTP) 005

1. **Scope.** This testing procedure provides guidelines and procedures for the verification of Contractors' asphalt mixture designs for use on Tollway contracts. All designs must meet the criteria in the Tollway Asphalt Mixtures Special Provision.

   The Illinois Tollway will permit contractors to submit an annual request for an approved WMA mix design to be recertified. Existing WMA mix designs will be eligible for an annual recertification except for mainline SMA and IL-4.75 mix designs. The request for recertification, along with the information described below, must be received by the Illinois Tollway not later than January 15 of the recertification year. (See Section 4 of this TTP for more details)

   IDOT verified mix designs will be accepted as long as they meet the requirements of this special provision. If the contractor requests to use an IDOT verified mix design and intends to add a warm mix chemical additive for use on the Tollway, the contractor must provide test results of a 1-point at optimum AC using the additive, showing compliant volumetrics, SIP, Hamburg and DCT.

   For all non-IDOT approved mix designs, the Tollway Mix Design Verification Process will follow the procedure herein.

2. **Required Design Data/Material Samples**. The Contractor shall provide an asphalt mixtures design prepared by a Hot-Mix Asphalt Level III Technician in accordance with IDOT's "Hot-Mix Asphalt Design Procedure" in the current *Hot-Mix Asphalt Level III Technician Course* manual. All testing shall be performed by Hot-Mix Asphalt Level I Technicians or higher. The asphalt mixture design shall be submitted with the following design data:

   2.1. **Design Data.** The material name, materials code number, source name, source Producer/Supplier Number, and source location shall be provided for all materials used in the asphalt mixtures design.

   2.2. **Material Samples.** The contractor shall provide the average mix plant stockpile gradations and aggregate blend percentages used to design the mix. Each of the individual aggregate gradations used in the Contractor design shall be an average of a minimum of 5 (five) stockpile gradations from existing stockpiles at the plant. Adjusted average aggregate source gradations (stockpile gradations preferred) may be substituted if aggregate has not been shipped to the mix plant. The adjustment shall be based on the amount of aggregate degradation during shipment to, and handling at, the mix plant. A design using gradation information not comparing to mix plant or aggregate source gradations shall be considered unacceptable.

Any aggregate sources, including RAP, FRAP or RAS shall be IDOT approved. If the contractor proposes a non-IDOT-approved source, testing and acceptance procedures must be reviewed and approved by Tollway Materials.

2.3. **Required Design Data**. The Contractor shall provide a summary of design test data and optimum design data utilizing a design package with the same output format as CARE-AC. Paperwork will be submitted in a packet in the following order.

1) Bituminous Mixture Design summary signed and dated by Level III
2) The four point Gmm and Gmb data worksheet summary
3) Batching worksheet
4) Height sheets of all four points and verification point of the compacted samples
5) Dust correction factor worksheet
6) TSR individual briquettes worksheet and supporting data (if applicable)
7) Power 45 gradation graph
8) AC vs. Voids (total mix) graph
9) AC vs. VFA (voids filled) graph
10) AC vs. VMA graph
11) AC vs. Specific Gravities (Gmm and Gmb) graph
12) Supporting documentation for representative aggregate, RAS, and FRAP gradations
13) Contractor results from ignition oven calibrations, if a different laboratory is being used for mix design purposes, the oven calibrations shall be submitted as soon as possible, before performing a test strip on the mix.
14) Hamburg (Tollway Modified AASHTO T314) and SIP Calculation
15) WMA Technology and additive information and dosage (if applicable)
16) DCT (Tollway Modified ASTM D7313)
17) Micro Deval (ASTM D6928 or AASHTO T327) if applicable

3. **Tollway Verification**. The Tollway will verify mix designs using either Method A or Method B.

3.1. **Method A.** Tollway verification for asphalt mixture designs will include a review of all the mix design data (including all aggregate field gradations) submitted by the Contractor.

The mix design must be prepared in an AASHTO Re:Source Accredited laboratory, and signed by a Professional Engineer. Upon submittal, the Tollway shall review of all mix design paperwork for compliance.

The AASTHO Re:Source laboratory creating the mix design and/or testing the performance samples, must be accredited in AASHTO T164, T166, T209, and T312. To complete all the mix design testing requirements, it is acceptable to have tests run in more than one AASHTO Re:Source accredited laboratory.

All design data shall be submitted to the Tollway a minimum of 7 calendar days for Method A, prior to production.

3.2. **Method B.** If the Asphalt Mix Design was prepared by a non-AASHTO Re:Source accredited laboratory, the Tollway verification will include a review of all mix design data submitted, in addition to the following testing:

1) Gse
2) Gmb
3) Gmm
4) Air Voids
5) Gradation
6) AC Content
7) Hamburg, including SIP (Tollway Modified AASHTO T314)
8) DCT (Tollway Modified ASTM D7313)

All design data and material samples shall be submitted to the Tollway a minimum of 14 calendar days for Method B, prior to production.

The Contractor shall provide samples of blended aggregate, asphalt binder, and additives which represent the materials in the mix design. The representative samples shall be identified and submitted as follows:

A. Aggregate, FRAP and RAS – Aggregate, FRAP and RAS shall be dried, split into the individual sizes for the Batching Worksheet as stated in the current *Hot-Mix Asphalt Level III Technician Course* manual, and then blended to the chosen gradation. FRAP and RAS shall be kept separate from the Aggregate. The total amount submitted shall be enough to comprise two (2) 12,000-gram samples of dry aggregate, FRAP and RAS. All material shall be bagged in plastic bags or other airtight containers. Each container shall be identified with the source names, source locations, source Producer/Supplier Numbers, material codes, sample location, and sample date.
B. Asphalt Binder – A minimum of 1 gallon. Identified with source name, source location, source Producer/Supplier Number, material code, sample location, and sample date.
C. Approved Additive(s) – The same approved additive(s) as used in the Contractor's design, identified by the additive source name, source location, brand name or number, material code, sample location, sample date, additive MSDS, the manufacturer's recommended dosage rate, and the rate used in the design if different that the manufacturer's dosage rate. NOTE: Prior to submitting the additive(s), the Contractor shall contact the Tollway for the required sample size.
D. Mixed/Compacted Samples – If the Hamburg or DCT testing was performed in an AASHTO Re:Source Accredited Lab, submitted samples (b. and c. below respectively) are not required.
    a. Two (2) 1,400 g mixed loose samples
    b. Two (2) 115mm bricks compacted at optimum AC and Design Air Voids
    c. Two (2) 63mm bricks compacted at optimum AC and 3% above the Mix Design Target Air Voids ± 0.5% Air Voids
    d. Two (2) 150mm bricks compacted at optimum AC and 3% above the Mix Design Target Air Voids ± 0.5% Air Voids
    e. One (1) 2,000 g mixed loose sample

The Contractor shall certify in writing that all materials submitted for mix design verification meet the Tollway requirements and represent the materials to be used during mix design.

3.3. **Verification Tolerance.** The Contractor asphalt mixture design and Tollway verification testing shall meet the mix design criteria in the Tollway Asphalt Mixtures Special Provision and any other Special Provisions in the Contract, and the following tolerances (where applicable):

Volumetric Testing	Tolerance
Gse (effective SG of combined aggregates)	± 0.014
Gmb	± 0.020
Gmm	± 0.014
Air Voids	± 0.5%

Gradation	Tolerance
12.5mm (1/2 in)	± 3.0
4.75mm (No. 4)	± 2.0
2.36mm (No. 8)	± 2.0
600 µm (No. 30)	± 1.0
75 µm (No. 200)	± 0.5
Pb (Asphalt Binder Content)	± 0.15

Performance	Tolerance
SIP (SIP @ # of Passes)	Above Minimum
Hamburg (Failure @ # of Passes)	Below Maximum
DCT	Above Minimum

All aggregate field gradations submitted by the Contractor will be compared to previous mix plant and/or Aggregate Gradation Control System gradations.

3.4. **Timeline.** The Tollway will notify the Contractor in writing within the required time frame for Method A or B. If the verification fails, the time for the Tollway to notify the Contractor starts over. Acceptable designs may be used in Tollway contracts, provided the design is reproducible in the mix plant.

4. **Annual Recertification.** To be eligible for recertification, the mix design must have been used in the last calendar year. The contractor must demonstrate that the mix design performed well during production and construction (as described below), and that mix properties have not varied from the original mix design. At a minimum, the contractor must provide the following documentation:

- Approval letter(s) for the original mix design and subsequent recertifications
- Affirmation of no material source changes (aggregate, asphalt binder, modifier, WMA technology, or recycled products), and that the mix design meets the most recent Tollway Asphalt Mixtures SP.
- QC/QA records for the last construction season, including:
  - Control charts showing test results and individual & running average tolerances for Air Voids, Gmm, Gmb, Field VMA, field density, asphalt content and gradation.
  - Explanation of any corrective action taken when mix test results triggered resampling and testing.
  - Design and production test results annually for Hamburg and DCT.

- Aggregate stockpile gradations, and recycled product stockpile test results per the Reclaimed Asphalt Materials (RAM) SP.
- A cover sheet with the current mix proportions and aggregate specific gravities.
- When compared to the original mix design, the allowable mix adjustments are shown below. The documentation must include a list of these items, with a side-by-side comparison of the original and current values.
  - Mix components have not changed by more than 5.0% from the original design blend proportions.
  - The current job-mix formula does not exceed these limits from the original mix design on the following sieves:
    - ½" Sieve ± 5.0%, #4 Sieve ± 4.0%, and #8 Sieve ± 3.0%.
    - Any change where the adjustment exceeds the original design on the #30 and #200 sieves
  - The optimum asphalt content or virgin asphalt content has not changed by more than ± 0.2%.
  - No ABR changes greater than ± 5%, and not exceeding the current allowable limits.
  - No change to the design RAS percentage.
  - AGCS bands or average target gradations have not changed by more than 5.0%.
  - An individual aggregate specific gravity has not changed by more than ± 0.04.
  - The cumulative aggregate specific gravity has not changed by more than ± 0.02.

The Tollway reserves the right to request individual components and mixed samples for independent assurance of the requirements herein.

Once the full documentation is received, the Tollway will respond within 15 business days.