EXPECTED IMPLEMENTATION JANUARY 2016

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160 STABILIZING.
(REV 7-6-15) (FA 7-16-15) (1-16)

SECTION 160 is deleted and the following substituted:

SECTION 160
STABILIZING

160-1 Description.

Stabilize designated portions of the roadbed to provide a firm and unyielding subgrade, having the required bearing value specified in the Plans.

160-2 Materials.

160-2.1 Commercial Material: Meet the requirements of Section 914-2.1.

160-2.2 Local Material: Meet the requirements of Section 914.Test material from each source, or if authorized by the Engineer, test blended materials. Submit test results to the Engineer at least 14 days prior to the stabilization operation.

160-2.2.1 Reclaimed Asphalt Pavement (RAP) (Same Project): The Engineer may allow the use of RAP material from the same project that is free of contaminants without testing the source.

160-2.2.2 Reclaimed Asphalt Pavement (RAP) (Different Project) or RAP Blended Material: When RAP is obtained from another project, the Engineer will determine the acceptability of the material.

160-2.3 Existing Base: When the material from an existing base is used as all, or a portion, of the stabilizing additives, no further testing is required unless directed by the Engineer.

160-2.4 Granular Subbase: The Engineer may allow, at no additional cost to the Department, the substitution of 6 inches of granular subbase meeting the requirements of 290-2 and 290-3, when 12 inches of stabilization requiring a limerock bearing ratio (LBR) value of 40 is specified.

160-3 Construction Methods.

160-3.1 General: Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed stabilized subgrade will conform to the lines, grades, and cross-section shown in the Plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the proposed finished surface.

Construct mainline pavement lanes, turn lanes, ramps, parking lots, concrete box culverts and retaining wall systems meeting the requirements of 120-8.1, except replace “embankment” with “subgrade”.

Construct shoulder-only areas, sidewalk, and shared use path areas meeting the requirements of 120-8.1 except replace “embankment” with “subgrade” and meet the acceptance criteria of 160-4.2.

Isolated mixing operations will be considered as separate LOTs. Curb pads and shoulders compacted separately shall be considered separate LOTs. Isolated compaction operations will be considered as separate LOTs. For multiple phase construction, a LOT shall not extend beyond the limits of the phase.

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160-3.2 Application and Acceptance of Stabilizing Material: After completing the roadbed grading operations, determine the type and quantity (if any) of stabilizing material necessary for compliance with the bearing value requirements. Before using any Fossil Fuel Combustion Products (FFCPs), provide documentation, at the preconstruction meeting or no later than 30 days prior to delivery of FFCP's to the project, signed and sealed by the Specialty Engineer that these materials meet the requirements of 403.7047 F.S. Notify the Engineer of the approximate quantity to be added before spreading. When additive stabilizing materials are required, spread the material uniformly over the area to be stabilized.

160-3.2.1 Sampling and Testing of Local Material before Mixing: When local materials are used for stabilizing, randomly select locations for sampling using a random number generator approved by the Engineer in accordance with the sampling procedure described in FM 1-T 267. Test at the minimum frequency listed in the table below before mixing.The Engineer may waive these testing requirements if the additive stabilizing material is RAP or RAP blended materials.

The Engineer will reject the material for failing quality control (QC) test results. The Engineer will sample for Verification and Resolution testing at the minimum frequency listed in the table below. The Engineer will perform Verification tests at the minimum frequency listed in the table below.

Test Name	Quality Control	Verification	Resolution
Liquid Limit (LL), Plastic Index (PI), and Organic Content	One per two LOTs	One per eight LOTs	One per eight LOTs

160-3.2.1.1 Verification Comparison Criteria and Resolution Procedures of Stabilizing Materials: If the QC and the Department's Verification tests meet the requirements of Section 914 then the Engineer will accept the corresponding LOTs. Otherwise, the Engineer will submit the Resolution sample to the State Materials Office (SMO) or an AASHTO accredited laboratory designated by SMO to perform Resolution testing.

If the Resolution Test results meet the requirements of Section 914 then the Engineer will accept the LOTs in question. Otherwise remove the material and apply new material meeting the requirements of Section 914 and retest in accordance with 160-3.2.

160-3.3 Mixing: Perform mixing using rotary tillers, a plant or other equipment meeting the approval of the Engineer. The subgrade may be mixed in one course if the equipment and method of construction provides the uniformity, particle size limitation, compaction and other desired results of 160-4. Thoroughly mix the area to be stabilized throughout the entire depth and width of the stabilizing limits.

Perform the mixing operations, as specified, (either in place or in a plant) regardless of whether the existing soil, or any select soils placed within the limits of the stabilized sections, have the required bearing value without the addition of stabilizing materials.

160-3.4 Mixed Material Requirements: At the completion of the mixing, ensure the following requirements are met:

Criteria	Test Method

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Average Organic Content ≤ 2.5%	FM 1-T267
Individual Organic Content Result ≤ 4.0%	FM 1-T267
Liquid Limit ≤ 30	AASHTO T89
Plastic Index ≤ 8	AASHTO T90
Asphalt Content ≤ 4.0%	FM 5-563 (excluding Gradation Analysis)

Ensure the gradation of the material within the limits of the area being stabilized is such that 97% will pass a 3 1/2 inch sieve. Break down or remove from the stabilized area materials, including clay lumps or lumps made of clay-size particles (any particle size 2 microns or less), not meeting the gradation requirements. Remove any lumps of clay or clay-sized particles greater than one inch that do not meet the requirements of 160-3.2. Remove any materials not meeting the requirements of this Section from the stabilized area.

160-3.4.1 Bearing Value: Meet the bearing value requirements for the subgrade in accordance with 160-4.

160-3.4.2 Compaction: After completing the mixing operations and satisfying the requirements for bearing value, uniformity, and particle size. Compact the materials at a moisture content permitting the specified compaction in 160-4.2.3. If the moisture content of the material is improper for attaining the specified density, either add water or allow the material to dry until reaching the proper moisture content for the specified compaction.

160-3.4.3 Finish Grading: Shape the completed stabilized subgrade to conform with the finished lines, grades, and cross-section indicated in the Plans. Check the subgrade using elevation stakes or other means approved by the Engineer.

160-3.4.4 Condition of Completed Subgrade: After completing the stabilizing and compacting operations, ensure that the subgrade is firm and substantially unyielding to the extent that it will support construction equipment and will have the bearing value required by the Plans.

Remove all soft and yielding material, and any other portions of the subgrade which will not compact readily, and replace it with suitable material so that the whole subgrade is brought to line and grade, with proper allowance for subsequent compaction.

160-3.4.5 Maintenance of Completed Subgrade: After completing the subgrade as specified above, maintain it free from ruts, depressions, and any damage resulting from the hauling or handling of materials, equipment, tools, etc. The Contractor is responsible for maintaining the required density until the subsequent base or pavement is in place including any repairs, replacement, etc., of curb and gutter, sidewalk, etc., which might become necessary in order to recompact the subgrade in the event of underwash or other damage occurring to the previously compacted subgrade. Perform any such recompaction at no expense to the Department. Construct and maintain ditches and drains along the completed subgrade section.

160-4 Acceptance Program for Mixed Materials.

160-4.1 General Requirements: Meet the requirements of 120-10, except use 160-4.2 instead of 120-10.2, 160-4.3 instead of 120-10.3, and 160-4.4 instead of 120-10.4.

160-4.2 Acceptance Criteria:

160-4.2.1 Bearing Value Requirements:

160-4.2.1.1 General: Within the entire limits of the width and depth of the areas to be stabilized, obtain the required minimum bearing value for each LOT. For any area where the bearing value obtained is deficient from the value indicated in the Plans, in excess of

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the tolerances established herein, spread and mix additional stabilizing material in accordance with 160-3.3. Perform this reprocessing for the full width of the roadway being stabilized and longitudinally for a distance of 50 feet beyond the limits of the area in which the bearing value is deficient.

Determine the quantity of additional stabilizing material to be used in reprocessing.

160-4.2.1.2 Under-tolerances in Bearing Value Requirements: The under-tolerances are allowed for the following specified Bearing Values:

Specified Bearing Value	Under-tolerance
LBR 40	5.0
LBR 35	4.0
LBR 30 (and under)	2.5

The following unsoaked bearing value requirement is based on tests performed on samples obtained after completing mixing operations:

Specified Bearing Value	Unsoaked Bearing Value Required	Under-tolerance
LBR 40	LBR 43	0.0

160-4.2.2 Mixing Depth Requirements: Do not exceed individual plan depth thickness by more than 2 inches or exceed LOT-average depth thickness by more than 1 inch measured to the nearest 0.25 inch. No undertolerance of mixing depth is allowed.

As an exception to the above mixing requirements, where the subgrade is of rock, the Engineer may waive the mixing operations (and the work of stabilizing), and the Department will not pay for stabilization for such sections of the roadway.

160-4.2.3 Density Requirements:

160-4.2.3.1 General: Within the entire limits of the width and depth of the areas to be stabilized, other than as provided in 160-4.2.3.2, obtain a minimum density at any location of 98% of the Modified Proctor maximum density as determined by FM 1-T 180, Method D.

160-4.2.3.2 Exceptions to Density Requirements: The Contractor need not obtain the minimum density specified in 160-4.2.3.1 if within the following limits:

(a) The width and depth of areas which are to be subsequently incorporated into a base course under the same contract.

(b) The upper 6 inches of areas to be grassed under the same contract. Compact these areas to a reasonably firm condition as directed by the Engineer.

160-4.2.4 Frequency: Conduct QC sampling and testing at a minimum frequency listed in the table below. The Engineer will perform Verification sampling and tests at a minimum frequency listed in the table below.

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Test Name	Quality Control	Verification	Verification for Shoulder-Only, Shared Use Path and Sidewalk Construction
Modified Proctor Maximum Density	One per two consecutive LOTs	One per eight consecutive LOTs	One per four LOTs
Density	One per LOT	One per four LOTs	One per two LOTs
Stabilizing Mixing Depth	Three per 500 feet	Witness one per LOT	Witness one per LOT
LBR	One per two consecutive LOTs	One per eight consecutive LOTs	One per four LOTs

160-4.2.4.1 Local Materials: When local materials are tested in accordance with 160-3.2.1 and meet the requirements of 160-2.2, the Engineer will sample and test at a minimum frequency listed in the table below.

Test Name	Quality Control	Verification	Verification for Shoulder-Only, Shared Use Path and Sidewalk Construction
Organic Content, Gradation, LL/PI, and Soil Classification	Not required	One per eight consecutive LOTs	One per four LOTs

160-4.2.4.2 RAP or RAP Blended Materials: When RAP or RAP blended materials are used for stabilizing that are not tested in accordance with 160-3.2.1, conduct QC sampling and testing at a minimum frequency listed in the table below. The Engineer will sample and test at a minimum frequency listed in the table below.

Test Name	Quality Control	Verification	Verification for Shoulder-Only, Shared Use Path and Sidewalk Construction
Asphalt Content, Gradation, LL/PI, and Soil Classification	One per two consecutive LOTs	One per eight consecutive LOTs	One per four LOTs

160-4.3 Additional Requirements:

160-4.3.1 Quality Control Testing:

160-4.3.1.1 Bearing Values: Test the stabilized subgrade sample collected in 160-4.3.1.3. Determine the LBR in accordance with FM 5-515 and 160-4.2.4.

160-4.3.1.1.1 Unsoaked LBR: If unsoaked LBR is desired, submit request for approval to the Engineer. Upon approval by the Engineer to consider the use of unsoaked LBR, randomly sample and test from three locations in the initial Lot for both soaked and unsoaked LBR in accordance with FM 5-515. Ensure all of the tests demonstrate the material achieves the LBR values in 160-4.2.1.2. Continue testing unsoaked LBR at the frequency shown

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in 160-4.2.4. Discontinue unsoaked LBR testing if any unsatisfactory QC LBR test result is obtained or resolution determines an unsatisfactory LBR.

160-4.3.1.2 Mixing Depths: Meet required plan mixing-depths by measuring from the proposed final grade line. Determine test locations, including stations and offsets, using the Random Number generator approved by the Department. Notify the Engineer a minimum of 24 hours before checking mixing depths. Record results on forms supplied by the Department.

160-4.3.1.3 Modified Proctor Maximum Density Requirement: Collect enough material to split and create three separate samples. Determine test locations, including stations and offsets, using the Random Number generator approved by the Department for the two LOTs under consideration. Retain the Verification and Resolution samples for the Department until the Engineer accepts the LOTs represented by the samples.

160-4.3.1.4 Asphalt Content and Soil Classification: Where RAP or RAP Blended material has been approved for stabilizing, collect enough material to split and create three separate samples. Determine test locations, including stations and offsets, using the Random Number generator approved by the Department for the two LOTs under consideration. Retain the Verification and Resolution samples for the Department until the Engineer accepts the LOTs represented by the samples. Test the sample in accordance with FM 5-563 (excluding gradation analysis), AASHTO T88, AASHTO T89, AASHTO T90 and AASHTO M145. Determine compliance with the requirements of 160-3.4 and embankment utilization requirements.

160-4.3.2 Department Verification Tests:

160-4.3.2.1 Bearing Value & Soil Classification: The Engineer will collect a sample at a location other than the location where the sample was collected in 160-4.3.1.3, and test the stabilized subgrade for determination of the LBR in accordance with FM 5-515. The Engineer will select test locations, including stations and offsets, using a Random Number generator, based on the LOTs under consideration.

If local material is used for stabilizing, and tested in accordance with 160-2.2 and 160.3.2, the Engineer will independently verify compliance with embankment utilization requirements and 160-3.4 by testing and classifying the stabilized subgrade in accordance with AASHTO T88 and AASHTO M 145 at the frequency shown in 160-4.2.4.

When RAP or RAP Blended Material is used, the Engineer will randomly select one of the retained split samples from 160-4.3.1.4 and test in accordance with FM 5-563 (excluding gradation analysis), AASHTO T88, AASHTO T89, AASHTO T90 and AASHTO M145 at the frequency shown in 160-4.2.4.

160-4.3.2.1.1 Unsoaked LBR: The Engineer will sample and test the initial LOT for one soaked and one unsoaked LBR if consideration of the unsoaked LBR has been approved.

160-4.3.2.2 Mixing Depth: The Engineer will witness the Contractor's mixing depth checks to ensure compliance with 160-4.2.2. The Engineer will select test locations, including stations and offsets, using a Random Number generator.

160-4.3.2.3 Modified Proctor Maximum Density: The Engineer will randomly select one of the retained split samples and test in accordance with FM 1-T 180, Method D.

160-4.4 Verification Comparison Criteria and Resolution Procedures:

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160-4.4.1 Bearing Value & Soil Classification: If the Department's Verification test meets the requirements of 160-4.2.1 and embankment utilization requirements, the Engineer will accept the corresponding LOTs. Otherwise, the Engineer will collect an additional sample in the same LOT the Verification sample was obtained. SMO or an AASHTO accredited laboratory designated by SMO will perform Resolution testing on the additional sample. The material will be sampled and tested in accordance with FM 5-515. If local material is used for stabilization, the sample will be tested in accordance with AASHTO T-88, and AASHTO M-145.

If the Resolution Testing results meet the requirements of 160-4.2.1 and embankment utilization requirements then the Engineer will accept the LOTs in question. Otherwise reprocess the corresponding LOTs in accordance with 160-3 and retest in accordance with 160-4.3.1.1.

If RAP or RAP Blended material is approved for use in the subgrade and the Department's Verification tests meet the requirements of 160-3.4 and embankment utilization requirements, the Engineer will accept the corresponding LOTs. Otherwise, the Engineer will test the split sample collected in 160-4.3.1.4. The material will be tested in accordance with FM 5-563 (excluding gradation analysis), AASHTO T88, AASHTO T89, AASHTO T90, and AASHTO M145. If the Resolution Testing results meet the requirements of 160-3.4 and embankment utilization requirements, then the Engineer will accept the LOTs in question. Otherwise, reprocess the corresponding LOTs in accordance with 160-3 and retest in accordance with 160-4.

160-4.4.2 Mixing Depth Thickness: The Department will witness the mixing depth checks.

1. If the depth checks meet the requirements of 160-4.2.2 the Engineer will accept that 500-foot section.
2. If the depth checks confirm shallow depth, re-mix the 500-foot section to an appropriate depth and re-measure in accordance with 160-4.3.1.2. The Engineer will repeat the witness process.
3. If the depth checks confirm extra deep mixing, conduct an additional QC density test after compaction for the bottom 12 inches of the subgrade for that 500-foot section in addition to a QC density test for the top 12 inches. The additional density test must meet the requirements of 160-4.2.3.

160-4.4.3 Modified Proctor Maximum Density Determination: The Engineer will compare the Verification test results of 160-4.3.2.3 to the corresponding QC test results. If the test result is within 4.5 lb/ft^3 of the QC test result, the LOTs will be verified. Otherwise, the Engineer will collect the Resolution split sample corresponding to the Verification sample tested. SMO or an AASHTO accredited laboratory designated by SMO will perform Resolution testing. The material will be sampled and tested in accordance with FM 1-T 180, Method D.

The Engineer will compare the Resolution Test results with the QC test results. If the Resolution Test result is within 4.5 lb/ft^3 of the corresponding QC test result, the Engineer will use the QC test results for material acceptance purposes for each corresponding pair of LOTs. If the Resolution test result is not within 4.5 lb/ft^3 of the corresponding QC test, the Engineer will collect the remaining Verification split samples for testing. Verification Test results will be used for material acceptance purposes for the LOTs in question**.**

160-4.4.4 Density: When a Verification or Independent Verification density test does not meet 160-4.2.3 (Acceptance Criteria), retest at a site within a 5 feet radius of the Verification test location and observe the following:

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1. If the QC retest meets the Acceptance Criteria and compares favorably with the Verification or Independent Verification test, the Engineer will accept the LOTs in question.

2. If the QC retest does not meet the Acceptance Criteria and compares favorably with the Verification or Independent Verification test, rework and retest the material in that LOT. The Engineer will re-verify the LOTs in question.

3. If the QC retest and the Verification or Independent Verification test do not compare favorably, complete a new equipment-comparison analysis as defined in 120-10.1.2. Once acceptable comparison is achieved, retest the LOTs. The Engineer will perform new verification testing. Acceptance testing will not begin on a new LOT until the Contractor has a gauge that meets the comparison requirements.

160-5 Method of Measurement.

The quantity to be paid for will be the plan quantity, in square yards, completed and accepted.

160-6 Basis of Payment.

Price and payment will constitute full compensation for all work and materials specified in this Section, including furnishing, spreading and mixing of all stabilizing material required and any reprocessing of stabilization areas necessary to attain the specified bearing value. The Department will make full payment for any areas where the existing subgrade materials meet the design bearing value requirements without the addition of stabilizing additives, as well as areas where the Contractor may elect to place select high-bearing materials from other sources within the limits of the stabilizing.

If the item of borrow excavation is included in the Contract, any stabilizing materials obtained from designated borrow areas will be included in the pay quantity for borrow excavation.

Payment will be made under:

Item No. 160- 4- Stabilization - per square yard.