

7. Aprons at ends of drainage structures

processed RAP: RAP that has been fractionated.

supplemental fine aggregate: Mineral filler consisting of rock dust, slag dust, hydrated lime, hydraulic cement, or any combination of these and complying with AASHTO M 17.

39-2.01A(3) Submittals

39-2.01A(3)(a) General

Reserved

39-2.01A(3)(b) Job Mix Formula

39-2.01A(3)(b)(i) General

Except for the HMA to be used in miscellaneous areas and dikes, submit your proposed JMF for each type of HMA to be used. The JMF must include:

1. Mix design documentation including test results dated within 12 months of submittal
2. Mix design verification documentation
3. SDS for:
 - 3.1. Asphalt binder
 - 3.2. Supplemental fine aggregate except fines from dust collectors
 - 3.3. Antistrip additives if used

The mix design documentation must show documentation on aggregate quality.

If you cannot submit mix design verification documentation dated within 12 months of HMA production the Engineer must verify the mix design.

Submit a new JMF if you change any of the following:

1. Target asphalt binder percentage greater than ± 0.2 percent
2. Asphalt binder supplier
3. Combined aggregate gradation
4. Aggregate sources
5. Liquid antistrip producer or dosage
6. Average binder content in a new processed RAP stockpile by more than ± 2.00 percent from the average RAP binder content reported on your mix design documentation
7. Average maximum specific gravity in a new processed RAP stockpile by more than ± 0.060 from the average maximum specific gravity value reported on your mix design documentation
8. Any material in the JMF

Allow the Engineer 5 business days from a complete JMF submittal for document review of the aggregate qualities, mix design, and JMF. The Engineer notifies you if the proposed JMF submittal is accepted.

If your JMF fails verification testing, submit an adjusted JMF based on your testing. The adjusted JMF must include a new documentation for adjusted JMF, and the results of the failed verification testing.

39-2.01A(3)(b)(ii) Not Used

39-2.01A(3)(b)(iii) Job Mix Formula Modification

For an authorized JMF, submit a modified JMF if you change any of the following:

1. Asphalt binder supplier
2. Liquid antistrip producer
3. Liquid antistrip dosage

You may change any of the above items only once during the Contract.

Submit your modified JMF request at least 15 days before production. Each modified JMF submittal must include:

1. Proposed modified JMF, marked *Modified*.
2. Mix design records, including testing results, for the authorized JMF to be modified.
3. JMF verification for the authorized JMF to be modified.
4. Test results for the modified JMF in compliance with the mix design specifications. Perform tests at the mix design OBC.

Allow the Engineer 5 business days from a complete JMF modification submittal for document review of the aggregate qualities, mix design, and JMF. The Engineer notifies you if the proposed JMF modification submittal is accepted.

39-2.01A(3)(c) Quality Control Plan

With your proposed JMF submittal, submit a QC plan for HMA.

The QC plan must include:

1. Names, qualifications, and certifications of:
 - a. Quality Control Manager
 - b. Samplers
 - c. Testers
 - d. Inspectors
 - e. Laboratory performing testing
 - f. Equipment used in testing
2. Description of the organization and procedures for:
3. Controlling HMA quality characteristics
 - a. Controlling HMA quality characteristics
 - b. Taking samples, including sampling locations
 - c. Establishing, implementing, and maintaining QC
 - d. Determining when corrective actions are needed
 - e. Implementing corrective actions
 - f. Using methods and materials for backfilling core locations
 - g. Test result reporting including samples form

The QC plan must address the elements affecting HMA quality, including:

1. Aggregates
2. Asphalt binder
3. Additives
4. Production
5. Paving

The QC plan must include aggregate QC sampling and testing during lime treatment if applicable.

Allow 5 business days for review of the QC plan.

If you change QC procedures, personnel, or sample testing locations, submit a QC plan supplement before implementing the proposed change. Allow 3 business days for review of the QC plan supplement.

39-2.01A(3)(d) Test Results

All test results shall be submitted to the Engineer.

Submit all QC test results within 2 business days of sampling unless otherwise stated in the specification.

If a tapered notched wedge is used, submit compaction test result values within 24 hours of testing.

39-2.01A(3)(e) Subgrade Paving Contingency Plan

Provide a contingency plan detailing the subgrade preparation/ paving operations for all roads shown in the Part 6 schedules as "subgrade paving"

The Subgrade Paving Contingency Plan shall include the following:

1. Description of cold planning and paving activities
2. Method for preparing subgrade if required
3. Request to increase HMA depth in lieu of adding more subgrade material

39-2.01A(3)(f) Liquid Antistrip Treatment

If liquid antistrip treatment is used, submit the following with your proposed JMF submittal:

1. One 1 pt sample
2. Infrared analysis, including copy of absorption spectra
3. Certified copy of test results
4. Certificate of compliance for each liquid antistrip shipment. On each certificate of compliance, include:
 - 4.1. Your signature and printed name
 - 4.2. Shipment number
 - 4.3. Material type
 - 4.4. Material specific gravity
 - 4.5. Refinery
 - 4.6. Consignee
 - 4.7. Destination
 - 4.8. Quantity
 - 4.9. Contact or purchase order number
 - 4.10. Shipment date
5. Proposed proportions for the liquid antistrip

For each delivery of liquid antistrip to the HMA production plant, submit shipping documents.

At the end of each day's production shift, submit production data in electronic and printed media. Present data on electronic media in a tab delimited format. Use line feed carriage return with 1 separate record per line for each production data set. Allow enough fields for the specified data. Include data titles at least once per report. For each HMA mixing plant type, submit the following information in the order specified:

1. For batch plant mixing:
 - 1.1. Production date
 - 1.2. Time of batch completion
 - 1.3. Mix size and type
 - 1.4. Each ingredient's weight
 - 1.5. Asphalt binder content as a percentage of the total weight of mix
 - 1.6. Liquid antistrip content as a percentage of the asphalt binder weight
2. For continuous mixing plant:
 - 2.1. Production date
 - 2.2. Data capture time
 - 2.3. Mix size and type
 - 2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt
 - 2.5. Aggregate moisture content as a percentage of the dry aggregate weight
 - 2.6. Flow rate of asphalt binder collected from the asphalt binder meter
 - 2.7. Flow rate of liquid antistrip collected from the liquid antistrip meter
 - 2.8. Asphalt binder content as a percentage of the total weight of mix calculated from:
 - 2.8.1. Aggregate weigh belt output
 - 2.8.2. Aggregate moisture input
 - 2.8.3. Asphalt binder meter output
 - 2.9. Liquid antistrip content as a percentage of the asphalt binder weight calculated from:
 - 2.9.1. Asphalt binder meter output
 - 2.9.2. Liquid antistrip meter output

39-2.01A(3)(g) Lime Treatment

If aggregate lime treatment is used, submit the following with your proposed JMF submittal and each time you produce lime-treated aggregate:

1. Exact lime proportions for fine and coarse virgin aggregates
2. If marination is required, the averaged aggregate quality test results within 24 hours of sampling

3. For dry lime aggregate treatment, a treatment data log from the dry lime and aggregate proportioning device in the following order:
 - 3.1. Treatment date
 - 3.2. Time of day the data is captured
 - 3.3. Aggregate size being treated
 - 3.4. HMA type and mix aggregate size
 - 3.5. Wet aggregate flow rate collected directly from the aggregate weigh belt
 - 3.6. Aggregate moisture content, expressed as a percentage of the dry aggregate weight
 - 3.7. Flow rate of dry aggregate calculated from the flow rate of wet aggregate
 - 3.8. Dry lime flow rate
 - 3.9. Lime ratio from the authorized JMF for each aggregate size being treated
 - 3.10. Lime ratio from the authorized JMF for the combined aggregates
 - 3.11. Actual lime ratio calculated from the aggregate weigh belt output, aggregate moisture input, and dry lime meter output, expressed as a percentage of the dry aggregate weight
 - 3.12. Calculated difference between the authorized lime ratio and the actual lime ratio
4. For lime slurry aggregate treatment, a treatment data log from the slurry proportioning device in the following order:
 - 4.1. Treatment date
 - 4.2. Time of day the data is captured
 - 4.3. Aggregate size being treated
 - 4.4. Wet aggregate flow rate collected directly from the aggregate weigh belt
 - 4.5. Moisture content of the aggregate just before treatment, expressed as a percentage of the dry aggregate weight
 - 4.6. Dry aggregate flow rate calculated from the wet aggregate flow rate
 - 4.7. Lime slurry flow rate measured by the slurry meter
 - 4.8. Dry lime flow rate calculated from the slurry meter output
 - 4.9. Authorized lime ratio for each aggregate size being treated
 - 4.10. Actual lime ratio calculated from the aggregate weigh belt and slurry meter output, expressed as a percentage of the dry aggregate weight
 - 4.11. Calculated difference between the authorized lime ratio and actual lime ratio
 - 4.12. Dry lime and water proportions at the slurry treatment time

Each day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on 1 line. The reported data must include data titles at least once per report.

39-2.01A(3)(h) Reserved

39-2.01A(3)(i) Samples

For the samples taken for JMF verification, submit 3 parts to the Engineer and use 1 part for your testing.

39-2.01A(3)(j-o) Reserved

39-2.01A(4) Quality Assurance

39-2.01A(4)(a) General

The Engineer reserves the right to test as required for quality assurance.

AASHTO T 324 (Modified) is AASHTO T 324 with the following parameters:

1. Target air voids must equal 7.0 ± 1.0 percent
2. Specimen height must be 60 ± 1 mm
3. Number of test specimens must be 4 to run 2 tests
4. Do not average the 2 test results
5. Test specimen must be a 150 mm gyratory compacted specimen
6. Test temperature must be set at:
 - 6.1. 113 ± 2 degrees F for PG 58
 - 6.2. 122 ± 2 degrees F for PG 64
 - 6.3. 131 ± 2 degrees F for PG 70 and above
7. Measurements for impression must be taken at every 100 passes along the total length of the sample

8. Inflection point is the number of wheel passes at the intersection of the creep slope and the stripping slope at maximum rut depth
9. Testing shut off must be set at 25,000 passes
10. Submersion time for samples must not exceed 4 hours

Take samples under California Test 125. Notify the Engineer 2 days prior to sampling material.

39-2.01A(4)(b) Job Mix Formula Verification

The Engineer verifies the JMF from samples taken from HMA produced by the plant to be used. The production set point at the plant must be within ± 0.2 from the asphalt binder percentage TV shown in your mix design documentation. Notify the Engineer at least 2 business days before sampling materials. Samples may be taken from a different project including a non-Department project if you make arrangements for the Engineer to be present during sampling.

In the Engineer's presence and from the same production run, take samples of:

1. Aggregates. Coarse, fine, and supplemental fine aggregates must be taken from the combined cold-feed belt or the hot bins. If lime treatment is required, samples must be taken from individual stockpiles before lime treatment. Samples must be at least 120 lb for each coarse aggregate, 80 lb for each fine aggregate, and 10 lb for each type of supplemental fine aggregate. For hot-bin samples, the County combines these aggregate samples to verify the TV submitted on the mix design documentation
2. Asphalt binder. Take at least two 1 qt samples. Each sample must be in a cylindrical-shaped can with an open top and friction lid. If the asphalt binder is modified or rubberized, the asphalt binder must be sampled with the components blended in the proportions to be used.
3. RAP. Samples must be at least 50 lb from each fractionated stockpile used or 100 lb from the belt.
4. Plant-produced HMA. The HMA samples must be at least 250 lb.

For aggregate, RAP, and HMA, split the samples into at least 4 parts and label their containers. Three parts are for the County's verification testing and 1 part is for your testing.

After acceptance of the JMF submittal, the Engineer verifies each proposed JMF within 20 days of receiving all verification samples.

For JMF verification, the Engineer tests the following for compliance with the specifications:

1. Aggregate quality
2. Aggregate gradation
3. Voids in mineral aggregate on laboratory-produced HMA
4. HMA quality characteristics for Department acceptance & Mix Design Requirements

To verify the HMA for air voids, voids in mineral aggregate, and dust proportion, the Engineer uses an average of 3 briquettes. The Engineer tests plant-produced material.

If the Engineer verifies the JMF, the Engineer furnishes you a Hot Mix Asphalt Verification form.

If the Engineer's test results on plant-produced samples do not show compliance with the specifications, the Engineer notifies you. Adjust your JMF based on your testing unless the Engineer authorizes reverification without adjustments. JMF adjustments may include a change in:

1. Asphalt binder content TV up to ± 0.20 percent from the OBC value submitted on the mix design documentation.
2. Aggregate gradation TV within the TV limits specified in the aggregate gradation table

You may adjust the JMF only once due to a failed verification test.

For each HMA type and aggregate size specified, the Engineer verifies up to 2 proposed JMF submittals including a JMF adjusted after verification failure. If you submit more than 2 JMFs for each type of HMA and aggregate size, the Engineer deducts \$3,000 from payments for each verification exceeding this limit. This deduction does not apply to verifications initiated by the Engineer or if a JMF expires while HMA production is stopped longer than 30 days.

A verified JMF is valid for 12 months.

39-2.01A(4)(c) Job Mix Formula Authorization

You may start HMA production if:

1. Engineer's review of the JMF shows compliance with the specifications
2. Engineer authorizes the verified JMF

39-2.01A(4)(d-e) Not Used

39-2.01A(4)(f) Certifications

39-2.01A(4)(f)(i) General

Laboratories testing aggregate and HMA qualities used to prepare the mix design and JMF must be qualified under AASHTO Materials Reference Laboratory program and CALTRANS Independent Assurance Program.

39-2.01A(4)(f)(ii) Hot Mix Asphalt Plants

Before production, the HMA plant must have a current qualification under CALTRANS Material Plant Quality Program.

39-2.01A(4)(f)(iii)–39-2.01A(4)(f)(v) Reserved

39-2.01A(4)(g) Reserved

39-2.01A(4)(h) Quality Control

39-2.01A(4)(h)(i) General

QC test results must comply with the specifications for acceptance.

Prepare 3 briquettes for air voids content and voids in mineral aggregate determination. Report the average of 3 tests.

Except for smoothness, if 2 consecutive QC test results or any 3 QC test results for 1 day's production do not comply with the materials specifications:

1. Stop HMA production
2. Notify the Engineer
3. Take corrective action
4. Demonstrate compliance with the specifications before resuming production and placement

For QC tests performed under CT 202, results are considered 1 QC test regardless of number of sieves out of compliance.

Do not resume production and placement until the Engineer authorizes your corrective action proposal.

39-2.01A(4)(h)(ii) Reserved

39-2.01A(4)(h)(iii) Aggregates

39-2.01A(4)(h)(iii)(A) General

Reserved

39-2.01A(4)(h)(iii)(B) Aggregate Lime Treatments

If lime treatment is required, sample coarse and fine aggregates from individual stockpiles before lime treatment. Combine aggregate in the JMF proportions. Test the aggregates under the test methods and frequencies shown in the following table:

Aggregate Quality Control During Lime Treatment

Quality characteristic	Test method	Minimum sampling and testing frequency
Sand equivalent ^{a, b}	CT 217	1 per 750 tons of untreated aggregate
Percent of crushed particles	CT 205	1 per 10,000 tons or 2 per project whichever is greater
Los Angeles Rattler	CT 211	
Fine aggregate angularity	CT 234	
Flat and elongated particles	CT 235	

^aReport test results as the average of 3 tests from a single sample.

^bUse of a sand equivalent test apparatus is required as detailed in Part C.1. of CT 217, use of Part C.2. does not apply.

For lime slurry aggregate treatment, determine the aggregate moisture content at least once every 2 hours of treatment. Calculate moisture content under CT 226 and report it as a percent of dry aggregate weight. Use the moisture content calculations as a set point for the proportioning process controller.

The device controlling lime and aggregate proportioning must produce a treatment data log. The log must consist of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by a data set is the quantity produced 5 minutes before and 5 minutes after the capture time. Collected data must be stored by the controller for the duration of the Contract.

If 3 consecutive sets of recorded treatment data indicate a deviation of more than 0.2 percent above or below the lime ratio in the authorized JMF, stop treatment and take corrective action.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the authorized JMF, stop treatment and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates a deviation of more than 0.2 percent above or below the lime ratio in the authorized JMF, stop treatment and do not use that day's treated aggregate in HMA.

The Engineer may order you to stop aggregate treatment activities for any of following:

1. You fail to submit treatment data log.
2. You fail to submit aggregate QC data for marinated aggregate.
3. You submit incomplete, untimely, or incorrectly formatted data.
4. You do not take corrective actions.
5. You take late or unsuccessful corrective actions.
6. You do not stop treatment when proportioning tolerances are exceeded.
7. You use malfunctioning or failed proportioning devices.

If you stop treatment for noncompliance, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

39-2.01A(4)(h)(iv) Liquid Antistrip Treatment

For continuous mixing or batch-plant mixing, sample asphalt binder before adding liquid antistrip. For continuous mixing, sample the combined asphalt binder and liquid antistrip after the static mixer.

39-2.01A(4)(h)(v) Production Start-up Evaluation

You and the Engineer evaluate HMA production and placement at production start-up.

Within the first 750 tons produced on the 1st day of HMA production, in the Engineer's presence, and from the same production run, take samples of:

1. Aggregates
2. Asphalt binder
3. RAP
4. HMA

Sample aggregates from the combined cold-feed belt or hot bin. Take RAP samples from the RAP system.

For aggregates, RAP, and HMA, split the samples into at least 4 parts and label their containers. Submit 3 parts and keep 1 part.

You and the Engineer must test the samples and report test results within 5 business days of sampling, If you proceed before receipt of the test results, the Engineer may consider the HMA placed to be represented by these test results.

You and the Engineer must test the samples and report test results.

If production start-up evaluation fails, do not begin production.

39-2.01A(4)(h)(vi) Hot Mix Asphalt Density

During HMA placement determine HMA density using a nuclear gauge. On the 1st day of production, develop a correlation factor under California Test 375.

Test for in-place density with a nuclear gauge. Test at random locations you select and include the test results in your QC production tests reports.

39-2.01A(4)(h)(vii) Tapered Notched Wedge

Perform QC testing on the completed tapered notched wedge joint as follows:

1. Perform density tests using a calibrated nuclear gauge at a rate of 1 test for every 1500-foot section along the joint. Select random locations for testing within each 1500-foot section.
2. Perform density tests at the centerline of the joint, 6 inches from the upper vertical notch, after the adjacent lane is placed and before opening the pavement to traffic.
3. Determine laboratory test maximum density(LTMD).
4. Determine percent compaction of the longitudinal joint as the ratio of the daily average density to the LTMD test results.

Determine percent compaction values each day the tapered notched wedge joint is completed. If the percent compaction of 1 day's production is less than 91 percent, that day's notched wedge joint is rejected. Discontinue placement of the tapered notched wedge and notify the Engineer of changes you will make to your construction process to comply with the specifications.

39-2.01A(4)(h)(viii) Reserved

39-2.01A(4)(h)(ix) Pavement Smoothness

Test pavement smoothness using a 12-foot straightedge.

39-2.01A(4)(h)(x) Reserved

39-2.01A(4)(i) Acceptance

39-2.01A(4)(i)(i) General

The County tests treated aggregate for acceptance before lime treatment except for gradation.

The Engineer reserves the right to sample and test as needed to ensure compliance to the specifications.

The Engineer takes HMA samples for all other tests from any of the following locations:

1. Plant
2. Truck
3. Windrow
4. Mat behind the paver

To obtain workability of the HMA sample for splitting, the Engineer reheats each sample of HMA mixture not more than 2 cycles. Each reheat cycle is performed by placing the loose mixture in a mechanical forced-draft oven for 2 hours or less after the sample reaches 140 degrees F.

The Engineer splits samples and provides you with a part if you request this.

No single test result may represent more than 750 tons or one day's production, whichever is less.

Except for smoothness, if 2 consecutive Department acceptance test results or any 3 Department acceptance test results for 1 day's production do not comply with the specifications:

1. Stop HMA production
2. Take corrective action
3. Demonstrate compliance with the specifications before resuming production and placement

The Engineer accepts HMA based on any combination of the following:

1. compliance with authorized JMF
2. compliance with authorized QC plan
3. Asphalt binder compliance
4. Asphalt emulsion compliance
5. Visual inspection
6. Pavement smoothness
7. Quality assurance test results

In lieu of quality assurance test results, the Engineer may use your quality control test results to support acceptance or rejection for work.

39-2.01A(4)(i)(ii) In-Place Density

Except for HMA pavement placed using method compaction, the Engineer tests the in-place density per CT 375. HMA pavement must be at least 95 percent LTMD determined by CT 308.

If the in-place density does not meet the 95 percent requirement stated above, You may have an independent 3rd party lab core the location in question and test for density per CT 308 method A. If your testing shows compliance with the density requirements the County shall accept the results and pay for this additional testing. If your testing confirms noncompliance the County will not pay for additional testing and you must correct non-conforming work per the specifications.

39-2.01A(4)(i)(iii) Pavement Smoothness

For areas that require pavement smoothness the pavement surface must not vary:

1. More than 1/8 inch when measured parallel with centerline
2. More than 1/4 inch when measured perpendicular with centerline

This requirement does not apply at grade changes and intersections.

39-2.01A(4)(i)(iv) Dispute Resolution

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. You and the Engineer may only dispute each other's test results if one party's test results pass and the other party's test results fail.

If you or the Engineer dispute the other's test results, submit your test results and copies of paperwork including worksheets used to determine the disputed test results within 3 business days of receiving Engineer's test results. An independent third party performs referee testing. Before the third party participates in a dispute resolution, it must be qualified under AASHTO re:source program, and CALTRANS Independent Assurance Program. The independent third party must have no prior direct involvement with this Contract. By mutual agreement, the independent third party is chosen from:

1. Laboratory currently under contract with the County (provided they have no previous involvement on this Contract)
2. Laboratory not currently employed by you or your HMA producer

If the County's portion of the split QC samples or acceptance samples are not available, the independent third party uses any available material representing the disputed HMA for evaluation.

You are required to pay for referee testing. If the independent third party determines the County's test results are valid, The County will not reimburse the cost of testing. If the independent third party determines your test results are valid, the reimburses you for independent third party's testing costs.

39-2.01B Materials

39-2.01B(1) General

Reserved

39-2.01B(2) Mix Design

39-2.01B(2)(a) General

The HMA mix design must comply with CT 367, AASHTO T 283 and AASHTO T 324 (modified).

39-2.01B(2)(b) Hot Mix Asphalt Treatments

If the test results for AASHTO T 283 or AASHTO T 324 (Modified) for untreated plant-produced HMA are less than the minimum requirements for HMA mix design, determine the plasticity index of the aggregate blend under California Test 204.

Do not use an aggregate blend with a plasticity index greater than 10.

If the plasticity index is from 4 to 10, treat the aggregate with dry lime with marination or lime slurry with marination.

If the plasticity index is less than 4, treat the aggregate with dry lime or lime slurry with marination, or treat the HMA with liquid antistripping.

39-2.01B(2)(c) Reserved

39-2.01B(3) Asphalt Binder

Asphalt binder must comply with section 92.

For a leveling course, the grade of asphalt binder for the HMA must be PG 64-10 or PG 64-16.

39-2.01B(4) Aggregates

39-2.01B(4)(a) General

Aggregates must be clean and free from deleterious substances.

The aggregates for a leveling course must comply with the gradation specifications for Type A HMA in section 39-2.02B.

39-2.01B(4)(b) Aggregate Gradations

Aggregate gradation must be determined before the addition of asphalt binder and must include supplemental fine aggregates. Test for aggregate gradation under CT 202. Do not wash the coarse aggregate. Wash the fine aggregate only. Use a mechanical sieve shaker. Aggregate shaking time must not exceed 10 minutes for each coarse and fine aggregate portion.

Choose a TV within the TV limits shown in the tables titled "Aggregate Gradations."

Gradations are based on nominal maximum aggregate size.

39-2.01B(4)(c) Aggregate Lime Treatments

39-2.01B(4)(c)(i) General

If aggregate lime treatment is required as specified in section 39-2.01B(2)(b), the virgin aggregate must comply with the aggregate quality specifications.

Lime for treating aggregate must comply with section 24-2.02.

Water for lime treatment of aggregate with lime slurry must comply with section 24-1.02B.

Notify the Engineer at least 24 hours before the start of aggregate treatment.

Do not treat RAP.

The lime ratio is the pounds of dry lime per 100 lb of dry virgin aggregate expressed as a percentage. Water content of slurry or untreated aggregate must not affect the lime ratio.

Coarse and fine aggregate fractions must have the lime ratio ranges shown in the following table:

Aggregate fractions	Lime ratio percent
Coarse	0.4–1.0
Fine	1.5–2.0
Combined	0.8–1.5

The lime ratio for fine and coarse aggregate must be within ± 0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ± 0.2 percent of the authorized lime ratio when you combine the individual aggregate sizes in the JMF proportions. The lime ratio must be determined before the addition of RAP.

If marination is required, marinate treated aggregate in stockpiles from 24 hours to 60 days before using in HMA. Do not use aggregate marinated longer than 60 days.

39-2.01B(4)(c)(ii) Dry Lime

If marination is required:

1. Treat and marinate coarse and fine aggregates separately
2. Treat the aggregate and stockpile for marination only once
3. Treat the aggregate separately from HMA production

Proportion dry lime by weight with an automatic continuous proportioning system.

If you use a batch-type proportioning system for HMA production, control proportioning in compliance with the specifications for continuous mixing plants. Use a separate dry lime aggregate treatment system for HMA batch mixing including:

1. Pugmill mixer
2. Controller
3. Weigh belt for the lime
4. Weigh belt for the aggregate

If a continuous mixing plant for HMA production without lime-marinated aggregates is used, use a controller that measures the blended aggregate weight after any additional water is added to the mixture. The controller must determine the quantity of lime added to the aggregate from the aggregate weigh belt input in connection with the manually input total aggregate moisture, the manually input target lime content, and the lime proportioning system output. Use a continuous aggregate weigh belt and pugmill mixer for lime treatment in addition to the weigh belt for the aggregate proportioning to asphalt binder in the HMA plant. If you use a water meter for moisture control for lime treatment, the meter must comply with Department's *MPQP* manual.

When mixing dry lime with aggregate, the aggregate moisture content must ensure complete lime coating. The aggregate moisture content must not cause aggregate to be lost between the point of weighing the combined aggregate continuous stream and the dryer. Add water to the aggregate for mixing and coating before dry lime addition. Immediately before mixing lime with aggregate, water must not visibly separate from the aggregate.

Mix aggregate, water, and dry lime with a continuous pugmill mixer with twin shafts. Immediately before mixing lime with aggregate, water must not visibly separate from the aggregate. Store dry lime in a uniform and free-flowing condition. Introduce dry lime to the pugmill in a continuous process. The introduction must occur after the aggregate cold feed and before the point of proportioning across a weigh belt and the aggregate dryer. Prevent loss of dry lime.

The pugmill must be equipped with paddles arranged to provide sufficient mixing action and mixture movement. The pugmill must produce a homogeneous mixture of uniformly coated aggregates at mixer discharge.

If the aggregate treatment process is stopped longer than 1 hour, clean the equipment of partially treated aggregate and lime.

Aggregate must be completely treated before introduction into the mixing drum.

39-2.01B(4)(c)(iii) Lime Slurry

For lime slurry aggregate treatment, treat aggregate separate from HMA production. Stockpile and marinate the aggregate.

Proportion lime and water with a continuous or batch mixing system.

Add lime to the aggregate as slurry consisting of mixed dry lime and water at a ratio of 1 part lime to from 2 to 3 parts water by weight. The slurry must completely coat the aggregate.

Immediately before mixing lime slurry with the aggregate, water must not visibly separate from the aggregate.

Proportion lime slurry and aggregate by weight in a continuous process.

39-2.01B(5)

Liquid Antistrip Treatment

Liquid antistrip must be from 0.25 to 1.0 percent by weight of asphalt binder. Do not use liquid antistrip as a substitute for asphalt binder.

Liquid antistrip total amine value must be 325 minimum when tested under ASTM D2074.

Use only 1 liquid antistrip type or brand at a time. Do not mix liquid antistrip types or brands.

Store and mix liquid antistrip under the manufacturer's instructions.

39-2.01B(6)–39-2.01B(7) Reserved

39-2.01B(8) Hot Mix Asphalt Production

39-2.01B(8)(a) General

Produce HMA in a batch mixing plant or a continuous mixing plant. Proportion aggregate by hot or cold feed control.

Aggregate temperature must not be more than 375 degrees F when mixed with the asphalt binder.

Asphalt binder temperature must be from 275 to 375 degrees F when mixed with aggregate.

Mix HMA ingredients into a homogeneous mixture of coated aggregates.

The temperature of HMA with or without RAP must not be more than 325 degrees F.

If method compaction is used, HMA must be produced at a temperature from 305 to 325 degrees F.

If you stop production for longer than 30 days, a production start-up evaluation is required.

39-2.01B(8)(b) Liquid Antistrip

If 3 consecutive sets of recorded production data show that the actual delivered liquid antistrip weight is more than ± 1 percent of the authorized mix design liquid antistrip weight, stop production and take corrective action.

If a set of recorded production data shows that the actual delivered liquid antistrip weight is more than ± 2 percent of the authorized mix design liquid antistrip weight, stop production. If the liquid antistrip weight exceeds 1.2 percent of the asphalt binder weight, do not use the HMA represented by that data.

The continuous mixing plant controller proportioning the HMA must produce a production data log. The log must consist of a series of data sets captured at 10-minute intervals throughout daily production. The data must be a production activity register and not a summation. The material represented by the data is the quantity produced 5 minutes before and 5 minutes after the capture time. For the duration of the Contract, the collected data must be stored by the plant controller or a computer's memory at the plant.

The Engineer orders proportioning activities stopped for any of the following reasons:

1. You fail to submit data

2. You submit incomplete, untimely, or incorrectly formatted data
3. You fail to take corrective actions
4. You take late or unsuccessful corrective actions
5. You fail to stop production when proportioning tolerances are exceeded
6. You use malfunctioning or failed proportioning devices

39-2.01B(8)(c) Reserved

39-2.01B(9) Geosynthetic Pavement Interlayer

Geosynthetic pavement interlayer must comply with the specifications for pavement fabric, paving mat, paving grid, paving geocomposite grid, or geocomposite strip membrane as shown.

The asphalt binder for geosynthetic pavement interlayer must be PG 64-10, PG 64-16, or PG 70-10.

39-2.01B(10) Tack Coat

Tack coat must comply with the specifications for asphaltic emulsion or asphalt binder. Choose the type and grade of emulsion or binder.

39-2.01B(11) Miscellaneous Areas and Dikes

For miscellaneous areas and dikes:

1. Use the 3/8-inch aggregate gradation for Type A HMA.
2. Minimum asphalt binder content must be 6.40 percent. You may reduce the minimum asphalt binder content if authorized.
3. Use asphalt binder Grade PG 70-10.

For HMA used in miscellaneous areas and dikes, sections 39-2.01A(3), 39-2.01B(2), 39-2.01B(4)(c), and 39-2.01B(5)–(10) do not apply.

39-2.01C Construction

39-2.01C(1) General

Do not place HMA on wet pavement or frozen surface.

You may deposit HMA in a windrow and load it in the paver if:

1. Paver is equipped with a hopper that automatically feeds the screed
2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without damaging base material
3. Activities for depositing, pickup, loading, and paving are continuous
4. HMA temperature in the windrow does not fall below 260 degrees F

HMA placed in a windrow on the roadway surface must not extend more than 250 feet in front of the loading equipment or material transfer vehicle.

You may place HMA in 1 or more layers on areas less than 5 feet wide and outside the traveled way, including shoulders. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture.

HMA handled, spread, or windrowed must not stain the finished surface of any improvement, including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.

HMA must be free of:

1. Segregation
2. Coarse or fine aggregate pockets
3. Hardened lumps
4. Marks or indentations
5. Tearing

Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 degrees F for HMA with unmodified binder
2. Below 140 degrees F for HMA with modified binder

39-2.01C(2) Spreading and Compacting Equipment

39-2.01C(2)(a) General

Paving equipment for spreading must be:

1. Self-propelled
2. Mechanical
3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane
4. Equipped with a full-width compacting device
5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope

Install and maintain grade and slope references.

The screed must be heated and produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

1. Spread the HMA by any means to obtain the specified lines, grades, and cross sections
2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction

39-2.01C(2)(b) Material Transfer Vehicle

If a material transfer vehicle is specified, the material transfer vehicle must have sufficient capacity to prevent stopping the paver and must be capable of:

1. Either receiving HMA directly from trucks or using a windrow pickup head to load it from a windrow deposited on the roadway surface
2. Remixing the HMA with augers before transferring into the paver's receiving hopper or feed system
3. Transferring HMA directly into the paver's receiving hopper or feed system

39-2.01C(2)(c) Method Compaction Equipment

For method compaction, each paver spreading HMA must be followed by 3 rollers:

1. One vibratory roller specifically designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 7.5 tons.
2. One oscillating-type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
3. One steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 7.5 tons.

Each roller must have a separate operator. Rollers must be self-propelled and reversible.

39-2.01C(2)(d)–39-2.01C(2)(f) Reserved

39-2.01C(3) Surface Preparation

39-2.01C(3)(a) General

Before placing HMA, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

39-2.01C(3)(b) Subgrade

Prepare subgrade to receive HMA under the sections for the material involved. Subgrade must be free of loose and extraneous material.

On roads where subgrade is encountered during the cold planning operation additional subgrade material shall be placed or extra material should be removed as necessary to ensure the compacted subgrade meets the depth tolerances for the HMA to be placed.

If additional subgrade material is required, the existing subgrade should be plowed or disc harrowed to a depth of 6 inches and class II base other approved fill material meeting the specifications should be blended in as needed in order to bring the subgrade elevation to the depth required to receive the inlay as shown in the Part 6 schedules.

You may request to place additional HMA up to 0.5-inches in compacted depth in lieu of adding subgrade material to a road. The Engineer’s decision to allow or deny this request shall be considered final. Additional HMA placed per this condition shall be paid for at the contract unit price.

On roads designated as “subgrade paving” in the Part 6 schedules payment for subgrade preparation is included in the unit price paid for the type of HMA used.

On roads not designated as subgrade paving, payment for subgrade preparation, if required, shall be made in accordance with Section 4-1.05 “Changes and Extra Work” of the standard specifications.

39-2.01C(3)(c) Reserved

39-2.01C(3)(d) Not Used

39-2.01C(3)(e) Not Used

39-2.01C(3)(f) Tack Coat

Apply a tack coat:

1. To existing pavement including planed surfaces
2. Between HMA layers
3. To vertical surfaces of:
 - 3.1. Curbs
 - 3.2. Gutters
 - 3.3. Construction joints

Equipment for the application of tack coat must comply with section 37-1.03B.

Before placing HMA, apply a tack coat in 1 application at the minimum residual rate shown in the following table for the condition of the underlying surface:

Tack Coat Application Rates for HMA

HMA over:	Minimum residual rates (gal/sq yd)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h asphaltic emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 asphaltic emulsion	Asphalt binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h asphaltic emulsion
New HMA (between layers)	0.02	0.03	0.02
Concrete pavement and existing asphalt concrete surfacing	0.03	0.04	0.03
Planed pavement	0.05	0.06	0.04

If a stress absorbing membrane interlayer as specified in section 37-2.06 is applied, the tack coat application rates for new HMA apply.

Notify the Engineer if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.

Measure added water either by weight or volume under section 9-1.02 or use water meters from water districts, cities, or counties. If you measure water by volume, apply a conversion factor to determine the correct weight.

With each dilution, submit:

1. Weight ratio of water to bituminous material in the original asphaltic emulsion
2. Weight of asphaltic emulsion before diluting
3. Weight of added water
4. Final dilution weight ratio of water to asphaltic emulsion

Apply a tack coat to vertical surfaces with a residual rate that will thoroughly coat the vertical face without running off.

If authorized, you may:

1. Change tack coat rates
2. Omit tack coat between layers of new HMA during the same work shift if:
 - 2.1. No dust, dirt, or extraneous material is present
 - 2.2. Surface is at least 140 degrees F

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not allow the tracking of tack coat onto pavement surfaces beyond the job site.

If you use an asphalt binder for tack coat, the asphalt binder temperature must be from 285 to 350 degrees F when applied.

39-2.01C(3)(g) Geosynthetic Pavement Interlayer

Where shown, place geosynthetic pavement interlayer over a coat of asphalt binder and in compliance with the manufacturer's instructions. Do not place the interlayer on a wet or frozen surface.

Before placing the interlayer and asphalt binder:

1. Repair cracks 1/4 inch and wider, spalls, and holes in the pavement.
2. Clean the pavement of loose and extraneous material.

Immediately before placing the interlayer, apply 0.25 ± 0.03 gal of asphalt binder per square yard of interlayer or until saturated. Apply asphalt binder the width of the interlayer plus 3 inches on each side. At an interlayer overlap, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

Align and place the interlayer with no overlapping wrinkles, except a wrinkle that overlaps may remain if it is less than 1/2 inch thick. If the overlapping wrinkle is more than 1/2 inch thick, cut the wrinkle out and overlap the interlayer no more than 2 inches.

Overlap the interlayer borders between 2 to 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

Before placing HMA on the interlayer, do not expose the interlayer to:

1. Traffic except for crossings under traffic control and only after you place a small HMA quantity
2. Sharp turns from construction equipment
3. Damaging elements

Pave HMA on the interlayer during the same work shift. The minimum HMA thickness over the interlayer must be 0.12 foot thick including at conform tapers.

39-2.01C(4) Longitudinal Joints

39-2.01C(4)(a) General

Longitudinal joints in the top layer must match lane lines. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the lane line. Other longitudinal joint placement patterns are allowed if authorized.

A vertical longitudinal joint of more than 0.15 foot is not allowed at any time between adjacent lanes open to traffic.

For an HMA thickness of 0.15 foot or less, the distance between the ends of the adjacent surfaced lanes at the end of each day's work must not be greater than can be completed in the following day of normal paving.

For an HMA thickness greater than 0.15 foot, you must place HMA on adjacent traveled way lanes or shoulder such that at the end of each work shift the distance between the ends of HMA layers on adjacent lanes is from 5 to 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place kraft paper or other authorized release agent under the conform tapers to facilitate the taper removal when paving activities resume.

If placing HMA against the edge of existing pavement, saw cut or grind the pavement straight and vertical along the joint and remove extraneous material.

39-2.01C(4)(b) Tapered Notched Wedge

For divided highways with an HMA lift thickness greater than 0.15 foot, you may construct a 1-foot wide tapered notched wedge joint as a longitudinal joint between adjacent lanes open to traffic. A vertical notch of 0.75 inch maximum must be placed at the top and bottom of the tapered wedge.

The tapered notched wedge must keep its shape while exposed to traffic. Pave the adjacent lane within 1 day.

Construct the tapered portion of the tapered notched wedge with an authorized strike-off device. The strike-off device must provide a uniform slope and must not restrict the main screed of the paver.

You may use a device attached to the screed to construct longitudinal joints that will form a tapered notched wedge in a single pass. The tapered notched wedge must be compacted to a minimum of 91 percent compaction.

39-2.01C(5) Pavement Edge Treatments

Construct edge treatment on the HMA pavement as shown.

Where a tapered edge is required, use the same type of HMA used for the adjacent lane or shoulder.

The edge of roadway where the tapered edge is to be placed must have a solid base, free of debris such as loose material, grass, weeds, or mud. Grade the areas to receive the tapered edge as required.

The tapered edge must be placed monolithic with the adjacent lane or shoulder and must be shaped and compacted with a device attached to the paver.

The device must be capable of shaping and compacting HMA to the required cross section as shown. Compaction must be accomplished by constraining the HMA to reduce the cross sectional area by 10 to 15 percent. The device must produce a uniform surface texture without tearing, shoving, or gouging and must not leave marks such as ridges and indentations. The device must be capable of transitioning to cross roads, driveways, and obstructions.

For the tapered edge, the angle of the slope must not deviate by more than ± 5 degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

If paving is done in multiple lifts, the tapered edge must be placed with each lift.

Short sections of hand work are allowed to construct tapered edge transitions.

39-2.01C(6) Widening Existing Pavement

If widening existing pavement, construct new pavement structure to match the elevation of the existing pavement's edge before placing HMA over the existing pavement.

39-2.01C(7) Shoulders, Medians, and Other Road Connections

Until the adjoining through lane's top layer has been paved, do not pave the top layer of:

1. Shoulders
2. Tapers
3. Transitions
4. Road connections
5. Driveways
6. Curve widenings
7. Chain control lanes
8. Turnouts
9. Turn pockets

If the number of lanes changes, pave each through lane's top layer before paving a tapering lane's top layer. Simultaneous to paving a through lane's top layer, you may pave an adjoining area's top layer, including shoulders. Do not operate spreading equipment on any area's top layer until completing final compaction.

If shoulders or median borders are shown, pave shoulders and median borders adjacent to the lane before opening a lane to traffic.

If shoulder conform tapers are shown, place conform tapers concurrently with the adjacent lane's paving.

On roads receiving an overlay, If a driveway or a road connection is required, perform transitions per the details in Part 6.

On roads receiving mill/ inlay, place additional HMA along the pavement's edge to conform to road connections and driveways. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

39-2.01C(8) Leveling

Section 39-2.01C(8) applies if a bid item for hot mix asphalt (leveling) is shown on the Bid Item List.

Fill and level irregularities and ruts with HMA before spreading HMA over the base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not paid for as hot mix asphalt (leveling).

39-2.01C(9) Miscellaneous Areas and Dikes

Prepare the area to receive HMA for miscellaneous areas and dikes, including excavation and backfill as needed.

Spread the HMA in miscellaneous areas in 1 layer and compact to the specified lines and grades.

Where new or reconstructed dikes are to be constructed extent the width of the adjacent lane such that the area under location to receive the new or reconstructed dike is paved with HMA at a thickness equal to the overlay. Place the new or reconstructed dike directly on top of the widened HMA section after application of tack coat.

In median areas adjacent to slotted median drains, each layer of HMA must not exceed 0.20 foot maximum compacted thickness.

The finished surface must be:

1. Textured uniformly
2. Compacted firmly
3. Without depressions, humps, and irregularities

39-2.01C(10)–39-2.01C(14) Reserved

39-2.01C(15) Compaction

39-2.01C(15)(a) General

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving.

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not open new HMA pavement to traffic until its mid depth temperature is below 160 degrees F.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures are taken in the shade.

39-2.01C(15)(b) Method Compaction

Use method compaction for any of the following conditions:

1. HMA pavement thickness shown is less than 0.15 foot
2. Replace asphalt concrete surfacing
3. Leveling courses
4. Areas the Engineer determines conventional compaction and compaction measurement methods are impeded

HMA compaction coverage is the number of passes needed to cover the paving width. A pass is 1 roller's movement parallel to the paving in either direction. Overlapping passes are part of the coverage being made and are not a subsequent coverage. Do not start a coverage until completing the prior coverage.

Method compaction must consist of performing:

1. Breakdown compaction of each layer with 3 coverages using a vibratory roller. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000. If the HMA layer thickness is less than 0.08 foot, turn the vibrator off.
2. Intermediate compaction of each layer of HMA with 3 coverages using a pneumatic-tired roller at a speed not to exceed 5 mph.
3. Finish compaction of HMA with 1 coverage using a steel-tired roller.

Start rolling at the lower edge and progress toward the highest part.

The Engineer may order fewer coverages if the layer thickness of HMA is less than 0.15 foot.

39-2.01C(15)(c)–39-2.01C(15)(e) Reserved

39-2.01C(16) Smoothness Corrections

If the pavement surface does not comply with section 39-2.01A(4)(i)(iii), grind the pavement to within specified tolerances, remove and replace the pavement, or place an overlay of HMA. Do not start corrective work until your method is authorized.

Do not use equipment with carbide cutting teeth to grind the pavement unless authorized.

Smoothness corrections must leave at least 75 percent of the specified HMA thickness. If ordered, core the pavement at the locations selected by the Engineer. Coring, including traffic control, is change order work. Remove and replace deficient pavement areas where the overlay thickness is less than 75 percent of the thickness specified.

Corrected HMA pavement areas must be uniform rectangles with edges:

1. Parallel to the nearest HMA pavement edge or lane line
2. Perpendicular to the pavement centerline

On ground areas not to be overlaid with OGFC, apply a fog seal coat under section 37.

Where corrections are made within areas requiring testing with a 12-foot straightedge, retest the corrected area with the straightedge.

39-2.01C(17) Reserved

39-2.01D Payment

The payment quantity for geosynthetic pavement interlayer is the area measured from the actual pavement covered.

Payment for tack coat is included in the payment for hot mix asphalt.

The Department does not adjust the unit price for an increase or decrease in the tack coat quantity.

The payment quantity for HMA of the type shown on the Bid Item List is measured based on the combined mixture weight. If recorded batch weights are printed automatically, the bid item for HMA is measured by using the printed batch weights, provided:

1. Total aggregate and supplemental fine aggregate weight per batch is printed. If supplemental fine aggregate is weighed cumulatively with the aggregate, the total aggregate batch weight must include the supplemental fine aggregate weight.
2. Total virgin asphalt binder weight per batch is printed.
3. Each truckload's zero tolerance weight is printed before weighing the first batch and after weighing the last batch.
4. Time, date, mix number, load number and truck identification is correlated with a load slip.
5. Copy of the recorded batch weights is certified by a licensed weigh master and submitted.

The payment quantity for place hot mix asphalt dike of the type shown on the Bid Item List is the length measured from end to end.

The payment quantity for replace hot mix asphalt dike of the type shown on the Bid Item List includes all compensation for removal and disposal of existing dike.

Payment for the HMA used to construct the dike is not included in the payment for place hot mix asphalt dike.

The payment quantity for place hot mix asphalt (miscellaneous areas) is the area measured for the in-place compacted area. Payment for the HMA used for miscellaneous areas is not included in the payment for place hot mix asphalt (miscellaneous areas).

39-2.02 TYPE A HOT MIX ASPHALT

39-2.02A General

39-2.02A(1) Summary

Section 39-2.02 includes specifications for producing and placing Type A hot mix asphalt and polymer modified hot mix asphalt (HMA). All reference to "Type A HMA" shall be interpreted as applying to both unless expressly stated otherwise.

39-2.02A(2) Definitions

Reserved

39-2.02A(3) Submittals

39-2.02A(3)(a) General

Reserved

39-2.02A(3)(b) Job Mix Formula

The JMF must be based on HMA mix design process as described in California Test 367.

39-2.02A(3)(c) Reclaimed Asphalt Pavement

Submit QC test results for RAP gradation with the combined aggregate gradation within 2 business days of taking RAP samples during Type A HMA production.

39-2.02A(3)(d)–39-2.02A(3)(f) Reserved

39-2.02A(4) Quality Assurance

39-2.02A(4)(a) General

Reserved

39-2.02A(4)(b) Quality Control**39-2.02A(4)(b)(i) General**

Reserved

39-2.02A(4)(b)(ii) Aggregates

Test the quality characteristics of aggregates under the test methods and frequencies shown in the following table:

Aggregate Testing Frequencies

Quality characteristic	Test method	Minimum testing frequency
Gradation ^a	CT 202	1 per 750 tons and any remaining part
Sand equivalent ^b	CT 217	
Moisture content ^c	CT 226 or 370	
Crushed particles	CT 205	1 per 10,000 tons or 2 per project whichever is greater
Los Angeles Rattler	CT 211	
Flat and elongated particles	CT 235	
Fine aggregate angularity	CT 234	

^aIf RAP is used, test the combined aggregate gradation under California Test 384.

^bReported value must be the average of 3 tests from a single sample.

^cTest at continuous mixing plants only. If RAP is used, test the RAP moisture content at continuous mixing plant and batch mixing plant.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during HMA production.

39-2.02A(4)(b)(iii) Reclaimed Asphalt Pavement

Sample and test processed RAP at a minimum frequency of 1 sample per 1,000 tons with a minimum of 6 samples per fractionated stockpile. If the fractionated stockpile has not been augmented, the 3 RAP samples taken and tested for mix design can be part of this minimum sample requirement. If a processed RAP stockpile is augmented, sample and test processed RAP quality characteristics at a minimum frequency of 1 sample per 500 tons of augmented RAP.

The combined RAP sample when tested under AASHTO T 308, the uncorrected binder content must be within ± 2.00 percent of the average uncorrected asphalt binder content reported on your approved mix design. If a new processed RAP stockpile is required, the average uncorrected binder content of the new processed RAP stockpile must be within ± 2.00 percent of the average binder reported on your approved mix design. You must use the same ignition oven used to determine the uncorrected asphalt binder content.

The combined RAP sample when tested under CT 309 must be within ± 0.06 of the average maximum specific gravity reported on your approved mix design.

During Type A HMA production, sample RAP twice daily and perform QC testing for:

1. Aggregate gradation at least once a day under California Test 384
2. Moisture content at least once a day

39-2.02A(4)(b)(iv)–39-2.02A(4)(b)(viii) Reserved**39-2.02A(4)(b)(ix) Type A Hot Mix Asphalt Production**

Test the quality characteristics of Type A HMA under the test methods and frequencies shown in the following table:

Type A HMA Production Testing Frequencies

Quality characteristic	Test method	Minimum testing frequency
Asphalt binder content	CT 382	1 per 750 tons and any remaining part
HMA moisture content	CT 370	1 per 2,500 tons but not less than 1 per paving day
Air voids content	CT 367	1 per 4,000 tons or 2 every 5 paving days, whichever is greater
Voids in mineral aggregate	CT 367	1 per 10,000 tons or 2 per project whichever is greater
Dust proportion	CT 367	
Nuclear gauge density	CT 375	3 per 250 tons or 3 per paving day, whichever is greater
Stabilometer value	CT 366	1 per 4,000 tons or 2 every 5 paving days, whichever is greater

39-2.02A(4)(c)–39-2.02A(4)(d) Reserved

39-2.02A(4)(e) Acceptance

The County accepts Type A HMA based on compliance with:

1. Aggregate quality requirements shown in the following table:

Aggregate Quality

Quality characteristic	Test method	Requirement	
Aggregate gradation ^a	CT 202	JMF ± Tolerance	
Percent of crushed particles	CT 205		
Coarse aggregate (min, %)			
One-fractured face			95
Two-fractured faces			75
Fine aggregate (min, %) (Passing No. 4 sieve and retained on No. 8 sieve.)			
One-fractured face		70	
Los Angeles Rattler (max, %)	CT 211		
Loss at 100 Rev.			12
Loss at 500 Rev.			40
Sand equivalent (min.) ^{b, c}	CT 217	50	
Flat and elongated particles (max, % by weight at 5:1)	CT 235	10	
Fine aggregate angularity (min, %) ^c	CT 234	45	

^aThe Engineer determines combined aggregate gradations containing RAP under California Test 384.

^bReported value must be the average of 3 tests from a single sample.

^cThe Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

2. If RAP is used, RAP quality requirements shown in the following table:

Reclaimed Asphalt Pavement Quality

Quality characteristic	Test method	Requirement
Uncorrected binder content (% within the average value reported ^a)	AASHTO T 308	±2.00
Specific gravity (within the average value reported ^b)	CT 309	±0.06

^aAverage uncorrected binder content of three ignition oven tests performed at verification. Engineer must use the same ignition oven used to determine the average uncorrected binder content at verification.

^bAverage maximum specific gravity reported on approved mix design.

3. In place Type A HMA quality requirements shown in the following table:

Type A HMA Quality Requirements

Quality characteristic	Test method	Requirement
Asphalt binder content (%)	CT 382	JMF -0.30, +0.50
HMA moisture content (max, %)	CT 370	1.00
Air voids content (%) ^{a, b}	CT 367	4.0 ± 1.5
Voids in mineral aggregate on plant-produced HMA (min, %) ^a Gradation: No. 4 3/8-inch 1/2-inch 3/4-inch	CT 367	 17.0 15.0 14.0 13.0
Dust proportion No. 4 and 3/8" gradings 1/2" and 3/4" gradings	CT 367	0.9-2.0 0.6-1.3
Relative Compaction ^d (%)	CT 375	95+ 2.5
Stabilometer value (min) ^a No. 4 and 3/8" gradings 1/2" and 3/4" gradings	CT 366	30 37

^aPrepare 3 briquettes. Report the average of 3 tests.

^bThe Engineer determines the bulk specific gravity of each lab-compacted briquette under CT 308, Method A, and theoretical maximum specific gravity under CT 309.

^dThe Engineer determines LTMD per CT 308, at the frequency specified in California Test 375.

39-2.02B Materials

39-2.02B(1) General

Reserved

39-2.02B(2) Type A Hot Mix Asphalt Mix Design

The mix design for Type A HMA must comply with the requirements shown in the following table:

Type A HMA Mix Design Requirements

Quality characteristic	Test method	Requirement
Air voids content (%)	CT 367 ^a	4.0
Voids in mineral aggregate (min, %)	CT 367	
Gradation:		
No. 4		17.0
3/8-inch		15.0
1/2-inch		14.0
3/4-inch		13.0
Voids filled with asphalt (%)	CT 367	
Gradation:		
No. 4		76.0-80.0
3/8-inch		73.0-76.0
1/2-inch		65.0-75.0
3/4-inch		65.0-75.0
Dust proportion	CT 367	
No. 4 and 3/8" gradings		0.9-2.0
1/2" and 3/4" gradings		0.6-1.3
Stabilometer value (min) ^a	CT 366	
No. 4 and 3/8" gradings		30
1/2" and 3/4" gradings		37
Hamburg wheel track (in number passes at 0.5-inch rut depth)	AASHTO T 324 (modified) ^c	
Binder Grade:		
PG 58		10,000
PG 64		15,000
PG 70		20,000
PG 76 or higher		25,000
Hamburg wheel track (in number passes at the inflection point)	AASHTO T 324 (modified) ^c	
Binder Grade:		
PG 58		10,000
PG 64		10,000
PG 70		12,500
PG 76 or higher		15,000
Moisture susceptibility, dry strength (min, psi)	AASHTO T 283 ^c	100
Moisture susceptibility, wet strength (min, psi)	AASHTO T 283 ^{c,d}	70

^a Modify California Test 304, Part 2.B.2.c: "After compaction in the compactor, cool to 140 °± 5 °F by allowing the briquettes to cool at room temperature for 0.5-hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."

^cTest plant produced TYPE A HMA

^dFreeze thaw required

For Type A HMA mixtures using RAP, the maximum allowed binder replacement is 25.0 percent in the upper 0.2 foot exclusive of OGFC and 40.0 percent below. The binder replacement is calculated as a percentage of the approved JMF target asphalt binder content.

39-2.02B(3) Asphalt Binder

The Grade of asphalt binder for Type A HMA shall be as shown on the plans or schedules or PG 64-10 if not specified elsewhere.

For Type A HMA using RAP substitution of 15 percent or less of the aggregate blend, the grade of the virgin binder must comply with the PG binder grade specified above.

For Type A HMA using RAP substitution of greater than 15 percent of the aggregate blend, the virgin binder grade must comply with the PG binder grade specified above with 6 degree C reduction in the upper and lower temperature classification. Hamburg wheel track requirements are based on the grade of asphalt binder specified for Type A HMA.

39-2.02B(4) Aggregates

39-2.02B(4)(a) General

Before the addition of asphalt binder and lime treatment, the aggregates must comply with the requirements shown in the following table:

Aggregate Quality

Quality characteristic	Test method	Requirement
Percent of crushed particles:		
Coarse aggregate (min, %)		
One-fractured face		90
Two-fractured faces		75
Fine aggregate (min, %)	CT 205	
(Passing No. 4 sieve and retained on No. 8 sieve.)		
One-fractured face		70
Los Angeles Rattler (max, %)		
Loss at 100 Rev.	CT 211	12
Loss at 500 Rev.		45
Sand equivalent (min) ^a	CT 217	50
Flat and elongated particles (max, % by weight at 5:1)	CT 235	10
Fine aggregate angularity (min, %) ^b	CT 234	45

^aThe reported value must be the average of 3 tests from a single sample.

^bThe Engineer waives this specification if the Type A HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate, except if your JMF fails verification. Manufactured sand is fine aggregate produced by crushing rock or gravel.

39-2.02B(4)(b) Aggregate Gradations

The aggregate gradations for Type A HMA must comply with the requirements shown in the following table unless otherwise called for on the plans or work schedules:

Aggregate Gradation Requirements

Type A HMA use	Gradation
Final Surface Course	1/2 inch
Asphalt Repairs within Traveled Way	3/4 inch
Dikes, Berms, Misc Area	3/8 inch
Leveling	No. 4

Aggregate gradation must be within the TV limits for the specified sieve size shown in the following tables:

**Aggregate Gradations for Type A HMA
(Percentage Passing)**

1 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	--
3/4"	88-93	TV ± 5
1/2"	72-85	TV ± 6
3/8"	55-70	TV ± 6
No. 4	35-52	TV ± 7
No. 8	22-40	TV ± 5
No. 30	8-24	TV ± 4
No. 50	5-18	TV ± 4
No. 200	3.0-7.0	TV ± 2.0

3/4 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	—
3/4"	90 - 100	TV ±5
1/2"	70 - 90	TV ±6
No. 4	45 - 55	TV ±7
No. 8	32 - 40	TV ±5
No. 30	12 - 21	TV ±4
No. 200	2 - 7	TV ±2

1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	—
1/2"	95 - 99	TV ±6
3/8"	75 - 95	TV ±6
No. 4	55 - 66	TV ±7
No. 8	38 - 49	TV ±5
No. 30	15 - 27	TV ±4
No. 200	2 - 8	TV ±2

3/8 inch

Sieve size	Target value limit	Allowable tolerance
1/2"	100	—
3/8"	95 - 100	TV ±6
No. 4	58 - 72	TV ±7
No. 8	34 - 48	TV ±6
No. 30	18 - 32	TV ±5
No. 200	2 - 9	TV ±2

No. 4

Sieve size	Target value limit	Allowable tolerance
3/8"	100	—
No. 4	95 - 100	TV ±7
No. 8	72 - 77	TV ±7
No. 30	37 - 43	TV ±7
No. 200	2 - 12	TV ±4

39-2.02B(5) Reclaimed Asphalt Pavement

You may substitute RAP for part of the virgin aggregate in a quantity up to 25 percent of the aggregate blend.

Provide enough space at your plant for complying with all RAP handling requirements. Provide a clean, graded base, well drained area for stockpiles.

If RAP is from multiple sources, blend the RAP thoroughly and completely before fractionating.

For RAP substitution greater than 15 percent of the aggregate blend, fractionate RAP stockpiles into 2 sizes, a coarse fraction RAP retained on 3/8-inch sieve and a fine fraction RAP passing 3/8-inch sieve. For RAP substitution of 15 percent of the aggregate blend or less, fractionation is not required.

The RAP fractionation must comply with the requirements shown in the following table:

RAP Stockpile Fractionation Gradation Requirements

Size	Test method	Requirement
Coarse (% passing the 1-inch sieve)	California Test 202 ^a	100
Fine (% passing the 3/8-inch sieve)	California Test 202 ^a	98–100

^aMaximum mechanical shaking time is 10 minutes.

You may use the coarse fractionated stockpile, the fine fractionated stockpile, or a combination of the coarse and fine fractionated stockpiles.

Isolate the processed RAP stockpiles from other materials. Store processed RAP in conical or longitudinal stockpiles. Processed RAP must not be agglomerated or be allowed to congeal in large stockpiles.

39-2.02B(6)–39-2.02B(10) Reserved

39-2.02B(11) Type A Hot Mix Asphalt Production

If RAP is used, the asphalt plant must automatically adjust the virgin asphalt binder to account for RAP percentage and RAP binder.

During production, you may adjust hot- or cold-feed proportion controls for virgin aggregate and RAP. RAP must be within ±3 of RAP percentage described in your Job Mix Formula Proposal form without exceeding 25 percent.

39-2.02C Construction

For production paving, the minimum compacted thickness of each lift of Type A HMA shall be 3 times the maximum aggregate size. Where the pavement thickness shown is greater than 3 inches, you must place Type A HMA in multiple lifts. For replaced asphalt pavement surfacing (digouts) work you may place Type A HMA in 4" maximum lifts.

If placing Type A HMA in multiple lifts:

1. Apply a tack coat before placing a subsequent lift
2. The Engineer evaluates each HMA lift individually for compliance

If the ambient air temperature is below 60 degrees F, cover the loads in trucks with tarpaulins. If the time for HMA discharge to truck at the HMA plant until transfer to paver's hopper is 90 minutes or greater and if the ambient air temperature is below 70 degrees F, cover the loads in trucks with tarpaulins, unless the time from discharging to the truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or the pavement surface.

Spread Type A HMA at the ambient air and surface temperatures shown in the following table:

Minimum Ambient Air and Surface Temperatures

Lift thickness (feet)	Ambient air (°F)		Surface (°F)	
	Unmodified asphalt binder	Modified asphalt binder	Unmodified asphalt binder	Modified asphalt binder
<0.15	55	50	60	55
≥0.15	45	45	50	50

For Type A HMA placed under method compaction, if the asphalt binder is:

1. Unmodified, complete:
 - 1.1. 1st coverage of breakdown compaction before the surface temperature drops below 250 degrees F
 - 1.2. Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F
 - 1.3. Finish compaction before the surface temperature drops below 150 degrees F
2. Modified, complete:
 - 2.1. 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F
 - 2.2. Breakdown and intermediate compaction before the surface temperature drops below 180 degrees F
 - 2.3. Finish compaction before the surface temperature drops below 140 degrees F

You may cool Type A HMA with water when rolling activities are complete if authorized.

39-2.02D Payment

Not Used

39-2.03 Reserved

39-2.04 Not Used

39-2.05 Not Used

39-2.06 Not Used

39-2.07 MINOR HOT MIX ASPHALT

39-2.07A General

39-2.07A(1) Summary

Section 39-2.07 includes specifications for producing and placing minor hot mix asphalt.

Minor HMA must comply with section 39-2.02 except as specified in this section 39-2.07.

39-2.07A(2) Definitions

Reserved

39-2.07A(3) Submittals

The QC plan and test results in sections 39-2.01A(3)(c) and 39-2.01A(3)(d) do not apply.

39-2.07A(4) Quality Assurance

39-2.07A(4)(a) General

The JMF renewal requirements in section 39-2.01A(4)(d) do not apply.

Test pavement smoothness with a 12 foot straightedge.

39-2.07A(4)(b) Quality Control

Testing for compliance with the following quality characteristics is not required:

1. Flat and elongated particles
2. Fine aggregate angularity

3. Stabilometer value

39-2.07A(4)(c) Acceptance

The County accepts minor HMA under section 39-2.02A(4)(e) except for compliance with requirements for the following quality characteristics:

1. Flat and elongated particles
2. Fine aggregate angularity
3. Stabilometer value

39-2.07B Materials

39-2.07B(1) General

Reserved

39-2.07B(2) Minor Hot Mix Asphalt Mix Design

The Stabilometer value does not apply to the mix design for minor HMA.

39-2.07B(3) Asphalt Binder

The grade of asphalt binder for minor HMA must be PG-64-10 or PG-64-16.

39-2.07B(4) Not Used

Liquid Antistrip Treatment

39-2.07C Construction

Not Used

39-2.07D Payment

Not Used

39-2.08–39-2.10 RESERVED

39-3 EXISTING ASPHALT CONCRETE

39-3.01 GENERAL

39-3.01A General

Section 39-3.01 includes general specifications for performing work on existing asphalt concrete facilities.

Work performed on existing asphalt concrete facilities must comply with section 15.

39-3.01B Materials

Not Used

39-3.01C Construction

Before removing a portion of an asphalt concrete facility, make a 2-inch deep saw cut to a true line along the limits of the removal area.

39-3.01D Payment

Not Used

39-3.02 REPLACE ASPHALT CONCRETE SURFACING

39-3.02A General

Section 39-3.02 includes specifications for replacing asphalt concrete surfacing (digouts).

A per-road summary of digout areas is provided in Part 6. Prior to beginning any work on the digouts, the You shall conduct a field review of each digout repair with the Engineer. If the Engineer determines the failing area marked out has increased, the dimensions shown in Part 6 and the field markings shall be modified to include the increased failing area.

Record the agreed upon digout dimensions and submit them in writing to the Engineer.

No digout work shall commence on a specific road until the Engineer approves the digout dimensions submitted. Digout work performed in excess of the approved dimensions shall not be paid for unless approved by the Engineer.

On roads scheduled for milling/inlay tie out digout dimensions to ensure they can be located after milling. Tie out details shall be submitted and approved by the Engineer prior to main line milling operations.

Digouts on mill/ inlay roads shall commence within 24 hours of mainline milling.

Digouts shall be performed prior to placing asphalt for the overlay/inlay. For mill / inlay roads, the digout depth listed in the schedules in Part 6 of these Contract Documents shall be considered as the depth below the milled surface. At your option, digouts on mill/ inlay roads may be performed prior to the milling operation. However, the portion of the digout that will be milled shall not be included in the measurement or payment.

39-3.02B Materials

HMA to be used for replacing asphalt concrete surfacing must comply with Type A HMA as specified in section 39-2.02.

The grade of asphalt binder shall be as shown in the schedules in Part 6 of these contract documents.

Tack coat must comply with section 39-2.01B(10).

39-3.02C Construction

Cold planing machines used to remove existing pavement shall be provided with cutter heads that are no wider than the repair limits marked out on the pavement. The minimum width of an individual digout shall be 6 feet.

Before removing asphalt concrete, outline the replacement area and cut neat lines with a saw or grind to full depth of the existing asphalt concrete. Do not damage asphalt concrete and base remaining in place.

Remove existing asphalt section, including any paving fabric or geo grid if present, to the depth specified in Part 6 of these contract documents and proof roll the area with a loaded dump truck or other heavy equipment to confirm an unyielding plane. Should the area yield under proof rolling, continue removal as directed by the Engineer.

If subgrade is encountered prior to reaching the digout depth called for in Part 6 of these Contract Documents, stop removal efforts and proof roll the subgrade with a loaded dump truck or other heavy equipment. If the subgrade provides an unyielding plane, as determined by the Engineer no further removal is required. In no case shall a digout be repaired to a depth of less than 3 inches.

In the event base materials are removed to achieve an unyielding plane, asphalt millings of compactable grading or HMA may be used to fill the depth of over-excavation.

Removal of additional material and subsequent placement of asphalt millings or additional HMA shall be made at the bid unit price for replace asphalt concrete surfacing for the additional volume removed. Additional HMA used shall be paid at the contract unit price for HMA.

Replace asphalt concrete in a lane before the lane is specified to be opened to traffic.

Before placing HMA, apply a tack coat as specified in section 39-2.01C(3)(f).

Place HMA using method compaction as specified in section 39-2.01C(2)(c).

The completed digout shall be true to the line and grade of the existing surface when tested with a 12 foot straight edge. Deviations shall be corrected prior to resurfacing. If grinding is required apply a new layer of tack coat prior to resurfacing.

39-3.02D Payment

The payment quantity for replace asphalt concrete surfacing is the volume determined from the dimensions shown.

39-3.03 REMOVE ASPHALT CONCRETE DIKES

39-3.03A General

Section 39-3.03 applies to removing asphalt concrete dikes outside the limits of excavation.

39-3.03B Materials

Not Used

39-3.03C Construction

Reserved

39-3.03D Payment

Not Used

39-3.04 COLD PLANING ASPHALT CONCRETE PAVEMENT

39-3.04A General

Section 39-3.04 includes specifications for cold planing asphalt concrete pavement.

Cold planing asphalt concrete pavement includes the removal of pavement markers, traffic stripes, and pavement markings within the area of cold planing.

39-3.04A (1) Full Width

Roads scheduled for planing across their entire width shall be planed at the scheduled depth for the entire width. If the road has curb and gutter or dike the cut shall be made clean at the lip of the gutter or the flowline of the dike or as directed by the Engineer. In the case where there is a build up of asphalt concrete at the lip of the gutter vary the depth of the mill such that the depth of the milled surface at the lip of gutter is equal to the scheduled depth of the inlay.

39-3.04A (2) Edge Grind

The Contractor shall perform Edge Grind per the detail included in Part 6 of these contract documents if called for in the schedules.

39-3.04A (2) Header Cut

The Contractor shall perform Header Cuts per the detail included in Part 6 of these contract documents if called for in the schedules.

39-3.04B Materials

HMA for temporary tapers must be of the same quality that is used for the HMA overlay or comply with the specifications for minor HMA in section 39-2.07.

39-3.04C Construction

39-3.04C(1) General

Remove all asphalt and other material encountered (including but not limited to paving fabric and geo grid) to the depth specified in the Part 6 schedules of these Contract Documents unless otherwise directed by the Engineer.

Do not use a heating device to soften the pavement.

The cold planing machine must be:

1. Equipped with a cutter head width that matches the planing width unless a wider cutter head is authorized.
2. Equipped with automatic controls for the longitudinal grade and transverse slope of the cutter head and:
 - 2.1. If a ski device is used, it must be at least 30 feet long, rigid, and a 1-piece unit. The entire length must be used in activating the sensor.
 - 2.2. If referencing from existing pavement, the cold planing machine must be controlled by a self-contained grade reference system. The system must be used at or near the centerline of the

roadway. On the adjacent pass with the cold planing machine, a joint-matching shoe may be used.

3. Equipped to effectively control dust generated by the planing operation
4. Operated such that no fumes or smoke is produced.

Replace broken, missing, or worn machine teeth.

HMA shall be placed on the milled portion within 3 working days unless otherwise determined by the Engineer. In no case shall any portion of a road be left in a milled condition on a Friday or any other day in which paving cannot be accomplished in the 3 working day period.

If you do not complete placing the HMA surfacing before opening the area to traffic, you must construct a temporary HMA taper to the level of existing pavement.

Immediately prior to beginning cold planing operations furnish and place W8-8 "ROUGH ROAD" signs, in addition to the required advance warning signs. The W8-8 signs shall be placed 200 feet in advance and at the beginning of the cold planing operation for each direction of travel, at a maximum of 1,000-foot intervals along each side of the traveled way, at all intersections, on-ramps and public roads or streets entering the cold planing area, and as directed by the Engineer.

39-3.04C(2) Grade Control and Surface Smoothness

Install and maintain grade and transverse slope references.

The final cut must result in a neat and uniform surface.

The completed surface of the planed pavement must not vary more than 0.02 foot when measured with a 12-foot straightedge parallel with the centerline. With the straightedge at right angles to the centerline, the transverse slope of the planed surface must not vary more than 0.03 foot.

Where lanes are open to traffic, the drop-off of between adjacent lanes must not be more than 0.15 foot.

39-3.04C(3) Planed Material

Remove cold planed material concurrently with planing activities such that the removal does not lag more than 50 feet behind the planer.

39-3.04C(4) Temporary HMA Tapers

If a drop-off between the existing pavement and the planed area at transverse joints cannot be avoided before opening to traffic, construct a temporary HMA taper. The HMA temporary taper must be:

1. Placed to the level of the existing pavement and tapered on a slope of 30:1 (horizontal:vertical) or flatter to the level of the planed area
2. Compacted by any method that will produce a smooth riding surface

Completely remove temporary tapers before placing permanent surfacing.

39-3.04D Payment

The County estimates paving fabric or other deleterious material will be present in up to 10 percent of the total milled surface area. If the amount of contaminated millings exceeds this amount the County will pay for additional disposal fees only. No markup or other costs will be allowed. You must submit a written request detailing the amount of millings in excess of 10 percent to the Engineer for payment. This request shall include :

1. The surface area of the millings in excess of 10 percent
2. Actual disposal cost of non-contaminated millings
3. Actual disposal cost of contaminated millings

Once the Engineer approves your request, a change order will be issued for the difference in disposal fees for the portion of contaminated millings in excess of 10 percent of the total milled area for the entire project.

39-3.05 REMOVE BASE AND SURFACING

39-3.05A General

Section 39-3.05 includes specifications for removing base and asphalt concrete surfacing.

39-3.05B Materials

Not Used

39-3.05C Construction

Where base and surfacing are described to be removed, remove base and surfacing to a depth of at least 6 inches below the grade of the existing surfacing. Backfill resulting holes and depressions with embankment material under section 19.

39-3.05D Payment

The payment quantity for remove base and surfacing is the volume determined from the dimensions shown.

39-3.06–39-3.08 RESERVED

39-4 FIBER REINFORCEMENT OF HMA

39-4.01 GENERAL

39-4.01A Summary

Section 39-4 includes general specification for adding fiber reinforcement to HMA if called for.

Reinforcing Fibers for HMA shall conform the Standard Specifications, these special provisions and the selected manufacturer's recommendations.

Unless explicitly stated herein all requirements for the production/ placement of fiber reinforced HMA shall conform to the specifications for the type and grade of asphalt concrete scheduled to receive fiber reinforcement.

39-4.02 MATERIALS

39-4.02A Summary

Reinforcing fibers shall consist of a high tensile strength aramid fiber blend specially formulated to reinforce asphalt concrete. The selected material shall be one of the following:

1. Forta-FI®(Forta Corporation)
2. ACE XP Polymer Fiber™ (Surface Tech)

Fibers shall be added to the HMA during production and according to the fiber manufacturer's recommended procedures.

The application rate per ton of HMA shall be per the fiber manufacturer's and/ or supplier's recommendations.

The type of fiber and application rate shall be included as part of the mix design submittal.

39-4.02B Submittals

Provide the following at least 2 weeks prior to asphalt production:

1. MSDS on fiber blend
2. Product data including physical properties of the fiber blend
3. QC Plan developed by the fiber supplier including:
 - a. Mixing plant location and type (batch or continuous drum)
 - b. Dosing procedure including:
 - i. pre dosing set up
 - ii. location of fiber dosing related to the asphalt mixing operation
 - iii. quality control procedure
 - iv. equipment and controls used ensure accurate dosing

