
02500 – BASE COURSE AND PAVING

(Revised 4/07/17)

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[PART 1 – GENERAL](#)

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this specification.
- B. Section 01000 – GENERAL REQUIREMENTS.
- C. [Section 02200](#) – EARTHWORK.
- D. [Section 02220](#) – TRENCHING, BACKFILLING AND COMPACTION OF UTILITIES.
- E. [Section 02400](#) – CURB & GUTTER, DRIVEWAYS AND SIDEWALKS.
- F. Any Specifications or details not covered herein shall be per Virginia Department of Transportation, *Road and Bridge Specifications*, 2002 or latest revision.

1.2 SUMMARY

This section includes all equipment, labor, material, and services required for complete installation of aggregate base courses and asphalt concrete pavement structures and specialties for municipal street systems.

1.3 DEFINITIONS

For the purposes of this specification, the following definitions refer to roadway and street systems that come under the authority of the City of Lynchburg, Virginia as specified within this section and other sections of this manual.

- A. **Aggregate Base Course:** A layer of material of a specified thickness placed between the subbase and asphalt paving.
- B. **Base Course:** A layer of material of a specified thickness placed between the subbase or aggregate base course and the intermediate or surface course.

- C. **Public Road System:** Roadway, streets, and their appurtenances required for the conveyance of the motoring public that are maintained by either the City of Lynchburg or the Virginia Department of Transportation.
- D. **Subbase Course:** A layer of material of a specified thickness that is placed on a subgrade to support a base course.
- E. **Subgrade:** The top surface of a roadbed shaped to conform to the typical section on which the pavement structure and shoulders are constructed.
- F. **Subgrade Stabilization:** The modification of roadbed soils by admixing with stabilizing or chemical agents that will increase the load bearing capacity, firmness, and resistance to weathering or displacement.
- G. **Suitable Subgrade:** A subgrade that consists of a material type and density that is approved by the City Engineer for placing a subsequent layer of material.
- H. **Surface Course/Wearing Surface:** The top layer of a pavement structure that resists skidding, traffic abrasion, and disintegrating effects of weather.

1.4 SUBMITTALS

- A. Submit job-mix formula for each mixture to be supplied within 30 days after contract is awarded.
- B. Submit product data and shop drawings for manhole, lampstack, and valve box adjustment rings in accordance with Section 01000, *General Requirements*.

1.5 QUALITY ASSURANCE

- A. Asphalt concrete pavement thickness and density shall conform to the requirements of Section 315 of VDOT *Road and Bridge Specifications*, or latest revision. Asphalt concrete pavement coring sample thickness and density test reports shall be submitted at completion of project in accordance with the requirements of Section 315 of VDOT *Road and Bridge Specifications*, or latest revision.
- B. Aggregate base course density shall conform to the requirements of Section 308 and 309 of VDOT *Road and Bridge Specifications*, or latest revision.
- C. Materials and operations shall comply with the latest revision of all applicable codes and standards.

1.6 STANDARD ABBREVIATIONS

AASHTO	American Association of State Highway Transportation Officials
ANSI	American National Standards Institute
AREA	American Railway Engineers Association

ASTM	American Society for Testing and Materials
BM	Base Mix
FS	Federal Specifications
HMA	Hot Mix Asphalt
IM	Intermediate Mix
MSDS	Material Safety Data Sheets
OSHA	Occupational Safety and Health Administration
RAP	Recycled Asphalt Pavement
SM	Surface Mix
VDOT	Virginia Department of Transportation

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Plant operations shall be in accordance with Section 211 *Asphalt Concrete* of the VDOT *Road and Bridge Specifications*, latest revision.
- B. Shipping and storing shall be in accordance with Section 210 *Asphalt Materials* of the VDOT *Road and Bridge Specifications*, latest revision.
- C. Hauling equipment shall be in accordance with Section 315.03 *Equipment* of the VDOT *Road and Bridge Specifications*, latest revision.
- D. **Delivery**
 - 1) Hauling equipment shall be loaded in a manner to minimize segregation of the mix.
 - 2) Haul trucks shall park in a designated area to minimize tracking of tack coats.
 - 3) Once loaded, haul trucks shall proceed immediately to the job site.

1.8 PROJECT CONDITIONS

1.8.1 PROTECTION OF STREAMS

Do not discharge excess concrete into a drainage pipe, catchbasin, ditch, stream, river, pond, lake, or on City property without the approval of the City Construction Engineer.

1.8.2 PROTECTION OF ROADWAYS

Do not discharge or allow concrete to spill onto any roadway or appurtenances either during placement or while in transit. Remove spills immediately or otherwise repair street as directed by the City Engineer. The contractor shall be responsible for cleanup of all waste/excess of concrete.

1.8.3 PROTECTION OF PROPERTY

Do not discharge excess concrete without written permission of the property owner.

1.9 COORDINATION

- A. Coordinate manhole, lampstack, and valve box adjusting with the City of Lynchburg, City Engineer.
- B. Coordinate tie-in to municipal roadways with the City of Lynchburg, City Engineer.

PART 2 – PRODUCTS

2.1 AGGREGATE BASE COURSE

Aggregate base material shall be designated as Type 1 size 21A or 21B in accordance with Section 208 *Subbase and Aggregate Base Material* of the VDOT *Road and Bridge Specifications*, latest revision.

2.2 HYDRAULIC CEMENT STABILIZATION

Hydraulic cement stabilization shall be in accordance with Section 307 *Hydraulic Cement Stabilization* of the VDOT *Road and Bridge Specifications*, latest revision.

2.3 ASPHALT CONCRETE PAVEMENTS

Asphalt concrete pavements shall be in accordance with Section 211 *Asphalt Concrete Materials* of the VDOT *Road and Bridge Specifications*, latest revision.

The use of reclaimed asphalt pavement shall be in accordance with Section 211 *Asphalt Concrete Materials* of the VDOT *Road and Bridge Specifications*, latest revision.

The use of aggregate from Blue Ridge Stone Corporation, Lawyers Road Plant, Lynchburg, Virginia will be restricted from use in asphalt surface courses where the ADT exceeds 14,999 vehicles per day.

2.4 TACK COAT

Tack coat shall be in accordance with Section 310 *Tack Coat* of the VDOT *Road and Bridge Specifications*, latest revision.

2.5 ASPHALT SEAL COAT

Asphalt seal coat shall be in accordance with Section 312 *Seal Coat* of the VDOT *Road and Bridge Specifications*, latest revision.

2.6 EMULSIFIED ASPHALT SLURRY SEAL SURFACES

Emulsified asphalt slurry seal surfaces shall be in accordance with VDOT *Special Provision for Emulsified Asphalt Slurry Seal* dated October 14, 1994 or latest revision.

2.7 PAVEMENT REINFORCING FABRIC

Pavement reinforcing fabric shall be A/oMat C040 or equal and meet or exceed AASHTO M288-00, Paving Fabric requirements and conform under AASHTO National Transportation Product Evaluation program. The fabric is needle punched, non-woven and heat treated on one side. This fabric shall conform to the following:

Physical Properties			
Fabric Property	Test Method	Units	C040
Weight	ASTM D 3776	oz/yd ²	≥4.2 (142gm/m ²)
Grab tensile elongation	ASTM D 4632	Lbs.	102 (453N)
Grab elongation	ASTM D 4632	%	50
Trap tear	ASTM D 4533	Lbs.	45(.220 kN)
Puncture	ASTM D 4833	Lbs.	60 (.267kN)
Mullen burst	ASTM D 3786	psi	200(1378 kPa)
Asphalt retention	ASTM D 6140	Gal/yd ²	0.23 (1.04l/m ²)
Melting point	ASTM D 276	Degrees F	325 F (163 C)
Thickness	ASTM D 1777	Mils	30
Ultraviolet Degradation	ASTM D 4355	%Strength Retained @ 150 Hrs	70%

PART 3 – EXECUTION

3.1 GENERAL

Construction and testing shall conform to these specifications and standard drawings as well as any specifications or details not covered herein shall be per the applicable sections of Divisions I, II, III, V, and VII of the *Virginia Department of Transportation Road and Bridge Specifications*, latest revision and on the Standard Details shown in the VDOT *Road and Bridge Standards*, latest revision.

3.2 PAVEMENT, PATCHES, REPAIR AND REPLACEMENT (PERMANENT & TEMPORARY)

- A. **General:** This work shall consist of replacing subbase stone, and asphalt material in the street in areas where it becomes necessary to remove the original pavement such as for roadway failures, sewer trenches, water main trenches, drainage pipe ditches, etc. Pavement repair depths shall be the type to match the existing street pavement as shown on the drawings or as determined by the City Engineer.

- B. **Cutting Pavement:** For all areas that are patched, the edges of the pavement shall be cut in a straight line revealing a vertical face for the patch to abut against. Care shall be taken during excavation and construction to avoid damage to adjoining paved surfaces. If patching is performed as part of piping installations, perform cutting operations prior to installation of line to avoid excessive removal of pavement.
- C. **Surface Tolerances:** The asphalt patched surface shall be tested using a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not exceed ½ -inch allowing for the contours of the existing pavement. All humps or depressions exceeding the specified tolerance shall be corrected or the defective work removed and replaced with new material. Any deviation from this standard will be at the discretion of the City Engineer.
- D. **Excavation:** Excavation of the existing pavement and subbase shall be made to a depth as shown on the applicable **Standard Details 25.18 through 25.22**. Before the placement of any stone, concrete or asphalt material, a representative of the City Engineer shall inspect the underlying subgrade. The Contractor shall be responsible for correcting any ruts or soft yielding places to a depth of approved suitable subgrade before placing of the asphalt material. Any depths below 4 inches shall be paid as extra work.

3.2.1 PERMANENT PAVEMENT REPAIR

A. Asphalt Pavement Repair

Aggregate Base Stone: The aggregate base shall be installed in accordance with **Standard Detail 25.18** and compacted to the density specified in VDOT *Road and Bridge Specifications*, Section 309 *Aggregate Base Course*, latest revision.

Asphalt Concrete Pavement: The asphalt concrete pavement shall be installed in accordance with **Standard Detail 25.18**. Compact to the density specified in VDOT *Road and Bridge Specifications*, Section 315 *Asphalt Concrete Pavement*, latest revision.

Lift thickness shall not exceed those as referenced within these specifications. Before placing any asphalt material, all sides of the existing pavement and subbase shall be thoroughly tacked at the rate of 0.3 Gal/SY. The finished surface shall abut the existing pavement with no overlap allowed.

B. Concrete Pavement Repair

Aggregate Base Stone: The aggregate base shall installed in accordance with **Standard Detail 25.19** and compacted to the density specified in VDOT *Road and Bridge Specifications*, Section 309 *Aggregate Base Course*, latest revision.

Hydraulic Cement Concrete Pavement: The concrete pavement shall be installed in accordance with **Standard Detail 25.19** using a minimum 3000 psi concrete at 28 days. The City Engineer reserves the right to require that the Contractor pull concrete test cylinders for verifying concrete strength. Concrete shall meet *VDOT Road and Bridge Specifications*, Section 217 *Hydraulic Cement Concrete* and Section 316, *Hydraulic Cement Pavement*.

C. **Historical District with Asphalt Pavement Overlay or without Asphalt Overlay**

Sand: Four inches of sand shall be placed to the depth shown on **Standard Details 25.21 or 25.22**, as applicable. Sand shall be Unified Soil Classification type SW compacted in accordance with Table 2220.1 of this specification.

Aggregate Base Stone: The aggregate base shall be installed in accordance with **Standard Detail 25.21 or 25.22**, as applicable and compacted to the density specified in *VDOT Road and Bridge Specifications*, Section 309 *Aggregate Base Course*, latest revision.

Belgium Block, Cobble or Brick: The pavers shall be installed in accordance with **Standard Detail 25.21 or 25.22** as applicable. Before placing an asphalt mix over pavers (**Standard Detail 25.21**), fill joints between pavers with like material.

Asphalt Surface Course: **Standard Detail 25.21** specifies a finished surface course of asphalt mix over the pavers. Cut back the existing asphalt pavement as shown on **Standard Detail 25.21**. Care shall be taken to insure a uniform grade between the existing pavement and the new surface.

3.2.2 TEMPORARY PAVEMENT REPAIR

A. **Asphalt Pavement Repair**

When shown on the plans, during winter months when asphalt concrete is unavailable, or when directed by the City Engineer, temporary pavement patches conforming to **Standard Detail 25.20** shall be installed. The Contractor shall maintain the temporary repair to the satisfaction of the City Engineer until the permanent pavement repair is made.

Cold patch material shall be installed in accordance with manufacturer's recommendations.

Density shall conform to the applicable sections referenced above under permanent pavement repair for each particular product (i.e. aggregate base course).

B. Once hot asphalt mix is available, all temporary patch material shall be removed and replaced with a permanent hot asphalt patch within thirty calendar days.

3.3 AGGREGATE BASE COURSE

A. Subgrade Approval

The underlying course upon which the aggregate base course is to be placed shall be prepared in accordance with the requirements of Section 02200, *Earthwork*, of these specifications and applicable sections of VDOT *Road and Bridge Specifications*, Section 304, *Constructing Density Control Strips* and Section 305, *Subgrade and Shoulders*, latest revision. Prior to any spreading operations, the underlying course shall be checked and accepted by the City Engineer. Any ruts or soft yielding places shall be corrected and rolled before the base course is applied.

B. Installation of Aggregate Base Course

The aggregate base course shall be mixed in an approved central mixing plant of the pugmill type and water added during mixing operations in the amount necessary to provide the optimum moisture content for compacting. After mixing, the material shall be transported to the job site and placed on the roadbed by means of an approved aggregate spreader.

The aggregate base course shall be constructed in layers not less than 3 inches or more than 6 inches of compacted thickness. When vibrating with other approved types of special compacting equipment, the compacted depth of a single layer of the aggregate base course may be increased to 8 inches upon approval by the City Engineer. The aggregate, as spread, shall be uniform in gradation with no segregation or pockets of fine or coarse material.

C. Compaction Operations and Density Requirements

After mixing and spreading, the aggregate base course shall be thoroughly compacted at optimum moisture within +/- 20-percent of optimum. Rolling shall progress gradually from the sides to the center and shall continue until the entire area of the course has been rolled by the rear wheels. Rolling shall continue until the material has been compacted to not less than 100 percent density when tested in accordance with AASHTO T191, latest revision.

D. Grading Tolerances of Final Surface

After final rolling, the surface shall be inspected and any irregularities in excess of ½ inch shall be corrected. Aggregate base course shall conform to the lines, grades, and typical cross sections shown on the plans, details or as established by the City Engineer within a tolerance of +/- ½ inch. Any irregularities in the surface shall be corrected by scarifying, remixing, reshaping, and recompacting until a smooth surface is obtained. If directed by the City Engineer, the aggregate base shall be opened to public traffic for at least 2 weeks before being surfaced. During this time, the surface shall be protected against loss of shape, required grades, and material by the addition of moisture and any re-working as necessary. This shall be at no additional cost to the City.

3.4 HYDRAULIC CEMENT STABILIZATION

Placement of hydraulic cement stabilization shall be in accordance with *VDOT Road and Bridge Specifications*, Section 307, latest revision.

3.5 ASPHALT CONCRETE PAVEMENT

3.5.1 CONDITIONING EXISTING SURFACE

Preparation of Surface: Prior to beginning paving operations, the existing areas to be resurfaced shall be thoroughly cleaned by the contractor to the satisfaction of the City Engineer. This cleaning shall include sweeping of the streets with a power operated broom, cutting excess debris with a grader, washing with a water truck, and hand cleaning any debris left after this operation is complete. Cleaning operations shall commence just prior to the resurfacing of streets. In addition, the contractor shall expose any existing paving areas, which have been covered by soil, grass, or debris. These areas shall be thoroughly cleaned and tacked before resurfacing. Any excess material left over after this operation shall be removed or spread out to the satisfaction of the City Engineer. No additional payment shall be made for this work.

When the surface of the existing pavement or base is irregular, it shall be brought to a uniform grade and cross section as directed by the City Engineer. The surface on which the asphalt concrete is to be applied shall be prepared in accordance with the requirements of the applicable specifications.

When specified, prior to placement of asphalt concrete, longitudinal and transverse joints and cracks in hydraulic cement concrete shall be sealed by the application of an approved joint sealing compound.

Any surface casting such as water boxes, manholes, grates, cleanouts, etc. shall be set to grade prior to beginning of paving operation. All telephone manholes and gas boxes are to be adjusted by the utility companies or contractor if approved by the City Engineer. All such castings shall be adjusted within a tolerance of 1/8 inch below or flush with the asphalt finished elevation. See **Standard Details 25.08** and **25.09**. A maximum of three 2-inch riser rings will be allowed for adjusting to grade. Adjustments more than 6 inches above original grade will require excavation and frame adjustment. The contractor shall be required to coat the top of any such casting with a suitable coating material to prevent adhesion of the asphalt material to the casting. A tack coat of asphalt material, conforming to the requirements of these specifications, shall be applied prior to resurfacing operations.

A. Tack Coat

A tack coat of liquid asphalt shall be applied between the existing surface and each asphalt course placed thereafter. The tack coat shall conform to the applicable requirements of *VDOT Road and Bridge Specifications* Section 310.

Tack material shall be uniformly applied with a pressure distributor conforming to VDOT requirements. Hand spray equipment shall not be used except in areas inaccessible by a pressure distributor. Undiluted asphalt shall be applied at a rate of 0.05 to 0.10 gallons per square yard. Diluted asphalt shall be applied at a rate of 0.10 to 0.15 gallons per square yard. The time interval between applying the tack coat and placing the paving mixture shall be sufficient to ensure a tacky residue providing maximum adhesion of the paving mixture to the base. On rich sections or those that have been repaired by the extensive use of asphalt patching mixtures, the tack coat shall be eliminated only if approved by the City Engineer.

Application of tack at joints, adjacent to curbs, gutters, or other appurtenances shall be applied with a hand wand at the rate of 0.20 gallons per square yard. At joints, the hand wand applied tack shall be 2 feet in width with 4 to 6 inches protruding beyond the joint for the first pass. Tack for the adjacent pass shall completely cover the vertical face of the mat edge, so that slight puddling of asphalt occurs at the joint, and extends a minimum of 1 foot into the lane to be paved. Milled faces that are to remain in place shall be tacked as above for the adjacent pass. Use of tack at longitudinal joint vertical faces will not be required when paving in echelon. Care shall be taken to prevent spattering of adjacent pavement, structures, trees, and private property. Any spattering shall be cleaned up by the contractor at no cost to the City.

Tack shall be applied in such a manner as to offer the least inconvenience to traffic and to permit a minimum of one way traffic without pickup or tracking. Traffic shall be excluded from the any pavement that has received tack. New asphalt shall not be placed on tack or prime coats that have been damaged by traffic or contaminated by foreign material.

B. Removing Depressions/Irregularities

Where irregularities in the existing surface would result in a course more than 3 inches in thickness after compaction, the surface shall be brought to a uniform grade by scratching with a thin layer of asphalt concrete not exceeding the minimum thickness as recommended for that type of mix. Then the material shall be thoroughly compacted until it conforms to the surrounding surface. The mixture used shall be the same as that specified for the surface mix to be placed.

3.5.2 PAVEMENT PROFILING

The work included in this item shall consist of the removal of existing asphalt surfaces of in place pavements on various streets within the City of Lynchburg, to produce the desired profile, cross-section, and surface conditions as specified by the City Engineer. All removed material shall become the property of the Contractor.

The contractor shall plan and prosecute a schedule of operations so that milled roadways will be overlaid with asphalt concrete asphalt as soon as possible, and, in no instance, shall the time lapse exceed 7 days after the milling operations, unless otherwise specified. The milled areas of the roadway shall be kept free of irregularities and obstructions that may create a hazard or annoyance to traffic in accordance with the requirements of VDOT *Road and Bridge Specifications* Section 104, latest revision.

The Contractor shall plan and prosecute the milling operation to avoid trapping of water on the roadway. At the discretion of the City Engineer, cutting drainage slots in roadway shoulders or inlets may be required, at no additional cost. The Contractor shall also restore the cut drainage slots afterwards, at no additional cost.

Where asphalt pavement extends into the existing curb and gutter, the contractor shall be required to plane at different slopes. The first cuts shall remove the material existing above the gutter line. These cuts shall be made at the appropriate gutter slope (1/2":1') for 2-foot curb and gutter and (1":1') for 2.5-foot curb and gutter. Any curb and gutter with a different slope shall be planed at the existing curb and gutter slope. The last cuts shall remove the material to a depth of 1 inch below the gutter line with a street cross-section slope of 1/4":1' or to slope of existing street.

Where curb and gutter exists but the pavement is at or below the existing gutter line, the pavement shall be cut to a depth of the thickness of overlay below the gutter line while adjusting street cross-section to 1/4":1' toward the centerline of the street.

Where existing straight curbing has pavement built up to expose less than 6 inches of curbing, the pavement shall be planed down on grade of 1/4":1' or whatever the existing grade of the street back to the street centerline until a desired height of curbing is exposed.

Where center of pavement has correct crown but pavement has rutting or ripples (possibly caused by vehicular braking), the pavement shall be planed to the depth necessary to remove all such defects.

Additional Procedures shall be in accordance with the requirements of VDOT *Road and Bridge Specifications* Section 515, latest revision.

3.5.3 PAVING OPERATIONS

A. Asphalt Concrete Pavement Equipment

Bituminous concrete pavement equipment shall be in accordance with Section 315.03 of the VDOT *Road and Bridge Specifications*, latest revision.

B. Placing and Finishing

Asphalt concrete asphalt shall not be placed until the surface upon which it is to be placed has been approved by the City Engineer.

The edge of the pavement shall be marked by means of a continuous line placed and maintained a sufficient distance ahead of the paving operation to provide proper control of the pavement width and horizontal alignment.

An asphalt paver shall be used to distribute the asphalt mix over the widest pavement width practicable. Wherever practicable and when the capacity of sustained production and delivery is such that more than one paver can be operated, pavers shall be used in echelon to place the wearing course in adjacent lanes. Crossovers, as well as areas containing manholes or other obstacles that prohibit the practical use of mechanical spreading and finishing equipment, may be constructed using hand tools. However, care shall be taken to obtain the required thickness, jointing, compaction, and surface smoothness.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6 inches. However, the joint in the wearing surface shall be at the centerline of the pavement if the roadway comprises two traffic lanes or at lane lines if the roadway is more than two lanes in width. Offsetting layers will not be required when adjoining lanes are paved in echelon and the rolling of both lanes occurs within 15 minutes after laydown.

The contractor shall have a certified Asphalt Concrete Paving Technician present during paving operations. Immediately after placement and screeding, the surface and edges of each layer shall be inspected and straightedged by the technician and necessary corrections performed prior to compaction. The finished pavement shall be uniform and smooth.

The placement of asphalt concrete shall be as continuous as possible and shall be scheduled such that the interruption occurring at the completion of each day's work will not detrimentally affect the partially completed work. Material that cannot be spread and finished in daylight shall not be dispatched from the plant unless the use of artificial lighting has been approved. When paving is performed at night, sufficient light shall be provided to properly perform and thoroughly inspect every phase of the operation. Such phases include cleaning planed surfaces, tack application, paving, compacting, and testing. Lighting shall be provided and positioned such as to not create a blinding hazard to the traveling public.

During paving operations, the Contractor shall be responsible for furnishing and erecting temporary "no parking" signs on each street that is to be paved. The signs shall be erected at least 24 hours prior to paving operations and on each side of the street as necessary.

C. Layer Thickness

Asphalt concrete SUPERPAVE pavement courses shall be placed in layers not exceeding 4.0 times the nominal maximum size aggregate in the asphalt mixture. The maximum thickness may be reduced if the mixture cannot be adequately placed in a single lift and compacted to required uniform density and smoothness. The minimum thickness for a pavement course shall be no less than 2.5 times the nominal maximum size aggregate in the asphalt mixture. Nominal maximum size aggregate for each mix shall be defined as one sieve size larger than the first sieve to retain more than 10 percent aggregate as shown in the design range specified in Section 211.03, table II-13 of *VDOT Road and Bridge Specifications*, latest revision.

Recommended Thickness Chart	
Mix Type	Minimum Thickness (inches)
SM 9.5	1.5
SM 12.5	2
IM 19.0	2
BM 25.0	4

D. Joints

Care shall be exercised when tying into curb and gutter and newly overlaid travel lanes to ensure a uniform grade and joint.

The contractor shall construct the final riding surface to tie into the existing surface by cutting a notch 1 inch deep by 1 inch wide for all tie-ins to existing pavement, including driveways and ramps. Suitable guidelines or devices shall be used to ensure cutting of the joint on a true line. The joint shall be thoroughly cleaned and dried prior to being sealed. This work shall be done at no additional cost to the City.

Method of temporary joints at the end of each workday shall be approved by the City of Lynchburg City Engineer.

E. Compaction

Immediately after the asphalt mixture is placed and struck off and surface irregularities are corrected, the mixture shall be thoroughly and uniformly compacted by rolling.

During compaction of asphalt concrete asphalt, the roller shall not pass over the end of freshly placed material except when a construction joint is to be formed. Edges shall be finished true and uniform.

The surface shall be rolled when the mixture is in the proper condition. Rolling shall not cause undue displacement, cracking, or shoving.

The number, weight, and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. The sequence of rolling operations and the selection of roller types shall provide the specified pavement density.

Immediately after the hot mixture is placed, it shall be sealed with rollers. Thereafter, rolling shall be a continuous process, insofar as practicable, and all parts of the pavement shall receive uniform compaction.

Rolling shall begin at the sides and proceed longitudinally parallel to the center of the pavement, each trip overlapping at least $\frac{1}{2}$ the roller width, gradually progressing to the crown of the pavement. When abutting a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. On superelevated curves, rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the centerline.

Displacements occurring as a result of reversing the direction of a roller, or from other causes, shall be corrected at once by the use of rakes or lutes and addition of fresh mixture when required. Care shall be taken in rolling not to displace the line and grade of the edges of the asphalt mixture. All roller marks shall be eliminated.

To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with a very small quantity of detergent or other approved material. Excess liquid will not be permitted.

Along forms, curbs, headers, walls, and other places not accessible to rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Edges of asphalt pavement surfaces shall be true curves or tangents. Irregularities shall be corrected.

The surface of the compacted course shall be protected until the material has cooled sufficiently to support normal traffic without marring.

F. Density

Density requirements shall be in accordance with Section 315.05 (d) of the *VDOT Road and Bridge Specifications*, latest revision.

G. Pavement Samples

If requested by the City Engineer, the Contractor shall cut samples for testing depth and density. Samples shall be taken for full depth at the locations as selected by the City Engineer. The removed pavement shall be replaced with new mixture and refinished. No additional compensation will be made for such work.

H. Placement Limitations

Placement limitations, to include but not limited to, mixture temperatures, and cold weather paving shall be in accordance with Section 315.04 of the *VDOT Road and Bridge Specifications*, latest revision. Surface mix applications for A and D mixes shall not be placed until the ambient air temperature and the base surface temperature is 50 degrees and rising without prior approval from the City Engineer. Base mix applications shall not be placed until the ambient air temperature and the surface temperature is 40 degrees and rising.

I. Pavement Tolerance

The surface will be tested by using a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not be more than 1/4 inch. Humps and depressions exceeding the specified tolerance shall be corrected, or the defective work shall be removed and replaced with new material.

3.6 PRIME COAT

When a prime coat is required, it shall conform to the applicable requirements of VDOT *Road and Bridge Specifications* Section 311.

When asphalt concrete to be placed has a total thickness of 4 inches or more, priming with liquid asphalt material will not be required on aggregate subbase or base material.

3.7 SEAL COAT

Seal coat shall be in accordance with Section 312, *Seal Coat* of the *VDOT Road and Bridge Specifications*, latest revision.

3.8 EMULSIFIED ASPHALT SLURRY SEAL

Emulsified asphalt slurry seal shall be in accordance with *VDOT Special Provision for Emulsified Asphalt Slurry Seal* dated October 14, 1994, or latest revision.

3.9 PAVEMENT REINFORCING FABRIC

A. Asphalt Distributor

The distributor truck shall be metered and capable of spraying tack coat at a specified uniform application rate. The applicator shall provide uniform coverage without gaps, partial overlaps, or otherwise create heavy streaking. The truck shall be equipped with a hand spray nozzle to distribute tack coat in locations inaccessible by the truck.

B. Fabric Laydown Equipment

The fabric can be installed with a mechanical unit mounted on the front of a tractor or on the back of the distributor truck. Manual units can be used for small jobs. Provide stiff bristle brooms or pneumatic rollers to smooth fabric. Provide all tools such as scissors or blades for cutting fabric. Do not permit traffic directly on fabric.

C. Surface Preparation

Air and pavement temperatures during installation shall be warm enough for the tack coat to remain tacky after placement. Ambient temperatures shall be at least 50°F and rising for bituminous cement tack coat or 60°F and rising for asphalt emulsions.

Clean old pavement of dirt, water, oil, and foreign materials. Fill cracks as directed by the City Engineer, with suitable filler (such as asphalt cement or rubberized asphalt). Repair larger cracks and potholes with a properly compacted hot mix or other similar filler as directed by the City Engineer.

Badly broken pavement is an indication of a failed subgrade and shall be dug out and replaced before overlaying. If the surface is rough but stable, the City Engineer may require milling or placement of a leveling course before installation of the pavement reinforcing fabric. The surface shall be dry prior to tack coat and fabric placement.

D. Application of Tack

The tack coat shall be applied uniformly at the specified rate with calibrated distributor truck. The application temperature shall be high enough to assure uniform distribution (290°F to 325°F for asphalt cements, up to 160°F for heavier grade emulsions). The tack coat shall be applied 2 to 3 inches wider than the edge of the fabric.

Fully saturate the fabric and provide a bond to the overlay without providing excess tack coat that could mix with the overlay of the asphalt. The optimum amount depends on the porosity of the old pavement, fabric weight, tack coat material, and other variables. Typically, 0.2 to 0.3 gal/yd² of pure asphalt cement tack coat is used with the fabric. Emulsion tack coat application rates are greater to provide the same amount of residual asphalt cement. Verify the applications rates with the geotextile manufacturer and coordinate with the City Engineer prior to application.

If asphalt emulsions are used, the water in the emulsion must be allowed to evaporate completely before the fabric is placed. Verify the cure times with the Geotextile manufacturer and coordinate with the City Engineer prior to application.

E. Fabric Placement

Place the fabric on the pavement surface, smooth side up, while the tack coat is still tacky. Drive the vehicle straight to avoid wrinkling. Turns shall be made gradually. For sharp curves or corners, cut fabric to size and place by hand. Hand broom or pneumatic roll to eliminate small wrinkles. Large wrinkles (with a height of 1 inch or more) shall be slit and laid flat in the direction of paving. Overlap joints 2 to 4 inches. Apply additional tack coat to joints and overlapped fabric layers to ensure proper fabric saturation. The tack coat temperature shall not exceed 325°F when the fabric is placed.

F. Hot Mix Overlay

Standard paving operations shall closely follow fabric laydown. All areas in which paving fabric has been placed shall be paved during the same day. If the fabric becomes wet, allow to dry before paving. Unless directed otherwise by the City of Engineer, a minimum compacted asphalt thickness of 1.5 inches shall be placed to provide adequate heat and pressure to bond the systems.

3.10 DEFFECTIVE WORK AND WARRANTY

The Contractor shall warrant and guarantee all asphalt and concrete paving from defects for a period of one year from the date of completion. Defects include settlement, improper drainage, manhole and valve transitions, and patches due to repair work associated with this project. If defects occur, the contractor shall profile and overlay the entire street width from a minimum of 100 linear feet.

END OF SECTION 02500

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