SECTION 32 1216

ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Prepare pavement sub-grade as described in Contract Documents to receive pavement base and paving.
   2. Furnish and install pavement base and asphaltic concrete paving in driveways and parking areas as described in Contract Documents.

B. Related Sections:
   1. Section 31 2323: Compaction procedures and tolerances for fill.

1.2 REFERENCES

A. American Society For Testing And Materials:
   2. ASTM D 977-03, 'Standard Specification for Emulsified Asphalt.'
   5. ASTM D 2027-97 (2004), 'Standard Specification for Cutback Asphalt (Medium-Curing Type).' 
   6. ASTM D 2041-03a, 'Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.'

1.3 SUBMITTALS

A. Product Data: Manufacturer's published product data on pre-emergent herbicide.

B. Quality Assurance / Control:
   1. Mix design of asphalt concrete mixture.
   2. Copies of test results from tests conducted to assure compliance to Contract Document requirements.
   3. Manufacturer's application instructions for pre-emergent herbicide.
1.4 QUALITY ASSURANCE

A. Qualifications: Pre-emergent herbicide shall be applied by applicator certified by State in which Project is located as an applicator of agricultural chemicals.

B. Pre-Installation Conferences:
   1. Participate in pre-installation conference specified in Section 31 2213.
   2. Schedule paving pre-installation conference after staking of parking areas and installation of sleeves, but before installation of base and paving.

1.5 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Do not perform work during following conditions:
      a. Ambient temperature or temperature of base below 50 deg F 10 deg C.
      b. Presence of free surface water.
      c. Over-saturated base and sub-grade materials.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Pre-emergent herbicide:
   1. Selective type pre-emergence control chemical containing 40 percent Trifluralin minimum.
   2. Labeled for under-pavement use.
   3. Type Two Acceptable Products:
      a. Treflan or Spike 80W by Dow AgroSciences, Indianapolis, IN  www.dowagro.com.
      c. Equal as approved by Architect before installation. See Section 01 6000.

B. Base:
   1. New Aggregate Base:
      a. Road Base type gravel or crushed stone, graded as follows:
         1) Sieve Percent by Weight Passing Sieve
            a) 1 inch 100
            b) 3/4 inch 85 - 100
            c) No. 4 45 - 60
            d) No. 10 30 - 50
            e) No. 200 5 - 10 (non-plastic)
            f) 25 mm 100
            g) 19 mm 85 – 100
            h) No. 4 45 – 60
            i) No. 10 30 – 50
            j) No. 200 5 - 10 (non-plastic)
   2. Recycled Aggregate Base:
      a. Pulverized existing asphalt or concrete paving mixed uniformly with existing aggregate base.
      b. Conform to following gradation:
         1) Sieve Percent by Weight Passing Sieve
            a) 2 Inch 100
            b) 1-1/2 inch 85 – 100
            c) 3/4 inch 60 – 80
            d) No. 4 30 – 50
            e) No. 200 5 – 12
            f) 50 mm 100
            g) 38 mm 85 – 100
            h) 19 mm 60 – 80
c. Quality Requirements as established by testing:
   1) R-value: 70 minimum.
   2) Sand Equivalent: 25 minimum.
   3) Durability Index: 35 minimum.

C. Asphalt Cement Primer: Meet requirements of ASTM D 2027, MC 70, plus or minus one grade.

D. Tack Coat: Emulsified asphalt meeting requirements of either ASTM D 977, Grade SS-1H, or ASTM D 2397, Grade CSS-1H.

E. Pavement:
   1. Asphalt Cement:
      a. Meet requirements of ASTM D 3381, Viscosity grade (Original Asphalt) as follows:
         1) AC5 in cold climatic conditions.
         2) AC10 in moderate climatic conditions.
         3) AC20 in hot climatic conditions.
   2. Aggregates:
      a. Fine to coarse mineral aggregates with wear less than 40 percent as determined by ASTM C 131 and mineral filler suitable for pavement meeting following gradation requirements:
         1) Sieve          Percent by Weight Passing Sieve
            a) 3/4 inch     100
            b) 1/2 inch     95 – 100
            c) 3/8 inch     80 – 95
            d) No. 4        54 – 71
            e) No. 8        38 – 54
            f) No. 30       17 – 32
            g) No. 200      3 – 8 (non-plastic)
            h) 19 mm        100
            i) 3 mm         95 – 100
            j) 9.5 mm       80 – 95
            k) No. 4        54 – 71
            l) No. 8        38 – 54
            m) No. 30       17 – 32
            n) No. 200      3 – 8 (non-plastic)
      b. Up to 15 percent by weight of total aggregates may consist of pulverized, recycled asphalt cement concrete pavement, providing aggregate grading requirements are met.

2.2 MIXES

A. Central plant hot mix.

B. Develop mix design according to Marshall Method to achieve optimum asphalt content as shown by test data curves based on testing samples containing 1/2 percent increments of asphalt content. Samples shall include minimum of two with asphalt content above optimum and two with asphalt content below optimum.
   1. Make tests in accordance with ASTM D 1559 and ASTM D 1075 (50 blow count Marshall).
   2. Final design shall meet following criteria:
      a. Stability: 1200 pounds 545 kg minimum.
      b. Flow: 8 minimum, 18 maximum.
      c. Air voids: 2 percent minimum, 4 percent maximum.
      d. Voids in mineral aggregate: 15 percent minimum.
      e. Asphalt cement by weight of total: 5 percent minimum.
      f. Dry Strength: 200 psi 975 kg per sq m.
      g. Index of Retained Strength: 75 percent.
PART 3 - EXECUTION

3.1 APPROVED INSTALLERS

A. Approved Applicators:
   1. <Insert Approved Applicators>
   2. Paving companies shall be pre-approved and included in Construction Documents by Addendum.

3.2 PREPARATION

A. Survey and stake parking surfaces to show grading required by Contract Documents.

B. Sub-Grade:
   1. Finish grade parking surface area to grades required by Contract Documents.
   2. Compact sub-grade as specified in Section 31 2323.

C. Pre-emergent Herbicide:
   1. Apply to prepared subgrade dispersed in liquid. Concentrate shall be such that Manufacturer’s full recommended rate of chemical will be applied to every 1000 sq ft 100 sq m and liquid will penetrate a minimum of 2 inches 50 mm.
   2. Application shall be no more than one day before installation of base.
   3. Take necessary precautions to protect adjoining property and areas designated for planting on building site.

3.3 INSTALLATION

A. Site Tolerances:
   1. Sub-Grade: 0.00 inches mm high. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
   2. Base:
      a. Base shall be 6 inches 150 mm thick minimum after compaction, except where shown thicker on Drawings.
      b. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
   3. Paving:
      a. Apply asphaltic concrete paving in single lift 3 inches 75 mm thick minimum after compaction, except where shown thicker on Drawings. Paving thicker than 3 inches 75 mm may be applied in two lifts, the first 2 inches 50 mm thick minimum and the second 1-1/2 inches 38 mm thick minimum.
      b. Paving adjacent to cast-in-place concrete site elements shall be between 1/4 inch 6 mm higher than concrete and flush with concrete.
      c. Surface texture of hand worked areas shall match texture of machine-laid areas.

B. Base:
   1. If roller is smaller than 8 ton 7260 kg, lay gravel and compact in two courses.
   2. Compact as specified in Section 02315.
   3. Priming: Prime base with application of 0.2 to 0.5 gallons 2 to 5 liters of asphalt cement primer per square yardmeter if pavement will be laid more than three days after compaction of base, or if precipitation is anticipated between completion of compaction of base and laying of pavement.
   4. Recompact unprimed base if it receives precipitation before pavement is laid.
   5. Remove or repair improperly prepared areas as directed by Architect.

C. Asphalt Paving:
   1. Tack coat vertical concrete surfaces that will be in contact with paving.
   2. Uniformly mix materials so aggregate is thoroughly coated with asphalt.
   3. Place at temperatures between 250 and 325 deg F 120 and 163 deg C with a self-propelled laydown machine.
4. Longitudinal bituminous joints shall be vertical and properly tack coated if cold. Transverse joints shall always be tack coated.

5. Compaction:
   a. Compact asphalt paving to 96 percent minimum. Determine percent compaction by dividing density of test cores as determined by either ASTM D 1188 or ASTM D 2726 by laboratory compacted density as determined by ASTM D 1559. Maximum total air voids in completed asphaltic concrete shall be 8 percent as determined by ASTM D 2041.
   b. Roll with powered equipment capable of obtaining specified density.
   c. Begin breakdown rolling immediately after asphalt is placed when asphalt temperature is at maximum. Complete breakdown rolling before mix temperature drops below 240 deg F 115 deg C. Complete handwork compaction concurrently with breakdown rolling.
   d. Complete intermediate rolling as soon as possible after breakdown rolling and before mix temperature drops below 185 deg F 85 deg C. Do not roll paving for compaction purposes after asphalt temperature falls below 185 deg F 85 deg C.
   e. Execute compaction so visibility of joints is minimized. Complete finish rolling to improve asphalt surface as soon as possible after intermediate rolling and while asphalt paving is still warm. Do not use vibration for finish rolling.

6. Surface shall be uniform with no 'birdbaths.' Leave finished surfaces clean and smooth. Variations from specified grades shall not exceed 1/2 inch 13 mm.

3.4 FIELD QUALITY CONTROL

A. Site Tests: When tested with 10 foot 3 meter straight edge, surface of completed work shall not contain irregularities in excess of 1/4 inch 6 mm.

B. Laboratory Tests:
   1. Architect will select testing laboratory and select test locations, an equal number from near edges of paving and at random in field. Owner will pay for laboratory services.
   2. Arrange for selected laboratory to make tests after completion of work of this Section. After testing, repair test locations as necessary and remove and replace work not in compliance with Contract Documents at no additional cost to Owner.
   3. Testing laboratory will perform one test series for every 10,000 sq ft 900 sq M of parking.
      a. Tests reports will show compliance with Contract Documents regarding type of sub base, depth and density of base, depth and density of paving, and in materials used. Reports will also give test procedures used by testing laboratory.
      b. Testing laboratory will forward three copies of test report to Architect.

END OF SECTION