

SECTION 02780 - UNIT PAVERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Concrete pavers set in bituminous setting bed.
2. Edge restraints for unit pavers and stabilized stone dust surfacing

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for compacted subgrade and subbase course, if any, under unit pavers.
2. Division 7 Section "Joint Sealants" for sealing control and expansion joints in unit pavers with elastomeric sealants.

1.2 SUBMITTALS

A. Product Data: For materials other than water and aggregates.

B. Product Data: For the following:

1. Concrete Pavers
2. Bituminous setting materials.
3. Edge restraints.
4. Asphalt tack coat

C. Sieve Analyses: For aggregate setting-bed materials, according to ASTM C 136.

D. Samples for Initial Selection: For the following:

1. Furnish no less than 4 individual concrete pavers of each type, color and finish of concrete unit paver indicated.
2. Exposed edge restraints sample 305mm in length with one stake
3. 1 kilo sample of sand for COR approval

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance

and physical properties. Pedestrian and vehicular pavers shall be installed under multiple contracts. Color and material selection to be approved by COR.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect unit pavers and aggregate during storage and construction against soiling or contamination from earth and other materials.
  - 1. Cover pavers with plastic or use other packaging materials that will prevent rust marks from steel strapping.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store liquids in tightly closed containers protected from freezing.
- D. Store asphalt cement and other bituminous materials in tightly closed containers.

#### 1.5 PROJECT CONDITIONS

- A. Weather Limitations for Bituminous Setting Bed: Comply with the following requirements:
  - 1. Apply asphalt adhesive when ambient temperature is above 10 deg C and when temperature has not been below 2 deg C for 12 hours immediately before application. Do not apply when base is wet or contains excess moisture.
  - 2. Install bituminous setting bed only when atmospheric temperature is above 4 deg C and when base is dry.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE UNIT PAVERS

- A. Vehicular Concrete Pavers: Solid paving units, ASTM C 936, made from normal-weight aggregates in sizes and shapes indicated.

Type 1, 2, 3

- 1. Color and Finish: Brown and Buff with light textured finish, beveled edges, and 1.5mm spacer on all 4 sides.
- 2. Size: 100 x 200 mm and 150 x 230 mm and approximately 80 mm thick.

- B. Pedestrian Concrete Pavers: Solid paving units, ASTM C 936, made from normal-weight aggregates in sizes and shapes indicated.

Type 1, 3, 4

- 1. Color and Finish: Brown and Buff with light textured finish, beveled edges, and 1.5mm spacer on all 4 sides.
- 2. Size: 300 x 600 mm and 100 x 200 mm and approximately 50 mm thick.

## 2.2 ACCESSORIES

- A. Plastic Edge Restraints: Manufacturer's heavy duty, standard triangular PVC extrusions designed to serve as edge restraints for unit pavers; rigid type for straight edges and flexible type for curved edges, with pipe connectors and 9.5-mm diameter by 300-mm- long steel spikes. Size of edging is as follows:
1. 45 mm high by 89 mm wide.
  2. 79 mm high by 241 mm wide.
- B. Steel Edge Restraints: Painted commercial steel edging with loops pressed from or welded to face to receive stakes at 900 mm o.c., and steel stakes 380 mm long for each loop. Size of edging is as follows:
1. 4.8 mm thick by 100 mm high.
  2. 6.4 mm thick by 125 mm high.
- C. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

## 2.3 BITUMINOUS SETTING BED

- A. Asphalt cement to be used in the bituminous setting bed shall conform to ASTM D 3381. Viscosity grade shall be A.C. 10 or A.C. 20.
- B. Fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coating, lumps of clay, alkali salts, and organic matter. Aggregate shall be uniformly graded from "coarse" to "fine" with 100 percent by weight passing the No. 4 (4.75 mm) sieve and shall meet the gradation requirements when tested in accordance with ASTM C 136.
- C. Fine aggregate shall be dried and shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees Fahrenheit (165 degrees Centigrade) at an asphalt plant. The approximate proportion of materials shall be 7 percent cement asphalt and 93 percent fine aggregate. Each ton of material shall be apportioned by weight in the approximate ratio of 145 pounds (65.8 kg) asphalt to 1,855 pounds (841.4 kg) sand. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet specified requirements.

## 2.5 ASPHALTIC PRIMER

- A. Primer for base beneath bituminous setting bed and asphalt block pavers shall be an emulsified asphalt rapid setting type conforming to AASHTO M 140, Grade RS-1, or AASHTO M 208, Grade CRS-1.

2.6 NEOPRENE-MODIFIED ASPHALT ADHESIVE

- A. Neoprene modified asphalt adhesive shall meet the following requirements:
1. Mastic (asphalt adhesive):
    - a. Solids (base) content by volume =  $75 \pm 1$  percent.
    - b. Weight = 8.0 to 8.5 pounds/gallon (1.05 to 0.97 kg./liter).
    - c. Solvent vehicle = Varsol [over 100°F (37°C) flash].
  2. Base (2 percent neoprene, 10 percent fibers, 88 percent asphalt):
    - a. Melting point (ASTM D 36) = 200°F (93°C) minimum.
    - b. Penetration at 77°F (25°C) 100 gram load 5 second (0.1 mm) = 23 to 27.
    - c. Ductility (ASTM D 113 at 77°F (25°C), 5 cm/minute) = 125 cm, minimum.

2.7 SURFACE SEALANT FOR PAVERS

- A. Surface sealant for all pavers shall be a clear, non yellowing, non staining water / oil repellent. Material must have 5 year warranty and comply with all AIM/VOC regulations

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Where pavers are to be installed over waterproofing, examine waterproofing installation, with waterproofing Installer present, for protection from paving operations. Examine areas where waterproofing system is turned up or flashed against vertical surfaces and horizontal waterproofing. Proceed with installation only after protection is in place.

3.2 EDGING

- A. Plastic edging strips shall be installed at locations indicated on the Contract Documents. Where required, edging shall be cut square and accurately to required length.
1. Plastic edging shall be securely staked in required position. Stakes shall be driven every (25 mm) in straight runs and into every support section in curved sections.
  2. Adjacent lengths shall be attached using manufacturer's standard connection pipe according to manufacturer's published instructions.

3. Edging shall be set plumb and vertical at required line and grade. Straights sections shall not be wavy; curved sections shall be smooth and shall have no kinks or sharp bends.

### 3.3 ACCEPTABILITY OF CONCRETE BASE

- A. Concrete shall have fully cured prior to the work of installing concrete pavers. Evidence of inadequate base shall be brought to the immediate attention of the Owner's Representative and shall be corrected by the Contractor as directed by the COR at no additional cost to the Owner.
- B. Start of work of this Division 2 Section, UNIT PAVERS, shall constitute acceptance of concrete base.

### 3.4 BITUMINOUS SETTING BED

- A. The surface of the concrete base shall receive an asphalt prime coat before laying bituminous setting bed. Prime coat shall be applied at rate that will leave bituminous residue of 5 to 7 gallons per 100 square yards after evaporation of vehicle. Base surface shall be dry and clean when prime coat is applied. Bituminous setting bed shall not be placed until vehicle has completely evaporated from prime coat.
- B. Bituminous setting bed over concrete base shall be specified under Division 2 Section HOT MIX ASHALT PAVING
- C. The setting bed shall be rolled with a power roller to a nominal depth of 19.05 mm while still hot. The setting bed thickness shall be adjusted so that when the concrete pavers are placed and rolled, the top surface of the pavers will be at the required finished grade.
- D. A coating of neoprene-modified asphalt adhesive shall be applied by mopping, squeegee, or troweling over the top surface of the bituminous setting bed so as to provide continuous bond under the pavers.
  2. If adhesive is trowel-applied, trowel shall be serrated type with serrations not to exceed 1/16 inch (1.59 mm).

### 3.5 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
  1. For concrete pavers, a block splitter may be used.
- D. Joint Pattern: As indicated, or match existing unit paver joint pattern.

- E. Tolerances: Do not exceed 0.8-mm unit-to-unit offset from flush (lippage) nor 3 mm in 3 m from level, or indicated slope, for finished surface of paving.
- F. Tolerances: Do not exceed 1.6-mm unit-to-unit offset from flush (lippage) nor 3 mm in 600 mm and 6 mm in 3 m from level, or indicated slope, for finished surface of paving.
- G. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler as backing for sealant-filled joints where indicated. Install joint filler before setting pavers. Sealant materials and installation are specified in Division 7 Section "Joint Sealants."
- H. Expansion and Control Joints: Provide joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.
- I. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
  - 1. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.
  - 2. For metal edge restraints with top edge exposed, drive stakes at least 25 mm below top edge.
  - 3. Install job-built concrete edge restraints to comply with requirements in Division 3 Section "Cast-in-Place Concrete."

### 3.6 JOINT TREATMENT

- A. Joint filler shall be swept dry into the joints between pavers until the joints are completely filled. Surface shall be swept clean. Swept surface shall then be thoroughly dampened with a low-volume fine spray of water.
  - 1. Sweep sand into paver joints until joints are filled solid. Fog lightly with water and repeat a minimum of three times or until joints are compacted and full.
  - 2. Prior to acceptance, the paved area shall be flooded with water to assure that there are no depressions. Pavers with top surfaces greater than 1.6 mm above or below adjacent pavers shall be removed and reset. Remove and reset pavers as required until surface is true to line and grade. Refill sand joints as necessary until all joints are filled to finish grade.
- B. Concrete paving shall be kept damp by intermittent spraying for three days, minimum, to effectively cure the joints.

### 3.7 CLEANING OF CONCRETE PAVER SURFACES

- A. After completion of concrete paving, surfaces shall be carefully cleaned, removing all dirt, excess filler, and stains.
- B. Clean pavers using an approved masonry cleaner and soft bristle brush.

3.8 APPLICATION OF SURFACE SEALANT OF CONCRETE PAVER SURFACES

A. Seal pavement surface as follows:

1. Apply surface sealer to installed, thoroughly cleaned paved areas using a low pressure airless sprayer, brush or roller in compliance with manufacturer's recommendations. Apply material in quantities sufficient to saturate the surface pavement and not less than 1 gallon per 450 square feet.
2. Contractor shall take safety precautions in order to avoid all skin contact with the sealer, keep the sealer away from all heat sources or flames, and maintain adequate ventilation to avoid any concentration of sealer vapors in the work area. Vapors may ignite explosively and may travel along the ground by ventilation to ignition sources far from the product.
3. Sealed, paved surfaces shall display no color difference from the unsealed surface and no surface sheen. Paved areas that do exhibit these qualities after

END OF SECTION 02780