



**SPECIAL PROVISIONS**

**FOR**

**P.C.C. PAVERS**

**Johnson County  
STP-U-5557(615)--70-52**

**Effective Date**

**April 20, 2010**

**IOWA DEPARTMENT OF TRANSPORTATION STANDARD  
SPECIFICATIONS, SERIES OF 2009, ARE AMENDED BY THE  
FOLLOWING MODIFICATIONS. THESE ARE SPECIAL PROVISIONS AND  
SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD  
SPECIFICATIONS**

## **PART 1 GENERAL**

### **1.01 SUMMARY**

- A. SECTION INCLUDES:
1. This part of the Specifications includes all labor, materials, equipment, and supervision required to furnish and install 6 cm and 8 cm P.C.C. PAVERS AND DETECTABLE WARNING PAVERS.
  2. This section includes the specifications for 6 cm and 8 cm P.C.C. PAVERS AND DETECTABLE WARNING PAVERS, sand setting bed or ACC setting bed as specified, paver joint filler, concrete subbase preparation, installation of sand setting bed or ACC setting bed as specified, paver and joint filler installation.

### **1.02 MEASUREMENT AND PAYMENT**

- A. Method of Measurement: The Engineer will measure the SQUARE YARD surface area of the installed P.C.C. PAVERS.
- B. Basis of Payment: Payment for P.C.C. PAVERS Includes all labor, materials, equipment, and supervision required to furnish and install concrete pavers.
- C. Unit Price for P.C.C. PAVERS shall include subslab preparation, paver edging, material and installation of pavers, setting bed, engineer fabric and joint filler.

### **1.03 SUBMITTALS**

- A. Paver manufacturer's material test data certifying pavers comply with specification.
- B. Paver samples representing actual size, shape, and color range.
- C. PCC paver sample – 12" X 12" for detectable warning pavers and 4"x8" for 6cm and 8cm pavers (showing the full range of colors for blended colors)
- D. Setting bed and joint filler sand gradation reports.
- E. Engineer Fabric sample – 6" x 6".
- F. Neoprene asphalt adhesive.

### **1.04 SITE DISTURBANCES**

- A. Take precautions to insure equipment and vehicles do not disturb or damage existing site grading, walks, drives, utilities, plants, etc.
- B. Repair and/or return to original condition any damage caused by Contractor's negligence at no cost to Owner.
- C. Provide temporary barricades and warning lights as required for protection of project work and public safety.

### **1.05 DELIVERY, STORAGE & HANDLING**

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers packaging with identification labels intact.

1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
  2. Deliver concrete pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by fork lift or clamp lift.
  3. Unload pavers at job site in such a manner that no damage occurs to the product.
- B. Storage and Protection: Store materials protected such that they are kept free from mud, dirt, and other foreign materials.
1. Cover bedding sand and joint sand with waterproof covering if needed to prevent exposure to rainfall or removal by wind. Secure the covering in place.

## 1.06 QUALITY ASSURANCE

- A. Quality Control Plan
1. The installer and manufacturer shall establish, provide and maintain a quality control plan. The quality control plan shall provide reasonable assurance that the materials and completed construction submitted for acceptance will conform to the contract requirements. Although guidelines are established and certain requirements are specified, they are a minimum and the installer and manufacturer shall assume full responsibility for meeting all requirements.
  2. The installer and manufacturer shall agree upon a method for measuring the clusters at the factory and in the field. That method shall be submitted in writing to the owner for approval.
  3. The Quality Control Plan shall contain at a minimum, but not limited to, the following elements:
    - a. The manufacturer's quality control procedures.
    - b. The manufacturer's production records showing at a minimum the date of manufacture, a mix design designation, mold number, mold cycles, and sequential pallet numbers. Copies of such records shall be made available to the owner upon request.
    - c. A description of the anticipated growth (due to mold wear) in the cluster size and a plan for managing the growth so as to not interfere with placement by paving machine(s), if mechanically installed.
    - d. The installer's quality control procedures, including but not limited to, dimensional control methods, paving machine(s) head adjustment, typical daily work schedule to insure that all pavers placed on the bedding course on any given day are adjusted as required and vibrated, and installation of void filler completed at the end of that work day. (Exception: The installation of the void filler may not be installed for the first and second day due to start-up procedures.)
- B. Sampling and Testing
1. The manufacturer shall employ an independent testing company, qualified to undertake tests in accordance with the applicable standards specified herein. Test results shall be provided to the installer and the owner, upon request.
  2. Pavers shall be tested for density and dimensional variation, compressive strength (ASTM C140), density and absorption (ASTM C140) and abrasion resistance (ASTM C418).
    - a. The initial testing frequency shall be one set of tests for each 100,000 full-sized pavers delivered to the site or at any time a change in the manufacturing process, mix design, cement, aggregate or other material occurs.
    - b. The following number of full-sized pavers shall be randomly sampled for each test: five (5) for dimensional variation; three (3) for density and absorption; three (3) for compressive strength; and three (3) for abrasion resistance.
    - c. If all pavers tested pass all requirements for a sequence of 400,000 pavers then the testing frequency may be relaxed to one set of tests for each 500,000

full-sized pavers. If any pavers fail any of the required tests then the testing frequency shall revert to the initial testing frequency.

- d. When any of the individual test results fail to meet the specified requirements, the cube of pavers represented by that test sample shall be rejected. The manufacturer shall provide additional testing of paver samples taken from both before and after the rejected test sample to determine the sequence of the paver production run that should be rejected. In addition, the testing frequency shall revert to the initial testing frequency specified in Item B.1 for the balance of the project.
- e. Additional testing, as described above, shall be carried out at no additional expense to the owner. The sequence of pavers found to be defective shall, if they have been delivered to the site, be removed from the site promptly at no expense to the owner or installer.
- f. Pavers shall be sound and free from defects that would interfere with the proper placing of the pavers or impair the strength or performance of the construction.

C. Method Statement

- 1. The installer and manufacturer shall each prepare a Method Statement describing the overall plan to complete the work. This plan shall include at a minimum:
  - a. The quality control plan.
  - b. A description of the anticipated mold life, rate and effect of mold wear on pavers produced, individual mold runs, and a mold rotation plan.
  - c. Clear diagrams of the site showing the proposed starting point of the installation and the proposed direction of installation.
  - d. A method of measuring the clusters at the factory and in the field.
  - e. A description of the anticipated growth in cluster size due to mold wear and a plan for dealing with that growth or other dimensional variances.
  - f. A description of the personnel and equipment to be employed for each portion of the work including manufacture, installation and quality control.
  - g. The manufacturer's proposed daily production rate and mold life for this project and supply data demonstrating experience on similar past projects. Installer shall state the proposed daily installation rate.

D. Qualifications

- 1. Every manufacturer and installer shall demonstrate that they have supplied and/or installed pavers for projects of a similar nature, with regard to installation and production capacity of at least 300,000 square feet. Qualifications shall be submitted at the time of bid, without exception.
  - a. Paver Manufacturer's Qualifications:
    - 1) The manufacturer shall demonstrate a minimum of 5 years successful experience in the manufacture of interlocking concrete block pavers.
    - 2) The manufacturer shall have sufficient production capacity and established quality control procedures to produce, transport, and deliver the required number of pavers with the quality specified, without causing a delay to the work.
    - 3) The manufacturer shall have suitably experienced personnel and a management capability sufficient to produce the number of quality pavers as depicted on the contract plans and as specified herein.
  - b. Paver Installer's Qualifications
    - 1) Installer shall provide installation history, including references in writing with contact information, demonstrating to the satisfaction of the owner their ability to perform the paver installation and related work indicated in the plans and specifications.

- 2) The installer shall have suitably experienced personnel and a management capability sufficient to execute the work shown on the contract plans and specified herein.
- 3) The installer's foreman shall demonstrate, including references, a minimum of 5 years experience in the installation of unit paver systems similar in size and nature to this project.

**1.07 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install during heavy rain or snowfall.
- B. Do not install over frozen aggregate base materials.
- C. Do not install frozen sand or saturated sand.
- D. Do not install concrete pavers on frozen or saturated sand.

**PART 2 PRODUCTS**

**2.01 P.C.C. PAVERS, 6 CM**

- A. Acceptable Manufacturers:
  1. Hanover Architectural Products  
 Contact: Rick Masemer  
 717-637-0500  
 Style: Traditional Prest Brick  
 Color: Red or Quarry Red- Sample to be approved by Owner prior to placing order.
  2. Unilock  
 Contact: Brad Punke  
 630-892-9191, ext. 253  
 847-489-0382 (mobile)  
 Style: Hollandstone  
 Color: Red- Sample to be approved by Owner prior to placing order.
  3. Borgert Products  
 Contact: Karen McKinnie  
 320-363-4671  
 515-720-7169  
 Style: Holland Stone  
 Color: Terracotta or Red- Sample to be approved by Owner prior to placing order.
  4. Approved Equal
- B. Pavers in compliance with the following:
  1. Comply with ADA regulations.
  2. Compressive Strength: Minimum 8,000 PSI
  3. Flexural Strength: Minimum 600 PSI
  4. Water Absorption: 5% to 6%
  5. Freeze Thaw: Less than 1% loss of dry weight
  6. Size: +/-4" x +/-8" (nominal) x thickness varies depending on manufacturer.

**2.02 P.C.C. PAVERS, 8 CM**

- A. Acceptable Manufacturers:
1. Hanover Architectural Products  
Contact: Rick Masemer  
717-637-0500  
Style: Traditional Prest Brick  
Color: Red or Quarry Red- Sample to be approved by Owner prior to placing order.
  2. Unilock  
Contact: Brad Punke  
630-892-9191, ext. 253  
847-489-0382 (mobile)  
Style: Hollandstone  
Color: Red- Sample to be approved by Owner prior to placing order.
  3. Borgert Products  
Contact: Karen McKinnie  
320-363-4671  
515-720-7169  
Style: Holland Stone  
Color: Terracotta or Red- Sample to be approved by Owner prior to placing order.
  4. Approved Equal
- B. Pavers in compliance with the following:
1. Comply with ADA regulations.
  2. Compressive Strength: Minimum 8,000 PSI
  3. Flexural Strength: Minimum 600 PSI
  4. Water Absorption: 5% to 6%
  5. Freeze Thaw: Less than 1% loss of dry weight
  6. Size: +/-4" x +/-8" (nominal) x thickness varies depending on manufacturer.

**2.03 P.C.C. DETECTABLE WARNING PAVERS**

- A. Acceptable Manufacturers:
1. Hanover Architectural Products  
Contact: Rick Masemer  
717-637-0500  
Description: Hanover Prest Paver Detectable Warning  
12" x 12"  
Color: To be selected by Owner's Representative
  2. Unilock  
Contact: Brad Punke  
630-892-9191, ext. 253  
847-489-0382 (mobile)  
Description: Unilock Detectable Warning ADA Pavers  
12"x12"  
Color: To be selected by Owner's Representative
  3. Wasau Tile  
Contact: Paul Hantz  
800-388-8728  
Description: Terra Paving ADA Compliant Warning Pavers  
12"x12"  
Color: To be selected by Owner's Representative

4. Approved Equal

- B. Detectable Warning Pavers in compliance with the following:
  - 1. Comply with ADA regulations.
  - 2. Compressive Strength: Minimum 8,000 PSI
  - 3. Flexural Strength: Minimum 600 PSI
  - 4. Water Absorption: 5% to 6%
  - 5. Freeze Thaw: Less than 1% loss of dry weight
  - 6. Size: +/-12" x +/-12" (nominal) x thickness varies depending on manufacturer.

**2.04 ENGINEERING FABRIC**

- A. Knit fabric of polymeric filaments of yarns such as polypropylene, polyethylene, polyester, or polyimide formed into a stable network such that the filaments/yarns retain relative position to each other and will withstand normal installation stresses.
- B. Acceptable knit fabrics: IA DOT 4196.01B.

**2.05 SETTING BED SAND**

- A. Provide setting bed sand as follows:
  - 1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
  - 2. Do not use limestone screenings, stone dust, or sand for bedding sand material that do not conform to the grading requirements of ASTM C 33.
  - 3. Do not use mason sand or sand conforming to ASTM C 144 for bedding sand.
- B. Grading Requirements for Setting Bed Sand - ASTM C33:

Sieve Size	Percent Passing
3/8 inch (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No 200 (0.075 mm)	2 to 10

**2.06 ASPHALT PRIMER**

- A. Iowa DOT Section 2303; Asphalt Cement Concrete Mixtures; Grade: MC-70

**2.07 ASPHALTIC SETTING BED FOR PAVERS**

- A. Mixture: The approximate proportion of materials shall be 7% asphalt binder and 93% fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 pounds asphalt binder to 1855 pounds sand. The dried fine aggregate shall be combined with asphalt binder and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The Contractor shall determine the exact proportions to produce the appropriate mixture for construction of the asphalt setting bed to meet construction requirements.

- B. Asphalt Binder: Asphalt binder (7%) to be used in the asphalt setting bed shall conform to AASHTO MP-1, with a performance grade of PG58-28 or 64-22.
- C. Fine Aggregate: Fine aggregate (93%) for asphalt setting bed shall be clean, hard sand with durable particles and free from adherent coating, lumps of clay, alkali salts and organic matter. To be uniformly graded from coarse to fine with all passing the No. 4 sieve and meeting requirements when tested in accordance with the standard method of test for sieve or screen analysis of fine and coarse aggregate, AASHTO T27.

**2.08 NEOPRENE ASPHALT ADHESIVE FOR PAVERS**

Neoprene asphalt adhesive shall conform to the following:

**A. Mastic (Asphalt adhesive):**

- Solids (base): 75 + 1%
- Pounds/Gallon: 8 – 8.5 pounds
- Solvent: Varsol (over 100-degrees F flash)

**B. Base (2% Neoprene, 10% Fiber, 88% Asphalt):**

- Melting Point: ASTM D-36, 200-degree F Minimum
- Penetration: 77% F 100 gram load, 5 second (.1 mm), 23-27
- Ductility: ASTM D-137-79 @ 25-degree C, 5 cms/per minute, 125 cm minimum

**2.09 JOINT FILLER SAND**

- A. Provide joint filler sand as follows:
  - 1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
- B. Grading Requirements for Joint Filler Sand – ASTM C144

Sieve Size	ASTM C144 Natural Sand	ASTM C144 Manufactured Sand
	Percent Passing	Percent Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 100
No. 50 (0.300 mm)	10 to 35	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075 mm)	0	0 to 10



**PART 3 EXECUTION****3.01 PREPARATION OF CONCRETE SUBBASE**

- A. Inspect P.C.C subslab to insure surface is clean and built in conformance with details.
- B. Verify elevation difference between P.C.C subslab and adjacent finished PCC sidewalk surface to confirm concrete pavers can be installed flush with bordering PCC sidewalk pavement.
- C. Prior to construction of concrete base (included in separate bid item and specification), confirm all dimensions of the actual pavers with the design pattern to confirm configuration, patterns, and dimensions of all material. Contractor shall notify the Owner's Representative if there are any conflicts between the material and the design. Inspect the PCC sub-slab to ensure surface is clean and built in conformance with the plans.

**FOR PLACEMENT UPON SAND SETTING BED (ADA CURB RAMPS AND PED. LANDINGS)****3.02 PLACING SETTING BED SAND**

- A. Spread the bedding sand evenly over the subslab and screed to a nominal thickness required to achieve a nominal 1" thick max., final, settled setting bed depth (note: initial placed sand depths could vary from 1 inch thickness, but not to exceed 1 inch thick).
- B. Do not disturb the screeded sand.
- C. Place sufficient sand to stay ahead of the laid pavers.
- D. Screeded area will not substantially exceed that which is covered by pavers in one day.

**3.03 INSTALLATION OF P.C.C. DETECTABLE WARNING PAVERS AND 6 CM PAVERS**

- A. After the sand setting bed has been installed, carefully place the pavers in straight courses with "hand" tight joints and uniform top surface.
- B. Paver spacer bars will provide joints between pavers (joints may be between 1/16 inch and 3/16 inch wide and no more than 5% of the joints shall exceed 1/4 inch wide to achieve straight bond lines).
- C. Paver Joint lines shall not deviate more than  $\pm 1/2$  inch over 50 feet from string lines.
- D. Fill gaps at the edges of the paved area with cut pavers or edge units.
- E. Cut pavers, to be placed along the edge, with a double blade paver splitter or masonry saw.
- F. Adjust paver pattern at pavement edges such that cutting of edge pavers is minimized.
- G. All cut pavers exposed shall be no smaller than one-third of a whole paver.
- H. Cut pavers edges are to abut pavers only; a paver spacer bar must abut the cut edge of a paver.
- I. Do not place cut paver edges against concrete.

- J. Keep skid steer and forklift equipment off newly laid pavers that have not received initial compaction and joint sand.
- K. Good alignment must be kept and the pattern shall be that shown on the plans.
- L. Orient truncated domes on detectable warning pavers as shown on the plans.

**3.04 INSTALLATION OF ENGINEER FABRIC**

- A. Install on concrete subslab surface prior to installation of sand setting bed.
- B. Install on clean, dry surface.
- C. Cover the entire concrete surface.
- D. Install in accordance with manufacture's recommendations.
- E. Install overlapping seams perpendicular to direction of drainage.
- F. Lay the fabric smooth without ridges, bubbles or other surface irregularities.
- G. Overlap 12 inches of each newly installed layer over the previously installed layer.
- H. While overlapping, weld the overlapping fabric in accordance with the manufacturer's specifications.
- I. Cut the fabric to fit the vertical edge of the PCC pavement adjacent to pavers and after the setting bed is in-place neatly trim the excess fabric above the setting bed surface.
- J. Cut the fabric in accordance with the manufacturer's specifications.

**FOR PLACEMENT UPON HMA SETTING BED (CROSSWALKS)**

**3.05 PRIME CONCRETE SLAB**

- A. Clean PCC sub-slab.
- B. Prime PCC sub-slab surface with asphalt primer.

**3.06 PLACING BITUMINOUS SETTING BED**

- A. Prior to bituminous setting bed installation, install protective covering over adjacent PCC sidewalk/pavement to avoid pavement staining and other surface damage.
- B. Install the setting bed over the PCC sub-slab surface, place 3/4" deep control bars directly over the base.
  - 1. If grade must be adjusted, set wood chocks under depth control bars to proper grade.
  - 2. Set two bars parallel to each other, approximately eleven (11) feet apart to serve as guides for striking board (12' long x 2" x 6" board).
  - 3. The depth control bars must be set carefully to bring pavers, when laid, to proper grade.
- C. Place some bituminous bed between parallel depth control bars. Pull this bed with the striking board over bars several times.

1. After each passage, low porous spots must be showered with fresh bituminous material to produce a smooth, firm, and even setting bed.
  2. As soon as this initial panel is completed, advance the first bard to the next position, in readiness for striking the next panel.
  3. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.
- D. The setting bed shall be rolled with a 600-pound, walk-behind, power roller to a nominal depth of  $\frac{3}{4}$ " while still hot; the thickness shall be adjusted so that when the concrete pavers are placed, the top surface of the pavers will be at the required finished grade.
- E. After the setting bed has cooled, a coating of neoprene asphalt adhesive shall be applied by moping or squeegeeing or troweling over the top surface of the bituminous setting bed so as to provide a bond under the pavers; if the adhesive is troweled, the trowel shall be serrated with serrations not to exceed one-sixteenth ( $1/16$ ) of an inch.
- F. Limitations: placement of the setting bed and application of the modified asphalt adhesive will comply with IDOT article 2303.18.

### **3.07 INSTALLATION OF PAVERS**

- A. After the modified asphalt adhesive is applied, carefully place the pavers by hand in courses as shown in the plans with hand tight joints and uniform top surfaces.
- B. Good alignment must be kept and the pattern shall be that shown on the plans.

### **3.08 JOINT TREATMENT**

- A. Use a low-amplitude plate compactor capable of at least minimum of 4,000 lbf (18 kN) at a frequency of 75 to 100 Hz to vibrate the pavers into the sand. Remove any cracked or damaged pavers and replace with new units.
- B. Simultaneously spread, sweep and compact dry joint sand into joints continuously until full. This will require at least 4 to 6 passes with a plate compactor. Do not compact within 6 ft (2 m) of unrestrained edges of paving units.
- C. All work within 6 ft. (2 m) of the laying face shall be left fully compacted with sand-filled joints at the end of each day or compacted upon acceptance of the work. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and compacted pavers with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.
- D. Remove excess sand from surface when installation is complete.
- E. Allow excess joint sand to remain on surface to protect pavers from damage from other trades. Remove excess sand when directed by the Engineer.
- F. Surface shall be broom clean after removal of excess joint sand.
- G. Final joints will be from 0" to maximum of  $1/4$ " for concrete pavers.

### **3.09 FIELD QUALITY CONTROL**

- A. The final surface tolerance from grade elevations shall not deviate more than  $\pm 3/8$  inch under a 10 foot straightedge.

- B. Check final surface elevations for conformance to drawings.
- C. The surface elevation of pavers shall be 1/8 inch to 1/4 inch above adjacent drainage inlets, concrete collars or channels.
- D. Lippage: No greater than 1/8 inch difference in height between adjacent pavers.

**3.10 CLEANING**

- A. Clean concrete pavers in accordance with the manufacturer's written recommendations.
- B. Sweep excess sand from paved surfaces and remove from site.
- C. Remove all excess materials and debris from site.

**3.11 PROTECTION**

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.