

SECTION 02522  
CEMENT CONCRETE SIDEWALKS, DRIVEWAYS, AND MEDIAN PAVEMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

This Work shall consist of constructing sidewalks, driveways, and median pavement exclusive of sidewalks, driveways, and median pavement that are integrally part of structures of portland cement concrete on a prepared subgrade in accordance with TDOT Standard Specifications Section 701 and this Section and in reasonably close conformity with the lines, grades, and typical cross sections shown in the plans or established by the Engineer.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 01580 - Traffic Signals  
Section 01710 - Cleanup and Restoration  
Section 02200 - Earthwork  
Section 02210 - Embankments  
Section 02500 - Paving and Surfacing  
Section 02520 - Cement Concrete Curb, Gutter, and Combined Curb and Gutter  
Section 03300 - Cast-In-Place Concrete

1.3 APPLICABLE SPECIFICATIONS

"STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", Latest Revision, Tennessee Department of Transportation (TDOT)

"SUBDIVISION SPECIFICATIONS FOR STREETS AND ROADS", Latest Revision, Metropolitan Government of Nashville and Davidson County

1.4 APPLICABLE REFERENCES

"American Association of State Highway and Transportation Officials" (AASHTO), Latest Revision

"American Society for Testing and Materials" (ASTM), Latest Revision

"American Concrete Institute" (ACI), Latest Revision

"Americans with Disabilities Act" (ADA), Latest Revision

"Americans with Disabilities Act Accessibility Guidelines" (ADAAG), Latest Revision

"Architectural Barriers Act" (ABA), Latest Revision

## PART 2 - MATERIALS

### 2.1 GENERAL REQUIREMENTS

Materials shall meet the requirements in TDOT Standard Specifications Sections 604 and 913 and in Section 03300 - Cast-In-Place Concrete together with the conditions and requirements set forth in this Section.

### 2.2 PREFORMED JOINT FILLER

Prefomed joint filler shall conform to the requirements in TDOT Standard Specifications Subsection 905.01 and in Section 03300 - Cast-In-Place Concrete. Joint filler for brick sidewalk shall be portland cement with prepared color added conforming to ASTM C 150. Sand shall conform to ASTM C 144.

### 2.3 DRAIN PIPE

Drain pipe shall conform to the requirements in TDOT Standard Specifications Subsection 914.04 and in Section 02520 - Cement Concrete Curb, Gutter, and Combined Curb and Gutter unless otherwise specified in the plans.

### 2.4 CONCRETE

Concrete for sidewalks, driveways, and median pavement shall be Class A concrete meeting all the requirements prescribed in TDOT Standard Specifications Section 604 and in Section 03300 - Cast-In-Place Concrete.

### 2.5 BRICK

Brick when made from clay or shale shall conform to ASTM 902 including BX for dimensional tolerance. When made of concrete they shall conform to ASTM C 55. The kind and grade shall be as specified in the plans. Brick shall be full depth two and one-quarter (2 1/4) inches thick and shall be four inches by eight inches (4" x 8") in area unless otherwise shown in the plans or directed by the Engineer. Contractor shall submit sample for approval.

### 2.6 ASPHALT

Setting bed for brick sidewalk shall be a three-quarter (3/4) nominal inch deep binder mix and binder base shall be a four (4) inch deep binder mix both conforming to the applicable requirements in TDOT Standard Specifications Sections 307 and 407 and in Section 02500 - Paving and Surfacing. Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed and binder base to meet construction requirements and shall submit design mix to the Engineer for approval.

### 2.7 NEOPRENE MODIFIED ASPHALT ADHESIVE

Neoprene modified asphalt adhesive under brick shall conform to the following specifications "or equal":

mastic (asphalt adhesive)	
solids (base)	75% ± 1%
pounds/gallon	8 lbs. - 8.5 lbs.
solvent mineral spirits (over 100° Fahrenheit flash)	
base (2% neoprene, 10% asbestos-free fibers, 88% asphalt)	
melting point - ASTM D 36	150° Fahrenheit mix
penetration - 77° Fahrenheit 100 gram load 5 sec.	23 - 27
ductility - ASTM D 113-44 at 77° Fahrenheit	
2 inches/min.	39 - 49 inches/min.

## 2.8 MORTAR

Cement and sand used for preparation of mortar shall conform to the requirements in TDOT Standard Specifications Section 607 and in Section 02720 - Storm Sewers and Drain Systems.

## PART 3 - EQUIPMENT

- A. Forms shall be of wood, metal, or other suitable material and shall extend for the full depth of the concrete. All forms shall be true to line, free from warp, and of sufficient strength to resist the pressure of the concrete without springing. Curved forms of proper radius shall be used on all radial sections and shall be of a design acceptable to the Engineer. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.
- B. Mixers shall meet the requirements in TDOT Standard Specifications Subsection 604.12 and in Section 03300 - Cast-In-Place Concrete.
- C. Satisfactory floats, templates, straightedges, edgers, spades, and tamps shall be furnished. Compaction of subgrade shall be accomplished by any type of tamping or rolling equipment that will produce the desired results.
- D. A slip form paver which is capable of producing the required results may be used in lieu of forms.

## PART 4 - EXECUTION

### 4.1 PRELIMINARY WORK

Clearing and grubbing, removal of structures and obstructions, excavation and undercutting, and embankment construction shall be performed in accordance with the provisions in TDOT Standard Specifications Sections 201, 202, 203, and 205 and in Section 02100 - Site Preparation, Section 02200 - Earthwork, Section 02210 - Embankments, and Section 02225 - Earthwork for Structures and Pipelines respectively.

### 4.2 SUBGRADE PREPARATION

Subgrade preparation for sidewalks, driveways, and median pavement shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The subgrade shall be shaped and compacted to a firm even surface in reasonably close conformity with the grade and cross section shown in the plans. All soft and yielding material

shall be removed and replaced with acceptable material which shall then be compacted as directed.

#### 4.3 EXPANSION JOINTS

A. Unless otherwise indicated in the plans or directed by the Engineer premolded expansion joint filler one-half (1/2) inch in thickness shall be placed at locations and in line with expansion joints in the adjoining pavement, gutter, or curb. All premolded expansion joint filler shall be cut to full width or length of the proposed construction and shall extend to within one-half (1/2) inch of the top or finished surface. All longitudinal expansion joints shall be placed as indicated in the plans or as directed by the Engineer. All expansion joints shall be true, even, and present a satisfactory appearance.

B. Construction joints shall be formed around all appurtenances such as manholes, utility poles, etc., extending into and through the sidewalk or median area. Premolded expansion joint filler one-half (1/2) inch thick shall be installed in these joints. Expansion joint filler of the thickness indicated shall be installed between concrete sidewalks and any fixed structure such as a building or bridge. One-half (1/2) inch thick expansion joint filler shall be installed between concrete curb and median pavement and unless otherwise specified between concrete curb and sidewalk. This expansion joint material shall extend for the full depth of the walk or median pavement.

#### 4.4 LIMITATIONS OF MIXING

Limitations on the mixing of concrete shall be as prescribed in TDOT Standard Specifications Subsection 501.11 and in Section 03300 - Cast-In-Place Concrete.

#### 4.5 MIXING AND PLACING CONCRETE

A. Concrete shall be mixed in accordance with the provisions in TDOT Standard Specifications Subsection 604.14 and in Section 03300 - Cast-In-Place Concrete. Placing concrete shall be performed as provided for in TDOT Standard Specifications Subsection 501.12 except that mechanical spreaders will not be required. Immediately before placing the concrete the subgrade shall be thoroughly wetted and the forms given a coating of light oil. The forms shall be thoroughly cleaned and oiled each time before using.

B. Concrete sidewalks, driveways, and medians shall be constructed to the dimensions and finished elevations as specified in the plans.

C. Sidewalks shall be constructed with materials which produce one of the following results:

1. standard portland cement concrete (white concrete) with a coarse broomed finish.
2. portland cement concrete containing river gravel to produce an exposed aggregate finish.
3. brick sidewalk.

- D. Joints shall be constructed at intervals of twenty-five (25) feet to thirty (30) feet except for closures but no interval less than six (6) feet will be permitted.
- E. A four (4) feet wide grass area furnishing zone adjacent to curb shall be provided for placement of light standards, poles, fire hydrants, mailboxes, etc.
- F. A minimum three (3) feet wide clearance shall be provided through the path of travel.
- G. Where a grass area furnishing zone is not provided a maximum two (2) feet wide furnishing zone adjacent to curb shall be provided maintaining a minimum three (3) feet clearance through the path of travel.
- H. Place premolded expansion joints, longitudinal expansion joints, and construction joints in accordance with the requirements in paragraph 4.3 above.
- I. Ramps (curb and driveway) shall be constructed to the dimensions and finished elevations as specified in the plans or Contract Documents and shall also conform to the requirements of the ADA, ADAAG, and ABA. Surface of ramp shall be stable, firm, and slip resistant. Surface texture of ramp shall be that obtained by a coarse brooming transverse to the slope of the ramp. Ramps shall not be constructed using brick or an exposed aggregate concrete finish and shall not contain longitudinal or transverse expansion joints or grooves.
- J. Where existing sidewalks, ramps, islands, or medians are to be removed for replacement or to permit other construction the limits of construction shall be considered as extending to the next existing joint marking beyond the normal limits of replacement and/or other construction.
- K. Where sidewalks, islands, or medians are constructed adjacent to permanent structures or other rigid construction on one (1) side and curb on the other extend expansion joint of premolded material only along back at curb and place for the full depth of the slab. Place a premolded expansion joint between the sidewalk and adjacent curb at all crosswalks both public and private. Fasten premolded expansion joint filler to prevent displacement.
- L. Where sidewalk is constructed in conjunction with adjacent curb the expansion joints in the curb and sidewalk shall coincide. Where such construction is adjacent to existing curb the expansion joints shall if practicable coincide. Prior to placing concrete around any permanent structure place premolded expansion joint material around such structure for the full depth of the sidewalk.
- M. Where existing structures such as light standards, poles, fire hydrants, etc., are within the limits of the sidewalk area place premolded expansion joint around the structure for the full depth of the concrete.

#### 4.6 FINISHING

The concrete shall be struck off with a transverse template resting upon the side forms. After the concrete has been struck off to the required cross section it shall be finished with floats and straightedges until the required surface requirements have been obtained.

- A. When the surface of the concrete is free from water and just before the concrete obtains its initial set it shall be finished and swept lightly with a broom in order to produce a sandy texture. The longitudinal surface variations shall be not more than one-quarter (1/4) inch under a twelve (12) foot straightedge nor more than one-eighth (1/8) inch on a five (5) foot transverse section. The surface of the concrete shall be so finished as to drain completely at all times.
- B. The edges of the sidewalks, driveways, and median pavement shall be carefully finished and rounded with an edging tool having a radius of one-half (1/2) inch.
- C. The surface of sidewalks shall be divided into blocks by the use of a grooving tool. The grooves shall be spaced approximately five (5) feet apart and the blocks shall be rectangular unless otherwise ordered by the Engineer. The grooves shall be cut to a depth of not less than one (1) inch. The edges of the grooves shall be edged with an edging tool having a radius of one-quarter (1/4) inch. Grooves shall be placed in median pavement in line with corresponding joints in adjoining construction or as directed by the Engineer.
- D. Unless otherwise indicated in the plans marks or grooves may be placed at right angles to the center line of driveways and approximately eight (8) inches apart. These markings shall be between one-eighth (1/8) inch to one-quarter (1/4) inch in depth and shall be made with a suitable marking tool. A grooving tool six (6) inches to eight (8) inches in width with multiple grooves for grooving alternate strips eight (8) inches apart may be used. Any irregularities caused by the edges of the marking tool shall be removed by the use of a wetter brush or wooden float. All marking edges shall be rounded satisfactorily.
- E. Grooves shall not be placed in the surface of sidewalks or driveways reinforced for beam action where the full thickness of concrete is required for strength.
- F. The edges of the concrete at expansion joints shall be rounded with an edging tool having a radius of one-quarter (1/4) inch. All marks caused by edging shall be removed with a wetted brush or wooden float. The top and ends of expansion joint material shall be cleaned of all concrete and the expansion joint material shall be so trimmed as to be slightly below the surface of the concrete.

#### 4.7 PROTECTION AND CURING

Forms may be removed at any time that removal will not damage the concrete. No pressure shall be exerted upon the concrete in removing forms.

- A. Curing and protection during cold weather shall be performed as provided for in TDOT Standard Specifications Subsection 501.18.
- B. Pedestrians will not be allowed upon concrete sidewalks, driveways, or medians until twelve (12) hours after finishing concrete and no vehicles or loads shall be permitted on any sidewalk, driveway, or median until the Engineer has determined that the concrete has attained sufficient strength for such loads. An accessible alternative route(s) meeting the requirements of the ADA and approval of the Engineer shall be provided by the Contractor.

C. The Contractor shall construct and place such barricades and protection devices as are necessary to keep pedestrians and other traffic off the sidewalk, driveway, or median. An accessible alternative route(s) meeting the requirements of the ADA and approval of the Engineer shall be provided by the Contractor.

D. Any sidewalk, driveway, or paved median damaged prior to final acceptance of the project shall be repaired at the Contractor's expense by removing concrete within groove limits and replacing it with concrete of the type and finish in the original construction.

#### 4.8 BACKFILLING

Immediately after removing the side forms the spaces along the edges of sidewalk or driveway shall be filled with suitable material. This material shall be placed in layers not exceeding four (4) inches in loose thickness and compacted until firm and stable.

#### 4.9 BRICK SIDEWALK (GENERAL)

A. Before beginning work on brick sidewalk all necessary clearing and grubbing, removal of structures and obstructions, excavation and undercutting, and embankment construction shall be performed in accordance with the provisions in TDOT Standard Specifications Sections 201, 202, 203, and 205 and in Section 02100 - Site Preparation, Section 02200 - Earthwork, Section 02210 - Embankments, and Section 02225 - Earthwork for Structures and Pipelines.

B. Subgrade preparation for brick sidewalks shall be done in accordance with the provisions in paragraph 4.2 above. The foundation for this type of construction shall present a uniform bearing surface and if a reinforced foundation is necessary it shall be constructed of Class A concrete in accordance with the applicable provisions and requirements set out in TDOT Standard Specifications Section 604 and in Section 03300 - Cast-In-Place Concrete.

C. Brick sidewalk shall not be constructed in freezing weather nor when bricks contain frost.

D. Brick for exposed surfaces, corners, etc., shall be selected from approved brick as to color and uniformity.

E. All brick shall be thoroughly cleaned and well moistened with water immediately before being laid and the bed which is to receive the brick shall be thoroughly cleaned and well moistened with water before placing thereon.

F. All brick laid in freshly made mortar shall be laid in a substantial and workmanlike manner and true to the lines and grades indicated in the plans or as directed by the Engineer.

G. Care shall be taken to keep the exposed surface of brick free from mortar stains. Immediately after laying brick face shall be cleaned thoroughly of all mortar stains.

H. In case any brick is moved, has settled, or the joints broken after laying the brick shall be taken up, the mortar thoroughly cleaned from the brick, bed, and joints,

and the brick re-laid in fresh mortar.

I. When brick is to be laid in sand it shall be laid with sand swept butt joints on a one-half (1/2) inch sand setting bed.

J. When brick is to be laid on concrete the concrete shall be a solid four (4) inch thick slab with 6-6-10-10- welded wire mesh reinforcing (if shown in plans or directed by Engineer). Punch holes for concrete slab shall be one (1) inch in diameter at twelve (12) inches center to center spacing each way.

K. Prime concrete base with emulsified asphalt (RS-1 or CRS-1) if there is to be vehicular traffic over brick.

L. After the modified asphalt adhesive is applied (if called for to be used in the plans or directed by the Engineer) carefully place brick by hand in straight courses with hand tight joints and uniform top surface. Good alignment shall be kept and the pattern shall be that shown in the plans or directed by the Engineer.

M. New brick and mortar shall match existing brick and mortar in color and size where integrating with existing sidewalks. Contractor shall submit samples of all brick to Engineer for approval.

N. Brick sidewalk shall be protected and kept wet for a period of forty-eight (48) hours after laying brick.

#### 4.10

#### PLACING BITUMINOUS SETTING BED FOR BRICK

To install the setting bed over the asphalt binder or concrete base surface place control bars directly over the base. The depth control bars shall be set carefully to bring the brick when laid to proper grade. Thickness of the finished setting bed shall be no more than one (1) inch or less than one-half (1/2) inch.

A. The setting bed shall be rolled with a power roller to a nominal depth of three-quarter (3/4) inch. The thickness shall be adjusted so that when the brick is placed the top surface of the brick shall be at the required finished grade. However under no circumstances shall the setting bed exceed one (1) inch.

B. A coating of two (2) percent neoprene modified asphalt adhesive shall be applied by squeegeeing or troweling over the top surface of the bituminous setting bed so as to provide a bond under the brick.

C. After the modified asphalt adhesive is applied (if called for to be used in the plans or directed by the Engineer) carefully place the pavers by hand in straight courses with hand tight joints and uniform top surface. Good alignment shall be kept and the pattern shall be that shown in the plans or as directed by the Engineer.

D. Hand tight joints shall read from zero (0) inches to maximum one-quarter (1/4) inch for brick. Sweep a dry mixture of one (1) part portland cement to match color of brick and three (3) parts sand until joints are flush with top surface. Fog lightly with water. Joints may recede up to one-eighth (1/8) inch. Cement stains that remain should be cleaned. Screenings or other suitable fillers are also acceptable.

E. Prime concrete or asphalt binder base with emulsified asphalt (RS-1 or CRS-



1) if there is to be vehicular traffic over brick.

#### 4.11 FINAL CLEANUP

Final cleanup shall be performed in accordance with the requirements in TDOT Standard Specifications Subsection 104.11 and in Section 01710 - Cleanup and Restoration.

### PART 5 - MEASUREMENT AND PAYMENT

#### 5.1 METHOD OF MEASUREMENT

A. Sidewalks and driveways will be measured by the square foot complete in place. The area shall be obtained by surface measurements. Where standard widths are constructed the measurements shall not exceed the standard widths shown in the plans unless on written direction of the Engineer. Sidewalks of each thickness and driveways will be measured separately. Concreted median pavement will be measured by the cubic yard complete in place. The volume shall be obtained from the specified thickness shown in the plans and surface measurements for width and length.

B. No measurement for payment will be made for preparing the subgrade, for backfill, expansion joint materials, or drain pipe unless otherwise indicated in the plans as these are necessary parts of the construction.

#### 5.2 BASIS OF PAYMENT

The accepted quantities of sidewalk of each thickness and driveway will be paid for at the Contract Unit Bid Price per square foot for the respective items complete in place. The accepted quantities of concrete median pavement will be paid for at the Contract Unit Bid Price per cubic yard complete in place.

**END OF SECTION - 02522**