SUPERSEDED BY EB 15-031 EFFECTIVE 9/28/15		*New York State Department of Transportation* **ENGINEERING INSTRUCTION**	**EI** **10-027**

Title: **REVISION TO SECTION 608 – SIDEWALKS, DRIVEWAYS AND BICYCLE PATHS**

Distribution:
- ☐ Manufacturers (18)
- ☒ Local Govt. (31)
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- ☐ Surveyors (33)
- ☒ Consultants (34)
- ☒ Contractors (39)

Approved:

Robert L. Sack 3SEP10

Robert L. Sack, P.E. — Date
Deputy Chief Engineer, Research

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of 01/06/2011.
- This EI supersedes EI 06-010 and EI 06-020.
- The revisions issued with this EI will be incorporated into a future update of the Standard Specifications.

PURPOSE: The purpose of this EI is to revise Standard Specification Section 608, *Sidewalks, Driveways and Bicycle Paths.*

TECHNICAL INFORMATION:

- Since EIs 06-010 and 06-020 have been superseded with this EI, the 711-01, 726-01, and 726-02 Standard Specifications that were issued with them have been re-issued with this EI for the May 4, 2006 Standard Specifications.

Some highlights of the changes are:

- "Vegetation Control Strips" added to the section title and list of construction items for hot mix asphalt (HMA). A "Vegetation Control Strip", as referenced in the Highway Design Manual, Chapters 3 & 10, is an optional use of hot mix asphalt to control vegetation growth as opposed to the use of herbicides.
- Updated terminology: Throughout section 608, references to "asphalt concrete" and "asphalt cement" will now be referred to as "hot mix asphalt (HMA)" and "PG binder" respectively.
- Inaccurate values made when converting the metric specification to the English specification have been corrected.
- Under 608-2 MATERIALS, *"Item 702-02 or 702-03 Asphalt Cement for Paving"* has been deleted.
- Identification of mixture types used for surface course and any course below the surface.
- Identification of PG binder grade specified.
- Added restrictions on the use of polyphosphoric acid (PPA) as a PG binder modifier.
- New payment item number for *"Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips."* Under this payment item number, this material will be certified by the producer as a 1.00. However, when it is tested by the QAT, a disincentive of 0.85 QAF may be assigned by the QAT.
- Added paragraph to §608-3.01 B in order for specification to remain consistent with other standard specifications for machine-formed paving.

DESIGN GUIDANCE: There is no need to calculate quality units (QUs) for this item since there is no incentive. However, there may be a disincentive and therefore, adjustment will be made based on Quality Index price from the current Engineering Bulletin. In the estimate, the Designer will enter 1 QU, the Quality Index price based on the Region, and the total amount. This will provide an item to make negative adjustment using Quality Index Price. Contractors cannot bid this item.

IMPLEMENTATION: Main Office Design Quality Assurance Bureau will insert the revisions to the Standard Specifications into the contract proposals beginning with projects submitted for the letting of 01/06/2011.

The following Section 608 Special Specifications will be deleted with the issuing of this EI:

- Item 10608.0205 M - Asphalt Concrete Sidewalks, Driveways and Bicycle Paths (Grading Included)
- Item 608.02050110 - Asphalt Concrete Sidewalks, Driveways and Bicycle Paths (Grading Included)
- Item 608.02051110 – Plant Production Quality Adjustment to 608.02050110
- Item 10608.020501 M – Asphalt Concrete Sidewalks, Driveways and Bicycle Paths (Grading Included)
- Item 10608.020511 M – Plant Production Quality Adjustment to 10608.020501 M

Regional Special Specification Coordinators should review their 608 special specifications and amend accordingly.

The following Standard Specification items are disapproved:

- Item 608.020101 – *Asphalt Concrete Sidewalks, Driveways and Bicycle Paths*
- Item 608.020110 – Plant Production Quality Adjustment to 608.020101

The following Standard Specification items are approved:

- Item 608.020102 – *Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips*
- Item 608.020112 – Plant Production Quality Adjustment to 608.020102

TRANSMITTED MATERIALS: This EI transmits revisions to standard specification for Section 608 – *Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips* in both metric and USC.

BACKGROUND: The revision of Section 608 transmitted with this issuance was necessary to conform to the updated specifications for hot mix asphalt.

CONTACT: Direct questions regarding this EI to Sigrid Rantanen of the Materials Bureau at (518) 457-2074 or via e-mail at srantanen@dot.state.ny.us.

Make the following changes to the Standard Specifications dated May 1, 2008:

Pages 527 through 535, **Delete** Section 608 – *Sidewalks, Driveways and Bicycle Paths* entirely and **replace** it with the following:

SECTION 608 - SIDEWALKS, DRIVEWAYS, BICYCLE PATHS, AND VEGETATION CONTROL STRIPS

608-1 DESCRIPTION. This work shall consist of the construction of Portland cement concrete sidewalks and driveways; hot mix asphalt (HMA) sidewalks, driveways, bicycle paths, and vegetation control strips; or furnishing and placing precast concrete paving, brick paving or grouted stone block paving. Furnish and install detectable warnings on sidewalk curb ramps and other locations as detailed in the contract documents or as directed by the Engineer. All work shall be in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans or established by the Engineer.

608-2 MATERIALS. Materials shall meet the requirements specified in the following subsections of Section 700 – *Materials and Manufacturing*:

Portland Cement	701-01
Bituminous Materials	702-00
Fine Aggregates	703-01
Coarse Aggregates	703-02
Mortar Sand	703-03
Cushion Sand	703-06
Concrete Sand	703-07
Mineral Filler	703-08
Brick Pavers	704-08
Stone Blocks	704-09
Precast Concrete Driveway and Sidewalk Pavers	704-13
Premoulded Resilient Joint Filler	705-07
Masonry Mortar	705-21
Wire Fabric for Concrete Reinforcement	709-02
Fibers for Concrete Reinforcement	711-01
Membrane Curing Compound	711-05
Form Insulating Materials for Winter Concrete (Blankets)	711-07
Water	712-01
Surface-applied Detectable Warning Units	726-01
Embedded Detectable Warning Units	726-02

608-2.01 Portland Cement Concrete Sidewalks and Driveways.

A. Reinforcement. Welded wire fabric reinforcement shall be made of W2.9 or W3 wire at 6 inch centers transversely and longitudinally.

B. Conventionally Formed Concrete. Conventionally formed concrete shall meet the requirements for Class D in accordance with Section 501 *Portland Cement Concrete - General*. All concrete shall contain a water-reducing admixture meeting the requirements of §711-08 *Admixtures* in such a quantity as to provide a minimum 10% reduction of the design water content by using a normal range water-reducer.

C. Machine-Formed Concrete Sidewalks. Machine-formed concrete shall meet the requirements for

Class J in accordance with Section 501 *Portland Cement Concrete - General* with the exception that fibers shall be incorporated in the mix.

D. Accelerated-Cure Sidewalks and Driveways. When specified in the plans that an accelerated cure sidewalk and/or driveway is required at a commercial driveway, a mix design must be submitted to the Materials Bureau by the Contractor for approval a minimum of 14 days prior to anticipated sidewalk or driveway construction. Supply data indicating that the mix achieves a compressive strength of 2,000 psi in less than 24 hours. Also supply data indicating that the mix will have a scaling rating of one or less when tested in accordance with ASTM C672.

608-2.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. The requirements for these items shall either be 9.5 mixture for surface course or 19.0 mixture for any course below the surface. These mixtures shall be designed for <0.3 million ESALs and produced in accordance with Section 401 using coarse aggregate Type F9. The number of courses and course thicknesses shall be as given in Table 608-1 *Hot Mix Asphalt Composition* except for vegetation control strips which have a minimum thickness requirement of 3 inches of a 9.5 mix that may be placed in one course. The PG binder grades specified will be PG 64-22. Alternate PG binder grades may be allowed by the RME in lieu of PG 64-22. Upstate use of polyphosphoric acid (PPA) to modify the PG binder properties is prohibited. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification. Upstate is defined as all other counties not designated as downstate. Downstate is defined as Orange, Putnam, Rockland, Westchester, Nassau, Suffolk Counties and the City of New York. Downstate use of polyphosphoric acid (PPA) to modify the PG binder properties is prohibited for mixtures containing limestone, limestone as an aggregate blend component, limestone as a constituent in crushed gravel aggregate, or recycled asphalt pavement (RAP) that includes any limestone. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

TABLE 608-1 HOT MIX ASPHALT COMPOSITION

Total Paved Thickness	9.5 Mix	19.0 Mix	Number of Courses
1 1/2 inch	1 1/2 inch		1
2 inch	2 inch		1
≥3 inch	1 1/2 inch	≥1 1/2 inch	≥2

NOTES:

1. For the 19.0 mixture, the maximum thickness that can be placed in one pass is 3 inches.
2. A course shall consist of one or more separate lifts of hot mix asphalt, as directed by the Engineer, to attain the indicated thickness.

608-2.03 Brick-Paved Sidewalks and Driveways. Brick pavers shall meet the requirements of §704-08 *Brick Sidewalk and Driveway Pavers* and shall be the size(s), shape(s) and color(s) as specified in the contract documents.

A. Neoprene-Modified Asphalt Adhesive. Neoprene-modified asphalt adhesive shall consist of 2% neoprene, grade WM1, oxidized asphalt with an R & B softening point of 155°F minimum and a penetration of 80, and 10% asbestos-free fibers.

B. Mortar for Brick Paving. Mortar for brick paving shall meet the requirements outlined in §705- 21 *Masonry Mortar.*

C. Sand-Cement Setting Bed. Sand-Cement Setting Bed shall consist of 1 part *Portland Cement* Type 2, §701-01 and 6 parts of *Fine Aggregate*, §703-01 by volume.

608-2.04 Grouted Stone Block Paved Sidewalks and Driveways. *Stone Blocks* shall meet the requirements of §704-09 and shall be the size(s), shape(s) and color(s) as specified in the contract documents.

A. Sand-Cement Setting Bed. Sand-cement setting bed shall consist of 1 part *Portland Cement* Type 2, §701-01 and 6 parts of *Fine Aggregate*, §703-01 by volume.

B. Mortar for Stone Block Paving. Mortar for stone block paving shall meet the requirements outlined in §705-21 *Masonry Mortar.*

608-2.05 Precast Concrete Block Paved Sidewalks and Driveways. *Precast Concrete Driveway and Sidewalk Pavers* shall meet the requirements of §704-13 and shall be the size(s), shape(s) and color(s) as specified in the contract documents. Unless otherwise specified in the contract documents the setting bed material shall consist of hard, durable, uncoated particles of soil or rock, free from lumps of clay and all deleterious substances.

Setting Bed Material shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
1/4 inch	100
# 10	50-85
# 40	20-45
# 200	3-10

608-2.06 Surface-Applied Detectable Warning Units. *Surface-Applied Detectable Warning Units* shall meet the requirements of §726-01 and shall be the color as specified in the contract documents to provide the required contrast, light-on-dark or dark-on-light, with the adjacent surface. If no color is specified, the color shall be dark gray Federal Standard 595B #36081 or darker. Setting bed material and/or surface preparation materials for installation of detectable warning units shall be in accordance with the manufacturer's recommendations.

608-2.07 Embedded Detectable Warning Units. *Embedded Detectable Warning Units* shall meet the requirements of §726-02 and shall be the color as specified in the contract documents to provide the required contrast, light-on-dark or dark-on-light, with the adjacent surface. If no color is specified, the color shall be dark gray Federal Standard 595B #36081, or darker. Setting bed material and/or surface preparation materials for installation of detectable warning units shall be in accordance with the manufacturer's recommendations.

608-2.08 Stamped Concrete Detectable Warnings. Imprinted or stamped concrete detectable warning units shall comply with the specifications for Class D concrete as outlined in Section 501 *Portland Cement Concrete - General.* The color of the constructed detectable warning shall be uniform over the entire surface. The color shall be an approximate visual match to the color specified in the contract documents. If no color is specified, the color shall be dark gray Federal Standard 595B #36081 or darker. The color shall be incorporated into the concrete surface immediately prior to stamping the detectable warnings, or integrally incorporated throughout the mix. Color admixtures for integrally colored concrete shall meet the requirements of ASTM C979.

Imprinting tools shall be capable of imprinting the surface of the concrete with a uniform and aligned pattern meeting the required dimensions.

608-3 CONSTRUCTION DETAILS

608-3.01 Portland Cement Concrete Sidewalks and Driveways. When the contract includes 65 cubic yards or more of sidewalk and driveway concrete, provide an American Concrete Institute (ACI) certified concrete flatwork finisher to supervise all finishing. Provide proof of ACI flatwork certification to the Engineer prior to concrete placement. The general construction details for manufacturing and transporting concrete shall meet the requirements of Section 501 *Portland Cement Concrete- General.* Concrete placement operations may be started when the ambient air temperature is 40° F or higher when measured in the shade within an accuracy of ± 2° F. Discontinue placement when the air temperature falls below 40° F. The temperature of the base material must be 40° F or higher. The base material shall not have any snow, ice, frost, or standing water on its surface. The use of insulating materials and heating equipment may be required before concreting begins. Do not place concrete in the rain.

Install a *Premoulded Resilient Joint Filler*, §705-07, at all joints between sidewalk and curb, pavement, building, etc. and at all transverse construction joints.

Sidewalks and driveways may be conventionally formed or machine formed. Concrete reinforcement shall be welded wire fabric or fiber reinforcement except, at all commercial driveways both the sidewalk and the driveway must be reinforced with welded wire fabric. They may be additionally reinforced with fiber reinforcement.

When using fiber reinforcement, it shall be added to the concrete at a rate of 1.5 pounds of fibers per cubic yard of concrete. Fibers shall be added to the concrete during batching under supervision of the Regional Materials Engineer, or using a method approved by the Director, Materials Bureau. Batch an appropriate volume of concrete such that whole standard size bags or packages of fibers are used. It is the responsibility of the producer to indicate on each delivery ticket the amount of fibers added to the concrete.

A. Conventionally Formed Sidewalks and Driveways. Forms shall be free from warp, extend to the full depth of the sidewalk or driveway, and be secured so no displacement will occur during the placement of concrete. Reinforcement may be either fiber or wire fabric. When using wire fabric for concrete reinforcement, embed it at mid-depth in the slab.

Place the concrete in one course to the full depth shown in the contract documents. Immediately after placement of the concrete thoroughly compact the concrete with internal mechanical vibrating equipment. Internal mechanical vibrators shall be adequately powered, capable of transmitting vibration to the concrete in frequencies of not less than 5,000 vibrations per minute while inserted in concrete and shall produce a vibration of sufficient intensity to consolidate the concrete into place without separation of the ingredients. The vibrating element shall be vertically inserted in the concrete mass at a depth sufficient to vibrate the entire depth. It shall be withdrawn completely from the concrete before being advanced to the next point of application. Vibrate at evenly spaced intervals not farther apart than the radius over which the vibration is visibly effective and at a distance close enough to the forms to effectively vibrate the surface concrete. The time of vibration shall be of sufficient duration to accomplish thorough consolidation, produce dense, smooth surfaces free from aggregate pockets, honeycombing, and air bubbles; and to work the concrete into all angles and corners of the forms. However, over-vibration shall be avoided. Vibration shall be continued in one place until the concrete has become uniformly plastic, but not to the extent that pools of grout are formed. Vibration shall be supplemented by working or spading by hand in the corners and angles of forms and along form surfaces while the concrete is plastic. Vibrators shall not be used to push or distribute the concrete laterally.

The use of mechanical screeding or finishing equipment (such as a jitterbug) shall not be allowed. Only hand screeding and finishing shall be allowed.

B. Machine-Formed Sidewalk. Machine-formed paving consists of a single paver capable of placing, spreading, consolidating, screeding, and finishing the concrete such that hand finishing is kept to a minimum. Use equipment guided by a reference system that ensures the pavement is placed to the specified line, grade, and cross section. Use a self-propelled paver equipped with rigid side forms that laterally support the concrete and minimize edge slumping, a full-width finishing pan, and attached internal vibrators capable of consolidating the entire concrete placement. The equipment proposed for use by the Contractor shall demonstrate the capability of placing the concrete in accordance with these specifications.

Apply the provisions of §569-3.05 E. *Central and Transit Mixed Concrete* to maintain desired slump during the concrete placement. The reinforcement shall be fibers. Water additions at the point of deposition may be made according to §569-3.05 E.

C. Finishing. Only magnesium floats and trowels are allowed. The use of aluminum or steel finishing trowels and tools is prohibited. The concrete shall be finished to produce a smooth surface and then lightly broomed to a uniform texture. The edges and scored joints of all sidewalk slabs shall be tooled with an edging tool having a ¼ inch radius.

Unless otherwise specified in the contract documents, the concrete surface shall be scored and tooled at intervals of 5 feet. Score the concrete a minimum ⅛ inch to a maximum ¼ inch in width and to a minimum depth of one-third the total thickness.

D. Curing. Immediately after finishing, and not more than 30 minutes after concrete placement, apply a

clear with fugitive dye *Membrane Curing Compound* meeting §711-05 at a rate of 1 gallon per 150 square feet. Do not apply curing compound in the rain. If rain damages the curing compound before it sets, reapply curing compound immediately after the concrete surface dries. Alternative curing methods shall be approved by the Director, Materials Bureau.

Concrete must be cured for a minimum of six days in colder weather. Colder weather and the methods of curing during colder weather are described as follows: If the ambient air temperature falls, or is expected to fall below 40° F anytime during the curing period of the concrete placement, a supply of blankets meeting §711-07 *Form Insulating Materials for Winter Concreting* must be provided at the work site that is sufficient to cover all concrete placed. Use material capable of maintaining a surface temperature of 55° F. Apply the insulating material to prevent the newly placed concrete from being exposed to ambient air temperatures at the surface below 36° F during the curing period. Secure and overlap the insulation tight to the concrete surface to prevent air intrusion beneath the insulation. Extend these materials a minimum of 12 inches beyond the edge of the concrete. Place recording surface thermometers provided by the Contractor between the concrete surface and the insulating material and 12 inches from the outside edge of concrete wherever insulation is used. Use four equally spaced thermometers for each day's placement. When insulation is needed it must remain in place for the curing period. Do not subject the concrete to a temperature drop in excess of 50° F during the first 24 hours after removing the insulation. If the concrete temperature falls below 32° F or the concrete is cold-weather damaged as determined by the Engineer, it shall be removed and replaced at the Contractor's expense.

Cure all driveways and sidewalks at driveways for a minimum of three days prior to opening to vehicle traffic. In colder weather, as defined above, extend the curing period to six days unless other provisions to determine strength are provided and approved by the Director, Materials Bureau.

If saw cutting is necessary, use diamond blade saws capable of making straight cuts to the dimensions required. Saws must be equipped with cutting guides, blade guards, water cooling systems, dust controls, and cut depth control.

E. Accelerated-Cure Sidewalks and Driveways. When specified in the plans that an accelerated-cure sidewalk and/or driveway is required at a commercial driveway all the provisions for constructing sidewalks and driveways outlined above shall apply with the following exceptions: Only conventional forming with wire fabric reinforcing is allowed. Apply curing compound as outlined in "D" above. To reduce the time needed to reach the required opening compressive strength the concrete must be covered with blankets meeting §711-07 *Form Insulating Materials for Winter Concreting* such that the concrete curing temperature reaches a minimum 25° F above ambient air temperature. Secure the insulation tight to the concrete surface to prevent air intrusion beneath the insulation. Extend these materials a minimum of 12 inches beyond the edge of the concrete. Place recording surface thermometers between the concrete surface and the insulating material and 12 inches from the edge of concrete wherever insulation is used. Use four thermometers for each day's placement. These thermometers may be equally spaced at one location or placed at separate locations depending on the nature of the placements. Also, use one recording thermometer for ambient air temperature. At the request of the Contractor, external heat meeting the requirements of §555-3.08 C, 2. *Provision of External Heat* may be applied to the concrete.

Compressive strength cylinders for determining strength gain must be cast at the time of placement. These cylinders must be kept insulated with the placement. Cylinders shall be broken at times requested by the Contractor until the minimum compressive strength of 2,000 psi is reached. Alternate means to determine concrete maturity may be considered with approval of the Director, Materials Bureau by coordinating cylinder compressive strengths to concrete curing temperature.

608-3.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. The provisions under §402-3 *Construction Details for Hot Mix Asphalt (HMA) Pavements*, shall apply. For compaction requirements, the provisions under §402-3.07 *Compaction* D. *80 Series Compaction Method* shall apply.

The sidewalks, driveways, bicycle paths, and vegetation control strips shall be constructed as indicated in the contract documents (including the Standard Sheets).

608-3.03 Brick-Paved Sidewalks and Driveways. All brick pavers shall be laid in the pattern shown in the contract documents or as directed by the Engineer to provide a uniformly even surface. Joints shall be hand tight unless otherwise specified. No brick pavers shall be laid or grouted in freezing weather.

A dry mixture of mortar for brick paving shall be swept over the brick pavers until the joints are completely filled. The joints shall be lightly wetted with water. Brick pavers shall be cleaned of excess mortar, and joints shall be finished prior to the mortar setting up. All brick paving shall be kept moist for 4 days after filling the joints with mortar. After the 4 day curing period, removal of remaining mortar film may be accomplished by the use of a light acid wash (10% solution of hydrochloric or muriatic acid) followed by flushing clean with water or as approved by the Engineer. Care shall be taken to avoid the use of acid in areas where runoff could damage trees or other vegetation.

All brick pavers used over tree pits shall be laid in a 3 inch bed of *Cushion Sand*, §703-06 with sand filled joints.

A. Brick-Paved Sidewalks and Driveways (Sand Setting Bed). Brick pavers shall be laid in a properly compacted 2 inch bed of cushion sand over the specified subbase or subgrade.

B. Brick-Paved Sidewalks and Driveways (Mortar Setting Bed). Brick pavers shall be laid in a bed of mortar with a minimum thickness of 1 inch over the specified concrete or bituminous subbase.

C. Brick-Paved Sidewalks and Driveways (Bituminous Setting Bed). Brick pavers shall be laid in a ¾ inch thick bituminous setting bed over the specified concrete or bituminous subbase. The setting bed shall consist of PG binder 64-22 mixed with fine aggregate meeting the requirements of §703-01. Alternate PG binder grades may be allowed by the RME in lieu of PG 64-22. The PG binder will meet the requirements outlined in Section 702 *Bituminous Materials*, Table 702-1 *Performance-Graded Binders for Paving*. The PG binder shall be 7.0% of the total batch weight. The mix shall be heated to approximately 325° F. A coating of neoprene-modified asphalt adhesive shall be applied by mopping, squeegeeing or troweling over the top surface of the setting bed to provide bond under the bricks.

D. Brick-Paved Sidewalks and Driveways (Sand-Cement Setting Bed). Brick pavers shall be laid on a 2 inch setting bed of sand-cement over the specified subbase. The sand-cement setting bed shall not be placed more than 4 hours prior to installing the brick paving.

E. Brick-Paved Sidewalks and Driveways (Optional Concrete Setting Bed). The Contractor shall have the option of installing Brick Paved Sidewalks and Driveways by one of the following methods:

1. Bricks shall be laid on a bed of cement concrete as specified in the contract documents. The bricks shall be laid in the cement concrete while it is still fresh as approved by the Engineer and they shall be firmly positioned to provide a uniformly even surface, and solid bedding under each brick.
2. Bricks shall be laid as provided for under *"Brick-Paved Sidewalks and Driveways (Mortar Setting Bed)"*. provided the finished surface shall conform to the lines and grades shown in the contract documents.

608-3.04 Grouted Stone Block Paved Sidewalks and Driveways. All grouted stone block pavers shall be laid in the pattern shown in the contract documents or as directed by the Engineer to provide a uniformly even surface. Joints between blocks shall be a maximum of 1¼ inch or as specified. No blocks shall be laid or grouted in freezing weather.

Unless otherwise approved by the Engineer, a dry mixture of mortar as specified for *Brick-Paved Sidewalks and Driveways*, §608-2.03, shall be swept over the stone blocks until the joints are completely filled and the joints lightly wetted with water prior to the mortar setting up. All grouted stone block paving shall be kept moist for four days after filling the joints with mortar. After the four day curing period, removal of remaining mortar film may be accomplished by the use of a light acid wash (10% ± solution of hydrochloric acid) followed by flushing clean with water, or as approved by the Engineer. Care shall be taken to avoid the use of acid in areas where runoff could damage trees or other vegetation.

All blocks used over tree pits shall be laid in a 1 inch bed of cushion sand with sand filled joints.

A. Grouted Stone Block Paved Sidewalks and Driveways (Sand Setting Bed). Blocks shall be laid in a 3 inch bed of cushion sand over the specified subbase or subgrade.

B. Grouted Stone Block Paved Sidewalks and Driveways (Mortar Setting Bed). Blocks shall be laid in a bed of mortar with a minimum thickness of 1 inch over the specified concrete or bituminous subbase.

C. Grouted Stone Block Paved Sidewalks and Driveways (Sand-Cement Setting Bed). Blocks shall be laid on a 2 inch setting bed of sand-cement over the specified subbase. The sand-cement setting bed shall not be placed more than 4 hours prior to installing the block paving.

D. Grouted Stone Block Paved Sidewalks and Driveways (Optional Concrete Setting Bed). The Contractor shall have the option of installing Grouted Stone Block Paved Sidewalks and Driveways by one of the following methods:

1. Blocks shall be laid on a bed of cement concrete as specified in the contract documents. The blocks shall be laid in the cement concrete while it is still fresh as approved by the Engineer and they shall be firmly positioned to provide a uniformly even surface, and solid bedding under each stone block.
2. Blocks shall be laid as provided for under "Grouted Stone Block Paved Sidewalks and Driveways (Mortar Setting Bed)" provided the finished surface shall conform to the lines and grades shown in the contract documents.

608-3.05 Precast Concrete Block Paved Sidewalks and Driveways. Precast Concrete Driveway and Sidewalk Pavers shall be laid in the pattern shown in the contract documents or as directed by the Engineer to provide a uniformly even surface. Joints shall be hand tight unless otherwise specified. No pavers shall be laid in freezing weather.

After the pavers are in place, an approved sand joint filler shall be swept over the pavers until the joints are completely filled.

Unless otherwise specified in the contract documents, or directed by the Engineer, the Contractor shall install the pavers in accordance with the manufacturer's recommended procedures.

Precast Concrete Block Paved Sidewalks and Driveways (Granular Material Setting Bed). Unless otherwise specified in the contract documents, Precast Concrete Driveway and Sidewalk Pavers shall be laid on a setting bed not to exceed 2 inches of uniformly compacted material placed over the specified subbase.

608-3.06 Surface-Applied Detectable Warning Units. Surface-applied detectable warning units may be applied to existing curb ramps, formed and bonded to existing curb ramps, or as otherwise directed by the manufacturer or specified in the Contract Documents.

Follow all applicable manufacturer's requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility.

608-3.07 Embedded Detectable Warning Units. Embedded detectable warning units may be installed in plastic concrete, installed directly on existing subbase prior to placing concrete, inlaid on prepared concrete surfaces or as otherwise directed by the manufacturer or specified in the Contract Documents.

Follow all applicable manufacturers' requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility.

608-3.08 Stamped Concrete Detectable Warnings. Apply §608-3.01 with the following modifications:

Prior to the start of work, the Contractor shall provide a contract-site sample that meets the dimensional requirements of the current Standard Sheet for Detectable Warnings and meets the approval of the Engineer. The sample may be constructed as part of the contract.

Color hardening powder, if used to color the surface of the concrete, shall be applied to the finished concrete in accordance with the manufacturer's recommendations.

If required, construct as many test panels as are necessary to achieve a sample panel that is satisfactory to

the Engineer. All completed surfaces shall conform to the appearance of the approved sample.

608-4 METHOD OF MEASUREMENT

608-4.01 Portland Cement Concrete Sidewalks and Driveways. Portland Cement concrete sidewalks and driveways will be measured by the number of cubic yards of cement concrete installed, measured to the nearest 0.1 cubic yard.

608-4.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. Hot mix asphalt sidewalks, driveways, bicycle paths, and vegetation control strips will be measured by the number of tons of hot mix asphalt furnished and incorporated in the work. A QAF of 1.00 will be assigned to material meeting the specification requirements as certified by the QCT. A QAF of 0.85 will be assigned to material that fails to meet the specification as tested by the QAT. Quality Units will be determined when there is a disincentive and will be calculated as per §402-4, *Method of Measurement.*

608-4.03 Brick-Paved Sidewalks and Driveways. Brick paving shall be measured as the number of square yards installed, measured to the nearest 0.1 square yard.

608-4.04 Grouted Stone Block Paved Sidewalks and Driveways. Grouted stone block paving shall be measured as the number of square yards installed, measured to the nearest 0.1 square yard.

608-4.05 Precast Concrete Block Paved Sidewalks and Driveways. Precast concrete paving will be measured by the number of square yards installed, measured in the field to the nearest 0.1 square yard.

608-4.06 Surface-Applied Detectable Warning Units. Surface-applied detectable warning units will be measured as the number of square yards installed, measured in the field to the nearest 0.1 square yard.

608-4.07 Embedded Detectable Warning Units. Embedded Detectable Warning Units will be measured as the number of square yards installed, measured in the field to the nearest 0.1 square yard.

608-4.08 Stamped Concrete Detectable Warnings. Stamped concrete detectable warnings will be measured as the number of square yards installed, measured in the field to the nearest 0.1 square yard.

608-5 BASIS OF PAYMENT

608-5.01 Portland Cement Concrete Sidewalks and Driveways. The unit price bid per cubic yard shall include the cost of labor, materials, and equipment necessary to satisfactorily complete the work, including preparing the subgrade, saw cutting and wire fabric reinforcement, except that any necessary excavation and subbase course will be paid for under their appropriate items.

Payment at the unit bid price will be made after the concrete sidewalk or driveway, and curing application have been properly placed.

608-5.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. The unit price bid per ton shall include the cost of preparing the subgrade and all materials, equipment and labor (including milling, cleaning surfaces, tack coat, saw cut, truing and leveling courses, etc.) necessary to complete the work as specified except that any necessary excavation and subbase course will be paid for under their appropriate items. When there is a disincentive, the payment adjustment will be made based on the Index Price listed in the contract documents. The index price shown in the itemized proposal for each Quality Unit shall be considered the price bid. The unit (index) price is NOT to be altered in any manner by the bidder. Should the bidder alter the price shown, the altered figure will be disregarded and the original price will be used to determine the total amount bid for the contract.

608-5.03 Brick-Paved Sidewalks and Driveways. The price bid per square yard shall include the cost of furnishing all labor, materials and equipment necessary to satisfactorily complete the work, including setting bed

material, except that any necessary excavation and subbase course will be paid for under their appropriate items.

608-5.04 Grouted Stone Block Paved Sidewalks and Driveways. The unit bid per square yard shall include the cost of furnishing all labor, materials and equipment necessary to satisfactorily complete the work, including setting bed material, except that any necessary excavation and subbase course will be paid for under their appropriate items.

608-5.05 Precast Concrete Block Paved Sidewalks and Driveways. The unit price bid per square yard shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including setting bed material, except that any necessary excavation and subbase course will be paid for under their appropriate items.

608-5.06 Surface-Applied Detectable Warning Units. The unit bid price per square yard shall include all labor, material, and equipment necessary to satisfactorily complete the work, including surface preparation.

608-5.07 Embedded Detectable Warning Units. The unit bid price per square yard shall include all labor, material, and equipment necessary to satisfactorily complete the work, including bedding material. No adjustment shall be made for concrete removed to accommodate embedded units.

608-5.08 Stamped Concrete Detectable Warnings. The unit bid price per square yard shall include all labor, material, and equipment necessary to satisfactorily complete the work, including construction of contract site sample(s).

Payment will be made under:

Item No.	Item	Pay Unit
608.0101	Concrete Sidewalks and Driveways	Cubic Yard
608.0102	Accelerated-Cure Sidewalks and Driveways	Cubic Yard
608.020102	Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips	Ton
608.020112	Plant Production Quality Adjustment to 608.020102	Quality Unit
608.03	Brick-Paved Sidewalks and Driveways (Sand Setting Bed)	Square Yard
608.04	Brick-Paved Sidewalks and Driveways (Mortar Setting Bed)	Square Yard
608.05	Brick-Paved Sidewalks and Driveways (Bituminous Setting Bed)	Square Yard
608.06	Brick-Paved Sidewalks and Driveways (Sand-Cement Setting Bed)	Square Yard
608.07	Brick-Paved Sidewalks and Driveways (Optional Concrete Setting Bed)	Square Yard
608.08	Grouted Stone Block Paved Sidewalks and Driveways (Sand Setting Bed)	Square Yard
608.09	Grouted Stone Block Paved Sidewalks and Driveways (Mortar Setting Bed)	Square Yard
608.10	Grouted Stone Block Paved Sidewalks and Driveways (Sand-Cement Setting Bed)	Square Yard
608.11	Grouted Stone Block Paved Sidewalks and Driveways (Optional Concrete Setting Bed)	Square Yard
608.12	Precast Concrete Block Paved Sidewalks and Driveways (Granular Material Setting Bed)	Square Yard
608.20	Surface-Applied Detectable Warning Units	Square Yard
608.21	Embedded Detectable Warning Units	Square Yard
608.22	Stamped Concrete Detectable Warning Units	Square Yard

Make the following changes to the Standard Specifications dated May 4, 2006:

Delete Section 608 – *Sidewalks, Driveways and Bicycle Paths* entirely and **replace** it with the following:

SECTION 608 - SIDEWALKS, DRIVEWAYS, BICYCLE PATHS, AND VEGETATION CONTROL STRIPS

608-1 DESCRIPTION. This work shall consist of the construction of Portland cement concrete sidewalks and driveways; hot mix asphalt (HMA) sidewalks, driveways, bicycle paths, and vegetation control strips; or furnishing and placing precast concrete paving, brick paving or grouted stone block paving. Furnish and install detectable warnings on sidewalk curb ramps and other locations as detailed in the contract documents or as directed by the Engineer. All work shall be in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans or established by the Engineer.

608-2 MATERIALS. Materials shall meet the requirements specified in the following subsections of Section 700 – *Materials and Manufacturing*:

Portland Cement	701-01
Bituminous Materials	702-00
Fine Aggregates	703-01
Coarse Aggregates	703-02
Mortar Sand	703-03
Cushion Sand	703-06
Concrete Sand	703-07
Mineral Filler	703-08
Brick Pavers	704-08
Stone Blocks	704-09
Precast Concrete Driveway and Sidewalk Pavers	704-13
Premoulded Resilient Joint Filler	705-07
Masonry Mortar	705-21
Wire Fabric for Concrete Reinforcement	709-02
Fibers for Concrete Reinforcement	711-01
Membrane Curing Compound	711-05
Form Insulating Materials for Winter Concrete (Blankets)	711-07
Water	712-01
Surface-applied Detectable Warning Units	726-01
Embedded Detectable Warning Units	726-02

608-2.01 Portland Cement Concrete Sidewalks and Driveways.

A. Reinforcement. Welded wire fabric reinforcement shall be made of MW19 or MW20 wire at 150 mm centers transversely and longitudinally.

B. Conventionally Formed Concrete. Conventionally formed concrete shall meet the requirements for Class D in accordance with Section 501 *Portland Cement Concrete--General.* All concrete shall contain a water-reducing admixture meeting the requirements of §711-08 *Admixtures* in such a quantity as to provide a minimum 10% reduction of the design water content by using a normal range water-reducer.

C. Machine-Formed Concrete Sidewalks. Machine-formed concrete shall meet the requirements for Class J in accordance with Section 501 *Portland Cement Concrete--General* with the exception that fibers shall be incorporated in the mix.

D. Accelerated-Cure Sidewalks and Driveways. When specified in the plans that an accelerated cure sidewalk and/or driveway is required at a commercial driveway, a mix design must be submitted to the Materials Bureau by the Contractor for approval a minimum of 14 days prior to anticipated sidewalk or driveway construction. Supply data indicating that the mix achieves a compressive strength of 14 MPa in less than 24 hours. Also supply data indicating that the mix will have a scaling rating of one or less when tested in accordance with ASTM C 672.

608-2.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. The requirements for these items shall be 9.5 mixture for surface course and 19.0 mixture for any course below the surface. These mixtures shall be designed for <0.3 million ESALs and produced in accordance with Section 401 using coarse aggregate Type F9. The number of courses and course thicknesses shall be as given in Table 608-1 *Hot Mix Asphalt Composition* except for the vegetation control strips which have a minimum thickness requirement of 75 mm of a 9.5 mix that may be placed in one course. The PG binder grade specified will be PG 64-22. Alternate PG binder grades may be allowed by the RME in lieu of PG 64-22. Upstate use of polyphosphoric acid (PPA) to modify the PG binder properties is prohibited. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification. Upstate is defined as all other counties not designated as downstate. Downstate is defined as Orange, Putnam, Rockland, Westchester, Nassau, Suffolk Counties and the City of New York. Downstate use of polyphosphoric acid (PPA) to modify the PG binder properties is prohibited for mixtures containing limestone, limestone as an aggregate blend component, limestone as a constituent in crushed gravel aggregate, or recycled asphalt pavement (RAP) that includes any limestone. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

TABLE 608-1 HOT MIX ASPHALT COMPOSITION

Total Paved Thickness	9.5 Mix	19.0 Mix	Number of Courses
40 mm	40 mm		1
50 mm	50 mm		1
≥75 mm	40 mm	≥40 mm	≥2

NOTES:

1. For the 19.0 mixture, the maximum thickness that can be placed in one pass is 75 mm.
2. A course shall consist of one or more separate lifts of hot mix asphalt, as directed by the Engineer, to attain the indicated thickness.

608-2.03 Brick-Paved Sidewalks and Driveways. Brick pavers shall meet the requirements of §704-08 *Brick Sidewalk and Driveway Pavers* and shall be the size(s), shape(s) and color(s) as specified in the contract documents.

A. Neoprene-Modified Asphalt Adhesive. Neoprene-modified asphalt adhesive shall consist of 2% neoprene, grade WM1, oxidized asphalt with an R & B softening point of 68°C minimum and a penetration of 80, and 10% asbestos-free fibers.

B. Mortar for Brick Paving. Mortar for brick paving shall meet the requirements outlined in §705-21 *Masonry Mortar*.

C. Sand-Cement Setting Bed. Sand-Cement Setting Bed shall consist of 1 part *Portland Cement* Type 2, §701-01 and 6 parts of *Fine Aggregate*, §703-01 by volume.

608-2.04 Grouted Stone Block Paved Sidewalks and Driveways. *Stone Blocks* shall meet the requirements of §704-09 and shall be the size(s), shape(s) and color(s) as specified in the contract documents.

A. Sand-Cement Setting Bed. Sand-cement setting bed shall consist of 1 part *Portland Cement* Type 2, §701-01 and 6 parts of *Fine Aggregate*, §703-01 by volume.

B. Mortar for Stone Block Paving. Mortar for stone block paving shall meet the requirements outlined

in §705-21 *Masonry Mortar.*

608-2.05 Precast Concrete Block Paved Sidewalks and Driveways. *Precast Concrete Driveway and Sidewalk Pavers* shall meet the requirements of §704-13 and shall be the size(s), shape(s) and color(s) as specified in the contract documents. Unless otherwise specified in the contract documents the setting bed material shall consist of hard, durable; uncoated particles of soil or rock, free from lumps of clay and all deleterious substances.

Setting Bed Material shall meet the following gradation requirements:

Sieve Size	**Percent Passing by Weight**
6.3 mm	100
2.0 mm	50-85
425 µm	20-45
75 µm	3-10

608-2.06 Surface-Applied Detectable Warning Units. *Surface-Applied Detectable Warning Units* shall meet the requirements of §726-01 and shall be the color as specified in the contract documents to provide the required contrast, light-on-dark or dark-on-light, with the adjacent surface. If no color is specified, the color shall be dark gray Federal Standard 595B #36081 or darker. Setting bed material and/or surface preparation materials for installation of detectable warning units shall be in accordance with the manufacturer's recommendations.

608-2.07 Embedded Detectable Warning Units. *Embedded Detectable Warning Units* shall meet the requirements of Section §726-02 and shall be the color as specified in the contract documents to provide the required contrast, light-on-dark or dark-on-light, with the adjacent surface. If no color is specified, the color shall be dark gray Federal Standard 595B #36081, or darker. Setting bed material and/or surface preparation materials for installation of detectable warning units shall be in accordance with the manufacturer's recommendations.

608-2.08 Stamped Concrete Detectable Warnings. Imprinted or stamped concrete detectable warning units shall comply with the specifications for Class D concrete as outlined in Section 501 *Portland Cement Concrete - General.* The color of the constructed detectable warning shall be uniform over the entire surface. The color shall be an approximate visual match to the color specified in the contract documents. If no color is specified, the color shall be dark gray Federal Standard 595B #36081 or darker. The color shall be incorporated into the concrete surface immediately prior to stamping the detectable warnings, or integrally incorporated throughout the mix. Color admixtures for integrally colored concrete shall meet the requirements of ASTM C979.

Imprinting tools shall be capable of imprinting the surface of the concrete with a uniform and aligned pattern meeting the required dimensions.

608-3 CONSTRUCTION DETAILS

608-3.01 Portland Cement Concrete Sidewalks and Driveways. When the contract includes 50 m^3 or more of sidewalk and driveway concrete, provide an American Concrete Institute (ACI) certified concrete flatwork finisher to supervise all finishing. Provide proof of ACI flatwork certification to the Engineer prior to concrete placement. The general construction details for manufacturing and transporting concrete shall meet the requirements of Section 501 *Portland Cement Concrete- General.* Concrete placement operations may be started when the ambient air temperature is 4° C or higher when measured in the shade within an accuracy of ± 1° C. Discontinue placement when the air temperature falls below 4° C. The temperature of the base material must be 4° C or higher. The base material shall not have any snow, ice, frost, or standing water on its surface. The use of insulating materials and heating equipment may be required before concreting begins. Do not place concrete in the rain.

Install a *Premoulded Resilient Joint Filler*, §705-07, at all joints between sidewalk and curb, pavement, building, etc. and at all transverse construction joints.

Sidewalks and driveways may be conventionally formed or machine formed.

Concrete reinforcement shall be welded wire fabric or fiber reinforcement except, at all commercial driveways

both the sidewalk and the driveway must be reinforced with welded wire fabric. They may be additionally reinforced with fiber reinforcement.

When using fiber reinforcement it shall be added to the concrete at a rate of 0.9 kg of fibers per cubic meter of concrete. Fibers shall be added to the concrete during batching under supervision of the Regional Materials Engineer, or using a method approved by the Director, Materials Bureau. Batch an appropriate volume of concrete such that whole standard size bags or packages of fibers are used. It is the responsibility of the producer to indicate on each delivery ticket the amount of fibers added to the concrete.

A. Conventionally Formed Sidewalks and Driveways. Forms shall be free from warp, extend to the full depth of the sidewalk or driveway, and be secured so no displacement will occur during the placement of concrete. Reinforcement may be either fiber or wire fabric. When using wire fabric for concrete reinforcement, embed it at mid-depth in the slab.

Place the concrete in one course to the full depth shown in the contract documents. Immediately after placement of the concrete thoroughly compact the concrete with internal mechanical vibrating equipment. Internal mechanical vibrators shall be adequately powered, capable of transmitting vibration to the concrete in frequencies of not less than 5,000 vibrations per minute while inserted in concrete and shall produce a vibration of sufficient intensity to consolidate the concrete into place without separation of the ingredients. The vibrating element shall be vertically inserted in the concrete mass at a depth sufficient to vibrate the entire depth. It shall be withdrawn completely from the concrete before being advanced to the next point of application. Vibrate at evenly spaced intervals not farther apart than the radius over which the vibration is visibly effective and at a distance close enough to the forms to effectively vibrate the surface concrete. The time of vibration shall be of sufficient duration to accomplish thorough consolidation, produce dense, smooth surfaces free from aggregate pockets, honeycombing, and air bubbles; and to work the concrete into all angles and corners of the forms. However, over-vibration shall be avoided. Vibration shall be continued in one place until the concrete has become uniformly plastic, but not to the extent that pools of grout are formed. Vibration shall be supplemented by working or spading by hand in the corners and angles of forms and along form surfaces while the concrete is plastic. Vibrators shall not be used to push or distribute the concrete laterally.

The use of mechanical screeding or finishing equipment (such as a jitterbug) shall not be allowed. Only hand screeding and finishing shall be allowed.

B. Machine-Formed Sidewalk. Machine-formed paving consists of a single paver capable of placing, spreading, consolidating, screeding, and finishing the concrete such that hand finishing is kept to a minimum. Use equipment guided by a reference system that ensures the pavement is placed to the specified line, grade, and cross section. Use a self-propelled paver equipped with rigid side forms that laterally support the concrete and minimize edge slumping, a full-width finishing pan, and attached internal vibrators capable of consolidating the entire concrete placement. The equipment proposed for use by the Contractor shall demonstrate the capability of placing the concrete in accordance with these specifications.

Apply the provisions of §569-3.05 E. *Central and Transit Mixed Concrete* to maintain desired slump during the concrete placement.

The reinforcement shall be fibers. Water additions at the point of deposition may be made according to §569-3.05 E.

C. Finishing. Only magnesium floats and trowels are allowed. The use of aluminum or steel finishing trowels and tools is prohibited. The concrete shall be finished to produce a smooth surface and then lightly broomed to a uniform texture. The edges and scored joints of all sidewalk slabs shall be tooled with an edging tool having a 6 mm radius.

Unless otherwise specified in the contract documents, the concrete surface shall be scored and tooled at intervals of 1.5 m. Score the concrete a minimum 3 mm to a maximum 6 mm in width and to a minimum depth of one-third the total thickness.

D. Curing. Immediately after finishing, and not more than 30 minutes after concrete placement, apply a clear with fugitive dye *Membrane Curing Compound* meeting §711-05 at a rate of 1 liter per 3.5 square

meters. Do not apply curing compound in the rain. If rain damages the curing compound before it sets, reapply curing compound immediately after the concrete surface dries. Alternative curing methods shall be approved by the Director, Materials Bureau.

Concrete must be cured for a minimum of six days in colder weather. Colder weather and the methods of curing during colder weather are described as follows: If the ambient air temperature falls, or is expected to fall below 4° C anytime during the curing period of the concrete placement, a supply of blankets meeting §711-07 *Form Insulating Materials for Winter Concreting* must be provided at the work site that is sufficient to cover all concrete placed. Use material capable of maintaining a surface temperature of 13° C. Apply the insulating material to prevent the newly placed concrete from being exposed to ambient air temperatures at the surface below 2° C during the curing period. Secure and overlap the insulation tight to the concrete surface to prevent air intrusion beneath the insulation. Extend these materials a minimum of 300 mm beyond the edge of the concrete. Place recording surface thermometers between the concrete surface and the insulating material and 300 mm from the outside edge of concrete wherever insulation is used. Use four equally spaced thermometers for each day's placement. When insulation is needed it must remain in place for the curing period. Do not subject the concrete to a temperature drop in excess of 10° C during the first 24 hours after removing the insulation. If the concrete temperature falls below 0° C or the concrete is cold-weather damaged as determined by the Engineer, it shall be removed and replaced at the Contractor's expense.

Cure all driveways and sidewalks at driveways for a minimum of three days prior to opening to vehicle traffic. In colder weather, as defined above, extend the curing period to six days unless other provisions to determine strength are provided and approved by the Director, Materials Bureau.

If saw cutting is necessary use diamond blade saws capable of making straight cuts to the dimensions required. Saws must be equipped with cutting guides, blade guards, water cooling systems, dust controls, and cut depth control.

E. Accelerated-Cure Sidewalks and Driveways. When specified in the plans that an accelerated cure sidewalk and/or driveway is required at a commercial driveway all the provisions for constructing sidewalks and driveways outlined above shall apply with the following exceptions: Only conventional forming with wire fabric reinforcing is allowed. Apply curing compound as outlined in "D" above. To reduce the time needed to reach the required opening compressive strength the concrete must be covered with blankets meeting §711-07 *Form Insulating Materials for Winter Concreting* such that the concrete curing temperature reaches a minimum 15° C above ambient air temperature. Secure the insulation tight to the concrete surface to prevent air intrusion beneath the insulation. Extend these materials a minimum of 300 mm beyond the edge of the concrete. Place recording surface thermometers between the concrete surface and the insulating material and 300 mm from the edge of concrete wherever insulation is used. Use four thermometers for each day's placement. These thermometers may be equally spaced at one location or placed at separate locations depending on the nature of the placements. Also, use one recording thermometer for ambient air temperature. At the request of the Contractor external heat meeting the requirements of §555-3.08, C, 2. *Provision of External Heat* may be applied to the concrete.

Compressive strength cylinders for determining strength gain must be cast at the time of placement. These cylinders must be kept insulated with the placement. Cylinders shall be broken at times requested by the Contractor until the minimum compressive strength of 14 MPa is reached. Alternate means to determine concrete maturity may be considered with approval of the Director, Materials Bureau by coordinating cylinder compressive strengths to concrete curing temperature.

608-3.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. The provisions under §402-3 *Construction Details for Hot Mix Asphalt (HMA) Pavements*, shall apply.

The sidewalks, driveways, bicycle paths, and vegetation control strips shall be constructed as indicated in the contract documents (including the Standard Sheets).

608-3.03 Brick-Paved Sidewalks and Driveways. All brick pavers shall be laid in the pattern shown in the contract documents or as directed by the Engineer to provide a uniformly even surface. Joints shall be hand tight unless otherwise specified. No brick pavers shall be laid or grouted in freezing weather.

A dry mixture of mortar for brick paving shall be swept over the brick pavers until the joints are

completely filled. The joints shall be lightly wetted with water. Brick pavers shall be cleaned of excess mortar, and joints shall be finished prior to the mortar setting up. All brick paving shall be kept moist for 4 days after filling the joints with mortar. After the 4 day curing period, removal of remaining mortar film may be accomplished by the use of a light acid wash (10% solution of hydrochloric or muriatic acid) followed by flushing clean with water or as approved by the Engineer. Care shall be taken to avoid the use of acid in areas where runoff could damage trees or other vegetation.

All brick pavers used over tree pits shall be laid in a 75 mm bed of *Cushion Sand*, §703-06 with sand filled joints.

A. Brick-Paved Sidewalks and Driveways (Sand Setting Bed). Brick pavers shall be laid in a properly compacted 50 mm bed of cushion sand over the specified subbase or subgrade.

B. Brick-Paved Sidewalks and Driveways (Mortar Setting Bed). Brick pavers shall be laid in a bed of mortar with a minimum thickness of 25 mm over the specified concrete or bituminous subbase.

C. Brick-Paved Sidewalks and Driveways (Bituminous Setting Bed). Brick pavers shall be laid in a 20 mm thick bituminous setting bed over the specified concrete or bituminous subbase. The setting bed shall consist of PG binder 64-22 mixed with fine aggregate meeting the requirements of §703-01. Alternate PG binder grades may be allowed by the RME in lieu of PG 64-22. The PG binder will meet the requirements outlined in Section 702 *Bituminous Materials*, Table 702-1 *Performance-Graded Binders for Paving*. The PG binder shall be 7.0% of the total batch weight. The mix shall be heated to approximately 163°C. A coating of neoprene-modified asphalt adhesive shall be applied by mopping, squeegeeing or troweling over the top surface of the setting bed to provide bond under the bricks.

D. Brick-Paved Sidewalks and Driveways (Sand-Cement Setting Bed). Brick pavers shall be laid on a 50 mm setting bed of sand-cement over the specified subbase. The sand-cement setting bed shall not be placed more than 4 hours prior to installing the brick paving.

E. Brick-Paved Sidewalks and Driveways (Optional Concrete Setting Bed). The Contractor shall have the option of installing Brick Paved Sidewalks and Driveways by one of the following methods:

1. Bricks shall be laid on a bed of cement concrete as specified in the contract documents. The bricks shall be laid in the cement concrete while it is still fresh as approved by the Engineer and they shall be firmly positioned to provide a uniformly even surface, and solid bedding under each brick.
2. Bricks shall be laid as provided for under *"Brick-Paved Sidewalks and Driveways (Mortar Setting Bed)"* provided the finished surface shall conform to the lines and grades shown in the contract documents.

608-3.04 Grouted Stone Block Paved Sidewalks and Driveways. All grouted stone block pavers shall be laid in the pattern shown in the contract documents or as directed by the Engineer to provide a uniformly even surface. Joints between blocks shall be a maximum of 32 mm or as specified. No blocks shall be laid or grouted in freezing weather.

Unless otherwise approved by the Engineer, a dry mixture of mortar as specified for *Brick-Paved Sidewalks and Driveways*, §608-2.03, shall be swept over the stone blocks until the joints are completely filled and the joints lightly wetted with water prior to the mortar setting up. All grouted stone block paving shall be kept moist for four days after filling the joints with mortar. After the four day curing period, removal of remaining mortar film may be accomplished by the use of a light acid wash (10% ± solution of hydrochloric acid) followed by flushing clean with water, or as approved by the Engineer. Care shall be taken to avoid the use of acid in areas where runoff could damage trees or other vegetation.

All blocks used over tree pits shall be laid in a 25 mm bed of cushion sand with sand filled joints.

A. Grouted Stone Block Paved Sidewalks and Driveways (Sand Setting Bed). Blocks shall be laid in a 75 mm bed of cushion sand over the specified subbase or subgrade.

B. Grouted Stone Block Paved Sidewalks and Driveways (Mortar Setting Bed). Blocks shall be laid in a bed of mortar with a minimum thickness of 25 mm over the specified concrete or bituminous subbase.

C. Grouted Stone Block Paved Sidewalks and Driveways (Sand-Cement Setting Bed). Blocks shall be laid on a 50 mm setting bed of sand-cement over the specified subbase. The sand-cement setting bed shall not be placed more than 4 hours prior to installing the block paving.

D. Grouted Stone Block Paved Sidewalks and Driveways (Optional Concrete Setting Bed). The Contractor shall have the option of installing Grouted Stone Block Paved Sidewalks and Driveways by one of the following methods:

1. Blocks shall be laid on a bed of cement concrete as specified in the contract documents. The blocks shall be laid in the cement concrete while it is still fresh as approved by the Engineer and they shall be firmly positioned to provide a uniformly even surface, and solid bedding under each stone block.
2. Blocks shall be laid as provided for under *"Grouted Stone Block Paved Sidewalks and Driveways (Mortar Setting Bed)"* provided the finished surface shall conform to the lines and grades shown in the contract documents.

608-3.05 Precast Concrete Block Paved Sidewalks and Driveways. Precast Concrete Driveway and Sidewalk Pavers shall be laid in the pattern shown in the contract documents or as directed by the Engineer to provide a uniformly even surface. Joints shall be hand tight unless otherwise specified. No pavers shall be laid in freezing weather.

After the pavers are in place, an approved sand joint filler shall be swept over the pavers until the joints are completely filled.

Unless otherwise specified in the contract documents, or directed by the Engineer, the Contractor shall install the pavers in accordance with the manufacturer's recommended procedures.

Precast Concrete Block Paved Sidewalks and Driveways (Granular Material Setting Bed). Unless otherwise specified in the contract documents, Precast Concrete Driveway and Sidewalk Pavers shall be laid on a setting bed not to exceed 50 mm of uniformly compacted material placed over the specified subbase.

608-3.06 Surface-Applied Detectable Warning Units. Surface-applied detectable warning units may be applied to existing curb ramps, formed and bonded to existing curb ramps, or as otherwise directed by the manufacturer or specified in the Contract Documents.

Follow all applicable manufacturers' requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility.

608-3.07 Embedded Detectable Warning Units. Embedded detectable warning units may be installed in plastic concrete, installed directly on existing subbase prior to placing concrete, inlaid on prepared concrete surfaces or as otherwise directed by the manufacturer or specified in the Contract Documents.

Follow all applicable manufacturers' requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility.

608-3.08 Stamped Concrete Detectable Warnings. Apply §608-3.01 with the following modifications:

Prior to the start of work, the Contractor shall provide a contract-site sample that meets the dimensional requirements of the current Standard Sheet for Detectable Warnings and meets the approval of the Engineer. The sample may be constructed as part of the contract.

Color hardening powder, if used to color the surface of the concrete, shall be applied to the finished concrete in accordance with the manufacturer's recommendations.

If required, construct as many test panels as are necessary to achieve a sample panel that is satisfactory to the Engineer. All completed surfaces shall conform to the appearance of the approved sample.

608-4 METHOD OF MEASUREMENT

608-4.01 Portland Cement Concrete Sidewalks and Driveways. Portland Cement concrete sidewalks and driveways will be measured by the number of cubic meters of cement concrete installed, measured to the nearest 0.1 cubic meters.

608-4.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. Hot mix asphalt sidewalks, driveways, bicycle paths, and vegetation control strips will be measured by the number of metric tons of hot mix asphalt furnished and incorporated in the work. A QAF of 1.00 will be assigned to material meeting specification requirements as certified by the QCT. A QAF of 0.85 will be assigned to material that fails to meet the specification as tested by the QAT. Quality Units will be determined when there is a disincentive and will be calculated as per §402-4, *Method of Measurement.*

608-4.03 Brick-Paved Sidewalks and Driveways. Brick paving shall be measured as the number of square meters installed, measured to the nearest 0.1 square meter.

608-4.04 Grouted Stone Block Paved Sidewalks and Driveways. Grouted stone block paving shall be measured as the number of square meters installed, measured to the nearest 0.1 square meter.

608-4.05 Precast Concrete Block Paved Sidewalks and Driveways. Precast concrete paving will be measured by the number of square meters installed, measured in the field to the nearest 0.1 square meter.

608-4.06 Surface-Applied Detectable Warning Units. Surface-applied detectable warning units will be measured as the number of square meters installed, measured in the field to the nearest 0.1 square meter.

608-4.07 Embedded Detectable Warning Units. Embedded Detectable Warning Units will be measured as the number of square meters installed, measured in the field to the nearest 0.1 square meter.

608-4.08 Stamped Concrete Detectable Warnings. Stamped concrete detectable warnings will be measured as the number of square meters installed, measured in the field to the nearest 0.1 square meter.

608-5 BASIS OF PAYMENT

608-5.01 Portland Cement Concrete Sidewalks and Driveways. The unit price bid per cubic meter shall include the cost of labor, materials, and equipment necessary to satisfactorily complete the work, including preparing the subgrade, saw cutting and wire fabric reinforcement, except that any necessary excavation and subbase course will be paid for under their appropriate items.

Payment at the unit bid price will be made after the concrete sidewalk or driveway, and curing application have been properly placed.

608-5.02 Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips. The unit price bid per metric ton shall include the cost of preparing the subgrade and all materials, equipment and labor (including milling, cleaning surfaces, tack coat, saw cut, truing and leveling courses, etc.) necessary to complete the work as specified except that any necessary excavation and subbase course will be paid for under their appropriate items. When there is a disincentive, the payment adjustment will be made based on the Index Price listed in the contract documents. The index price shown in the itemized proposal for each Quality Unit shall be considered the price bid. The unit (index) price is NOT to be altered in any manner by the bidder. Should the bidder alter the price shown, the altered figure will be disregarded and the original price will be used to determine the total amount bid for the contract.

608-5.03 Brick-Paved Sidewalks and Driveways. The price bid per square meter shall include the cost of furnishing all labor, materials and equipment necessary to satisfactorily complete the work, including setting bed material, except that any necessary excavation and subbase course will be paid for under their appropriate items.

608-5.04 Grouted Stone Block Paved Sidewalks and Driveways. The unit bid per square meter shall include the cost of furnishing all labor, materials and equipment necessary to satisfactorily complete the work,

including setting bed material, except that any necessary excavation and subbase course will be paid for under their appropriate items.

608-5.05 Precast Concrete Block Paved Sidewalks and Driveways. The unit price bid per square meter shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including setting bed material, except that any necessary excavation and subbase course will be paid for under their appropriate items.

608-5.06 Surface-Applied Detectable Warning Units. The unit bid price per square meter shall include all labor, material, and equipment necessary to satisfactorily complete the work, including surface preparation.

608-5.07 Embedded Detectable Warning Units. The unit bid price per square meter shall include all labor, material, and equipment necessary to satisfactorily complete the work, including bedding material. No adjustment shall be made for concrete removed to accommodate embedded units.

608-5.08 Stamped Concrete Detectable Warnings. The unit bid price per square meter shall include all labor, material, and equipment necessary to satisfactorily complete the work, including construction of contract site sample(s).

Payment will be made under:

Item No.	Item	Pay Unit
608.0101	Concrete Sidewalks and Driveways	Cubic Meter
608.0102	Accelerated-Cure Sidewalks and Driveways	Cubic Meter
608.020102	Hot Mix Asphalt (HMA) Sidewalks, Driveways, Bicycle Paths, and Vegetation Control Strips	Metric Ton
608.020112	Plant Production Quality Adjustment to 608.020102	Quality Unit
608.03	Brick-Paved Sidewalks and Driveways (Sand Setting Bed)	Square Meter
608.04	Brick-Paved Sidewalks and Driveways (Mortar Setting Bed)	Square Meter
608.05	Brick-Paved Sidewalks and Driveways (Bituminous Setting Bed)	Square Meter
608.06	Brick-Paved Sidewalks and Driveways (Sand-Cement Setting Bed)	Square Meter
608.07	Brick-Paved Sidewalks and Driveways (Optional Concrete Setting Bed)	Square Meter
608.08	Grouted Stone Block Paved Sidewalks and Driveways (Sand Setting Bed)	Square Meter
608.09	Grouted Stone Block Paved Sidewalks and Driveways (Mortar Setting Bed)	Square Meter
608.10	Grouted Stone Block Paved Sidewalks and Driveways (Sand-Cement Setting Bed)	Square Meter
608.11	Grouted Stone Block Paved Sidewalks and Driveways (Optional Concrete Setting Bed)	Square Meter
608.12	Precast Concrete Block Paved Sidewalks and Driveways (Granular Material Setting Bed)	Square Meter
608.20	Surface-Applied Detectable Warning Units	Square Meter
608.21	Embedded Detectable Warning Units	Square Meter
608.22	Stamped Concrete Detectable Warning Units	Square Meter

Page 827 - ***delete*** **"711-01 (VACANT)"**, and ***replace*** with the following:

"711-01 FIBERS FOR CONCRETE REINFORCEMENT

SCOPE. This specification covers the material requirements for fibers for concrete reinforcement.

MATERIAL REQUIREMENTS. Synthetic, fibrillated fibers, specifically engineered and manufactured for use as secondary concrete reinforcement meeting ASTM C1116 Type III.

BASIS OF ACCEPTANCE. Acceptance will be based on the product name and manufacturer appearing on the Department's Approved List and material certification that states the product conforms to this specification."

Page 961 - ***delete*** **"SECTION 726 (VACANT)"**, and ***replace*** with the following:

"SECTION 726 – DETECTABLE WARNING UNITS

726-01 – SURFACE-APPLIED DETECTABLE WARNING UNITS

SCOPE. This specification covers the material and quality requirements for surface-applied detectable warning units.

MATERIAL REQUIREMENTS. Surface-applied detectable warning units shall conform to the dimensions shown on the current standard sheet for detectable warnings.

Units shall be composed of cementitious materials, steel, iron, plastics, polymeric materials, resins, pigments, or as approved by the Director, Materials Bureau. The units shall be an approximate visual match to the color specified in the Contract Documents. Units shall provide the required contrast (light-on-dark or dark-on-light) with the adjacent curb ramp or other applicable walkway. The units shall be uniform in color and texture, be free of cracks or other defects, and have clean-cut and well-defined edges.

Units shall adhere to hot mix asphalt (HMA) or Portland cement concrete (PCC) surfaces at a minimum air temperature of 16°C, and a minimum surface substrate temperature of 21°C. They shall be weather resistant and durable to normal pedestrian wear and maintenance activities, and show no appreciable fading, lifting, or shrinkage. The units shall be capable of molding or fitting itself to the contours, breaks, and faults of HMA or PCC surfaces, and show no significant tearing, rollback, lifting, or other signs of poor adhesion. The units shall have friction characteristics similar to a broomed PCC surface.

The detectable warning units shall meet the following physical properties:

Standard	Property	Results
ASTM C501	Wear Resistance	Wear Index: > 15
ASTM C1028	Slip Resistance	Dry Coefficient of friction 0.8 minimum
ASTM E96	Water Vapor Transmission	100 grams/square meter/24 hours
Various	Adhesion/Bonding Strength	See Note*

*Note: Due to the various types of materials available, the manufacturer shall certify, through independent laboratory testing, that the type of material used for detectable warnings will bond to a prepared surface.

PACKAGING AND SHIPMENT. Preformed, surface-applied, detectable warning units shall be shipped and packaged in accordance with commercially accepted standards. The following information shall be marked on each package or on the shipping invoice: the name of the product, the name and address of the manufacturer, and the quantity of material.

BASIS OF ACCEPTANCE. Acceptance of this material for placement on the Approved List will be based on the manufacturer's certification of compliance with these requirements and in accordance with procedural directives of the Materials Bureau. Contract acceptance will be based on the manufacturer's name appearing on the Department's Approved List.

726-02 – EMBEDDED DETECTABLE WARNING UNITS

SCOPE. This specification covers the material and quality requirements for embedded detectable warning units.

MATERIAL REQUIREMENTS. Embedded detectable warning units shall conform to the dimensions shown on

the current standard sheet for detectable warnings.

Units shall be composed of cementitious materials, steel, iron, clay, shale, plastics, polymeric materials, resins, pigments, or as approved by the Director, Materials Bureau. The units shall be an approximate visual match to the color specified in the Contract Documents. Units shall provide the required contrast (light-on-dark or dark-on-light) with the adjacent curb ramp or other applicable walkway. The units shall be uniform in color and texture, be free of cracks or other defects, and have clean-cut and well-defined edges.

Where applicable, the units shall adhere to hot mix asphalt (HMA) or Portland cement concrete (PCC) surfaces at a minimum air temperature of 16°C, and a minimum surface substrate temperature of 21°C. They shall be weather resistant and durable to normal pedestrian wear and maintenance activities, and show no appreciable fading, lifting, or shrinkage. The units shall have friction characteristics similar to a broomed PCC surface.

The detectable warning units shall meet the following physical properties:

Property	Results
Compressive Strength, Min., 28 days	55 MPa Minimum
Freeze-thaw Loss (25 Cycles, one per day, 10% NaCl solution) in accordance with NY Test Method 502-3P	1.0% Maximum

PACKAGING AND SHIPPING. Embedded detectable warning units shall be shipped and packaged in accordance with commercially accepted standards. The following information shall be marked on each package or on the shipping invoice: the name of the product, the name and address of the manufacturer, and the quantity of material.

BASIS OF ACCEPTANCE. Acceptance of this material for placement on the Approved List will be based on the manufacturer's certification of compliance with these requirements and in accordance with procedural directives of the Materials Bureau. Contract acceptance will be based on the manufacturer's name appearing on the Department's Approved List."