2016 ROAD AND BRIDGE SPECIFICATIONS

DIVISION VII—TRAFFIC CONTROL DEVICES

SPECIAL PROVISION COPIED NOTES (SPCNs),
SPECIAL PROVISION (SPs)
and SUPPLEMENTAL SPECIFICATIONS (SSs)

Specifications may also be found at the following locations:

- VDOT Web (Global Web Access)
- OutsideVDOT (Accessible by permission only)
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GUIDELINES – Asphalt projects (surface treatment only). Not needed when Volume 2 surface treatment is used. (2007-c704cm1)

Sweeping Prior to Pavement Marking — No earlier than 7 days after completion of surface treatment the Contractor shall sweep the roadway surface prior to installation of permanent pavement markings. Permanent pavement markings shall be installed within 30 calendar days after completion of surface treatment placement. The cost of sweeping the roadway prior to installing pavement marking shall be included in the price bid for pavement marking.

7-28-14; Reissued 7-12-16 (SPCN)
GUIDELINES – Asphalt resurfacing (surface treatment, slurry seal and latex only). Not needed when Volume 2 surface treatment and slurry/latex is used. [2007-c704bm1]

COVERING CLEANING AND INSPECTING EXISTING RAISED PAVEMENT MARKERS — The Contractor shall cover all existing raised pavement markers with a non-stick covering. The Contractor shall ensure that no resurfacing material, duct tape, or adhesive comes into contact with the retroreflector. The covering shall extend to include an area of 12 inches in front and in back of the casting, and the entire width of the casting.

After completion of the resurfacing operation, the covering shall be removed. If the existing raised pavement marker retroreflectors are dirtied during paving operations (including dirtying from adhesive residue), they shall be fully cleaned or replaced by the Contractor to ensure minimum retroreflectivity as defined in Section 235 of the Specifications. Any raised markers (including retroreflectors and/or castings) damaged by the Contractor’s operations shall be replaced by the Contractor and properly disposed of at no expense to the Department. Replacement castings shall not be placed in the same location as the existing castings. The void left by the dislodged casting shall be repaired according to the Specifications, and the replacement raised pavement marker properly installed in a new location at least 3 inches from the repair.

The covering, cleaning, and inspection of the raised markers will not be measured for payment. All cost for performing this work shall be included in the price bid for other items of work.

9-17-15c; Reissued 7-12-16 (SPCN)
GUIDELINES — Maintenance schedule projects only. (2007-S704M06)

SECTION 704.04—MEASUREMENT AND PAYMENT of the Specifications is amended to include the following:

The Schedule of Items may contain permanent pavement marking bid items designated as “Bonus” in addition to the regular permanent pavement marking bid items. This “Bonus” designation indicates an adjustment of 1.25 to be made to the regular Contract unit bid price for the designated item according to Section 102.05 of the Specifications which is to be paid to the Contractor if the conditions specified herein are met. For items with the “Bonus” designation the Contractor will be paid at the adjusted price instead of at the regular bid price for the linear foot of permanent pavement marking installation completed if the following conditions are met:

- **Plant Mix**: Pavement markings (not including Type B, Class VI) are installed on Plant Mix surfaces within 14 days or less after the last day of paving.

- **Non-Plant Mix**: Pavement markings (not including Type B, Class VI) are installed on Non-Plant Mix surfaces within 21 days or less after the last day of paving.

7-12-16 (SPCN)
GUIDELINES — For projects with signs, signals or lighting that must conform to AASHTO’s Standard Specifications for structural support for these items.

SP700-000180-01

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
MODIFICATIONS TO AASHTO’S SIGN STRUCTURE SPECIFICATION

July 25, 2016

I. GENERAL REQUIREMENTS

Lighting (conventional and high mast), signal (overhead, mast arm and span wire), pedestal poles, overhead (span, cantilever and butterfly) sign structures and ITS structures (camera poles, dynamic message signs (DMS), etc.) shall conform to the requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (LTS-6), 2013 with 2015 interims as modified by this Special Provision. Any AASHTO Specification optional design parameter noted as “may be used at the discretion of the owner” that are not addressed in this document shall not be used for design.

Modifications to span or height limits shown on the plans shall be approved by the Regional Traffic Engineer.

II. WIND LOADING (LTS-6 Article 3.8 and Appendix C)

1. The alternate method for wind pressures provided in AASHTO Appendix C shall be used. Linear interpolation between wind contours is not permitted. The next higher contour shall be used for design. Reduced forces shall not be used for free swinging traffic signal and free swinging sign wind loadings.

2. LTS-6 Article C.2 is supplemented with the following: Wind speeds using 50-year mean recurrence shall be used for all conventional light poles, high mast light poles, ITS device support poles and overhead sign structures (span, cantilever and butterfly).

3. Mast arm signal poles, mast arms, and strain poles shall be designed using the following wind speeds:

<table>
<thead>
<tr>
<th>VDOT Traffic Operations Region</th>
<th>VDOT Districts Within That Region</th>
<th>Design Wind Speed for strain poles, mast arms, and mast arm poles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest</td>
<td>Bristol, Salem, and Lynchburg</td>
<td>70 MPH</td>
</tr>
<tr>
<td>Northwest</td>
<td>Staunton and Culpeper</td>
<td>70 MPH</td>
</tr>
<tr>
<td>Northern</td>
<td>Northern Virginia</td>
<td>80 MPH</td>
</tr>
<tr>
<td>Central</td>
<td>Richmond and Fredericksburg</td>
<td>80 MPH</td>
</tr>
<tr>
<td>Eastern</td>
<td>Hampton Roads</td>
<td>90 MPH</td>
</tr>
</tbody>
</table>

Mast arm signal pole and strain pole foundations shall be designed for wind speeds at the foundation location using the 25-year mean recurrence.
4. For special wind regions in Bristol District shown in Figure 3.8.3-2 of LTS-6, the selection of the design wind speed shall consider localized effects. The minimum design wind speed for 50 year mean in these areas is 90 MPH, 25 year mean in these areas is 80 MPH and 10 year mean in these areas is 70 MPH.

5. For bridge mounted structures, light poles and other site condition where structures may be elevated above the surrounding terrain, the height factor used shall be increased to account for the increased wind effects.

III. STEEL DESIGN

1. **Laminated Structures (LTS-6 Article C5.1):** Laminated or multi-ply structures shall only be used in tapered sections.

2. **Holes and Cutouts, Unreinforced and Reinforced (LTS-6 Article 5.14.5):** The location and size of hand holes and cutouts shall be in accordance with the details shown in the Standard Drawings. For high mast light poles, the width of unreinforced and reinforced holes and cutouts in the cross-sectional plane of the tube shall not be greater than 50 percent of the tube diameter at that section.

3. **Welding:** A connection detail using a full penetration groove weld with a backing ring may be considered for signal mast arms and high mast light poles. The backing ring shall be attached at the top and bottom face of the ring using a continuous fillet weld.

4. **Diameter:** Mast arm signal pole structures shall have the following maximum column and arm outside diameters, unless approved otherwise by the Engineer. If the Contractor is proposing column diameters or arm diameters that exceed these maximums, then the Contractor’s submittal shall document the cost benefits to the Department that would be achieved by using the larger diameter. Calculations and drawings for both the maximum diameter and the desired size shall be included. Submittals shall also provide specific steel and fabrication cost details and structural benefits that would be achieved by using the larger diameter.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Arm Length</th>
<th>Design Loading</th>
<th>Max. column diameter at base of column</th>
<th>Max. arm diameter at base of arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual arm</td>
<td>Length of one arm exceeds 70 feet or total length of both arms exceeds 130 feet</td>
<td>Varies (Project specific loads will be provided by work order)</td>
<td>22 inches</td>
<td>20 inches</td>
</tr>
<tr>
<td></td>
<td>All other dual-arm structures</td>
<td>Design loading does not exceed Standard Drawing MP-3</td>
<td>20 inches</td>
<td>18 inches</td>
</tr>
<tr>
<td>Single arm</td>
<td>&gt; 75 feet</td>
<td>Varies (Project specific loads will be provided by work order)</td>
<td>22 inches</td>
<td>20 inches</td>
</tr>
<tr>
<td></td>
<td>≤ 75 feet</td>
<td>“Case 2” loading as per Standard Drawing MP-3</td>
<td>22 inches</td>
<td>20 inches</td>
</tr>
</tbody>
</table>
IV. FATIGUE DESIGN

1. Fatigue Importance Categories (LTS-6 Article 11.6): The following fatigue importance categories shall apply to structures:

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Span Length*, ft.</th>
<th>Fatigue Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>All structures supporting dynamic message signs</td>
<td>All span lengths</td>
<td>Category I</td>
</tr>
<tr>
<td>Overhead sign span structure</td>
<td>&gt; 150</td>
<td>Category I</td>
</tr>
<tr>
<td></td>
<td>≤ 150</td>
<td>Category II</td>
</tr>
<tr>
<td>Overhead sign cantilever structure</td>
<td>&gt; 50</td>
<td>Category I</td>
</tr>
<tr>
<td></td>
<td>≤ 50</td>
<td>Category II</td>
</tr>
<tr>
<td>Overhead sign butterfly structure</td>
<td>All span lengths</td>
<td>Category II</td>
</tr>
<tr>
<td>Signal mast arm structure**</td>
<td>&gt; 75</td>
<td>Category I</td>
</tr>
<tr>
<td></td>
<td>50 to ≤ 75</td>
<td>Category II</td>
</tr>
<tr>
<td></td>
<td>&lt; 50</td>
<td>No fatigue design required</td>
</tr>
<tr>
<td>Overhead signal structure</td>
<td>&gt; 190</td>
<td>Category I</td>
</tr>
<tr>
<td></td>
<td>≤ 190</td>
<td>Category II</td>
</tr>
<tr>
<td>High mast light poles</td>
<td>All lengths</td>
<td>Category I</td>
</tr>
<tr>
<td>Signal span wires, conventional lights poles and ITS device support poles (excluding DMS)</td>
<td>No fatigue design required</td>
<td></td>
</tr>
</tbody>
</table>

*Span length is defined as center-to-center of column(s) for span structure and face-of-column to tip of arm for cantilever and signal structures.

**For twin mast arms, The pole, arms and connections shall be designed for the applicable fatigue category for the longest arm attached.

2. Mitigation Devices (LTS-6 Article 11.6 and 11.7.1): Mitigation devices shall not be used in lieu of designing for fatigue.

3. Aluminum light poles (LTS-6 Article 11.6 and 11.7.1): Internal first and second mode vibration dampeners shall be provided and installed according to the manufacturer’s instructions in all cases. External dampeners may be used if approved by the Engineer.

4. Galloping Loads (LTS-6 Article 11.7.1): Galloping loads shall not be considered in the design of overhead sign cantilevered structures with four chord trusses, signal mast arm structures, and multi-chord overhead signal structures.
5. **Truck-Induced Gust Loads (LTS-6 Article 11.7.1.3):** Truck induced gust loads shall not be considered in the design of signal mast arm and overhead signal structures.

6. **Vertical Deflection (LTS-6 Article 11.8):** The vertical deflection of the free end of the arm for overhead sign cantilevered structures due to the wind load effects of galloping or truck-induced gusts shall not exceed 8”.

V. **FOUNDATION DESIGN**

The AASHTO Standard Specifications for Highway Bridges, 1996; 1997 and 1998 Interim Specifications, as referenced in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, are modified as follows:

1. **Geotechnical Design:** The factor of safety shall be as follows:

<table>
<thead>
<tr>
<th>MINIMUM FACTORS OF SAFETY¹</th>
<th>Drilled Shaft</th>
<th>Overhead Sign Structures and all other types of ancillary structures except for Mast arm traffic Signals</th>
<th>Mast arm traffic Signals</th>
<th>Spread Footing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tip resistance/ Bearing pressure</td>
<td>1.75</td>
<td>1.75</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Torsion/Sliding/Skin Friction</td>
<td>2.0²</td>
<td>1.3²</td>
<td>1.2³</td>
<td></td>
</tr>
<tr>
<td>overturning (Broms Method)</td>
<td>2.25</td>
<td>2.25</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

¹The factors of safety shown above already account for the 1.33/1.40 group overload/overstress factor. No reduction shall be applied to the design loading used in the analysis.

²Torsion Resistance shall be evaluated as specified by the AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (Seventh Edition, 2014) Section 10.8.3.5: Nominal Axial Compression Resistance of Single Drilled Shafts. A value of 1.0 shall be used in lieu of the resistance factors as shown in Table 10.5.5.2.4.1.

³Passive resistance shall be reduced by 50% to limit foundation movement.

In capacity calculations for the foundation design of a drilled shaft, the soil resistance of the top 1.5 feet shall be neglected in the analysis for torsion/skin friction/tip resistance. The full length of the shaft from the ground surface to the tip may be used in overturning/horizontal deflection. The remainder of the shaft may be assumed to be fully effective in supporting applied loads.

2. **Horizontal Deflection:** In lieu of Broms method, COM624P or other commercially available software may be used to evaluate the overturning of shafts and to estimate shaft deflections. For mast arm signals and span wire signals, the total horizontal deflection shall be limited to 0.75 inches at the ground level and the tip of the pile deflection shall not exceed -0.25 inches. For other structures, the total horizontal deflection shall be limited to 0.50 inches at the ground level and the tip of the pile deflection shall not exceed -0.15 inches. The loading used in the analysis shall not be reduced by the allowable overload/overstress factor. The shafts shall be modeled such that the nonlinear flexural rigidity (non-linear EI, or “cracked” section) is accounted for when the horizontal deflections are calculated.
3. **Reinforcement:** Where tremie placement of concrete is anticipated, a minimum spacing of 5 inches or 10 times the size of the largest coarse aggregate whichever is greater shall be provided in both horizontal and vertical direction. For dry shafts, a smaller space of 5 times the size of the largest coarse aggregate may be considered. A dry shaft is when the amount of standing water in the base of the shaft prior to concreting is less than or equal to 3 inches and water is entering the shaft at a rate of less than 12 inches/hour.
GUIDELINES — For projects involving traffic signals requiring SM-3 Signal Head Mounting Details - Mast Arm and SMD-2 Sign Mounting Details.

SP703-000100-00

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
MAST ARM HANGER ASSEMBLY STD SM-3 AND SMD-2

May 25, 2016; Issued July 12, 2016

I. Description

This work shall consist of furnishing and installing mast arm signal hanger assembly (Standard SM-3) and mast arm sign hanger assembly (Standard SMD-2) for new or relocated signals and signs on mast arms and replacing existing hanger assemblies.

II. Definitions

The following terms are used as follows in this special provision:

1. Mast Arm Hanger Assembly (Complete): An inclusive mast arm hanger assembly that consists of the main mount, swivel plate, mounting system, mounting tube, and miscellaneous hardware items.

2. Mast Arm Hanger Assembly (Components): Main mount, swivel plate, mounting system and miscellaneous hardware items (washers, screws, bolts, or nuts).

3. Main Mount: The bracket component that mounts against the mast arm signal pole. Once installed, this component is fixed and is not adjusted.

4. Swivel Plate: The bracket component(s) that mate to the main mount. The swivel plate can be adjusted along multiple axes to allow the signal mounting tube to be positioned at different angular orientations. The mounting tube is connected to the swivel plate.

5. Mounting System: Stainless steel cables which connect the main mount and mast arm signal pole.

6. Mounting Tube: The bracket component that holds the signal head assembly, camera, or sign panel bracing to the swivel plate.

7. Miscellaneous items: Other components of the hanger assembly not listed above, including but not limited to: tie back, or tether clamps which fasten the cable to the mounting tube; mounting arms; cover plates; hardware (washers, screws, bolts, or nuts); caps; and seals.

8. Special Tools: Unique tools identified by a specific item or product number in the manufacturer’s installation instructions.
III. Materials

As used below: XX, XXX or xx refers to stainless steel cable length, which shall be determined by the Contractor for the specific mast arm diameter at each installation location; YY or yy refers to the mounting tube length for sign panels, which shall be determined by the Contractor for the specific sign height at each location; ## refers to the channel width, which shall be determined by the Contractor for the specific sign width at each location.

1. Mast Arm Signal Hanger Assembly (Components) for Relocation or Maintenance Replacement – Signals
   Mast arm hanger components (main mount, swivel plate, mounting system, and associated miscellaneous items) used for signal relocation or maintenance replacement of signal hanger assemblies shall be of the following or approved equal:

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AB-3055-XX-SS-PNC</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CAN-BRAC, Model CBL-VUB-2CXX-9</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>RM - MAC - XX</td>
</tr>
<tr>
<td>Cost Cast, Inc.</td>
<td>Cost Cast Item # 1816-A-CXX</td>
</tr>
<tr>
<td>Sky Bracket</td>
<td>SKYBRACKET, Model SS-SBCXX-SCK-VA</td>
</tr>
</tbody>
</table>

2. Mast Arm Signal Hanger Assembly (Complete) - Signals
   Complete Mast Arm Hanger Assemblies used for new signals, relocated signals or maintenance replacement of signal hanger assemblies shall be of the following or approved equal:

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AG-0125-1-XX-SS-PNC</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CAN-BRAC, Model CBL-VUN1-T24-2Cyy-9</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>RM-1000C-XX-1</td>
</tr>
<tr>
<td>Cost Cast, Inc.</td>
<td>Cost Cast Item # 1816-G-CXX-24</td>
</tr>
<tr>
<td>Sky Bracket</td>
<td>SKYBRACKET, Model SS-SBCXX-18-VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AG-0125-3-XX-SS-PNC</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CAN-BRAC, Model CBL-VUN1-T46-2Cyy-9</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>RM-1000C-xx-3</td>
</tr>
<tr>
<td>Cost Cast, Inc.</td>
<td>Cost Cast Item # 1816-G-CXX-48</td>
</tr>
<tr>
<td>Sky Bracket</td>
<td>SKYBRACKET, Model SS-SBCXX-46-VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AG-0125-4-XX-SS-PNC</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CAN-BRAC, Model CBL-VUN1- T58-2Cyy-9</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>RM-1000C-xx-4</td>
</tr>
<tr>
<td>Cost Cast, Inc.</td>
<td>Cost Cast Item # 1816-G-CXX-60</td>
</tr>
<tr>
<td>Sky Bracket</td>
<td>SKYBRACKET, Model SS-SBCXX-60-VA</td>
</tr>
</tbody>
</table>
### 5-SECTION HEAD HANGER ASSEMBLY (CLUSTER)

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AG-0138-XX-SS-PNC</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CBL-VUN2-14-T37-2CXX-9</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>RM-SC-5000C-xx</td>
</tr>
<tr>
<td>Cost Cast, Inc.</td>
<td>Cost Cast Item # 1816-G-CXX-5X</td>
</tr>
<tr>
<td>Sky Bracket</td>
<td>SKYBRACKET, Model SS-SBCXX-SCB-46-VA</td>
</tr>
</tbody>
</table>

### 3. Mast Arm Sign Hanger Assembly (Components) for Relocation or Maintenance Replacement – Signs

Mast Arm Hanger Assembly components (main mount, swivel plate, mounting system, and associated miscellanies items) used for sign relocation or maintenance replacement of sign hanger assemblies shall be of the following or approved equal:

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AB-3055-XX-SS-PNC</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 16 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CBS-HU-Exx-2Cyy-3</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 20 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>RM-MAC-XX</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 15 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>Cost Cast, Inc.</td>
<td>Cost Cast Item # 1816-A-Cxx</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 16 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>Sky Bracket</td>
<td>SKYBRACKET, Model SS-SBCXX-SCK-VA</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 13 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>Xccessories Squared</td>
<td>PAX2PC30-XXX and PASCL316-XXXX</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 10 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
</tbody>
</table>

### 4. Mast Arm Sign Hanger Assembly (Complete) - Signs

Complete Mast Arm Hanger Assemblies used for new signs, relocated signs or maintenance replacement of sign hanger assemblies shall be of the following or approved equal:

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelco Products, Inc.</td>
<td>Galaxy, Model AG-0142-XX-XX-SS-PNC</td>
</tr>
<tr>
<td></td>
<td>Galaxy, Model AG-0144-XX-XX-SS-PNC</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 16 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>Traffic Hardware &amp; Design</td>
<td>CAN-BRAC, Model CBS-HU-Exx-2Cyy-3</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 20 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
<tr>
<td>General Traffic Equipment Corp.</td>
<td>SMA - 3000 – XX</td>
</tr>
<tr>
<td></td>
<td>1-Bracket per 15 Sq. Ft. of sign panel spaced per manufacturer’s installation instructions</td>
</tr>
</tbody>
</table>
IV. Procedures

All work shall be accomplished according to the manufacturer's installation instructions. Only the tools, special tools, and anti-seize lubricants specifically noted in the manufacturer’s installation instructions shall be used. If the Contractor deviates from the manufacturer’s installation instructions, the Contractor shall provide documentation from the manufacturer authorizing such deviations, including the use of alternate tools.

If a bolt tightening sequence is not specified in the manufacturer installation instructions, bolts shall be tightened in an alternating pattern for even compression.

If a main mount with fully tightened bolts requires adjustment that necessitates loosening of the main mount bolts, the mounting system and associated hardware for the mounting system (washers, screws, bolts or nuts) shall be replaced at no additional cost to the Department.

1. **Tools:** If maximum torque values are provided in the manufacturer’s installation instructions, a calibrated torque wrench shall be used to verify that torque has not been exceeded. The Contractor shall calibrate torque wrenches in accordance with torque wrench manufacturer recommendations at the interval recommended by the torque wrench manufacturer. The torque wrench calibration testing lab shall be ISO, or ANSI accredited for instrument calibration.

   If special tools are identified in the manufacturer’s instructions as being either required or recommended for installation the Contractor shall furnish no less than one set of tools to the Engineer per ten mast arm hanger assemblies or portion thereof, unless otherwise specified in the contract documents.

2. **Packaging:** All required components of each hanger assembly, except the mounting tube, shall be packaged as one set. The mounting tube may be packaged separately. If special tools are required, or recommended, they may be packaged separately. Under no circumstances shall the parts from multiple assemblies be mixed.

3. **New Signal or Sign Installations:** A Mast Arm Hanger Assembly (Complete) shall be used - see Table 2 for signals and Table 4 for signs.

   The Mast Arm Hanger Assembly (Complete) may be attached to the mast arm and all bolts tightened to final tightness before lifting and placing the mast arm onto the signal pole (i.e. on the ground- attached to the mast arm prior to installation of the mast arm).

4. **Relocate Existing Mast Arm Hanger Assemblies for Signals or Signs:** Existing Mast Arm Hanger Assemblies (main mount, swivel plates, mounting systems and all associated miscellaneous items) that are in service before the commencement of any project shall not be relocated on the same mast arm or reused on a different mast arm.
The initial relocation of each existing signal or sign from its location at commencement of the project (Location A) to a new location on a mast arm (Location B) may be accomplished using one of the following at the new location on a mast arm:

   a. A new Mast Arm Hanger Assembly (Complete) – see Table 2 for signals and Table 4 for signs or

   b. New Mast Arm Hanger Assembly (Components) – see Table 1 for signals and Table 3 for signs. Existing mounting tubes, cover plates, tie backs, and tether clamps may be reused if they are compatible with the new components;

Subsequent relocations of the signal or sign from Location B to another location may be accomplished by the Contractor using one of the following at the new location on a mast arm:

   a. A new Mast Arm Hanger Assembly (Complete) – see Table 2 for signals and Table 4 for signs; or

   b. New Mast Arm Hanger Assembly (Components) – see Table 1 for signals and Table 3 for signs. Existing mounting tubes, cover plates, tie backs, and tether clamps may be reused if they are compatible with the new components; or

   c. New mounting system. The existing hanger assembly equipment installed for the initial relocation from Location A to Location B may be reused.

5. **Modify Existing Hanger Assembly**: Modifying an existing mast arm hanger assembly at the same location on a mast arm shall be accomplished in accordance with the following:

   New Mast Arm Hanger Assembly (Components) – see Table 1 for signals and Table 3 for signs. Existing mounting tubes, cover plates, tie backs and tether clamps may be reused if they are compatible with the new components;

6. **Remove Existing Hanger Assembly**: Removing and disposing of an existing hanger assembly or components shall be in accordance with Section 510 of the Specifications.

7. **Prosecution of Work**: The Contractor shall prosecute work in accordance with Section 703.03 of the Specifications.

   While performing this work, if the Contractor discovers any mechanical or electrical problems with the signals, or discovers any problems that require immediate repair, the Contractor shall log each problem by intersection and signal head and advise the Engineer immediately. The Engineer will instruct the Contractor how to proceed.

   The Contractor shall exercise caution during prosecution of work to prevent damage to any existing wiring, or signal component. If the Contractor damages any existing wiring, or signal equipment, repair and replacement shall be at no additional cost to the Department.

V. **Reporting**

For each mast arm hanger assembly (Complete or Components) installed, the Contractor shall submit the attached Mast Arm Bracket Installation Report form to the Engineer. The form shall also be submitted to the Department’s email hangerassemblies@vdot.virginia.gov.

Hard copy submission of the Mast Arm Bracket Installation Report to the Engineer shall not substitute for reporting to the required email address. The Mast Arm Bracket Installation Report shall be submitted within 7 business days of mast arm hanger assembly installation.
By submitting the report, the Contractor certifies that the mast arm hanger assembly installation was accomplished in strict conformance with these specifications.

Reporting will not be measured for separate payment but shall be considered incidental to the mast arm hanger assembly work.

VI. Warranty

The Contractor shall furnish a manufacturer warranty for the Complete Mast Arm Hanger Assembly or installed components to cover defects for a minimum of three years from the date of installation. The warranty shall include providing replacements, within 10 calendar days of notification, for defective parts and equipment at no additional cost to the Department. When the warranty normally given by the manufacturer is longer than three years, the manufacturer's normal warranty shall be furnished.

VII. Measurement and Payment

**Mast Arm (Type) Hanger Assembly (Standard)** will be measured in units of each for the standard and type specified to be paid for at the contract unit price per each. This price shall include furnishing and installing Mast Arm Hanger Assembly (Complete), including the main mount, swivel plate, mounting system, mounting tube, miscellaneous items, reporting, and special tools (when required).

**Remove Existing Traffic Signal Head Assembly** will be measured in units of each and will be paid for at the contract unit price per each. Signal head assembly is defined as one or more traffic signal head sections (vehicular or pedestrian) assembled as one unit. This price shall include disconnecting the signal head assembly from existing conductor cables, removing the signal head assembly and backplate, removing and disposing of hanger assembly, and removing all associated mounting equipment, hardware, and accessories. If the traffic signal head assembly is to be reinstalled, the price also shall include reconnecting signal cables. When designated in the contract for salvage or if salvage is directed by the Engineer, this price shall include storing, protecting, and delivering to a designated Department facility.

**Relocate Existing Mast Arm (Signal or Sign)** will be measured in units of each and will be paid for at the contract price per each. This price shall include removing and relocating an existing traffic sign, signal head, or pedestrian signal head from an existing to proposed location, disconnecting and reconnecting conductor cables, adjusting or relocating conductor cables, removing, salvaging, and disposing the existing mast arm hanger assembly, installing a new Mast Arm Hanger Assembly (Complete) or installing new Mast Arm Hanger Assembly (Components) and relocating or replacing existing miscellaneous items.

When relocation of signals or signs is accomplished when maintenance of the traffic signal is the responsibility of the Contractor as specified in Section 512 for the items Modify Signal or Temporary Traffic Control Signal, relocating existing mast arm hanger assemblies for signals or signs will not be measured separately and the cost thereof shall be included in the contract unit price of Modify Signal or Temporary Traffic Control Signal.

**Modify Existing Mast Arm Hanger Assembly (Type)** will be measured in units of each and will be paid for at the contract price per each. This price shall include removing an existing traffic sign, signal head, or pedestrian signal head from the existing hanger, furnishing new hanger assembly components, disconnecting and reconnecting conductor cables, removing, salvaging, and disposing of existing mast arm hanger assembly components, installing new Mast Arm Hanger Assembly (Components) and reusing or replacing existing miscellaneous items.
Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mast Arm (Type) Hanger Assembly (Standard)</td>
<td>Each</td>
</tr>
<tr>
<td>Remove Existing Traffic Signal Head Assembly</td>
<td>Each</td>
</tr>
<tr>
<td>Relocate Existing Mast Arm (Signal or Sign)</td>
<td>Each</td>
</tr>
<tr>
<td>Modify Existing Mast Arm Hanger Assembly (Type)</td>
<td>Each</td>
</tr>
<tr>
<td>Form TE-500, VDOT Mast Arm Bracket Installation Report</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Date Installation Completed: 6/1/2016</td>
<td></td>
</tr>
<tr>
<td>Contractor Name:</td>
<td></td>
</tr>
<tr>
<td>Installer Name:</td>
<td></td>
</tr>
<tr>
<td>Location (Highway, County/City, City/County Code)</td>
<td></td>
</tr>
<tr>
<td>Approach Location:</td>
<td></td>
</tr>
<tr>
<td>Latitude (°'') and Longitude (°'')</td>
<td></td>
</tr>
<tr>
<td>Height (Height of Signal or Sign)</td>
<td></td>
</tr>
<tr>
<td>Masts (Number of Masts)</td>
<td></td>
</tr>
<tr>
<td>Height of Signal (Height of Sign)</td>
<td></td>
</tr>
<tr>
<td>Signal/Sign Type</td>
<td></td>
</tr>
<tr>
<td>Category (Category of Signal/Sign)</td>
<td></td>
</tr>
<tr>
<td>Description (Description of Signal/Sign)</td>
<td></td>
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<tr>
<td>Notes (Any Additional Notes)</td>
<td></td>
</tr>
</tbody>
</table>

Digital Form found at [http://www.virginiadot.org/business/traffic_signal_brackets.asp](http://www.virginiadot.org/business/traffic_signal_brackets.asp)
GUIDELINES – ASPHALT PROJECTS (PLANT MIX ONLY).

SP703-000110-00

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
REPLACEMENT OF LOOP DETECTORS

March 16, 2017

I. Description

Loop Detectors shall be installed in accordance with the Section 703. Installation of loop detectors shall be performed in the presence of the Engineer.

II. Materials

Loop detector cables shall be No. 14 AWG stranded copper in accordance with Section 238. Loop sealant shall be from the Pre-Approved Traffic Control Device Listing.

New loop detectors shall be of the same size, configuration and locations as existing loop detector(s) unless otherwise indicated.

III. Procedures

When replacement of loop detectors is included in the Contract, the Contractor will be required to install new loop detector items either within the planed surface prior to the placement of new surface mix, or through the finished riding surface.

Loop detectors shall be installed at the depth specified in the TD-Series Standard Drawings for loop detectors installed in the planed surface or final riding surface, as applicable.

When an existing loop detector is taken out of service by the Contractor’s planing operation, the Contractor shall have the new loop detector items installed and operational 96 hours after being taken out of service, unless otherwise stated in the Contract. In no case shall any loop detector be out of service for more than 96 hours. If the Contractor chooses to install new loop detector items through the final riding surface, all loop detector items shall be installed and operational within 96 hours after completion of the paving operations in the affected intersection.

The Contractor shall notify the Engineer at least 72 hours prior to planing at locations that contain loop detectors.
SECTION 704—PAVEMENT MARKINGS AND MARKERS of the Specifications is amended as follows:

Section 704.02(a) Pavement Markings is amended to add the following:

The sizes and shapes of symbols and characters shall match the size and shape specified in the Standard Drawings or elsewhere in the Contract. Hand-drawn or “stick” symbols or characters will not be allowed.

Section 704.02(e) Flexible Temporary Pavement Markers (FTPMs) is inserted as follows:

Flexible Temporary Pavement Markers (FTPM’s) shall conform to Section 235 of the Specifications. All FTPM’s shall be new product. FTPM’s are suitable for use up to one year after the date of manufacture when stored in accordance with the manufacturer's recommendations.

The color of FTPM units and their reflective surfaces shall be the same color (white or yellow) as the temporary pavement markings they are being used in substitution for.

FTPM’s shall consist of products from the Materials Division’s Approved Products List No. 22. FTPM’s shall include a removable material covering the reflective lens to protect the lens from being obscured or damaged during the paving operation.

Section 704.03—Procedures is amended by replacing the third and fourth paragraphs with the following:

The Contractor shall provide staking in the field that documents any changes in passing zones on undivided roads, exact placement of all aerial speed enforcement markings, and placement of railroad crossing markings. Any changes to these markings that are specified in the Contract shall be staked. The Contractor shall complete all staking and notify the Engineer at least 14 days prior to the scheduled start of resurfacing operations.

The Contractor shall reference this staking when installing temporary markings, and for the premarking to be done in advance of permanent marking installation. The stakes shall be removed at the conclusion of the project.

All existing markings shall be replaced with permanent markings of the same width, color, size, and location unless otherwise directed in the PM Series Standard Drawings, in the Contract, or by the Engineer. All existing markers shall be replaced with new markers with the same retroreflector colors (front and back) unless otherwise directed in the Contract or by the Engineer.
The Contractor shall sweep clear all surface-treated, slurry seal, and latex emulsion roadways prior to installation of permanent pavement markings. Any loose aggregate remaining on the surface shall be blown-out with an air compressor or other approved method.

Section 704.03—Procedures is amended by replacing the 13th paragraph with the following:

Non-truck mounted equipment shall be regulated to allow for calibration of the amount and type of material applied.

Section 704.03(a)2 Type B markings is amended to replace the third paragraph with the following:

Non-truck mounted equipment for application of thermoplastic material shall include an extrude die with a burner, temperature controller, agitator, and mechanical bead applicator to allow for the correct amount of material to be applied.

Section 704.03(a)2e Patterned Preformed Tape (Type B, Class VI) is amended to insert the following:

Only products on Materials Division Approved List 17 which are warranted by the manufacturer against failure resulting from improper installation and material defects when used on Latex Emulsion or other Surface Treatments shall be used on these applications, in conjunction with a low-VOC surface preparation primer adhesive.

The Contractor shall install Type B, Class VI markings on existing asphalt concrete roadway surfaces, hydraulic cement concrete surfaces, and existing or new surface treatment, slurry seal, and latex emulsion surfaces in accordance with the manufacturer's installation instructions for pavement surface preparation, sweeping, and installation techniques for non-embedded (adhesive) surface applications and splicing.

Prior to tape installation on new latex emulsion surfaces:

- The surface shall be swept clear of all loose aggregate immediately prior to spraying the surface preparation primer adhesive.

- The primer adhesive shall be sprayed uniformly at the correct thickness (shall not exceed the maximum thickness specified by the manufacturer), and cured in accordance with the manufacturer's installation instructions.

After application of the surface preparation primer adhesive, the tape shall be tamped to the road using a 200 pound minimum tamper cart and vehicle wheels. The Contractor shall ensure that the vehicle tires, if used, ride true down the length of the tape marking and in accordance with manufacturer instructions.

Section 704.03(d) Pavement Markers is amended to add the following:

Permanent markers shall not be installed until after the installation of the adjacent permanent line marking.

The Contractor may choose to substitute FTPM's in lieu of Type A-temporary paint or in lieu of Type D temporary pavement markings. The Contractor's plan for FTPM's shall be in accordance with the Typical Plan for FTPM Placement drawings included herein.
When FTPM’s are used to simulate temporary edgelines, then FTPM’s shall be spaced every 20 feet and shall match the color of the line markings being simulated.

FTPM’s shall be installed at the same locations that permanent pavement markings will be installed.

For surface treatment, slurry seal or latex emulsion treatment operations, the appropriate FTPM’s with protective covering shall be installed prior to placing the new treatment. The lens protective covering shall be kept in place during the final surface placement to protect the lens from being obscured or damaged by the paving operation. Upon completion of surface treatment, slurry seal or latex emulsion treatment placement, the Contractor shall remove the protective covering from the reflective lens of the FTPM’s prior to leaving the work site. Failure to remove such covering shall result in the non-payment for that portion type (skip or solid) of temporary pavement marking.

For plant mix operations, the appropriate FTPM’s shall be installed on the newly-placed pavement after the pavement is thoroughly compacted and has cooled to the FTPM manufacturer’s recommended temperature for installation.

The Contractor shall maintain the FTPM’s until the permanent pavement markings are installed. Damaged or missing FTPM’s shall be replaced within 24 hours of discovery at the Contractor’s expense with new FTPM’s of the same manufacturing type, color and model. No more than one FTPM may be damaged or missing out of every skip line simulated segment. No two consecutive FTPMs may be damaged or missing on a simulated solid line application, and no more than 30 percent of the FTPM’s may be damaged or missing on any measured 100-foot segment of simulated solid line.

Once applied, FTPM’s will be considered for a single use. If a FTPM requires replacement, it shall be properly disposed of and replaced with a new FTPM at no additional cost to the Department. FTPM’s may remain in place, undamaged, after installation for up to 14 consecutive days. When FTPM’s are applied prior to final surface placement (such as with surface treatment, slurry seal, or latex emulsion operations) this 14 -consecutive-day time limit shall begin at the time of actual installation of the FTPM’s, not at the time of surface placement. The Engineer may approve an extension of the 14 days if all damaged FTPM’s are replaced and the remaining FTPM’s are maintained.

FTPM’s shall be removed and properly disposed of when permanent pavement markings are installed. Used FTPM’s removed from the pavement, including all containers, packaging, damaged FTPM’s and all other miscellaneous items of waste, shall be appropriately disposed of in accordance with Section 106.04.

**Section 704.03(d)1 Snow-Plowable Raised Pavement Markers** is amended to insert the following:

All SRPMs on plant mix surfaces shall be installed within 30 calendar days after the end of the last workday (final surface) of continuous paving on that section of roadway.

All SRPMs on surface treatment, slurry seal, or latex emulsion surfaces shall be installed within 14 calendar days after the final markings are installed, unless a time extension is approved by the Engineer. Time extensions will be granted when weather conditions prohibit installation or other operations on the project would damage the markers. The time limit commences for a continuous section at the end of the last workday that the final surface is placed. For roads with more than two lanes, each direction will be considered a separate continuous section.

Replacement of existing retroreflector lenses shall be in accordance with the manufacturer’s installation instructions. If the new retroreflectors are dirtied or damaged during installation they...
shall be replaced at no additional cost to the Department. Properly dispose of the existing retroreflectors in accordance with Section 106.04.

**Section 704.03(l) Maximum Allowable Time Limits for Unmarked Roads** is inserted as follows:

**Maximum Allowable Time Limits for Unmarked Roads**

Existing markings that are obscured, covered, or eradicated by resurfacing operations (including existing symbol and message markings where the need for temporary symbol or message markings has been identified in the Contract) shall be replaced with either temporary or permanent markings within the time limits established in Table VII-4, unless otherwise approved by the Engineer.

If the Contractor begins the next lift within the time limits specified in Table VII-4 for a non-final surface, then the time limits shall be recalculated as starting at the end of the work day from the time of that next resurfacing operation.

The Engineer may allow the extension of the time limits by up to 12 hours for 10,000 ADT or greater roads, up to 24 hours for 9,999 to 3000 ADT roads, and up to 48 hours for less than 3000 ADT roads, provided that all of the following apply:

- The road is non-limited access.
- The road has a posted or statutory speed limit of 40 mph or below.
- All lanes are delineated by the milled surface or asphalt overlay.
- The road is on tangent alignment.
- “Unmarked Pavement Ahead” or “No Center Line” warning signs were properly installed in accordance with the VWAPM when the unmarked lane was opened to traffic.

For final surfaces, the Contractor shall determine if the permanent markings can be installed within these time limits, based on the installation requirements for that permanent marking material on that type of surface, and the weather conditions. If the permanent markings will not be installed within these time limits, then temporary markings shall be installed.

**Table VII-4: Time Limits for Unmarked Roads** is inserted as follows:

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Maximum allowable duration for unmarked roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstates and other freeways (limited access roads) posted at 55 MPH or greater (including interstate/freeway ramps)¹</td>
<td>All lane line markings, at a minimum, shall be temporarily or permanently installed <strong>before opening the lane to traffic</strong>. If the latex emulsion surface has not cured enough to hold the temporary markings (weathered-in texture), then the Contractor shall apply the temporary paint before opening the lane to traffic and then, if necessary and when directed by the Engineer, shall refresh the temporary markings within 24 hours at VDOT expense. Contractor shall install FTPMs on top of all SRPMs in each lane and gore area with protective covering prior to latex placement in accordance with SP. For covering Cleaning and Inspecting Existing Raised Pavement Markers. All other markings shall be temporarily or permanently installed within <strong>24 hours</strong> after the end of the workday when the corresponding existing markings were obscured, removed, or eradicated.</td>
</tr>
</tbody>
</table>
Non-freeway roads with ADT of 10,000 or greater (Traffic Groups XV and above)\(^2,3,4\)

All lane line and center line markings shall be temporarily or permanently installed within **24 hours** after the end of the workday when the corresponding existing markings were obscured, removed, or eradicated. Application of temporary markings on surface treatment, slurry seal and latex emulsion shall be as soon as the surface has cured enough to hold the temporary markings.

Non-freeway roads with ADT between 3,000 and 9,999 (Traffic Groups XI through XIV)

All lane line and center line markings shall be temporarily or permanently installed within **48 hours** after the end of the workday when the corresponding existing markings were obscured, removed, or eradicated.

Non-freeway roads with ADT between 600 and 2,999 (Traffic Groups VII - X)\(^5,6\)

All lane line and center line markings shall be temporarily or permanently installed within **72 hours** after the end of the workday when the corresponding existing markings were obscured, removed, or eradicated.

Non-freeway roads with ADT less than 600 (Traffic Groups I – VII)

Temporary markings are not required if all “Unmarked Pavement Ahead” or “No Center Line” warning signs were properly installed as per the VWAPM when the unmarked road was first opened to traffic.

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1 For the purposes of this Special Provision, freeways shall be defined as any fully limited-access, divided roadway with two or more travel lanes in each direction and 55 mph or greater speed limit.

2 If an approach to a signalized intersection has (a) two or more approach through lanes, (b) 45 mph or greater speed limit, (c) greater than 3000 ADT, and (d) all markings on the approach are obliterated, then all lane lines and centerlines within 250 feet of the location of the stop line location shall be temporarily or permanently marked within **24 hours** of opening the approach to traffic, unless a time extension is approved by the Engineer and “Unmarked Pavement Ahead” or “No Center Line” warning signs were properly installed as per the VWAPM when the unmarked approach was first opened to traffic.

3 If the Contract Documents require temporary symbol/message markings or temporary edge line markings, those markings shall be temporarily or permanently marked within **72 hours** after the end of the workday when the corresponding existing markings were obscured, removed, or eradicated on non-freeway roads with 10,000 or greater ADT, and **96 hours** on less than 10,000 ADT non-freeway roads, unless the Engineer approves a time extension.

4 If the next resurfacing operation will obliterate the temporary markings within approximately **24 hours**, the Engineer may approve an extension of time for temporary marking installation if the posted/statutory limit is less than 45 mph, and all “Unmarked Pavement Ahead” or “No Center Line” warning signs were properly installed as per the VWAPM when the unmarked approach was first opened to traffic.

5 On surface treatment roads with ADT between 1000 and 2999, if it is anticipated that the surface treatment will not be sufficiently cured to permit temporary paint installation within 72 hours, then the Engineer may direct the Contractor to use yellow FTPMs to simulate the centerline, or to apply temporary pavement markings within 72 hours after the end of the workday when the corresponding existing markings were obscured, removed, or eradicated on non-freeway roads with 10,000 or greater ADT, and **96 hours** on less than 10,000 ADT non-freeway roads, unless the Engineer approves a time extension.

6 On curved portions of surface treatment roads with ADT between 600 and 999, if it is anticipated that the surface treatment will not be sufficiently cured to permit temporary paint installation within 72 hours, then the Engineer may direct the Contractor to use yellow FTPMs to simulate the centerline on the curves, or to apply temporary pavement markings within 72 hours on the new surface and then, if the Engineer determines it necessary, refresh those temporary pavement markings with a second application of Type A temporary paint at VDOT’s expense.

7 On tangent sections of roadway if all “Unmarked Pavement Ahead” or “No Center Line” signs were properly installed as per the VWAPM when the unmarked road was first opened to traffic, and if approved by the Engineer.

Section 704.03(g) Temporary Pavement Markings is inserted as follows:
Temporary Pavement Markings

Premarking, dotting or layout marking shall not be used as a substitute for temporary pavement marking.

Temporary linear, symbol, and message pavement markings specified in the Contract shall be installed at the same locations that the permanent pavement markings are to be installed, unless otherwise approved by the Engineer.

Type D-removable tape shall be installed and removed in accordance with manufacturer's installation instructions.

Type A temporary paint shall be installed in accordance with the manufacturer's installation instructions and as detailed in the following table:

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Milled Surface</th>
<th>Intermediate Lifts or Final Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Bead Application Rate</td>
<td>15 mils</td>
<td>8 to 10 mils¹</td>
</tr>
<tr>
<td></td>
<td>6 lbs. of glass beads per gallon of material</td>
<td>3 lbs. of glass beads per gallon of material for 8 to 10 mils and 6 lbs. per gallon for 11 to 15 mils</td>
</tr>
<tr>
<td>Long Line Width</td>
<td>Same width as the permanent markings</td>
<td>75% of the permanent marking width</td>
</tr>
<tr>
<td>Skip Line Pattern</td>
<td>8-foot line segments / 32-foot gaps (approx.)</td>
<td>8-foot line segments / 32-foot gaps (approx.)</td>
</tr>
</tbody>
</table>

¹Type A paint at approximately 15 mils thickness with 6 lbs. of glass beads per gallon will be permitted for the temporary lane line markings provided that the Type A is worn down to no more than 10 mils thickness prior to permanent marking installation. The contractor shall assess how long the temporary lane line, center-line and edge line temporary markings will be in service and may increase the thickness based upon the duration and expected wear.

Temporary Type A pavement markings on final surfaces shall be arranged and spaced so that they will be completely covered by the subsequent installation of permanent pavement markings atop those temporary paint markings.

The following Temporary markings location and placement types shall comply with the following:

- Skip and solid lane line markings shall be required at all locations unless otherwise directed in the Contract.
- Centerline markings shall be required at all locations unless otherwise directed in the Contract. Temporary passing zone changes shall be at the same location as the permanent marking passing zone change locations.
- Edgelines shall only be required where specified in the Contract, subject to the surface reaching a condition to support the markings and the equipment. Temporary edgelines are not required when the shoulder surface is in a milled condition.
- Temporary stop lines, when required by the Contract, shall be 12 inches wide unless otherwise directed.
- Temporary crosswalks, when required by the Contract, shall be two parallel 6-inch white lines unless otherwise directed.

Temporary lane lines, centerlines, and edge lines may be marked with Type D removable tape, Type A-temporary paint, or FTPMs. All temporary symbol and message markings and other types of temporary markings may be marked with Type D-removable tape or Type A-temporary paint.
VTM-94 is not required for temporary pavement marking. However, if the VTM-94 moisture test is not performed, the Contractor shall document the approximate surface wetness on the Form C-85.

If the surface is visibly dry (does not have puddling or free-standing water present), the Contractor is responsible for installing and maintaining the temporary pavement markings. If the Contractor opts not to perform VTM-94 and the temporary markings applied to a visibly dry surface do not sufficiently adhere to the surface, temporary pavement markings shall be reapplied at no additional cost to the Department.

If the surface has puddling or free-standing water present, or if a VTM-94 moisture test result indicates that the condition of the surface is not suitable for temporary pavement marking application, the Engineer may direct the Contractor to install temporary pavement markings on the surface in order to avoid having traffic operate on an unmarked road. In such circumstances the Department may direct the Contractor to install one subsequent reapplication of the temporary markings once the surface has dried, if the previous installation did not satisfactorily adhere to the road. In such circumstances the Contractor will be compensated at the Contract bid price for those temporary markings.

In order to quicken the paint drying process, the Contractor may spray an Engineer-approved drying agent into the traffic paint during installation in accordance with the manufacturer's installation instructions, at no additional cost to the Department.

The Contractor may employ approved methods of drying the pavement surface that will not damage the pavement. Methods that may damage the pavement, such as “torching” of the pavement, will not be allowed. Any drying of pavement will be at no extra cost to the Department.

While in place, temporary pavement markings sizes, shapes and retroreflectivity shall be maintained at adequate visibility and retroreflectivity, as defined in Section 512, until the permanent markings are installed. No additional application (refreshing) is required as long as the temporary markings continue to meet these requirements.

If Type D-removable tape fails the visual evaluation or is deficient in any other respect prior to the installation of permanent markings, the tape shall be removed and new Type D-removable tape, or Type A-temporary paint shall be reapplied, at no additional cost to the Department.

If Type A temporary paint does not meet the requirements of Section 512 prior to the installation of permanent markings, such temporary markings shall be refreshed by the application of a lighter application (applied so as to enhance visibility but not as to require eradication before application of permanent markings) of Type A-temporary markings at the Contractor’s expense.

Permanent pavement markings shall not be installed atop Type A temporary markings if the paint is not fully dry or if the paint exceeds the maximum specified thickness in Table VII-3. If the temporary pavement markings are not located directly underneath the location where the permanent markings are to be installed, they shall be 100% eradicated in accordance with Section 512 prior to installation of permanent markings at no additional cost to the Department.

Section 704.03(h) Time Limits for Permanent Pavement Marking Application is inserted as follows:

**Time Limits for Permanent Pavement Marking Application**

All permanent linear, message, and symbol markings on Interstate and Limited Access Roadways posted at 55 MPH or greater, all other roadways with 10,000 ADT or greater with a
posted or statutory speed limit of 45 mph or greater, shall be placed within the following time limits:

1) For Plant Mix operations:
   a. All Type B Class VI shall be inlaid the same day as the final surface is placed as specified herein.
   b. All other permanent markings shall be completed within 30 days after the end of the last workday of continuous paving on that section of roadway.

2) For Slurry Seal, Latex Emulsion, and Surface Treatment operations:
   The contractor shall evaluate the pavement surface between 14 and 18 days after the end of the last workday of continuous paving on that section of roadway. If that evaluation ascertains that the pavement surface meets the markings manufacturer’s requirements for application of permanent markings, the texture is weathered-in on the edges, and the temporary marking is worn down to 10 mils or less, then the Engineer shall be notified that the surface meets the markings manufacturer’s specifications. The permanent markings shall be installed between 14 days and 30 days after the end of the last workday of continuous paving on that section of roadway.

On all other roadways (non-interstate and non-limited access roads with less than 10,000 ADT, or posted or statutory speed less than 45 MPH), all permanent linear and message or symbol markings shall be installed within 30 days on plant mix surfaces and between 30 and 45 days on surface treatment, slurry seal, and latex emulsion surfaces, after the end of the last workday of continuous paving on that section of roadway.

Permanent markings shall not be installed where pavement curing time or weather conditions prohibit installation, or where the pavement surface does not meet the markings manufacturer’s requirements (e.g. the aggregate is not worn-in at the edges).

Any necessary refreshing or replacement of temporary pavement markings or FTPMs will not affect the allowable time limit for completion of permanent pavement marking installation.

Section 704.04—Measurement and Payment is amended to replace the first paragraph with the following:

Pavement line markings will be measured in linear feet and paid for at the contract linear foot price for the type, class and width specified. This price shall include furnishing and installing the pavement marking material, surface preparation, premarking, documentation and staking of existing markings, quality control tests, daily log, guarding devices, primer, adhesive, glass beads, and manufacturer’s warranty.

Section 704.04—Measurement and Payment is amended to add the following:

The Schedule of Items may contain permanent pavement marking bid items designated as “Bonus” in addition to the regular permanent pavement marking bid items. This “Bonus” designation indicates an adjustment of 1.25 to be made to the regular Contract unit bid price for the designated item in accordance with Section 102.05 which is to be paid to the Contractor if the following conditions are met:

- Plant Mix: Pavement markings (not including Type B, Class VI) are correctly installed on Plant Mix surfaces within 14 days or less after the last day of paving.
Non-Plant Mix: Pavement markings (not including Type B, Class VI) are correctly installed on Non-Plant Mix surfaces within 28 days or less after the last day of paving.

The Engineer will not consider an extension in the time limit for payment at the adjusted price due to weather or any other conditions that would prohibit installation of the permanent markings within the “Bonus” time frame.

Temporary pavement line markings will be measured in linear feet and paid for at the Contract linear foot price for the type, class, and width specified. This price shall include furnishing, installing, and maintaining the pavement marking materials; surface preparation, inspections, testing, daily log, and guarding devices; providing primer, adhesive, glass beads, and drying agents; and disposal, and removing removable markings when no longer required.

If temporary line markings require refreshing, reapplication, or replacement before the final surface or the permanent markings are installed, all cost for refreshing, reapplication, or replacement shall be at the Contractor’s expense, unless the Contractor was directed by the Engineer to apply the temporary markings to a visibly wet surface or to an insufficiently cured latex emulsion, slurry seal, or surface treatment surface.

In the event the Contractor uses FTPM’s in lieu of Type A-temporary paint to simulate a longitudinal line marking as allowed herein, the Contractor will be paid at the linear foot pay unit for the length of simulated line marking at the Type A-temporary paint unit price. That measurement shall represent all FTPM’s required for that simulated line marking. This cost shall include furnishing, installing and maintaining the FTPM’s, removable covers, surface preparation, quality control tests, daily log, guarding devices, removal, and disposal.

Temporary pavement message (word) markings will be measured in units of each and paid for at the contract each price for the character size, type, and class specified. This price shall include furnishing, installing, and maintaining the pavement marking materials; surface preparation, inspections, testing, daily log, and guarding devices; providing primer or adhesive, glass beads, and drying agents; and disposal, and removing removable markings when no longer required.

Temporary pavement symbol markings will be measured in units of each and paid for at the contract each price for the size, type, and class specified. This price shall include furnishing, installing, and maintaining the pavement marking materials; surface preparation, inspections, testing, daily log, and guarding devices; providing primer or adhesive, glass beads, and drying agents; and disposal, and removing removable markings when no longer required.

If temporary pavement line, message, or symbol markings require refreshing, reapplication, or replacement before the final surface or the permanent markings are installed, all cost for refreshing, reapplication, or replacement (including Maintenance of Traffic costs) shall be at the Contractor’s expense unless the Contractor was directed by the Engineer to apply the temporary markings to a visibly wet surface or to an insufficiently cured latex emulsion, slurry seal, or surface treatment surface.

Pavement Marker Retroreflector Replacement will be measured in units of each and paid for at the contract each price for the type specified. This price shall include furnishing retroreflectors, removal and disposal of the existing retroreflector, cleaning of the existing casting, adhesive, installation of the new retroreflector, quality control tests, daily log, and manufacturer’s warranty.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Unit</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>(Type or class) Temporary pavement line marking (width)</td>
<td>Linear foot</td>
</tr>
<tr>
<td>Temporary pavement message (word) marking (size character, type or class material)</td>
<td>Each</td>
</tr>
<tr>
<td>Temporary pavement symbol marking (Symbol, Type or class material)</td>
<td>Each</td>
</tr>
<tr>
<td>Pavement marker retroreflector replacement (Type)</td>
<td>Each</td>
</tr>
</tbody>
</table>
TYPICAL PLAN FOR FTPM PLACEMENT

TRAVEL LANE - TWO-WAY FTPM

SIMULATING A SOLID CENTER LINE - NO PASSING ZONE
PLAN 1

TRAVEL LANE

SIMULATING A BROKEN LINE (40' CYCLE)
TWO LANE ROADWAY - TWO-WAY FTPM
MULTI LANE ROADWAY - ONE-WAY FTPM
PLAN 2
GUIDELINES – Asphalt projects (plant mix only). (2007-S704GM2)

SP704-000110-00

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
REPLACEMENT OF PAVEMENT LINE MARKINGS,
PAVEMENT MARKERS AND LOOP DETECTORS

September 27, 2011; Reissued July 12, 2016

Certain plant mix line items will be designated to have traffic engineering items (pavement markings, pavement markers and loop detectors) replaced under this contract. Replacement of pavement line markings, pavement markers and loop detectors will have the same time limits or restrictions that apply to the plant mix line items and shall be performed according to the following, unless otherwise specified:

1. Pavement Markings shall be installed according to Section 704 of the Specifications, and according to the procedures and within the time limits set forth elsewhere in the Contract.

2. Pavement Markers shall be installed within 30 calendar days after the affected area is resurfaced. Pavement Markers shall not be installed prior to the installation of such pavement markings as centerline and lane-division pavement line markings.

3. Loop Detectors shall be installed according to Section 703 of the Specifications.

When replacement of loop detectors is included in the Contract, the Contractor will be required to install new loop detector items within the planed surface prior to the placement of new plant mix or new loop detector items may be installed through the finished riding surface.

Loop detectors installed prior to overlay operations shall be installed 3 inches below the planed surface. Loop detectors installed after the final overlay shall be installed no more than 4.5 inches and no less than 4 inches below the top elevation of the final riding surface.

Loops shall be installed with loop detector cable enclosed in tubing (IMSA 51-5). Loop cable and loop sealant shall be from the Virginia DOT Pre-approved Traffic Control Device Listing. Link: http://www.vdot.virginia.gov/business/resources/APPROVED_product_LISTING.pdf

New loop detectors shall be of the same size, configuration and locations as existing loop detector(s) unless otherwise indicated.

When an existing loop detector is taken “out of service” as a result of the Contractor's planing operation the Contractor shall have the new loop detector items installed and operational within 96 hours of the “out of service” time and date, unless otherwise stated in the Contract. In no case shall any loop detector be “out of service” for more than 96 hours. If the Contractor chooses to install new loop detector items through the final riding surface, all loop detector items shall be installed and operational within 96 hours after completion of the paving operations in the affected intersection. PLEASE NOTE: Installation of loop detectors shall be performed in the presence of the Engineer.

The Contractor shall notify the Engineer at least 72 hours prior to planing at locations that contain loop detectors.
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION FOR

PAVEMENT DOTTING

October 8, 2008; Reissued July 12, 2016

I. DESCRIPTION

This work shall consist of the furnishing and placing of pavement dots to establish the location of pavement markings on the roadway according to the requirements specified herein and as directed by the Engineer. This work is for those sections of roadways where the final pavement markings will be installed by the Department or by other contracts. Those sections of roadways where the Contractor installs the final pavement markings shall not require pavement dotting, however, premarking may be accomplished at the Contractor’s option according to Section 704.03 of the Specifications.

II. MATERIALS

Pavement dots shall be removable tape (Type D, Class II) conforming to Section 246.03(g)1 of the Specifications. Pavement dots shall consist of 4-inch by 4-inch squares or 4-inch diameter circles and shall be of the same color as the final pavement markings to be installed.

III. PROCEDURES

Pavement dots shall be placed on the new pavement surface for each individual pavement marking line unless otherwise directed by the Engineer. Pavement dots shall be placed in the same lateral position along the roadway where the existing markings were located.

Pavement dots shall be installed at 100-foot intervals in tangent sections and 50-foot intervals in curved sections. Less spacing may be used as needed for but not limited to such pavement markings items as stop lines, crosswalk lines, and hatching. Pavement dotting shall be installed according to the manufacturer’s recommendation.

IV. MEASUREMENT AND PAYMENT

Pavement dotting will be measured and paid for at the contract unit price per mile of pavement line dotted, to the nearest one-tenth of a mile. This price shall be full compensation for furnishing and installing the pavement dots, and all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement dotting</td>
<td>Mile</td>
</tr>
</tbody>
</table>
SECTION 700—GENERAL of the Specifications is amended as follows:

Section 700.02(a) Concrete is replaced with the following:

Concrete shall be Class A3 conforming to Section 217 of the Specifications.

Section 700.02(c) Dissimilar metals is replaced with the following:

Dissimilar metals - The contact surfaces between dissimilar metals shall be isolated with an approved durable nylon washer, gasket, or other approved isolation material to prevent corrosion, except that isolation material shall not be used in conjunction with mast arm hanger assemblies, nor shall isolation materials be used on square tube post structures.

Section 700.02(j) Breakaway support systems is replaced with the following:

Breakaway support systems shall conform to National Cooperative Highway Research Program (NCHRP) Report 350 or Manual for Assessing Safety Hardware (MASH) testing requirements. The Contractor shall provide a copy of the FHWA certification letter for the brands and models of breakaway systems planned for use.

Breakaway couplers will not be permitted.

The following materials shall be used when breakaway support systems are specified on the plans:

1. Frangible bases shall be aluminum.
2. Slip bases shall be galvanized steel or other approved noncorrosive metal.

Section 700.03—General Requirements is replaced with the following:

Cable wiring holes in traffic control device and ITS device structures shall be deburred and rounded, or fitted with a grommet. Damaged galvanization shall be repaired in accordance with Section 233. The size of the hole shall not exceed the sum of the diameter of the cables plus 1/2-inch.

The design of traffic control device and ITS device structures and foundations shall conform to AASHTO’s Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition (LTS-6), 2013 with 2015 interims, as modified elsewhere in the Contract.

In addition, structures and foundations shall be designed as per the following:

(a) Sign Structures:
Overhead Sign and Dynamic Message Sign (DMS) Structures (Span, Cantilever, Butterfly, etc.) shall be fabricated from galvanized steel material as specified herein. Aluminum structures will not be allowed. Base plates for overhead sign structures shall have at least the minimum number and diameter of anchor bolts specified in the Standard Drawings. Washers are required above and below the base plate. Tubular pole shafts shall have a removable cap fastened by at least three screws.

Ground Mounted Sign Structures shall be fabricated from galvanized steel unless otherwise indicated. Square tube posts shall conform to ASTM A1011, Grade 50 except the yield strength after cold-forming shall be 60,000 psi minimum for 12 and 14 gauge posts, and 55,000 psi minimum for 10 gauge posts. Posts (inside and outside) shall be galvanized in accordance with ASTM A653, Coating Designation G-90. Square tube sign posts shall have 7/16-inch (± 1/64-inch) openings or knockouts spaced 1-inch on centers on all four sides.

(b) Lighting Structures shall be of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. Pole shafts shall have a removable cap fastened by at least three screws.

1. **High Mast Lighting Structures** (Lengths of 55 feet or greater) shall be galvanized steel and shall have at least the minimum number and diameter of anchor bolts specified in the Standard Drawings. Aluminum structures will not be allowed. Washers are required above and below the base plate.

2. **Conventional Lighting Structures** (Lengths less than 55 feet) shall be galvanized steel or aluminum and shall have at least the minimum number and diameter of anchor bolts specified in the Standard Drawings.

(c) **Signal Poles and Mast Arms** shall be galvanized steel of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. Pole shafts and mast arms shall have a removable cap fastened by at least three screws. If field adjusting of mast arm length is required, the end cap shall snugly fit the arm after adjustment.

1. **Mast Arm Signal Poles**: The mast arms shall not deflect below the horizontal plane or below the minimum vertical clearance after the Standard Drawing MP-3 maximum loads are applied. The rise shall not exceed 3 percent of the mast arm length after the loads identified on the plans are applied, unless otherwise directed by the Engineer.

   The flange plate and pole shall have a 4 inch wiring hole centered in the pattern that is deburred and rounded or fitted with a grommet. Mast arms shall be secured to the pole with thru-bolt, nuts, and washer connections. The flange plate shall be continuously welded to gusset and side plates. Gusset and side plates shall be continuously welded to the pole and each other. The flange plate shall be parallel to the axis of the pole. Flange plates for mast arm poles with two arms shall be positioned 90 degrees to each other. The flange plate shall be designed to receive a minimum of eight 1.5-inch diameter bolts for attachment of the arm.

   Foundations for mast arm signal poles shall be designed in accordance with Standard Drawing PF-8 for the specified pole length and mast arm length shown on the Plans. Foundations shall also be designed for the greater of either the mast arm loadings and placement of loads shown on the Plans, or the Standard Drawing MP-3 design loadings for that arm length.
Mast arm poles shall have a round base plate and at least the minimum number of anchor bolts specified in the Standard Drawings. Washers are required above and below the base plate.

Mast arm pole types shall be in accordance with the following table. The poles shall be designed to support the maximum design loading allowed for that pole type, in accordance with the following table and Standard Drawing MP-3. The arms shall be designed to support the maximum design loading allowed for that mast arm length depicted in Standard Drawing MP-3.

<table>
<thead>
<tr>
<th>Pole Type</th>
<th># of arms</th>
<th>Maximum Allowable Loading as per Standard Drawing MP-3</th>
<th>Luminaire arm?</th>
<th>Length of Pole (top of arm to bottom of base plate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>49 ft Loading Standard</td>
<td>No</td>
<td>19</td>
</tr>
<tr>
<td>B1</td>
<td>1</td>
<td>75 ft Case 1 Loading Standard</td>
<td>No</td>
<td>19</td>
</tr>
<tr>
<td>B2</td>
<td>1</td>
<td>75 ft Case 2 Loading Standard</td>
<td>No</td>
<td>19</td>
</tr>
<tr>
<td>C</td>
<td>2 (mounted at 90° to each other)</td>
<td>70 ft Loading Standard &amp; 60 ft Loading Standard</td>
<td>No</td>
<td>19</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>49 ft Loading Standard</td>
<td>Yes</td>
<td>25</td>
</tr>
<tr>
<td>E1</td>
<td>1</td>
<td>75 ft Case 1 Loading Standard</td>
<td>Yes</td>
<td>25</td>
</tr>
<tr>
<td>E2</td>
<td>1</td>
<td>75 ft Case 2 Loading Standard</td>
<td>Yes</td>
<td>25</td>
</tr>
<tr>
<td>F</td>
<td>2 (mounted at 90° to each other)</td>
<td>70 ft Loading Standard &amp; 60 ft Loading Standard</td>
<td>Yes</td>
<td>25</td>
</tr>
</tbody>
</table>

Mast arms and poles shall be designed such that arm lengths greater than 49 feet in length cannot be mated to Type A or Type D poles. Mast arms shall not be attached to poles that have not been designed to support that length of mast arm.

Type D, E1, E2, and F poles, and the foundations for those poles, shall also be designed to support a maximum 18” luminaire arm supporting a 22-pound video camera with 1 square foot of wind load area concentrated 1 foot from the end of arm, and a 35-pound luminaire with 1 square foot of wind load area located at the end of the arm.

2. **Strain Signal Poles** shall be erected on foundations designed in accordance with Standard Drawing PF-8. They shall be galvanized steel and have a round base plate designed for at least the minimum number and diameter of anchor bolts specified in Standard Drawing PF-8. Washers are required above and below the base plate. The structure and the foundation shall be designed for the loads shown on the plans. Strain signal poles shall be field drilled for the attachment of span wire and tether wire. Span wire shall be located at least 18
inches below the top of the pole. All loads shall be assumed to be tethered and no load reduction for breaking of the tether wire shall be used in the pole design.

3. **Pedestal Signal Poles** shall be aluminum 6061-T6 structural tubes with minimum 0.337-inch wall thickness.

4. **Luminaire arms** attached to signal poles shall be galvanized steel, and shall be as specified in Standard Drawing MP-3. Luminaire arms shall be truss-style arms.

(d) **Camera Poles** for the support of ITS equipment shall be galvanized steel of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. They shall have at least four (4) anchor bolts.

(e) **Remove Existing Sign Panels or Sign Structures**: Items designated to be removed shall be disposed of in accordance with Section 106.04.

All foundations shall be removed to a point at least 2 feet below finished grade. The Contractor shall fill and compact the resulting cavities, and restore the area with topsoil, grading, seed, fertilizer, or lime as necessary.

All new signs in a particular sequence giving similar directions shall be installed before existing signs are removed.

Where a sign support is located on a bridge structure, or other such structure where the foundation cannot be removed, the existing anchor bolts shall be cut flush with the top of the structure and sealed with a two-part epoxy resin to prevent the remaining bolts from corroding.

When an overhead sign structure is attached to a bridge parapet, the existing anchor bolts shall be mechanically cut flush with the surface of the parapet, removed by mechanical drilling to a depth of one-half inch below the surface of the parapet, and patched to match the color and texture of the existing parapet surface with hydraulic cement mortar or grout in accordance with Section 410. Connection bolts to the steel beams shall be removed and voids shall be filled at the direction of the Engineer.

When an existing sign structure has lights or beacons, then electrical service shall be disengaged at the nearest junction box, and all conductors shall be capped and sealed in place unless service is to be reused for electrical service for the replacement structure.

When an existing sign panel is being removed in order to facilitate its replacement with a new sign panel, then the existing sign panel shall be removed immediately before installing the new sign panel in order to maintain continuity of signing, unless otherwise directed by the Engineer.

When an existing sign structure is being replaced with a new sign structure, then the new sign structure shall be erected immediately behind the existing sign structure before removing the existing sign structure in order to maintain continuity of signing, unless otherwise directed in the Plans or by the Engineer.

(f) **Relocate Existing Sign Panels**: Sign panels designated to be relocated shall be removed from their existing locations and reinstalled at the locations indicated in the Contract. Existing framing and bracing members shall be reused at the new sign location unless otherwise directed by the Engineer.
Sign panels shall be reinstalled immediately following removal from their existing location, unless otherwise approved by the Engineer.

Sign panels shall be attached to their new location using new attachment hardware in accordance with the Standard Drawings and the Specifications.

Any sign panels that are scratched or damaged during the relocation process shall be replaced at no additional cost to the Department.

Section 700.04—Working Drawings is amended to replace the last paragraph with the following:

The Contractor’s engineer shall verify that the proposed traffic control device or ITS device foundations and structures are designed in accordance with the requirements of the Plans, Specifications, Standard Drawings, and the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition (LTS-6), 2013 with 2015 interim, as modified elsewhere in the Contract; based on site conditions, required loadings, and required vertical clearances.

Section 700.05(c) Concrete Foundations is amended to replace the seventh paragraph with the following:

The Contractor shall furnish the foundation designs for signal poles, high-mast lighting poles, overhead sign structures, and camera poles to the Engineer for review. Such designs shall be supervised and sealed by a Professional Engineer holding a valid license to practice engineering in the Commonwealth of Virginia. Design calculations and drawings shall indicate the cubic yard quantity of concrete required for constructing the foundations. The foundations shall be designed for the structure it is supporting and for the loads the structure is being designed to support, unless indicated otherwise on the plans.

Section 700.05(d) Electrical Service is amended to replace the second and third paragraph with the following:

When required on the Standard Drawings, the Plans, or as directed by the Engineer, the Contractor shall construct an electrical service work pad in front of all electrical service safety switches, breaker boxes, and pole mounted cabinets, except when an immediately adjacent paved sidewalk can fulfill this purpose. The electrical service work pad shall be at least 20 inches in width, 36 inches in length, and 4 inches in depth, and sloped to facilitate drainage away from the structure. Exposed concrete areas of electrical service work pads shall be given a Class 7 finish in accordance with Section 404 of the Specifications.

Section 700.05(e) Poles, posts, sign structures, and ITS structures is amended to replace the fifth paragraph with the following:

All signal poles, light poles not mounted on transformer bases, camera poles, and overhead sign structures shall be provided with handholes that are on the opposite side from traffic. Handholes shall be at least 3 by 5 inches, unless otherwise specified in the Standard Drawings, and shall be provided with a weatherproof gasket and cover. Handholes shall be latchable, capable of being opened using a star wrench or other approved latching mechanism. If specified in the Contract Documents, a lockable handhole cover shall be provided, using key requirements provided by the VDOT Regional Operations Maintenance Manager.

For structures mounted on transformer bases, the transformer bases shall have hinged access covers on the side opposite traffic. The Contractor shall furnish the Engineer with at least one tool
or key required to open handholes and transformer base access covers for each 40 structures, or fraction thereof.

Section 700.05(f) Breakaway Support Systems is replaced with the following:

Breakaway Support Systems Breakaway support systems shall be installed where specified on the plans and installed according to the manufacturer’s instructions. Breakaway support systems shall not be used for poles that support electrical power service equipment.

Section 700.06—Measurement and Payment is amended to replace the first paragraph with the following:

Concrete foundations will be measured units of each or cubic yards and will be paid for at the contract unit price per each or cubic yards of concrete as applicable for the standard, type and size designated. When paid for in cubic yards of concrete, no payment will be made for concrete in excess of the cubic yards of concrete required by the approved foundation design unless otherwise authorized by the Engineer, in which case the additional concrete will be paid for in cubic yards for the invoice material cost only. This price shall include providing foundation design and shop drawings; concrete, reinforcing steel, anchor bolts, washers, nuts, bolt circle templates, lubricant, torque, ultrasonic test on anchor bolts, grounding electrodes (including grounding electrode clamps, grounding electrode conductors, and installation), conduits, testing grounding conductor-to-electrode continuity, excavating, backfilling, compacting, vented varmint screens, disposing of surplus and unsuitable material, and restoring disturbed areas.

Section 700.06—Measurement and Payment is amended to replace the ninth through the twelfth paragraph with the following:

Lighting poles will be measured in units of each and will be paid for at the contract unit price per each for the standard and luminaire mounting height or type specified. This price shall include providing design and shop drawings; pole shafts, grounding lugs, handholes, locks (when required), caps, identification tags, base plates, vibration dampeners (when required), bracket arms, breakaway support systems, field drilling, and galvanization.

Steel strain poles will be measured in units of each and will be paid for at the contract unit price per each for the length specified. This price shall include providing design and shop drawings, pole shafts, J-hooks, grounding lugs, handholes, locks (when required), caps, fittings, identification tags, field drilling, and galvanization.

Mast arm signal poles will be measured in units of each and will be paid for at the contract unit price per each for the standard and type specified. This price shall include providing design and shop drawings, pole shafts, J-hooks, grounding lugs, handholes, locks (when required), caps, fittings, base plates, identification tags, field drilling, and galvanization.

Mast arms will be measured in units of each and will be paid for at the contract unit price per each for the length and loading case (when required) specified. The price bid shall include providing design and shop drawings, mast arms including mast arms caps, galvanization, fittings, nuts, bolts, washers, field drilling of wire outlet holes and rubber gaskets or grommets, field adjustment of arm lengths, and identification tags.

Overhead sign structures will be measured in units of each and will be paid for at the contract unit price per each for the location specified. The price shall include furnishing design and shop drawings, structural units and supports, field drilling and adjustment, galvanization, base plates, handholes, locks (when required), caps, grounding lugs, electrical systems including conduit, sign luminaires, luminaire supports, fittings, conductor cable, and identification tags.
Section 700.06—Measurement and Payment is amended to replace the sixteenth paragraph with the following:

**Pedestal poles** will be measured in units of each and will be paid for at the contract unit price per each for the standard and length specified. This price shall include caps, breakaway support systems, hinged access covers, galvanization, grounding lugs, identification tags, and anchor bases.

Section 700.06 – Measurement and Payment is amended to insert the following:

**Remove Existing (Type) Sign Structure** will be measured in units of each and paid for at the Contract each price for the type of structure specified. This price shall include removing and disposing of the existing sign structure and all supported sign panels, conduits, cables, lights, luminaires, and luminaire retrieval system attached to the structure; disengaging existing electrical service; and capping and sealing conductors. This price shall also include excavating, demolishing and removing foundational elements to at least two feet below ground line; disposing of waste materials; backfilling with suitable materials; compacting; and restoring (grading, topsoiling and seeding). For removal of overhead sign structures, this price shall also include cutting existing anchor bolts, capping and sealing, hydraulic cement mortar or grout, and epoxy resin.

**Remove Existing (Type) Sign Panel** will be measured in units of each and paid for at the Contract each price for the type of sign panel specified. This price shall include removing and disposing of the existing sign panel, framing and bracing, luminaires, conductor cables, and attachment hardware.

**Relocate Existing (Type) Sign Panel** will be measured in units of each and paid for at the Contract each price for the type of sign panel specified. This price shall include removing sign panel, furnishing new mounting hardware and brackets, and installing onto new structure.

Section 700.06—Measurement and Payment is amended by revising the Pay Item Table as follows:

The following pay items are removed:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting pole (Standard, luminaire mounting height)</td>
<td>Each</td>
</tr>
<tr>
<td>Signal pole (Standard, class and type)</td>
<td>Each</td>
</tr>
<tr>
<td>Mast arm (Length)</td>
<td>Each</td>
</tr>
</tbody>
</table>

The following pay items are inserted:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting pole (Standard, luminaire mounting height or type)</td>
<td>Each</td>
</tr>
<tr>
<td>Signal mast arm pole (Standard and type)</td>
<td>Each</td>
</tr>
<tr>
<td>Steel strain pole (Standard and length)</td>
<td>Each</td>
</tr>
<tr>
<td>Mast arm (Length) (loading case)</td>
<td>Each</td>
</tr>
<tr>
<td>Remove existing (type) sign structure</td>
<td>Each</td>
</tr>
<tr>
<td>Remove existing (type) sign panel</td>
<td>Each</td>
</tr>
<tr>
<td>Relocate existing (type) sign panel</td>
<td>Each</td>
</tr>
</tbody>
</table>
SECTION 704—PAVEMENT MARKINGS AND MARKERS of the Specifications is amended as follows:

Section 704.01—Description is replaced with the following:

This work shall consist of establishing the location of retroreflective pavement markings and installing pavement markings and pavement markers in accordance with the MUTCD, the Contract, and as directed by the Engineer.

Section 704.02—Materials is amended to include the following:

(d) Contrast Pavement Markings shall conform to Section 246 of the Specifications.

Section 704.03(a)2 Type B markings is amended to replace the first paragraph with the following:

Type B markings shall be applied in accordance with the manufacturers’ installation instructions.

Section 704.03(a)2.e Patterned preformed tape (Class VI) is amended to replace the third, fourth, and fifth paragraph with the following:

The Contractor shall ensure that markings are not degraded by subsequent operations. Markings that are improperly inlaid during the pavement operations shall be completely eradicated and reapplied via non-embedded surface application at the Contractor’s expense.

Surface-applied Type B Class VI markings shall not be installed directly over existing markings, except that Type B Class VI markings may be installed over Type A markings that are fully dry and are at a thickness of 10 mils or less.

Section 704.03(a)2.f Polyurea (Class VII) is replaced with the following:

Polyurea (Class VII) shall be applied in accordance with the manufacturer’s installation instructions. Polyurea marking material shall not be applied over existing pavement markings unless the existing marking is 90 percent worn away or eradicated; or over Type A markings that are fully dry and are at a thickness of 10 mils or less.

Polyurea marking material shall be applied at a wet film thickness of 20 mils (± 1 mil). Glass beads and retroreflective optics shall be applied at the rate specified in the VDOT Materials Division’s Approved Products List 74 for the specific polyurea product.

Section 704.03(b) Pavement messages and symbols markings is amended to replace the second paragraph with the following:

Message and symbol markings include, but shall not be limited to, those detailed in Standard Drawing PM-10.
Section 704.04—Measurement and Payment is amended to replace the second paragraph with the following:

**Contrast Pavement Line Marking** will be measured in linear feet and will be paid for at the Contract unit price per linear foot for the type or class and width specified. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

**Pavement message markings** will be measured in units of each per location or in linear feet as applicable and will be paid for at the Contract unit price per each or linear foot. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

**Pavement symbol markings** will be measured in units of each per location for the symbol and type material specified and will be paid for at the Contract unit price per each. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

Section 704.04—Measurement and Payment is amended to replace the Pay Item Table with the following:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Type or class) Pavement line marking (width)</td>
<td>Linear Foot</td>
</tr>
<tr>
<td>(Type or Class) Contrast Pavement Line Marking (width)</td>
<td>Linear Foot</td>
</tr>
<tr>
<td>Pavement message marking (Message)</td>
<td>Each or Linear Foot</td>
</tr>
<tr>
<td>Pavement symbol marking (Symbol, Type or class material)</td>
<td>Each</td>
</tr>
<tr>
<td>(Type) Pavement marker (type pavement)</td>
<td>Each</td>
</tr>
</tbody>
</table>