

tions. Rivets shall be located on 1-foot centers (positioned 1 inch from each panel's edge) around the sign's perimeter. Where overlayment panels are 30 inches or greater in width, a column of rivets shall be installed on 1-foot centers down the centerline of the panel. Rivets shall be installed in such a sequence as to prevent buckling of the panels.

In the Hampton Roads District, at installations where the existing sign panel is attached by stud welds to the horizontal supports 3/8-inch galvanized bolts, washers, nuts and fiber washers shall be used in addition to rivets to attach the overlay panels. Bolts shall be located in alignment with each horizontal support (z-bar, t-bar), positioned 1 foot from each panel's edge and spaced on 1-foot maximum spacings along each horizontal support. At locations where existing stud welds and panel clips are in the area of the proposed bolt locations, the bolts shall be relocated as needed to miss these. Nuts shall be tightened only to the point just before the sign panel begins to buckle in that area.

701.04—Measurement and Payment.

Sign panels will be measured in square feet and will be paid for at the contract unit price per square foot. This price shall include background sheeting, sign messages, and framing units.

Overlay sign panels will be measured in square feet of sign panels without deductions for rounding corners. Overlay sign panel will be paid for at the contract unit price per square foot, which price shall be full compensation for verifying the size and color of overlayment panel, removal of existing overlayment and demountable messages including borders; fabricating, furnishing and installing overlayment.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Sign panel	Square foot
Overlay Sign panel	Square foot

SECTION 702—DELINEATORS

702.01—Description.

This work shall consist of furnishing and installing road edge, barrier or guardrail delineators of the type specified in accordance with these Specifications and in reasonably close conformity with the lines and dimensions on the plans or as established by the Engineer.

702.02—Materials.

- (a) **Fabrication** of aluminum panels with reflective sheeting shall conform to Section 701.
- (b) **Reflective sheeting** shall conform to Section 247 and shall be the same color as the adjacent pavement marking.
- (c) **Plastic lens retro-reflectors** shall conform to Section 235 and shall be the same color as the adjacent pavement marking.
- (d) **Plastic panels** shall conform to Section 235.
- (e) **Aluminum panels** shall conform to Section 235.
- (f) **Adhesive** for attaching delineators to guardrail and barrier shall be as recommended by the manufacturer.

702.03—General Requirements.

- (a) **Road edge delineators**
 - 1. **Interstate road edge delineators** shall consist of two types.
 - a. Type I shall be an aluminum panel with reflective sheeting.
 - b. Type II shall be plastic lens retro-reflector.
 - 2. **Standard and Special road edge delineators** shall be an aluminum panel with reflective sheeting.
- (b) **Barrier and guardrail delineators** shall have no less than 7.0 square inches of retro-reflective sheeting and shall have no more than 5 inches of vertical projection when installed. The delineator shall be fabricated from a flexible plastic panel.

702.04—Procedures.

- (a) **Road edge delineators** shall be placed as shown on the Standard Drawings.
- (b) **Barrier and guardrail delineators** shall be applied to clean dry surfaces in accordance with manufacturer's recommendations. Loose material and dirt shall be removed from concrete by wire brushing and from steel by appropriate methods. When recommended by the manufacturer, a primer shall be utilized.

Delineators shall be installed on barriers and guardrails that are within 15 feet of the edge of pavement.

Barrier delineators shall be installed on the top surface of the barrier wall, except barriers greater than 36 inches in height, barriers with glare screens or handrail attached and barriers located in construction work zones shall have the delineators installed at a height of approximately 25 inches above the roadway. Delineators installed on the sides of barrier shall be positioned so the reflective surface lies in the vertical plane facing oncoming traffic. Barrier delineators, shall be installed using an adhesive as recommended by the delineator's manufacturer.

Guardrail delineators shall be installed on the web of the guardrail posts. Where guardrail blockouts are installed, delineators shall be installed on the web of the blockouts. Where weak post guardrail and cable guardrail systems are installed, delineators shall be manufactured to fit on the web of the guardrail posts; no field cutting or adjustments will be allowed. If a bolting system is utilized to attach the delineators to the posts, the bolting system shall be such that no drilling of the guardrail posts or blockouts is necessary. Where wooden support posts or blockouts are utilized, delineators shall be attached with screws or by an adhesive system as recommended by the manufacturer. Screws shall be stainless steel or galvanized.

Spacing for delineators on barrier or guardrail shall be on 80-foot centers unless otherwise indicated. Delineators mounted on guardrail and barriers located in curves on interchange ramps shall be spaced in accordance with the spacing for Interstate Road Edge Delineators as shown on the Standard Drawings except the maximum spacing shall be 80 feet.

Where the center to center spacing for delineators on guardrail cannot be obtained due to post spacing, the delineators shall be installed to provide spacing that is not greater than the spacing indicated above.

702.05—Measurement and Payment.

Road edge delineators will be measured in units of each and will be paid for at the contract unit price. This price shall include sign post, fasteners, retro-reflective elements, and excavation and backfill.

Barrier and guardrail delineators are considered incidental to barrier and guardrail construction and will not be measured for separate payment unless specified in the Contract. When specified in the Contract for installation on existing barriers and guardrail, delineators will be measured in units of each and paid for at the contract unit price per each. This price shall include surface preparation, adhesive, fasteners, and retroreflectors.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Road Edge Delineator (Standard and Type)	Each
Barrier Delineator	Each
Guardrail Delineator	Each

SECTION 703—TRAFFIC SIGNALS

703.01—Description.

This work shall consist of furnishing and installing traffic signal equipment in accordance with these specifications and as shown on the plans or as directed by the Engineer. The terminology used herein and on the plans shall be as generically interpreted by manufacturers in the field except that certain terminology shall be interpreted as follows:

- (a) **auxiliary equipment:** separate devices used to add supplementary features to a controller, such as conflict monitors, load switches, and flashers
- (b) **manufacturer:** the company that assumes the responsibility for producing and assembling the equipment and that is responsible for guaranties and warranties for the equipment
- (c) **system:** the coordination of traffic signals through a time relationship or by interconnection of controllers with a master controller or computer to permit coordinated movement along a street(s)
- (d) **system manufacturer:** the company or system supplier that assumes the responsibility for procuring and assembling the equipment and that is responsible for guaranties and warranties for the equipment

703.02—Equipment.

Traffic signal controllers, master controllers, auxiliary equipment, and flashers for operating flashing beacons furnished by the Contractor shall be certified by the manufacturer as conforming to the requirements of NEMA TS-1 and any exceptions and additions stated herein unless otherwise specified. The manufacturer shall also provide certification from an independent testing laboratory that the model of controller, auxiliary equipment, and flasher furnished conforms to NEMA environmental standards and test procedures. Controllers and auxiliary equipment shall be the manufacturer's standard design. Controllers shall be furnished completely housed in a waterproof cabinet. Controllers and auxiliary equipment shall operate from a 120-volt, 60-Hz, single-phase, AC power supply. The manufacturer's name, model number, serial number, and part identification number shall be permanently