Section 633  Delineators and Markers

633.1  Description
(1) This section describes providing roadway delineators and markers including culvert markers and right-of-way markers.

633.2  Materials

633.2.1  Steel Posts
(1) Furnish a flanged channel section post weighing 1.12 pounds per linear foot or more before zinc coating, and made of steel with the following properties:
   - Minimum tensile strength ............................................................................................................................ 50 ksi
   - Minimum tensile yield strength ................................................................................................................... 36 ksi
   - Minimum elongation ......................................................................................................................... 5.0 percent in 2 inches
(2) Furnish posts the length, and with mounting holes the size and spacing the plans show. Ensure the posts are symmetrical, well rolled, and free from defects that impair their strength or appearance.
(3) Hot-dip zinc coat the posts after completing forming, cutting, and punching or drilling. Perform zinc coating according to ASTM A123.

633.2.2  Flexible Delineators and Markers
(1) Furnish flexible delineators or markers from the department's APL for the application the bid item indicates. If the contract requires reflective sheeting, furnish posts with shop-applied reboundable type H reflective sheeting from the department's APL and of the size plan details show.

633.2.3  Hardware
(1) Furnish galvanized steel soil anchors, nuts, bolts, washers, and other metal parts unless the contract specifies otherwise.

633.2.4  Barrier Wall Delineators
(1) Furnish aluminum for barrier wall delineators conforming to ASTM B221, alloy 6061-T6 with sheeting from the department's APL. Furnish stainless steel stud bolts, self-locking nuts, and washers conforming to 513.2.1.

633.2.5  Delineator Reflectors
(1) Fabricate reflectors as the plans show using sheet aluminum conforming to 637.2.1.3 covered with sheeting from the department's APL.

633.2.6  Right-of-Way Marker Plaques
(1) Use department-furnished R/W marker plaques and survey marker informative plaques.

633.3  Construction

633.3.1  General
(1) Erect posts to a true vertical position and at the locations the plans show.
(2) Install flexible delineators and markers conforming to manufacturer's recommendations for the application the bid item indicates unless the plans show otherwise. Ensure that the curved side of single curvature posts has the required marking and faces traffic.
(3) Install steel posts by driving using equipment that does not damage the post. Replace posts bent or otherwise damaged by contractor operations.

633.3.2  Delineators
(1) Provide steel delineator posts to support delineator reflectors and provide barrier wall delineators on concrete barriers or other structures. Install in the locations and at the offsets the plans show or the engineer directs.
(2) Attach each reflector securely to the supporting steel post.

633.3.3  Temporary Delineators
(1) Provide temporary delineators conforming to the requirements for permanent installations except, if the engineer approves, the contractor may furnish serviceable used posts. Maintain during construction by replacing damaged materials. Remove and dispose of temporary delineators when no longer needed.
(2) Upon contract completion, temporary delineator components become the contractor's property.
633.3.4 Right-of-Way Markers
(1) Provide right-of-way markers at the locations the plans show. Drive steel posts to the minimum depth the plans show, or to the depth required to provide adequate support, whichever is greater. If encountering rock above the minimum embedment depth, install as the plans show unless the engineer allows otherwise.
(2) The contractor may splice posts above grade. Provide the overlap the plans show or more.
(3) Attach R/W and survey marker informative plaques to the posts oriented as the plans show.

633.3.5 Culvert End Markers
(1) Provide flexible culvert end markers at the locations the plans show. Use white posts and apply black non-reflective sign tape to both sides of the top nine inches.
(2) Install posts in front of the object being marked as referenced from the direction of travel by the approaching highway traffic. Use only one marker where two or more apron endwalls are adjacent to each other.

633.3.6 Crossover Markers
(1) Install bases and flexible tubular marker posts to the pavement as the plans show. Use white posts with white reboundable sheeting. Attach posts to bases using a locking pin or other engineer-approved system.

633.3.7 Median Markers
(1) Install bases and flexible tubular marker posts to the pavement as the plans show. Use white posts with yellow reboundable sheeting. Attach posts to bases using a locking pin or other engineer-approved system.

633.3.8 Salvaging Material
(1) Remove the delineator or marker the salvaged bid item indicates from the locations the contract designates. Take care to minimize damage to reusable materials. Restore the site, and dispose of unusable and surplus materials.
(2) Sort by delineator or marker type and load reusable materials onto separate pallets. The contractor may place hardware and smaller parts in clearly labeled crates or plastic buckets. Stockpile reusable components in engineer-approved locations on the project.
(3) The contractor may use salvaged materials for temporary installations under the contract.

633.4 Measurement
(1) The department will measure the EACH bid items under this section as each individual unit acceptably completed except as follows:
  - The department will measure the Salvaged bid items as each individual installation including the post and associated reflector, barrier wall delineator, sheeting, marking, or plaque.
  - The department will measure Markers Crossover as each installation including the post and base.

633.5 Payment
(1) The department will pay for measured quantities at the contract unit price under the following bid items:

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>633.0100</td>
<td>Delineator Posts Steel</td>
<td>EACH</td>
</tr>
<tr>
<td>633.0200</td>
<td>Delineators Flexible</td>
<td>EACH</td>
</tr>
<tr>
<td>633.0500</td>
<td>Delineator Reflectors</td>
<td>EACH</td>
</tr>
<tr>
<td>633.1000</td>
<td>Delineators Barrier Wall</td>
<td>EACH</td>
</tr>
<tr>
<td>633.1100</td>
<td>Delineators Temporary</td>
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<tr>
<td>633.5100</td>
<td>Markers ROW</td>
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</tr>
<tr>
<td>633.5200</td>
<td>Markers Culvert End</td>
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<td>633.5300</td>
<td>Markers Crossover</td>
<td>EACH</td>
</tr>
<tr>
<td>633.5400</td>
<td>Markers Median</td>
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</tr>
<tr>
<td>633.9000 - 9100</td>
<td>Salvaged (type)</td>
<td>EACH</td>
</tr>
</tbody>
</table>

(2) Payment for Delineator Posts Steel and Delineators Flexible is full compensation for providing and erecting the posts; and for removing contractor-damaged posts, and debris. Reflectors for use on steel delineator posts are paid for separately under the Delineator Reflectors bid item while reflective sheeting for flexible delineators is incidental to the Delineators Flexible bid item.

Revise 633.5 to rename the Delineators Barrier Wall bid item formerly known as the Delineator Brackets bid item.
(3) Payment for Delineator Reflectors is full compensation for providing reflectors, including bolts, nuts, washers, screw-nails, or other connectors required for installation.

(4) Payment for Delineators Barrier Wall is full compensation for providing barrier wall delineators, including anchors, bolts, and gaskets.

(5) Payment for Delineators Temporary is full compensation for providing, maintaining, and removing delineators. The department will not pay for replacing temporary delineators damaged during construction.

(6) Payment for Markers ROW is full compensation for providing markers; for excavation including rock, grout, and backfill; and for splicing.

(7) Payment for Markers Culvert End is full compensation for providing the marker including non-reflective tape and soil anchor.

(8) Payment for the Markers Crossover and Markers Median bid items is full compensation for providing the marker pole and base.

(9) Payment for the salvaged bid items is full compensation for removing and stockpiling reusable delineators or markers.