ROAD COMMISSION FOR OAKLAND COUNTY

SPECIAL PROVISION
FOR
ILLUMINATED STREET NAME SIGN - LED
(Clearview Highway 2W Font)

ORG:05-07-21
REV: 03-01-25

a. Description

This work consists of furnishing all labor, equipment, and material to install an illuminated sign assembly. The sign assembly shall be either one or two faces as specified, street name sign(s), bracket arm, which includes the associated assembly, brackets, hardware, fittings, connectors, and all other material required to complete the installation specified on the plans. Storage and disposal of materials are also included in this item.

This work is according to the plans and Standard Specifications for Construction except as herein provided.

b. Materials

Material must meet sections 918, 919, and 921 of the Standard Specifications for Construction and this special provision.

1. Sign Housing

The sign assembly shall consist of a six-foot or eight-foot aluminum body with easily replaceable street name panels and optical cavities. The sign assembly shall be either one or two faces as specified.

Overall Sign Dimensions					
	Length	Height	Depth at the top (including the drip edge)	Depth at the bottom	Weight (No more than)
Six-foot sign	72-3/8”	22-5/16”	10-3/4”	5-7/8”	75 pounds
Eight-foot sign	96-3/8”	22-5/16”	10-3/4”	5-7/8”	90 pounds
The sign, when mounted, shall provide a 5º downward angle for increased visibility.					

The body of the sign must consist of aluminum housing. The top shall be extruded from 6063-T5 aluminum alloy with a minimum thickness of 0.140 inches. There must be drip rails overhanging the sign face to prevent water from entering the electrical housing.

The bottom of the sign must be extruded from 6063-T5 aluminum alloy with a minimum thickness of 0.094 inches.

The ends shall be cast from 356 aluminum and have a minimum thickness of 0.250 inches.

All seams shall be continually welded for a weather tight seal. Four drain holes shall be located in the bottom of the body, two at each end of the sign.

All fasteners and hardware shall be corrosion resistant.

No special tools shall be required for exchanging or retrofitting existing bulb technologies with these optical cavities or for routine maintenance.

2. Doors

The aluminum doors shall have one end removable for access to the sign face. Each door shall have a full length, 0.040 inch by 1 1/8-inch, open stainless-steel hinge on the bottom edge. The door shall be secured from opening by three (3) quarter turn air lock fasteners. A neoprene gasket, 5/32-inch-thick by 1 inch wide, shall be installed to provide a watertight seal between the door and housing.

3. Sign Face

The graphics used for the sign faces shall be in strict compliance with the current Michigan Department of Transportation (MDOT) sign fabrication guidelines and the current Michigan Manual on Uniform Traffic Control Devices (MMUTCD).

The legend shall be Clearview Highway 2W font.

Overhead Street Name signs shall be fabricated with an initial upper-case letter at 12 inches in height followed by proportional lower-case letters. The street name signs shall have the appropriate prefix or suffix as shown on the plans.

Public Roads - Street Name signs for RCOC specified public roads shall have a green background with white letters and one-inch white border. Signs shall be fabricated using specified sheeting materials and overlay film.

Private Roads - Street Name signs for RCOC specified private roads shall have a white background with black letters and one-inch black border. Signs shall be fabricated using specified sheeting materials and overlay film.

The contractor shall verify the letters and sign size with SignCAD.

The sign face shall be constructed of 0.125 inch ± 10% in thickness, Lexan SG404-7328 translucent white.

Public Roads - The sign face legend background shall be 3M #1177 electrically cuttable translucent vinyl green film applied to the front of the sign face. The legend shall be framed with a white polycarbonate border.

The name of the manufacturer of the sheeting and film used for fabrication, along with a Warranty Statement (if requested by the Engineer), shall be provided in the certificate of material compliance. All sheeting and film materials shall be from the same manufacturer.

The legend of the sign must be as indicated on the plans.

The size of the sign must be as indicated on the plans.

4. Mounting Hardware

Attach the street name signs to mast arms, mast arm poles, or strain poles as shown on the plans.

Street name signs located over the road, curb, and gravel shoulder must maintain 17-foot minimum vertical clearance from the roadway surface to the bottom of the sign as required in the contract.

The sign shall be orientated perpendicular to the traveled roadway.

Provide hardware which consists of AISI 300 series stainless steel.

A. Mast Arm – two point

The two-point sign assembly mounting brackets shall consist of (2) cast aluminum clamps with stainless steel bands, (2) clevis assemblies, (2) tri-stud clevis adapters, (1) 1 1/2 inch by 2 inch all thread nipple and (1) 12 inch all thread nipple. Provide cast aluminum clamps, clevis assemblies, tri-stud clevis adapters manufactured from 356-T6 aluminum alloy. Ensure the mounting assembly is capable of free swinging.

All aluminum mounting assemblies shall be provided with stainless steel inserts wherever a clevis pin is used. All hubs, tri-stud fittings and/or clamps that attach to the sign, shall be mounted on the sign by the sign manufacturer. It shall not be necessary to disassemble the sign to attach the mounting assemblies.

The connection of the street name sign to the mast arm is included in the street name sign pay item and not paid for separately.

B. Strain Pole or Mast Arm Pole – bracket arm

A street name sign bracket arm assembly shall be utilized when mounting the street name sign to a strain pole or mast arm pole.

The street name bracket arm assembly shall consist of a single cantilever arm, mounting plate, gusset plate and pole clamps attached to a wood or steel pole. The clamps shall consist of an upper and lower clamp assembly and shall support

a single cantilever arm. The clamps shall accommodate all pole diameters from approximately 8 inches to 14 inches. The contractor is required to coordinate the pole diameter with the clamps. The bracket assembly shall be designed for a 90-mph wind velocity, at a height of 18.5 feet and with a 1.3 gust factor in accordance with the latest AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals". The orientation, or relocation, of the cantilever arm and the sign shall be done with simple hand tools without removing the cantilever arm or sign.

The bracket arm truss tubes shall be made of A500 Grade B Steel, with Schedule 80 2-3/8 inch outer diameter galvanized steel tubing and welded to a 0.5-inch formed A-36 steel mounting plate. 0.35-inch flat bar steel gusset shall be welded between arm tube and mounting plate. The arm shall include an aluminum end cap and through bolt cap attachment and hardware. The adjustable clamps shall be made from ¼ inch by 4-inch flat bar conforming to ASTM A36, with a minimum yield of 50 KSI. Hardware for the bolts shall be made from high strength steel. The bolts that attach the clamps together shall be hex head, ½ inch – 13 NC x 5 inches long. The bolts that attach the arm to the clamp shall be hex head, ½ inch – 13 NC x 2 ½ inch long. Each bolt shall be supplied with one hex nut, one lock nut and two flat washers. The clamps shall consist of 2, 3 or 4 sections, depending upon the diameter of the pole. The adjustable clamps and the arm shall be hot dip galvanized after fabrication per ASTM A 123 specifications. The bracket arm, all brackets and hardware shall be hot dipped galvanized after fabrication and welding according to ASTM A123 and A153 where applicable. Welding shall be according to AWS D1.1 – Structural Welding Code – Steel. When indicated on the plans, the assembly shall be powder coated with a TGIC Polyester to 3.5 mils minimum coating thickness over the hot dip galvanize, after being properly treated for paint adhesion.

The bracket arm connection of the street name sign to the strain pole or mast arm pole is paid for separately.

5. Wiring

The internal wiring shall be designed for 600 volts at 90 degrees Fahrenheit using #18 AWG, stranded, soft annealed copper wire. Internal wiring shall be secured by insulated wire compression nuts. A wire entrance junction box shall be supplied with the sign assembly and shall provide a weather-tight seal. No wiring shall be allowed within the optical cavity. Input voltage shall be 120VAC and fused. The power conditioning circuitry shall control power to operate the LED's at the manufacturer's recommended specifications.

6. LED Panel

The LED panel(s) shall house the LED light engine panel. The LED panel shall provide a back-lit display to the sign face.

7. LED Light Engine Panel

The LED light engine panel shall consist of adequate LED's to provide 200 nits (200 Candela per square meter) or an equivalent surface luminance of 660 lux over a –40 degrees to +60 degrees Celsius ambient temperature range. There shall be a sufficient quantity of white LED's to uniformly illuminate the viewing area. Power use shall be 3-4 watts per square foot of viewing area. The failure of one (1) LED shall not reduce the light output by more than eight percent (8%) per foot of sign face. The LED light engine panel shall consist of a circuit board comprised of an insulated aluminum substrate, with a minimum thickness of 0.050 inch. Circuit conductors and LED attachment adhesive shall be minimally 90% silver to insure optimal electrical and thermal conductivity. The LED light engine panel face shall be entirely conformally coated with a 2-part urethane resin, no thinner than 0.002 inch (dry) to adequately protect the light engine from moisture and corrosion. The LED light engine panel shall be permanently attached to the LED panel. The LED light engine panel shall pass the following tests per NEMA standards:

A. Thermal Shock Test: 85/-40 degree Celsius with 2-hour dwells for 5 cycles with a 2-hour presoak at –40 degree Celsius.

B. Salt Spray and Soak Test: The LED panel shall endure 48 hours of continuous salt spray and 240 hours of a salt water soak.

C. All LED panels shall be burned-in for 24 hours and certified for compliance by the manufacture. The manufacturers name and date of manufacture along with a Quality Control tracking sticker shall be mounted on the inside of the LED light engine panel.

D. The panel(s) shall be painted white. Paint must meet GM4901 specifications.

8. Power Supply

There shall be one power supply for (1), one way six – eight-foot sign and one power supply for (2), two-way signs. The power supply(s) shall be rated for 80 watts by U.L. for Class 2 operation (24 volts D.C.). The temperature rise of the LED panel shall not exceed 15 degree Celsius under continuous operating conditions at rated output. The output of the 24v power supply(s) shall be connected to a two-wire connector that attaches to the LED light engine panel(s).

9. Painting Requirements

The paint color of the sign housing exterior must be as indicated on the plans and match the pole color. If not indicated on the plans, the surface must be unfinished / natural as-directed by the engineer.

Prior to painting the sign, all exterior metal surfaces of the sign shall be cleaned, etched, and primed in accordance with industry standards before receiving two color coats of industrial enamel.

Except for the sign faces, coat all exterior surfaces with a semigloss or gloss enamel. Ensure the color of the coating matches the central color within the limits shown on the Federal Highway Administration (FHWA) “Highway Yellow Color Tolerance Chart,” except that the color must not be darker than the central color.

Ensure the coating system consists of durable, weather resistant enamels of the color specified and is applied at a uniform thickness without blisters, runs, or other defects. The average dry film thickness must be 1.5 mils and determined by Method A, Inductance Thickness Gage, as specified in measurement of Dry Film Thickness of Nonmetallic Metal Base, Varnish, Lacquer, and Related Products Applied on a Nonmagnetic Metal Base, ASTM D 1400.

10. Warranty and Guarantee

Provide materials with a manufacturer’s warranty/guarantee, transferable to the Road Commission for Oakland County:

A. The supplied materials and sign will be free from all defects in materials and workmanship for two (2) years from the date of final project acceptance.

B. The LED light engine shall be guaranteed that all material supplied shall be free from all defects in materials and workmanship for a period of seven (7) years from date of final project acceptance.

If requested by the Engineer, supply manufacturer’s warranty and guarantee documents from the manufacturer and a copy of the invoice showing date of shipment.

11. Special Tools

No special tools shall be required. If special tools are required for any other application in the repair, assembly, or installation of this equipment, forty (40) complete sets of such tools shall be furnished.

12. Tests, Inspection, and Sampling

All equipment is to be tested as necessary and inspected for conformance with this specification before shipment.

Failure of any piece of equipment to meet the requirements of this specification shall be cause for rejection. The Road Commission for Oakland County shall have the right to pull out and reject any piece of equipment for non-conformance with specifications. The bidder shall replace any rejects at his own expense, including all handling and transportation charges.

13. Acceptance
Provide General Certification per the MDOT's *Materials Quality Assurance Procedures Manual* to the Engineer that the materials meet the requirements specified herein.

c. Construction

All work must be in accordance with the contract documents.

Furnish and install, a Street Name Sign, as indicated on the plans or as directed by the Engineer. Ensure work complies with sections 818, 819 and 820 of the Standard Specifications for Construction and this special provision.

Storage and/or disposal of the removed material are included and must comply with section 204 of the Standard Specifications for Construction or as directed by the Engineer.

1. Submittals / Working Drawings
Submit a detailed dimensional drawing of all equipment, material specification list which shows the materials to be used, equipment to be furnished, and assembly/installation method.

Provide SignCAD drawings as part of the submittal.

2. Samples
If required by the engineer, a sample case sign, shall be delivered within seven (7) working days after the request is submitted. At the sole discretion of the engineer, a picture of a recently (within 6 months) installed street name sign with all the same materials may be submitted.

d. Measurement and Payment

The completed work, as described, will be measured and paid for at the contract unit price using the following pay item(s).

Pay Item	**Pay Unit**
St Name Sign, Illuminated, One Way, __foot, RCOC	Each
St Name Sign, Illuminated, Two Way, _ foot, RCOC	Each
St Name Sign, Illuminated, Bracket Arm, RCOC	Each
St Name Sign, Illuminated, Rem, RCOC	Each
St Name Sign, Illuminated, Salv, RCOC	Each

St Name Sign, Illuminated, One Way, _ foot, RCOC (Ea) and St Name Sign, Illuminated, Two Way, _ foot, RCOC (Ea) will be measured as a unit. The contract unit price each shall be payment in full for furnishing and installing the internally illuminated street name sign, attachment to mast arm, lamps, fittings, wiring, line hardware, grounding, cable to controller and such other material as may be required to provide a complete and operating job as specified herein and as shown on the plans.

St Name Sign, Illuminated, Bracket Arm, RCOC (Ea) will be measured as a unit, regardless of the arm length. The contract unit price shall be payment in full for furnishing and installing the bracket arm, any required fittings, grounding, and any other materials as may be required to provide a complete and operating job as specified herein and as shown on the plans.

St Name Sign, Illuminated, Rem, RCOC (Ea) includes payment in full for removing an existing illuminated street name sign and taking the sign to a storage location or disposal per the engineer. The pay item includes one way and two-way signs.

St Name Sign, Illuminated, Salv, RCOC (Ea) includes payment in full for storing the signs in a protected location and installing the internally illuminated street name sign lamps, fittings, wiring, line hardware, grounding, cable to controller and such other new material and labor as may be required to provide a complete and operating sign as specified herein and as shown on the plans. The pay item includes one way and two-way signs.