

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY SPEED RADAR TRAILER

COS:CRB

1 of 4

APPR:LLR:MRB:02-19-21
FHWA:APPR:03-05-21

a. Description. This work consists of furnishing, installing, operating, maintaining, relocating, reconfiguring, and removing a temporary speed radar trailer as identified in the proposal or on the plans. Use temporary speed radar trailers to provide real time speed data to motorists. Ensure damaged temporary speed radar trailers are replaced as directed by the Engineer.

b. Materials. Provide a temporary speed radar trailer that meets the following requirements:

1. The unit is a self-contained trailer designed to be moved by a tow vehicle. The speed trailer must comply with the following codes or standards:

- A. *Institute of Electrical and Electronic Engineers (IEEE);*
- B. *American Association of State Highway and Transportation Officials (AASHTO);*
- C. *American Society of Testing and Materials (ASTM);*
- D. *American Society of Civil Engineers (ASCE);*
- E. *Institute of Electrical and Electronics Engineers (IEEE) 802.3;*
- F. *National Electrical Manufacturers Association (NEMA);*
- G. *National Fire Protection Association (NFPA) 780 - Lightning Protection Code;*
- H. *Lightning Protection Institute (LPI) Standards 175;*
- I. *Underwriters' Laboratories Standards (UL) 96 and 96A;*
- J. *American National Standards Institute (ANSI) Standard C2;*

2. The speed radar trailer includes an R2-1 sign that reflects the posted work zone speed limit for the majority of the work zone mounted above the digital display. Ensure this sign is constructed in accordance with subsection 922.02 of the Standard Specifications for Construction and part 6 of the *MMUTCD* and be sized appropriately for freeway or non-freeway. Mount this sign at a sufficient height above the digital speed limit to ensure visibility, including situations where the trailer is installed behind temporary barrier.

Mark the speed radar trailer with red and white conspicuity tape along the flat edges of the trailer tongue and framing.

3. Equip the speed radar trailer with a radar unit and data logger designed to detect the speed and quantity of approaching vehicles inclusive of the following requirements:

A. The radar unit must detect approaching vehicles at a minimum distance of 400 yards;

B. Ensure the radar unit is accurate to ± 1 mile per hour (mph) at a minimum;

C. The radar unit must collect traffic volume data and log that data with 10-minute time steps.

4. The speed radar trailer display must include the following requirements:

A. A full matrix display that is capable of a minimum 18-inch character height.

B. Alphanumeric characters are amber in color and highly visible in direct sunlight and dark conditions. Provide an automatic brightness control for the display which allows adjustment for the display to be highly visible in direct sunlight and dark conditions.

C. The top of the display reads "Your Speed" in black letters on a white background.

D. The display is mounted at a sufficient height for full visibility, including situations where the trailer is installed behind temporary barrier.

E. The display allows input of the work zone speed limit in mph. Ensure the work zone speed limit is input in multiples of 5 mph.

F. Display options must also include:

(1) The speed of the approaching vehicle (non-flash mode) when that speed is less than or equal to the work zone speed limit;

(2) The speed of the approaching vehicle (flash mode) when that speed is 1 mph to 10 mph greater than the work zone speed limit;

(3) "SLOW DOWN" message to be flashed when the approaching vehicle is greater than 10 mph over the work zone speed limit;

5. The speed radar trailer must include a self-contained electrical power source that, with or without maintenance, will ensure continuous operation of the speed trailer throughout the life of the contract.

6. Equip the speed radar trailer with a high-speed Global Positioning System (GPS) equipment, and cellular service with a minimum data plan of 1 gigabyte per month (GB/month) to connect to a remote management and data retention. The remote management and data retention application must provide the following functionality:

A. Allow up to 5 users to configure, update, and monitor the operation of the speed radar trailer including review of the data collected in real time, for the duration of the contract. The application must display the project the speed radar trailer is deployed on,

as well as the specific location of the trailer on a map interface.

B. Store and maintain traffic volume and speed data collected during the project in a secure location. Allow users to download the data in Microsoft Excel, comma separated value (CSV), or other format as approved by the Engineer.

7. Provide a copy of all data collected during the project to the Engineer on a flash drive at close of project.

c. Construction. Install the temporary speed radar trailer in accordance with the manufacturer's recommendations, and the following requirements:

1. Locate the trailer downstream of the lead in signing sequence, as shown on the plans or as directed by the Engineer. Relocation of the trailer may be required throughout the contract as directed by the Engineer.

A. Do not locate speed trailers in any areas subject to a Where Workers Present speed limit.

B. Orient the trailer so the digital display and any other signing is fully visible to oncoming traffic.

C. Ensure the speed radar unit is not obstructed by other traffic control devices, construction materials, or equipment and is able to detect traffic.

2. Elevate the mast and deploy outriggers, adjust outriggers to plumb the speed trailer and elevate the wheels from the pavement.

3. Program the speed trailer as described in subsection b.6 of this special provision unless otherwise directed by the Engineer. Adjust the display brightness for maximum visibility. Ensure the speed trailer is functioning properly upon installation.

4. Ensure the controller remains locked at all times, and default passwords are not used.

5. Update the R2-1 sign as necessary to reflect any changes in the speed limit throughout the contract. Provide additional R2-1 signs or additional legends as needed at no additional cost.

6. Remove the speed trailer from the clear zone when not in use, or if the trailer malfunctions.

7. Maintain all traffic volume and speed data collected on the project for future access. If the data management application cannot be accessed by the designated users, ensure the data is provided by the Contractor in Microsoft Excel format bi-weekly, or as directed by the Engineer.

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:

Pay Item

Pay Unit

Speed Radar Trailer, TempEach

Speed Radar Trailer, Temp includes furnishing, installing, operating, maintaining, relocating, reconfiguring, and removing a temporary speed radar trailer for the duration of the contract. **Speed Radar Trailer, Temp** includes all signing required to be attached to the trailer unit, as well as interchangeable legends for this signing if applicable. The Department will pay for the maximum quantity of temporary speed radar trailers in use at one time during the contract. Payment will not be made until the Engineer has verified the speed trailer and data collection application are functioning in accordance with this special provision.