

Chromaticity Limits for Fluorescent Orange

	x	y	x	y	x	y	x	y	Total Luminance Factor Y (%) Min.
Fluor Orange	0.595	0.361	0.645	0.355	0.583	0.416	0.542	0.403	30

The Linear Delineation Panels will not be paid for separately, but shall be considered incidental to TEMPORARY CONCRETE BARRIER WALL.

**REAL-TIME TRAFFIC CONTROL SYSTEM**

Revised: October 21, 2014

Description: This item shall consist of furnishing, installing, maintaining, relocating, and removal of an automated portable Real-Time Traffic Control System (RTTCS) meeting the requirements noted herein and providing the maintenance of the system during the duration of the work.

The Contractor shall furnish said system for measuring and delivering condition-responsive alerts on the project.

The RTTCS will be located within approximately 5 miles of the project limits. The RTTCS shall be installed and operational two weeks prior to any lane closures on the project and shall remain in place until directed by the engineer to remove the system or a portion thereof.

The RTTCS shall consist of, at a minimum:

- A Real-Time Traffic Control Sensor Unit. Each unit shall consist of:
  - Two Warning signs with sign legend as shown in the plans.
  - Each sign shall have amber wigwag LED flashing lights (two flashers per sign for a total of four flashers per Unit) attached, with a minimum lens size of 12 inches. The flash pattern and flash sequence shall comply with the Manual of Uniform Traffic Control devices (MUTCD), Chapter 4L.
  - One warning sign with two flashers on any ramps between the taper and the farthest Real-Time Traffic Control Sensor Unit.
  - One traffic sensor.
  - Remote communication hardware and software and controllers capable of activating flashing beacons.
- One Real-Time Traffic Control Central Base Unit equipped with appropriate hardware, software and dedicated network connection.

The exact locations of all devices shall be determined as part of an on-site communications analysis with the Contractor.

The RTTCS shall meet the following specifications:

- The RTTCS shall be a proven system that has been successfully deployed and operated in actual work zone and congestion areas.
- The RTTCS shall be capable of identifying stopped / slowed traffic conditions. The system shall self-test for communication or sensor failures.
- The RTTCS shall operate continuously (24 hours, 7 days a week) when in place and visible to the motoring public.
- The sensors shall be of a type whose accuracy is not degraded by inclement weather or degraded visibility conditions including, but not limited to precipitation, fog, darkness, excessive dust and road debris.
- The RTTCS shall be capable of acquiring traffic data for a minimum of two (2) lanes of traffic in the same direction.
- Traffic sensors shall sequentially activate the flashers as the queue extends and be capable of only activating specific flashers.
- The RTTCS shall be capable of activating a message board.
- The RTTCS shall utilize static signs with two wigwag flashing beacons that only activate when slowed or stop traffic is detected to convey real-time traffic condition information to motorists.
- The flashers shall activate whenever the average traffic speeds fall below 40 mph and turn off when the average speed returns to above 55 mph. These speed thresholds shall be capable of being changed based on actual field trials and the location of the sensor.
- The RTTCS shall have a reliable communication system and provide warnings to the system manager and the Resident Engineer when communication or device failures are detected.
- The RTTCS shall be capable of notifying the Resident Engineer and Communications Center when the flashing beacons are activated.
- The RTTCS and flashers shall have a reliable power source.
- The RTTCS shall allow authorized users remotely to manually override the system during apparent system failures.
- Critical system operator control functions shall be password protected.

- The RTTCS shall have reporting features to a secure website. The website shall, at a minimum, show the current speeds at each detector location and whether the warning flashers are activated. The website shall provide access to archival data for the duration of the project. This data shall be printable.
- The RTTCS shall provide data logging the system events and key detection data. The data is to include the dates and times that the system was activated, which signs were activated, duration of the activation, and average speeds at each detections device. The data shall be provided to the Resident Engineer at the close of the project in Microsoft Excel, latest format.
- If during the duration of the project, it is found that the distances or locations in relation to each other and/or to the taper, detectors or warning signs need to be relocated due to a change in the traffic conditions or queuing patterns, a one-time adjustment is included in the cost of the Real-Time Traffic Control Sensor Unit.
- The RTTCS Sensor Units shall be relocated as the taper is relocated.
- During winter shut-down all trailers shall be removed from the right of way and the signs shall be removed as directed by the engineer. All removal, storage, and reinstallation shall be included in the cost of the Real-Time Traffic Control Sensor Units.

System Performance: After the RTTCS is in place and operational, knowledgeable contractor personnel shall be available for one work week (until Friday at 8:00 PM) after the lane closures are in place to ensure that the system is functioning properly. The responsible individual shall be capable of responding within 15 minutes during the first week and shall have sufficient resources to correct any issues with the RTTCS at that time.

To ensure a prompt response to incidents involving the integrity of the RTTCS devices, the Contractor shall provide a telephone number where a responsible individual can be contacted on a 24-hour-a-day basis. The Contractor shall dispatch sufficient resources within two hours of notification to make needed corrections of deficiencies. All deficiencies shall be corrected within 12 hours. If the Contractor fails to restore the RTTCS to full operation within the time limits specified above, the Resident Engineer will impose a daily monetary Traffic Control Deficiency Deduction for each calendar day (or portion thereof) the deficiency exists, as described in Article 105.03 of the Standard Specifications.

Additional Real-Time Traffic Control Sensor units installed as directed the Engineer after the initial deployment of the system shall be in operation and accepted by the Engineer within fourteen (14) calendar days after the Contractor receives written notification of changes from the Engineer. If the Contractor fails to update the RTTCS to full operation within the time limits specified above, the Engineer will impose a daily monetary Traffic Control Deficiency Deduction for each calendar day (or portion thereof) the deficiency exists, as described in Article 105.03 of the Standard Specifications.

A traffic control deficiency deduction will be made for each individual component of the RTTCS that is not functioning correctly. Individual components of the RTTCS are traffic sensors, central base station, and signs with flashers.

Method of Measurement: This work will be measured for payment as follows.

Real-Time Traffic Control Sensor unit will be measured on a calendar month basis per each unit, which each unit includes two signs, four flashes, and one sign with two flashers on any ramps, one traffic sensor, remote communication hardware and software, and controllers capable of activating flashing beacons.

Real-Time Traffic Control Central Base Unit will be measured on a calendar month basis, which includes all hardware, software, website, and communications network necessary to run the Real-Time Traffic Control System.

Basis of Payment: This work will be paid for as follows.

Real-Time Traffic Control Sensor Unit shall be paid for at the contract unit price per calendar month or fraction thereof for REAL-TIME TRAFFIC CONTROL SENSOR UNIT.

Real-Time Traffic Control Central Base Unit shall be paid for at the contract unit price per calendar month or fraction thereof for REAL-TIME TRAFFIC CONTROL CENTRAL BASE UNIT.

Portable changeable message signs will be paid for at the contract unit price per calendar month for each sign as CHANGEABLE MESSAGE SIGN.

## **BRIDGE EXPANSION JOINTS**

Description: This work shall consist of the removal and disposal of existing expansion joint seals, preparation of surfaces to receive new joint seals, and the installation of new joint seals at locations and dimensions shown in the plans and as directed by the Engineer.

Construction Requirements: This work shall be done as specified in the applicable portions of Section 520 of the Standard Specifications, as detailed in the contract plans, and as described herein.

Specifications for Polymer Modified Portland Cement Mortar repair are included elsewhere in these special provisions.

### Neoprene Expansion Joints

Existing neoprene expansion joints consist of a neoprene seal held in place by steel reinforced rubber anchor blocks bolted to the concrete deck.