## SECTION 616

## TEMPORARY TRAFFIC CONTROL

**616.1 Description.** This work shall consist of furnishing, installing, operating, maintaining, cleaning, relocating and removing temporary traffic control devices and equipment, and the removal and relocation or covering and uncovering of existing signs and other traffic control devices in accordance with the contract documents or as directed by the engineer. For purposes of this specification, the work zone will be defined as the area between the first and last temporary traffic control device as shown on the plans for the work being performed.

**616.2 Material.** All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

| Item | Section |
|---|---|
| Temporary Traffic Control Devices | 1063 |

**616.3 Safety Requirements.**

**616.3.1** All workers within highway right of way who are exposed to traffic or construction equipment shall wear high-visibility safety apparel meeting Class 2 or Class 3 requirements of ANSI/ISEA 107-2004 publication entitled, "American National Standard for High-Visibility Safety Apparel and Headwear".

**616.3.2** All traffic control devices shall be in accordance with the MUTCD and any applicable safety and design codes.

**616.3.3** The contractor shall furnish a manufacturer's certification of crashworthiness, per NCHRP 350 Evaluation Criteria, for FHWA Category 1 traffic control devices and appurtenances. The contractor shall furnish the FHWA acceptance letter for FHWA Category 2 and Category 3 traffic control devices and appurtenances. The FHWA acceptance letter shall indicate that the device and appurtenance complies with the crash test requirements of NCHRP 350, Test Level 3 (TL-3). Regardless whether the device meets NCHRP 350 criteria, the engineer reserves the right of final approval. Installation of a device prior to the engineer's approval will be at the contractor's risk.

**616.3.4** The contractor shall:

(a) Designate a trained person at the project level who has the primary responsibility, with sufficient authority, for implementing the traffic management plan and other safety and mobility aspects of the project. The name of that person, proof they successfully completed MoDOT's Advanced Work Zone course, ATSSA's Traffic Control Supervisor course or an approved equivalent training course, and a 24-hour contact number for that person shall be provided to the engineer at the pre-construction meeting. Re-certification will be required as dictated by the organization providing the training.

(b) Ensure all contractor personnel are trained in traffic control to a level commensurate with their responsibilities.

(c) Advise the engineer, as required, at least two working days before any work requiring a lane closure begins and 14 calendar days prior to the imposition of height, width and weight restrictions.

(d) Perform quality control of work zones to promote consistency and ensure compliance with contract documents, policies and guidelines.

**616.4 Construction Requirements.**

**616.4.1** Performance and operational aspects of the devices shall be in accordance with the latest editions of the MUTCD and the Missouri *Quality Standards for Temporary Traffic Control Devices.*

**616.4.1.1** All traffic control devices shall be removed as soon as practical when the devices are no longer needed. When work is suspended for short periods of time, traffic control devices that are no longer appropriate shall be turned away from traffic, removed or covered. All temporary traffic control devices shall be removed after the completion of construction and shall remain the property of the contractor unless specified otherwise. All permanent traffic control devices that are in conflict with temporary traffic control devices shall be covered or removed as shown on the plans or as directed by the engineer. Upon completion of the work, all permanent traffic control devices to remain in place shall be restored to original condition.

**616.4.1.2** All sign covers shall meet the requirements of the MoDOT *Quality Standards for Temporary Traffic Control Devices.*

**616.4.1.3** All permanent traffic control devices relocated on a temporary basis shall be moved in the timeframe designated by the engineer, and shall remain visible to the traveling public during all stages of construction. The contractor shall place temporarily relocated permanent traffic control devices in the final location when construction is complete. Damaged devices shall be replaced by the contractor at the contractor's expense.

**616.4.2** The contract will indicate the minimum requirements for traffic control. With the engineer's approval, the contractor may add to the traffic control plan any temporary traffic control devices or services the contractor considers necessary to adequately protect the public and the work. Device quantities may be adjusted accordingly.

**616.4.2.1** Signs and sign quantities for blasting areas will not be included in the contract traffic control plan. The contractor will be responsible for furnishing, installing, maintaining and removing blasting zone signs in accordance with the MUTCD, at the contractor's expense. Placement of blasting zone signs will be subject to approval from the engineer.

**616.4.2.2** All changes to the traffic control plan resulting from contractor staging revisions, including proposed total road closures for the contractor's convenience, shall be submitted in writing to the engineer for review and acceptance prior to implementation. Device quantities may be adjusted accordingly.

**616.4.2.3** If the engineer determines the need for additional traffic control devices not included in the traffic control plan, the contractor will be notified in writing to provide the additional devices. Reimbursement for authorized changes to the traffic control plan will be made in accordance with Sec 104.3, unless covered by contract unit prices.

**616.4.2.4** The contractor shall monitor traffic flow through the project and verify that all traffic control devices are in place and functioning properly during both daytime and nighttime conditions, as applicable. If the contractor determines that a deficiency in any traffic control device exists, the contractor shall take corrective action. No additional payment will be made for the corrective action.

**616.4.2.5** As soon as possible after observing a traffic control deficiency, the engineer will report the deficiency to the contractor, either verbally or in writing. After receiving notification, if the contractor does not make corrections within an agreed upon timeline, order records or suspension of the work may occur. Regardless of the severity of the deficiency, corrections shall be made as soon as possible to maintain a quality work zone.

**616.4.2.5.1** The severity of a deficiency will be categorized as follows:

(a) Category 1 – Presents an immediate danger to the traveling public or workers and needs to be addressed immediately.

(b) Category 2 – The situation doesn't pose an immediate threat to either the public or the workers, but can impact the proper functioning of the work zone.

(c) Category 3 – The situation doesn't impact the functioning of the work zone but is more of a maintenance or aesthetic issue.

**616.4.2.5.2** When the engineer determines that the contractor has not made a good faith effort in correcting a deficiency as agreed upon in Sec 616.4.2.5, an order record will be issued and the contractor will be notified of the following timelines to correct the deficiency.

(a) A Category 1 deficiency shall be corrected within one hour.

(b) A Category 2 deficiency shall be corrected within 24 hours.

(c) A Category 3 deficiency shall be corrected within 96 hours.

**616.4.2.5.3** When the engineer determines the contractor has not made a good faith effort in complying with an order record issued in accordance with Sec 616.4.2.5.2, the following action may be taken:

(a) A second order record will be issued.

(b) The engineer may find the contractor in violation of the contract in accordance with Sec 105.

**616.4.2.5.4** For reoccurring deficiencies of similar nature within the contractor's control, the engineer may issue order records in accordance with Sec 616.4.2.5.3, bypassing Sec 616.4.2.5.2 requirements.

**616.4.2.6** The contractor shall provide written notice to the engineer of any pedestrian or vehicular accident when physical evidence or other information suggests an accident has occurred in the work zone. The contractor shall obtain and provide to the engineer copies of law enforcement accident reports for any accidents in the work zone.

**616.4.3** Each flagger, automated flagger assistance devices (AFAD) operator, portable flagger device (PDF) operator and pilot vehicle operator shall maintain a valid flagger certification card that certifies the individual has been trained in the principles of flagging in accordance with the MUTCD. Certifications will not be required in emergency situations that arise due to actions beyond the contractor's control when flagging is necessary to maintain safe traffic control on a temporary basis. All flagging, AFAD, PFD and pilot vehicle operations shall be in accordance with the MUTCD. Flaggers and pilot vehicles shall be provided as shown on the plans or as approved or directed by the engineer. When not specified in the plans, the contractor may use a Type B (Red/Yellow Lens) AFAD PFD or pilot vehicle to supplement the flagging operation upon approval from the engineer. When two-way traffic is maintained over a single lane, each flagger, AFAD operator, if used in tandom, and pilot vehicle operator involved in the traffic flagging operation shall be equipped with a portable, two-way, communication system approved by the engineer. When the AFED or PFD are not in use they shall be removed from the roadside.

**616.4.4** Crossovers for hauling material will be permitted only at locations indicated in the traffic control plan or as authorized by the engineer. Modifications to specified locations shall be in accordance with applicable portions of Sec 104. Crossovers shall be signed in accordance with the traffic control plan. When the project has been completed, temporary crossovers shall be removed and the area restored to original condition. Existing crossovers shall be restored to original condition, including surface material.

**616.5 Lighting Requirements.**

**616.5.1** All construction-related vehicles and equipment, except for haul trucks within paving operations, shall be equipped with a USDOT-approved warning light. Lights shall be amber in output, mounted such that the lights are visible to traffic from 360 degrees and activated while in the work zone.

**616.5.2** Work zone lighting shall be provided between dusk and dawn as specified in Secs 616.5.2.1 and 616.5.2.2. Lighting systems shall be positioned such that the lighting systems do not cause glare or hot spots, i.e. concentrated areas of high lighting intensity when compared to the average, for motorists, spillover to adjacent properties or become safety concerns. When work zone lighting is required, a lighting plan shall be submitted to the engineer for review 14 days prior to the start of operations. The lighting plan shall show the areas to be illuminated, the type and layout of the lighting systems and calculations of average maintained footcandles (lux).

**616.5.2.1** Work area lighting shall be provided in areas where construction equipment and labor are active. Lighting shall provide a minimum maintained intensity of 5 footcandles (54 lux).

**616.5.2.2** Overhead lighting shall be provided for flaggers and other specified locations shown on the plans. Lighting in these areas shall provide a minimum maintained intensity of 0.6 footcandles (6.5 lux).

**616.6 Flashing Arrow Panel.** The contractor shall deploy, operate and maintain flashing arrow panels as specified on the plans for the duration of the project, in accordance with the manufacturer's recommendations, at the contractor's expense. A minimum vertical clearance of 7 feet (2.1 m) shall be maintained from the edge of pavement to the bottom of the flashing arrow panel.

**616.6.1** When not in use, trailer-mounted flashing arrow panels shall be stored in accordance with Sec 107.5.

**616.6.2** Control programs shall be as follows:

(a) Caution: Flash the two highest and two lowest lamps on panel simultaneously.

(b) Left or Right Arrow: Flash five lamps in the arrowhead and five lamps in the horizontal shank simultaneously.

(c) Double Arrow: Flash five lamps in both the left and right arrowheads and three lamps in the horizontal shank simultaneously.

**616.7 Changeable Message Signs.** The contractor shall place the changeable message sign (CMS) at the location shown on the plans or as directed by the engineer. The CMS shall not be located in the median.

**616.7.1** The contractor shall deploy, operate and maintain the CMS as specified in the traffic control plan and in accordance with the manufacturer's recommendations for the duration of the project at the contractor's expense. The contractor shall program the CMS as directed by the engineer.

**616.7.2** When the CMS is not in use, the message board shall be turned away from traffic. When not required for longer than a 24-hour period, the CMS shall be stored in accordance with Sec 107.5.

**616.8 Work Zone Traffic Signals.** Work Zone Traffic Signals (WZTS) provide one-lane, two-way temporary traffic control through the use of a temporary traffic signal or a portable traffic signal programmed for two-phase operation. WZTS shall be in accordance with the provisions of this section. Unless otherwise shown on the plans, the contractor may choose either method to fulfill the WZTS requirement.

**616.8.1** The contractor shall notify the engineer at least 48 hours prior to the work zone traffic signal installation. After installation, the contractor shall receive approval from the engineer prior to activating the WZTS system. The contractor shall provide a service technician to be available for day, night and weekend trouble calls as required under test period requirements in Sec 902. The contractor shall furnish the telephone number or other contact information where the technician can be reached.

**616.8.1.1** The contractor shall operate and maintain the WZTS, at the contractor's expense, as specified in the traffic control plan until two-way traffic is restored.

**616.8.1.2** When the WZTS is not in use, the signal heads shall be covered to the satisfaction of the engineer.

**616.8.1.3** Adequate traffic control, including flaggers, shall be provided at the contractor's expense during the startup and shutdown of the WZTS installation. If the WZTS installation becomes inoperable due to alterations, malfunctions or periods of shutdown for required maintenance when one-way traffic control is required, the contractor shall provide adequate traffic control, including flaggers, at the contractor's expense.

**616.8.1.4** All signal timing and programming shall be provided by the contractor and furnished to the engineer for approval prior to use. The contractor shall ensure proper signal timing is provided for the duration of the project. The contractor shall provide the locations of the vehicle detection zones.

**616.8.1.5** The WZTS and lighting system shall be removed after two-way traffic has resumed or as directed by the engineer. All equipment shall remain the property of the contractor.

**616.8.1.6** Measurement of WZTS system, including lighting and traffic signals at both ends of a one-lane, two-way section, will be made per each.

**616.8.2 Temporary Traffic Signals.** Temporary traffic signals and lighting shall be in accordance with Sec 902.3.

**616.8.3 Portable Traffic Signals.** Portable traffic signals shall be in accordance with Sec 1063. The contractor shall place the portable traffic signal (PTS) units a minimum of 6 feet (2 m) beyond the edge of shoulder at the location shown on the plans or as directed by the engineer. Each unit shall be level to the satisfaction of the engineer. Each PTS shall be delineated with a minimum of five non-metallic drum-like channelizers. The PTS shall not be located in the median.

**616.8.3.1** When not required for a longer than a 24-hour period, the PTS shall be stored in accordance with Sec 107.5.

**616.8.3.2** The contractor shall deploy, operate and maintain the PTS in accordance with the manufacturer's recommendations. The contractor shall provide two copies of the operating manual to the engineer.

**616.8.3.3** Overhead lighting with an average maintained intensity of 0.6 footcandles (6.5 lux) shall be provided and maintained at each PTS location as authorized by the engineer.

**616.9 Portable Flagger Device.** Portable flagger devices (PFD) shall be installed on each side of roadway per direction and in accordance with Sec 1063.9.

**616.10 Method of Measurement.** Measurement for relocation of post-mounted signs will be made to the nearest square foot ($m^2$) of sign area.

**616.11 Basis of Payment.** Temporary traffic control devices specified in the traffic control plan or authorized by the engineer will be paid for at the contract unit price for each of the pay items included in the contract. No direct payment will be made for the following:

(a) Incidental items necessary to complete the work, unless specifically provided as a pay item in the contract.

(b) Installing, operating, maintaining, cleaning, repairing, removing or replacing traffic control devices.

(c) Covering and uncovering existing signs and other traffic control devices.

(d) Relocating temporary traffic control devices, including permanent traffic control devices temporarily relocated, unless specifically included as a pay item in the contract.

(e) Worker apparel.

(f) Flaggers, AFADs, PFDs, pilot vehicles, and appurtenances at flagging stations.

(g) Furnishing, installing, operating, maintaining and removing construction-related vehicle and equipment lighting.

(h) Construction and removal of temporary equipment crossovers, including restoring pre-existing crossovers.