

# Special Specification 6431

## Queue Detection System




---

### 1. DESCRIPTION

Transport, install and test Department-furnished Queue Detection System as shown on the plans or as directed.

---

### 2. MATERIALS

Provide all materials not supplied by the Department necessary for the installation of the Queue Detection System. All materials provided by the Contractor must be new. Include a task in the project schedule for delivery of Department furnished materials and provide a minimum of 7 days' notice to the Department for pick-up of Department furnished materials. Unless otherwise shown on the plans, Queue Detection System will be stored by the Department for pick up at locations shown on the plans or as directed.

Ensure that all materials and construction methods necessary to complete the installation conform to the requirements of this Item, the plans and the pertinent requirements of the following Item: Item 6006 "Electronic Components."

---

### 3. CONSTRUCTION

- 3.1. **Installation.** Before installation of any equipment, perform a site survey of the proposed locations to determine the optimal positioning of the Queue Detection System to achieve proper operation based on the manufacturer's recommendations. Test wireless links to assure they provide optimal communication between transmitters and receivers. Adjust locations as approved by the Engineer if necessary.

Install equipment in accordance with this Item and the lines, grades, details, and dimensions as shown on the plans or as directed. Maintain safe construction practices. Ensure the mechanical execution of work complies with NEC, Article 110.12. Equipment must be installed in a neat and workmanlike manner.

Provide all mounting hardware and cabling necessary to install and make operational all equipment. Provide only new and corrosion resistant materials. Consider all mounting hardware and cables as subsidiary to this item with no direct payment.

Adjustments and addition of sign attachment hardware, mounting components, and hardware for Queue Detection System, support brackets and appurtenances, such as conduit, etc., may be necessary for compatibility with specified positioning recommended by the manufacturer, as shown on the plans, or as directed. All adjustments and additional materials will not be paid for directly but will be subsidiary to this Item.

Prevent damage to all equipment provided by the department. Replace any portion of the equipment that is damaged or lost during transportation or installation. Do not use any materials furnished by the Department on any other work which is not part of the contract. Materials not used which were furnished by the Department must be returned undamaged to the location from which the materials were obtained upon completion of the work. Any unused or removed material deemed salvageable by the Engineer, will remain the property of the Department or be delivered to a designated site. Accept ownership of unsalvageable materials and dispose of in accordance with federal, state, and local regulations.

The Contractor must have the manufacturer's representative on site to assist with the installation of all equipment before any work begins.

Once installation is complete, contractor will coordinate with equipment manufacturer to ensure the Queue Detection System are properly positioned and the queue detection zones are accurate. Ensure that all equipment is functioning properly and communicating with manufacturer's equipment software. Testing will begin once proper system functionality is proven.

Stockpile all materials designated for reuse or to be retained by the Department within the project limits or at a designated location as directed.

- 3.2. **Testing.** Testing of the installed equipment locations is for the purpose of relieving the Contractor of maintenance of the equipment. The Contractor will be relieved of the responsibility for maintenance of the equipment in accordance with Item 7, "Legal Relations and Responsibilities", after all testing is successfully completed.

Testing of the equipment will consist of the following procedure: once the equipment has been installed and activated, the exit ramp will be closed to traffic. A test vehicles will then stop within the queue detection zones a minimum of 10 times. Once a maximum of 10 successful detections and notifications of the queue cause the upstream flashing sign to accurately turn on, the equipment will be accepted as fully tested and ready for operation. To be accepted the last five successful tests must be consecutive.

After each equipment location has been installed, the Department and the contractor will conduct approved continuity, stand alone, and system tests on the installed field equipment with laptop equipment. A final acceptance test will be conducted to demonstrate all control, monitor, and communication requirements for 60 days. The Engineer will furnish a letter acknowledging the final acceptance testing commencement date stating the first day of the final acceptance test.

The completion of the final acceptance test occurs when less than 2 false calls have occurred, the system downtime due to mechanical, electrical, or other malfunctions to equipment furnished or installed does not exceed 72 hr. and any individual points of failure identified during the test period have operated free of defects. Assume responsibility only for test failures directly related to the work in accordance with this Item. Upon completion of successful final acceptance testing, document the acceptance date and project identification information and provide 2 copies to the Engineer.

---

#### 4. MEASUREMENT

This Item will be measured by each Queue Detection System installed and made operational in accordance with this specification and as shown on the plans or as directed.

---

#### 5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for "Queue Detection System." This price is full compensation for transportation and installation of material furnished by the State; for furnishing and installing any required mounting hardware, connectors, conduit, cables, junction boxes and equipment cabinets; storing the equipment when required; testing the equipment; replacement/repair of damaged components; disposal of unsalvageable material, and for all manipulations, labor, tools, working drawings, equipment, and incidentals.