DESCRIPTION:

Under this item, the Contractor shall furnish and install cabinets at the locations shown on the Contract Documents and as ordered by the Engineer. These cabinets shall house equipment furnished and installed under other contract items.

MATERIALS:

Each cabinet shall be provided complete with all internal components and all mounting hardware including racks and shelves necessary to provide for the installation of electronic screening equipment.

All cabinets shall be of welded sheet aluminum construction, 0.125 inch thickness 5052-H32 sheet aluminum.

All equipment under this item is to be in full conformance with the New York State Standard Specifications unless otherwise stated herein.

The equipment design shall utilize the latest available manufacturing techniques, minimum number of different parts, subassemblies, and/or circuits to maximize standardization and commonality.

Electronic Components

No component shall be of such design, fabrication, nomenclature, or other identification as to preclude the purchase of said component from any wholesale electronics distributor or from the component manufacturer.

Mechanical Components

Hardware

All external screws, nuts, and locking washers shall be stainless steel; no self tapping screws shall be used unless specifically approved by the Engineer. All screws, nuts, and locking washers used internally shall be of corrosion resistant material, or suitably plated to resist corrosion. All material furnished shall be new, first quality, and used in accordance with the highest industry practices.

Material

All parts shall be made of corrosion resistant material, such as plastic, stainless steel, aluminum, or brass or shall be treated with corrosion resistance such as cadmium plating or galvanizing.

All materials used in construction shall be resistant to fungus growth and moisture deterioration.

Dissimilar metals apt to corrode through electrolysis under the environmental operating
conditions specified shall be separated by an inert material. The equipment shall be modular in
design such that major portions may be readily replaced in the field.

All equipment shall be designed for ease of installation and maintenance. All component parts
shall be readily accessible for inspection and maintenance.

Functional Requirements

These cabinets shall be provided with fully wired side panels with all necessary terminal boards,
wiring harnesses, connectors, and attachment hardware for each cabinet location. All cabinets
shall be keyed alike with one key to be provided for each cabinet.

The Contractor shall submit a cabinet layout for each cabinet type for review by the Engineer.
Only cabinets with approved layouts will be accepted under this Contract. Each field cabinet
shall, as a minimum, be supplied with the following:

- Fan and Thermostat
- Power Distribution Panel
- Air Filter
- Locking Mechanism
- Lock
- Ground Bus (2)
- Surge Protection
- Terminal Blocks
- All Necessary Installation and Mounting Hardware

Specific Requirements

Electrical

Power Distribution Panel

The cabinets shall be furnished with a power distribution panel. The necessary 120 VAC
power shall be distributed from a power distribution terminal board which is fed from the
equipment circuit breaker branch on the power panel.

The panel shall include the following equipment:

- **Duplex Outlet**

  115 VAC convenience outlet with integral ground fault interrupt, protected by a
circuit breaker. The receptacle shall be a NEMA Type 5-15R duplex receptacle
located so that no electrical hazard shall exist when used by service personnel.

- **Lamp**
A panel mounted lamp with an on-off switch.

Circuit Breaker(s)

The circuit breaker shall be approved and listed by Underwriter’s Laboratories. The operating mechanism shall be enclosed, trip free from operating handle on overload, and trip indicating. Contacts shall be silver alloy enclosed in an arc quenching chamber. Each cabinet used shall have, as a minimum, a circuit breaker to protect the lamp, vent fan and duplex outlet.

Circuit breakers shall be unaffected by ambient temperature range, relative humidity, applied power, shock, and vibration range specified in NEMA TS1. Breakers shall have a minimum interrupt capacity of 5000 amperes.

Power Cable Input and Junction Terminals

Power Distribution Blocks suitable for use as a power feed and junction points shall be furnished and installed for two and three wire circuits in cabinets. The line side of each circuit shall be capable of handling the number of AWG wire sizes as shown on the plans.

Communications Terminal

This terminal facility shall provide for the termination of the multi-pair cables as well as distribution of the particular associated cabinet pairs. Communication equipment provided shall be suitable for the chosen communication type.

Wiring

Cabinet wiring shall be provided for the equipment complement as specified on the plans.

All cabinet wiring where connected to terminal strips shall be identified by the use of insulated pre-printed sleeving slipped over the wire before attachment of the lug or making the connection. The wire markers shall carry the legend in plain words with sufficient details so that a translating sheet will not be required.

All wires shall be cut to the proper length before assembly. No wires shall be doubled back to take up slack. Wires shall be neatly laced into cables with nylon lacing. Cables shall be secured with nylon cable clamps. The grounded side of the electric service shall be carried throughout the cabinet without a break.

All electrical connections in the cabinet shall have sufficient clearance between each terminal and the cabinet to provide an adequate distance to prevent a leakage path or physical contact under stress. When these distances cannot be maintained,
barriers must be provided. All equipment grounds shall run directly and independently to the ground bus.

All wiring containing line voltage AC shall be routed and bundled separately and/or shielded from all low voltage circuits. All conductors and live terminals or parts, which could be hazardous to maintenance personnel, shall be covered with suitable insulating material.

All conductors used in the cabinet wiring shall be #22 AWG or larger. All wiring containing line voltage AC shall be #14 AWG or larger.

The AC return and equipment ground wiring shall be electrically isolated from each other and the AC + wiring by an insulation resistance of at least 10 Megohms when measured at 250 VAC. Return and equipment grounding wiring shall be color coded white and green respectively.

**Terminal Blocks**

Terminal strips located on the panels shall be accessible to the extent that it shall not be necessary to remove the electronic equipment from the cabinet to make an inspection or connection.

Terminal blocks shall be two position multiple pole barrier type. Shorting bars shall be provided in each of the positions provided along with an integral marking strip. Terminal blocks shall be so arranged that they shall not upset the entrance, training, and connection of incoming field conductors. All terminals shall be suitably identified by legends permanently affixed and attached to the terminal blocks. Not more than three conductors shall be brought to any one terminal screw. No electrically alive parts shall extend beyond the protection afforded by the barriers. All terminal blocks shall be located below the shelves.

AC terminal blocks shall be Underwriter’s Laboratory approved for 600 volts AC minimum and shall be suitable for outdoor use. Terminals used for field connections shall secure conductors by means of a #10-32 nickel or cadmium plated brass binder head screw. Terminals used for interwiring connections, but not for field connections, shall secure conductors by means of a #6-32 nickel or cadmium plated brass binder head screw.

As a minimum, all connections to and from the electronic equipment shall terminate to an interwiring type block. These blocks will act as intermediate connection points for all electronic equipment inputs and outputs.

All return and equipment grounding wiring shall terminate to the ground bus installed in the cabinet.
Surge Protection

Protector and Cabinet Configuration

Communication cable pairs or other electronic equipment harnesses within the cabinet shall have surge protectors installed between the cable pairs and the equipment. The conductor leads and the surge protector leads shall be kept as short as possible with all conductor bends formed to the maximum possible radius. The protector units shall be located as near as possible to the entry point and as far as possible from any electrical equipment. The protector ground lead shall be made directly to the cabinet wall or ground plane.

The surge protectors utilized for AC power shall not dissipate any energy and shall not provide any series impedance during stand-by operation. The units shall return to non-shunting mode after the passage of any surge and shall not allow the shunting of AC power.

Power Line Surge Protector

A power line surge protector shall be installed in each cabinet between the load side of the input power circuit breaker or fuse and ground. The surge protector shall have the following characteristics:

(a) Working Voltage

The unit shall be rated for operation on AC power lines with a voltage rating of 130 volts RMS and 184 volts peak or 275 volts RMS and 389 volts peak for nominal 115/240 VAC respectively.

(b) Surge Voltage

The unit shall limit the surge voltage applied to the equipment to 650 volts peak while conducting a peak surge current of at least 6000 amperes. The surge current shall be an unsymmetrical triangular wave (designated 8 x 20 microseconds) that requires 8 microseconds to reach the peak value and at 20 microseconds will have half the peak value.

(c) Energy Rating

The unit shall be capable of dissipating 50 joules of surge energy without damage to itself. The unit shall have a 15 watt power dissipation rating.
Cabinet Thermostat

For cabinets equipped with a cooling fan, a surge and transient noise suppressor in the form of a varistor shall be installed across the thermostat that is used to control the fan. The varistor shall have characteristics equal to or better than the following:

- GE Model Number V15OLA10A
- Stetron 250NRO7-1
- Siemens SIOK150

Cabinet Grounding

A solid copper ground bus bar shall be permanently affixed to the inside surface of a cabinet wall. The point of contact between the ground bus and cabinet wall shall have less than 1 ohm resistance. The copper ground bus bar shall have a minimum of 10 connector points, each capable of securing at least one #10 conductor. AC return and equipment ground wiring shall return to the ground bus bar. Where multiple bus bars are used, they shall be bonded to each other with bare stranded #10 copper wire. When installed, the cabinets shall be grounded in accordance with sub-section 680-3.12 of the New York State Standard Specifications.

Mechanical

Size and Construction
The cabinets shall be clean-cut in design and appearance and have minimal internal dimensions as shown on the plans. The cabinet shall be manufactured to be pole or pedestal mounted. All parts of the cabinet shall be cleaned, smoothed, and free from flaws, cracks, dents, and other imperfections. The cabinet shall be rigidly constructed to provide vibration free and satisfactory operation of the field equipment when installed. The cabinets shall be dust and rain tight and capable of maintaining a dry internal condition when subject to rain and wind gusts.

Doors

All doors shall be securely gasketed to prevent the entrance of dust and moisture. The main door of the cabinet shall include substantially the full area of the front of the cabinet. The door shall be provided with a catch to hold the door open at 135 degrees, plus or minus 25 degrees. The catch shall hold the door securely open until released. Doors shall be hinged on the right-hand side with at least two stainless steel hinges with stainless steel hinge pins. The hinges shall be crimped or welded to prevent removal of the hinge pins. The hinges shall be bolted to the cabinet housing in a manner that prevents unauthorized personnel from removing the door with commonly available tools.
Ventilation

The cabinet shall be furnished with a thermostatically controlled ventilation fan mounted with a rain-snow and insect tight housing for non-solar continuous count applications. The electric fan shall have a rated capacity of at least 201 cubic feet per minute. The louver area shall be of sufficient size to permit the free flow of air corresponding to the rated capacity of the associated cabinet fan. Filters shall be provided on all louvers. The fan and cabinet ventilation louvers shall be located with respect to each other so as to direct the bulk of the air flow throughout the entire cabinet and in particular over the field equipment units as approved by the Engineer. The thermostat shall be adjustable to turn on between 90 degrees and 122 degrees Fahrenheit.

Exterior Finish

The exterior on all equipment cabinets furnished shall be of bare, unpainted aluminum.

Locks

The lock for the door shall be of the self-locking heavy duty (5) pin tumbler cylinder rim type. Locks shall be keyed identical to existing Traffic Monitoring cabinets as follows: grand master key 1-10D and master key #2. The cabinet shall be furnished with a 3 point positive locking door. One key shall be provided for each cabinet.

Shelves

Adjustable shelves shall equipment needs as specified in the contract. Shelf adjustment shall be 2 inch intervals in the vertical positions and support a minimum of 55 lbs.

Mounting Hardware

The cabinet shall be furnished with mounting plates and other necessary hardware to mount the cabinet on a pole or foundation as shown in the contract.

Panels

All panels shall be designed to mount in the cabinet on mounting studs. It shall not be necessary to remove the panel to replace any panel mounted equipment.

Connection of Cables

Connection of wires required to complete connections of an operational system shall be accomplished in the following manner:

   All wiring shall be of such size to satisfy good engineering practices and meet the
requirements of the National Electric Code. All wiring connected to terminal boards shall be identified by the use of insulated pre-printed sleeving slipped over the wire before final attachment, or other suitable identification.

All wires shall be cut to proper length before assembly. No wire shall be doubled back to take up the slack. Wires shall be neatly laced into cables with nylon lacing or plastic straps. Cables shall be secured with suitable clamps.

All wires entering or leaving a field cabinet shall be terminated on their proper terminal boards.

Connection of loop and/or piezo detector lead-in cable to the electronics terminal boards shall be accomplished in the following manner:

Each cable shall be properly dressed into position in accordance with the approved lead-in cable position on the panel (cables shall be bundled together and broken out by their position on the terminal boards).

The cable shield shall be brought as close to the terminal points as possible and grounded.

Documentation
Each field cabinet shall be supplied with three (3) copies of the Final Cabinet Wiring Diagram. One (1) copy shall be placed in a clear plastic envelope and left in the cabinet. Two (2) copies shall be delivered to the Engineer.

Quality Assurance Provisions
The following water spray tests shall be performed on the empty cabinet:

Water shall be sprayed from a point directly overhead at an angle of 60 degrees from the vertical axis of the cabinet. This procedure shall be repeated for each of eight equally spaced positions around the cabinet for a period of not less than five minutes in each position. The water shall be sprayed using a domestic type sprinkling nozzle at a rate of not less than 10 gallons per minute per square foot of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

A Manufacturers certification of successful completion of the water spray test and that the cabinet conforms to this specification, shall be the basis of acceptance of the cabinet. Separate submission of test cabinets shall not be required.

METHOD OF MEASUREMENT
ITEM 683.06010001 – COMMERCIAL VEHICLE ELECTRONIC SCREENING EQUIPMENT CABINET

Each cabinet will be measured as the number of complete units furnished and installed in accordance with the Contract Documents or as directed by the Engineer.

BASIS OF PAYMENT

The unit bid for each cabinet shall include the cost of furnishing all labor, materials, and equipment necessary to complete the work. Payment for cabinet grounding and equipment harnesses shall be included under the price bid for these items.