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SPECIAL PROVISIONS
FOR
ITS INFRASTRUCTURE INSTALLATION

Scott County
IM-NHS-074-1(198)5--03-82

Effective Date
April 25, 2017

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

TABLE OF CONTENTS

II TECHNICAL PROVISIONS

PART I
GENERAL REQUIREMENTS

This part consists of the general provisions necessary when furnishing and installing the ITS Infrastructure as described in the project plans and these special provisions.

This project involves supplying and installing bridge attachments, device cabinets, junction boxes, and pull tape, power supplies and cabling, and power terminations deemed necessary for a complete ITS Infrastructure installation designed for use with future proposed ITS fiber and device deployments and other uses planned by the Iowa DOT. The Iowa DOT plans to initiate separate contracts to install and terminate the fiber optic cable and place it in service (light the fiber network). Separate contracts will also be initiated to supply and install the cameras, sensors, and other ancillary equipment in or on the cabinets, as well as other items required to provide a complete and functioning network of ITS devices.

The Contractor shall not take advantage of any apparent error, discrepancy or omission in the plans or specifications. Upon discovery of such an error, discrepancy or omission, the Contractor shall notify the Engineer immediately. The Engineer will then make such corrections or interpretations as necessary to fulfill the intent of the plans and specifications.

Materials or work described in words which, so applied, have known technical or trade meaning shall be held to refer to such recognized standards.

Figured dimensions on the plans shall be taken as correct but shall be checked by the Contractor before starting construction. Any errors, omissions, or discrepancies shall be brought to the attention of the Engineer and the Engineer's decision thereon shall be final. Correction of errors or omissions on the drawings or specifications may be made by the Engineer when such correction is necessary for the proper execution of the work.

The Contractor for this project shall coordinate work with the contractor(s) working on the fiber optic cable and device deployment projects. The Iowa DOT will assist in the coordination and scheduling of work. The Contractor for this project shall assign a responsible staff member that will work with the Iowa DOT on decisions regarding order of work and scheduling as needed throughout the duration of this project.

1.01 Related Specifications and Standards

The work as detailed on the plans for the ITS Infrastructure Installation shall be completed in accordance with the plans, special provisions and all other contract documents. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete project.

1. Specifications of the Underwriter's Laboratories, Inc.

2. National Electric Code

3. Manual on Uniform Traffic Control Devices

1.02 Local Requirements

A. General

Comply with any special requirements and limitations identified in the plans.

B. Coordination of Work

Contractor for this project shall coordinate work with the Contractor(s) working on other Iowa DOT projects in the vicinity as noted in the plans. The Contractor shall provide the Engineer any requests to perform work during the dates of special events noted in the plans a minimum of 5 days prior to the event. The decision of the Engineer regarding a request shall be final.

C. Building Facilities

All work in or around any building facility shall be coordinated with the Engineer and the Iowa DOT District staff. Provide a minimum of 48 hour notice to the Engineer before performing any work in the immediate vicinity of a building or surrounding parking area.

1.03 Contractor's Responsibility

A. Coordination with Utilities

1. The Contractor is responsible for determining the exact location and elevation of all public utilities in proximity to any construction work and shall conduct all activities to ensure that public utilities are not disturbed or damaged.

2. The Contractor is fully liable for all expenses incurred as a result of failing to obtain required clearances, location of utilities, and any damage to utilities caused by construction.

3. Utility companies whose facilities are shown on the plans or known to be within the construction limits shall be notified by the Contractor of the starting construction date.

B. One Call Locating

Until final acceptance, the Contractor shall provide all utility locates of the work performed under this contract when requested through One-Call services or by the Engineer. The Contractor shall perform any such locations within 48 hours of receiving notice that such locations are needed.

C. Material and Equipment Storage and Construction Site Access

1. Contractor shall secure a designated material storage area for this project. Any request to store material in the right-of-way in order to complete the current work activity shall be approved by the Engineer.

2. Construction equipment may be stored within the right-of-way during non-working hours if it is outside of the roadway clear zone, as far from the traveled way as practical and as approved by the Engineer. No equipment shall be stored at the toe of any roadway slope.

3. No worker vehicles will be allowed to park in, or access a job site directly from an Interstate or Freeway facility. Access to the job site for both workers and materials shall only be via interchanges or intersecting roadways unless otherwise approved by the Engineer. Worker vehicles shall be parked off-site or at a location acceptable to the Engineer

D. Finishing Activities

Upon completion of the work at each project area, thoroughly clean the site and restore it to a condition at least equal to that existing prior to construction. Project area is defined as the

approximate area disturbed during a normal week of work. During and after completion, employ appropriate measures for erosion control, where applicable. Seed and fertilize work areas upon completion of work in accordance with the contract documents.

1.04 Contractor Submissions

A. Materials List

The Engineer shall furnish a list of materials required for the project to each bidder with the proposal. Complete and submit one electronic pdf file of the materials list within 14 calendar days after award of the project contract. Include the name of the materials supplier and catalog number of each item listed.

B. Construction Schedule

1. Within 30 days after award of contract, the Contractor shall submit to the Engineer one electronic pdf file of the detailed construction schedule including dates of commencement for each major work item, duration of each major work item and completion of each major work item on each segment of the proposed construction.

2. Major items of work to be included on the schedule are installation of conduit, junction boxes, device cabinets, and electrical installations.

3. Upon acceptance of the schedule, the Contractor will be expected to adhere to these dates as proposed unless modified with the approval of the Engineer.

4. Submittal and approval of the proposed construction schedule by the Engineer is required before the Contractor can commence construction activities.

C. Shop Drawings/Catalog Cuts

1. Prior to construction and after approval of the Materials List, submit one electronic pdf file of the shop drawings or catalog cuts for the materials to the Iowa DOT for approval.

2. The Engineer shall review the shop drawings/catalog cuts for the purpose of assuring general conformance with the project design concept and contract documents.

3. Provide written notice of any deviations from the requirements of the plans or contract documents.

4. Engineer's approval of shop drawings/catalog cuts does not relieve the Contractor of responsibility for providing satisfactory materials complying with the contract documents. Errors not detected during review do not authorize the Contractor to proceed in error.

5. The Engineer shall provide approval before any materials are ordered.

D. Materials Procurement

1. Shop drawings, specification data, and samples for acceptance testing (when requested) shall be submitted to the Iowa DOT for approval and/or selection prior to the placing of orders for any equipment and materials.

2. The Contractor shall order all materials requiring production lead time greater than 4 weeks within 5 business days of receiving the approved shop drawing(s).

3. The Contractor shall submit to the Engineer proof of material purchase order in electronic pdf format.

E. Warranty

1. Transfer all required standard materials warranties on the date of final acceptance to the Iowa DOT.

2. Warranty periods shall not commence prior to final acceptance of the work.

1.05 As-Built Documentation

A. General

1. As-built record drawings will be the responsibility of, and completed by, the Engineer. As such, it will be the responsibility of the Engineer to coordinate directly with the Contractor to ensure that a master record set of the plans is maintained throughout construction to document all installations and any deviations from the design shown in the contract documents.

2. It is the responsibility of the Contractor to maintain written records of daily construction progress, areas worked and quantities installed to aid in the completeness of as-constructed documentation by the Engineer's on-site representative.

B. GPS Data Recording Staking Assistance

1. The Engineer's on-site representative will be responsible for collecting GPS data of all installations including, but not limited to: conduit routing, handholes, device poles, device cabinets, and power supplies. All efforts will be made by the Engineer's on-site representative to coordinate with the Contractor and collect construction progress daily.

2. The Contractor shall be responsible to coordinate and assist the Engineer's on-site representative in this effort by staking, flagging or otherwise locating all installed features until such time that the GPS data can be collected.

PART II
TECHNICAL PROVISIONS

This part consists of the material requirements, construction details, and methods of measurement and basis of payment necessary to complete construction of the ITS Infrastructure project, in place, as described in the contract documents.

2.01 General

A. Supply only new materials from reputable suppliers and manufacturers approved by the Engineer. Provide any items, equipment, or materials not specifically addressed in the contract documents but required to provide a complete and functional installation. The level of quality shall be consistent with other specified items. All miscellaneous electrical equipment and materials shall be UL-approved. Securely store and protect all materials delivered to the project site. Provide appropriate material quantities for testing or verification at no additional cost when requested by the Engineer.

B. The Contractor shall expect some reasonable variation in location of the facilities shown due to unforeseen conflicts, changes in proposed work, installation difficulties, or other circumstances. The Engineer shall authorize any changes in location in writing before performing the installation. No additional compensation shall be provided for additional work associated with or resulting from unauthorized changes to the contract documents.

2.02 Device Cabinets

Furnish all work, apparatus, and materials to construct and install the device cabinets designed to house the control equipment required for the planned ITS system.

A. Materials

1. General

- **a.** Supply device cabinets, clean-cut in design and appearance
- **b.** Cabinets shall be dimensioned as identified in the contract documents and have a typical internal layout as identified in the detailed drawings.
- **c.** Cabinets shall be corrosion resistant, UL-50 approved, NEMA Type 3R compliant, constructed of welded sheet aluminum with a minimum nominal thickness of 0.125 inch.
- **d.** Cabinets shall be complete with all required internal components, fully wired back panel, side mount DIN rails, terminal strips, and stainless steel hardware.
- **e.** Cabinets shall include one mounting shelf.
- **f.** Cabinets shall meet the requirements of ASTM B-209 for 5052 H-32 aluminum sheet. The aluminum shall be smooth and the exterior shall be left in its unpainted natural color.
- **g.** The cabinet structure shall be effectively sealed to prevent the entry of rain, dust, and dirt.
- **h.** All exterior seams for cabinet and doors shall be continuously welded. All edges shall be filed to a radius of 1/32 inch minimum.
- **i.** All pole mount cabinets shall be equipped with top and bottom mounting flanges and include pole mounting reinforcement/stiffener plates as part of the cabinet design. Mounting brackets shall be fabricated from 0.250 inch thick aluminum, 5052-H32, mill finish.

2. Cabinet Doors

- **a.** The cabinet door shall be sturdy, torsionally rigid, and attached by a continuous heavy duty gauge aluminum butt hinge utilizing a stainless steel hinge. The door shall substantially cover the full area of the front of the cabinet and have a stainless steel, pad-lockable handle.
- **b.** The cabinet shall be hinged on the right side (as viewed from the front)
- **c.** The cabinet door shall be provided with a door stop catch mechanism to hold the door open at three positions – 90 degrees, 120 degrees and 180 degrees, with plus or minus 10 degrees accuracy. Both the door and door stop mechanism shall be of sufficient strength to withstand a simulated wind load of five pounds per square foot of door area applied to both inside and outside surfaces.
- **d.** A closed-cell neoprene gasket shall be provided to act as a permanent and weather resistant seal at the cabinet door facing. The gasket material shall be of a non-absorbent material and shall maintain its resiliency after long term exposure to the outdoor environment. The gasket shall have a minimum thickness of 1/3 inch. The gasket shall be located in a channel provided for this purpose either on the cabinet or on the door. An “L” bracket is acceptable in lieu of this channel if the gasket is fitted snugly against the bracket to insure a uniformly dust and weather resistant seal around the entire door facing.
- **e.** Cabinet light (LED) with light bulb provided shall be operated by door switch.
- **f.** Each cabinet door shall be provided with a high quality, heavy duty tumbler-type lock. Two No. 2 keys for each tumbler lock shall be provided for each cabinet. All locks for the project shall be keyed identically to key pattern 9R46142 or as otherwise identified by the Engineer. Keys shall be given to the Engineer. Do not attach keys to the exterior of the cabinet at any time during storage or installation.
- **g.** A heavy-duty clear plastic envelope shall be provided, securely attached to the inside wall of the cabinet or cabinet door, for stowing cabinet wiring diagrams and equipment manuals. Minimum dimensions shall be 9 inches wide by 12 inches deep.

3. Power Panel, Connecting Cables and Wiring

- **a.** Provide cabinets equipped and configured with internal power components as shown in the contract documents.
- **b.** One four position service entrance terminal block with tin plated aluminum connectors, nickel plated steel screws, and a current rating up to 70 Amps.
- **c.** One 20 Amp single pole breaker (Main).
- **d.** One 15 Amp single pole breaker (Equipment).
- **e.** One 15 Amp single pole breaker (Auxiliary).
- **f.** A 120/240 VAC surge protector with surge current at minimum of 100KA, nanosecond response time, and an operating temperature of -40°C to +85°C.
- **g.** An auxiliary four terminal electrical block rated for a maximum 250 VAC RMS maximum voltage and 20 Amps current.
- **h.** A 15 Amp GFCI receptacle in Ivory color.
- **i.** An eight outlet Power Distribution Unit with built in surge suppressor (1800 Joules of surge/lightning protection) that includes a resettable circuit breaker and minimum cord length of 6 feet.
- **j.** One 7 TAP Ground Bar.
- **k.** One 7 TAP Neutral Bar.
- **l.** All miscellaneous wiring, harnesses connectors and attachment hardware.
- **m.** All conductors used on the cabinet wiring shall be No. 14 AWG or larger with a minimum of 19 strands. Conductors shall conform to MIL SPEC MIL-W-168780, Type

B or D. The insulation shall have a minimum thickness of 10 MILS. All wiring containing line voltage shall be a minimum size of No. 12 AWG.

4. Ventilation.

a. Vents.

1) Furnish cabinets containing a suitably designed rain tight vent or vents that:

- Are equipped with suitable screens or dust filters, and
- Allow the release of excessive heat and/or any explosive gases which may enter the cabinet.

2) Ensure when filters are utilized, positive retainment is provided on all sides to prevent warpage and entry of foreign matter around the edges.

3) The filters shall be dry type, easily removed and replaced, and standard dimensions commercially available.

b. Vent Fan.

Meet the following requirements:

- A thermostatically controlled vent fan is furnished to provide air circulation within the cabinet.
- The thermostat controlling the fan is manually adjustable to turn on between 90°F and 150°F with a differential of not more than 10°F between automatic turn on and turn off.
- The fan is located with respect to the vent holes to direct the bulk of the air flow over the internal components within the cabinet.
- Ventilation fan shall be fused separately and wired after the main AC+ circuit breaker.

5. Grounding.

a. The cabinet internal ground shall consist of one or more ground bus-bars permanently affixed to the cabinet and connected to the grounding electrode.

b. Use bare stranded No. 6 AWG copper wire between bus-bars and between the bus-bar and grounding electrode.

c. Each copper ground bus-bar shall have a minimum of 20 connector points. Each connector point shall be capable of securing at least one No. 6 AWG conductor.

d. AC neutral and equipment ground wiring shall return to bus-bars.

B. Construction.

1. General.

a. Install cabinets in accordance with the contract documents and the manufacturer's recommendations.

b. Do not penetrate the top of any cabinets without prior authorization by the Engineer.

c. Do not allow screws used for mounting shelves or other mounting purposes to protrude beyond the outside wall of the cabinet.

d. All connections shall be watertight.

e. Contact the Engineer a minimum of 1 week in advance to arrange a field review prior to placing the cabinets.

2. Mounting.

a. Orient cabinets as shown in the contract documents unless otherwise directed by the Engineer.

b. Ensure sufficient clamps, nuts, hardware, etc., as required for the specified mounting type, are furnished with each cabinet.

c. Seal all conduit openings in the controller cabinet with a sealing compound that meets the following requirements:
- Readily workable, soft plastic,
- Workable at temperatures as low as 30°F, and
- Does not melt or run at temperatures as high as 300°F.

d. Do not install the controller cabinet on preplaced caulking material on the concrete base or place caulking material around the base of the cabinet after installation.

C. Method of Measurement & Basis of Payment.

1. Measurement and payment for device cabinets shall be paid for at the contract unit price per each for the bid item Cabinet, Furnish and Install, 46 Inch X 24 Inch X 20 Inch and Cabinet, Furnish and Install, 30 Inch X 20 Inch X 14 Inch.

2. Payment is full compensation for:
- The furnishing and installation of all pole mounted and pedestal mounted cabinets,
- Including all internal components and accessories required to provide a complete cabinet installation per the contract documents,
- Providing and installing all mounting materials, cable pulling, routing and management, cable termination, and all necessary electric grounding materials, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

2.03 Junction Boxes.

A. Materials.

1. Supply only new junction boxes, free from damage, meeting the requirements in the standard specifications, NEC, and NEMA 3R.

2. Junction boxes shall be constructed of ~~Stainless Steel 316 material~~ galvanized steel per ASTM A 653 and shall be furnished with a lockable lid.

3. Junction boxes shall be gasketed and vented.

4. The Engineer shall provide approval prior to use of any junction boxes satisfying the contract documents requirements for structural, physical, and chemical properties.

B. Construction.

1. Install the type and size of junction boxes at the locations indicated in the contract documents.

2. Mount junction box through the flanges or mount junction box through the wall of the junction box. Use silicone sealant between mounting hardware and wall of the junction box.

3. Penetrate conduits 1.5 inches into the junction box. Terminate with bushings and/or bell ends that protect cables from chafing.

C. Method of Measurement & Basis of Payment

1. Measurement and payment for all junction boxes shall be paid for at the contract unit price per each for the pay items Junction Box, Furnish and Install, 30 Inch X 30 Inch X 16 Inch; Junction Box, Furnish and Install, 12 Inch X 12 Inch X 6 Inch; Junction Box, Furnish and Install, 12 Inch X 10 Inch X 6 Inch; and Junction Box, Furnish and Install, 10 Inch X 8 Inch X 4 Inch.

2. Payment is full compensation for:

- The furnishing and installation of all junction boxes,
- Including all mounting equipment, repair or restoration of any nearby areas, proper water/moisture drainage materials, all necessary electric grounding materials and installation,
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

2.04 Power Connections

A. Materials

Power connections shall comply with the requirements of NEC, the contract documents and all generally accepted standards and requirements for the electrical components and power terminations in the individual power source.

B. Construction

1. Install power connections in accordance with the contract documents and all NEC requirements.

2. Contractor shall coordinate installations in advance as noted on the contract documents.

3. Contractor shall provide all conduit, breaker enclosures, circuit breakers, wiring and accessories, neutral bars and accessories, ground bars and accessories, terminations and grounding in the power source.

4. Unless otherwise directed by the Engineer, the Contractor shall install the power connections as illustrated in the contract documents.

5. The Contractor is responsible for coordinating and scheduling all locally required inspections of electrical work prior to putting a location into service.

6. The Contractor shall coordinate with the Engineer and power provider to request that electrical service at a device location be initiated.

C. Method of Measurement & Basis of Payment

1. Measurement and payment for all power connections shall be paid for at the contract unit price per each for the pay item Power Connection.

2. Payment is full compensation for:

- The furnishing and installation of all power connection accessories as shown in the contract documents,
- Including the proper installation of the conduit, breaker enclosures, circuit breakers, wiring and accessories, neutral bars and accessories, ground bars and accessories, terminations, and grounding in the power source, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.