**SP-150646**
**(New)**

**SPECIAL PROVISIONS**
**FOR**
**ITS INFRASTRUCTURE INSTALLATION**

**Harrison County**
**ITS-030-1(168)--25-43**

**Effective Date**
**June 16, 2020**

**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.**

## 150646.01 DESCRIPTION.

This project involves installing DOT supplied poles, foundations, and cabinets. This project also involves supplying and installing conduit, handholes, tracer wire, test stations, power supplies and cabling deemed necessary for a complete ITS Infrastructure installation designed for use with future proposed device deployments and other uses planned by the Iowa DOT. Separate contracts will also be initiated to supply and install the cameras, sensors, and other ancillary equipment in or on the cabinets and poles, as well as other items required to provide a complete and functioning network of ITS devices.

## 150646.02 MATERIALS.

**A. General**

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 listed for its specific application.

**B. Device Cabinets**

All device cabinets shall be provided by the Iowa DOT. The Contractor shall coordinate with the Engineer the time for the Contractor to accept the device cabinets from the Iowa DOT Maintenance Garage in Missouri Valley, Iowa, and deliver the device cabinets to the field for installation or to the Contractor's construction yard for storage.

**C. Handholes.**

**1.** Supply handholes constructed of epoxy or polyester resin mortar with woven glass fiber reinforcement and an appropriate aggregate dimensioned as indicated in the contract documents.

**2.** Handhole materials shall not support combustion when tested in accordance with "Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position" ASTM D-635.

3. Water absorption shall not exceed two percent of the original weight of material under test conditions per “Standard Test Method for Water Absorption of Plastics” ASTM D-570.

4. The handhole shall be functional without failure throughout a temperature range of -50°F to +170°F.

5. The handhole walls shall not deflect more than 0.24 inches per foot of length of box when installed and subject to an ASTM C-857 TIER 22 load.

6. Handholes shall meet or exceed ANSI/SCTE 77 “Specification for Underground Enclosure Integrity” requirements.

7. Handhole lid strength shall be tested to 33,750 pounds (Tier 22).

8. Handhole lids shall be labeled as indicated in the plans or as directed by the Engineer.

**D. Meter**

Meter socket, pedestal, mounting, disconnect and bypass, and risers shall meet standards and requirements of the NEC and utility company.

**E. Power Connections.**

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

**F. Power Installed Foundation.**

All power installed foundations shall be provided by the Iowa DOT. The Contractor shall coordinate with the Engineer the time for the Contractor to accept the power installed foundations from the Iowa DOT Maintenance Garage in Missouri Valley, Iowa, and deliver the power installed foundations to the field for installation or to the Contractor’s construction yard for storage.

**G. Poles.**

All poles shall be provided by the Iowa DOT. The Contractor shall coordinate with the Engineer the time for the Contractor to accept the poles from the Iowa DOT Maintenance Garage in Missouri Valley, Iowa, and deliver the poles to the field for installation or to the Contractor’s construction yard for storage.

**H. Wire and Cable.**

1. **Power Wire.**
   Single conductor, stranded copper, Type XHHW, black colored jacket in sizes listed in the Contract Documents.

2. **Grounding/Bonding.**
   Ground all installations using a No. 6 AWG copper, non-insulated wire bonded to copper clad metal, driven electrodes using an exothermic weld.

**I. High Density Polyethylene Conduit.**

1. High Density Polyethylene (HDPE) conduit shall be smooth wall ORANGE in color.

2. Comply with ASTM F 2160 (conduit) and ASTM D 3350 (HDPE material), minimum SDR 13.5 or 11 as specified on the construction drawings.

3. Sequential foot markings printed on HDPE.

4. Continuous reel or straight pieces to minimize splicing.

**5.** For dissimilar conduit connections provide an adhesive compatible with both materials.

**J. Pull Tape.**

**1.** Pull tape shall be clearly marked with durable, sequential footage markings.

**2.** Pull tape shall have a minimum proper tensile strength of 600 pounds.

## 150646.03 CONSTRUCTION.

**A. General.**

The Contractor shall stake per coordinates provided in the plans, all handholes and proposed conduit alignment a minimum of 1 week prior to construction and for approval by the Engineer. 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.

**1.** Place stakes at the following locations and label with item being staked:

- Handholes
- Conduit and/or cable alignment direction changes
- Transitions from plow to bore or bore to plow
- At locations requiring specific depths to avoid existing or future facilities
- A minimum of 100 feet apart along plowed conduit
- A minimum of 25 feet apart along bored conduit
- At other locations as noted within the contract documents

**2.** The Iowa DOT will stake all pole locations. Pole locations shall not be adjusted without approval by the Engineer. The Engineer shall authorize any changes in location in writing before installation by Contractor.

**3.** Notify the Engineer immediately if an obstruction conflicts with a foundation. The Engineer is responsible for relocating or determining another effective means of supporting the structure to eliminate the conflict. Payment shall not be made for re-work or extra work as the result of an unauthorized relocation of a foundation.

**B. Related Specifications and Standards.**

The work as detailed on the plans for the ITS Infrastructure Installation shall be completed in accordance with the contract documents and the documents listed below.

**1.** NEC, latest edition adopted by the State of Iowa.

**2.** Telecommunications Industry Association/Electronic Industries Association (TIA/EIA) latest editions.

**C. Contractor's Responsibility.**

**1. 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.

**2. Conduit Locations.**

Prior to final acceptance, the Contractor shall meet with the Engineer to demonstrate the locate system is working properly throughout the entire locate system.

**D. Contractor Submissions.**

1. **Materials List.**
   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.

2. **Construction Schedule.**
   - **a.** Within 30 days after award of contract or before the construction kickoff meeting, 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.
   - **b.** Major items of work to be included on the schedule are installation of conduit, handholes, poles, and electrical service.
   - **c.** 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.
   - **d.** Submittal and approval of the proposed construction schedule by the Engineer is required before the Contractor can commence construction activities.

3. **Shop Drawings.**
   - **a.** After approval of the Materials List and before any items are ordered, the shop drawings shall be submitted for approval according to Article 1105.03 of the Standard Specifications.
   - **b.** The Engineer will review the shop drawings/catalog cuts for the purpose of assuring general conformance with the project design concept and contract documents.
   - **c.** Provide written notice of any deviations from the requirements of the contract documents or Special Provisions.
   - **d.** 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.

**E. Device Cabinets.**

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

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

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

4. All exterior connections shall be watertight.

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

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

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

8. Seal all conduit openings in the device cabinet using ETCO duct plugs or as directed by the Engineer.

**F. Handholes.**

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

2. Set top of all handholes to depths as indicated in the contract documents for different handhole

types and installation locations.

3. Install aggregate bedding below the handhole as identified in the contract documents.

4. Conduit shall enter the handhole from the bottom and extend conduit ends between 4 and 6 inches above the aggregate bedding.

5. Side penetrations of the handholes are not permitted.

6. Plug all open conduit ends within the handhole in a manner acceptable to the Engineer.

7. Rodent proof all handholes to the satisfaction of the Engineer.

8. Conduit entrance into junction boxes shall be through slip holes. Conduit shall fasten to the box using sealing type locknuts.

**G. Meter**

1. Install the type of meter at the locations in the contract documents.

2. Install meter within pedestal or on pole with riser to meet utility company standards and requirements.

**H. Power Connections.**

1. Install power connections in accordance with the contract documents, NEC, and all requirements of local electrical utility.

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.

7. The Contractor shall conform with all service provider standards and requirements.

**I. Power Installed Foundation.**

1. Install the power installed foundations in accordance with the contract documents and the manufacturer's recommendations.

2. Contact the Engineer a minimum of one week in advance to arrange a field review prior to placing the power installed foundation.

3. Notify the Engineer immediately if an obstruction conflicts with a proposed power installed foundation location. The Engineer is responsible for relocating or determining another effective means of supporting the structure to eliminate the conflict. Payment shall not be made for re-work or extra work as the result of an unauthorized relocation of a power installed foundation.

4. Construct all power installed foundations as located by the Engineer and set level and to the proper elevation.

5. Hand dig with shovel after power installed foundation is in place in order to install conduits into the provided conduit entrances.

6. Install a sufficient number of conduits sized as indicated in the contract documents. All conduits shall be located as indicated in the contract documents.

7. Remove and reconstruct, at no additional cost to the Engineer, all power installed foundations improperly constructed or with improperly installed anchor bolts, conduit, or any other foundations components as determined by the Engineer.

**J. Poles.**

1. If pole has structural damage do not erect and notify Engineer.

2. Repair any surface damage to galvanized components using a zinc-rich paint acceptable to the Engineer.

3. Erect poles (including camera mounting system and poles) and securely bolt to the power installed foundation base plate such that the pole is vertical to the centerline of the nearest adjacent major roadway.

4. Use leveling nuts on each anchor bolt installed below the pole flange. Adjust the pole's vertical position by adjusting both the upper and lower nuts.

**K. Wire and Cable.**

1. All installations and connections shall comply with the contract documents and all generally accepted codes and standards.

2. The Engineer shall resolve all conflicts.

3. Ground all installations as indicated in the contract documents.

4. Installation of grounds is incidental to the cost of the connected items of work.

5. Ground all installations in accordance with the requirements of NEC. Supply and install additional grounding rods and equipment as necessary to satisfy such requirements at no additional cost to the Contracting Authority.

**L. Conduit.**

1. Follow all general guidelines covering the construction of buried conduit.

2. Install conduit by plowing, jacking, pushing, boring, or other approved methods within the public right-of-way and in a manner that minimizes atypical damage from construction operations.

3. The minimum bending radius of HDPE conduit shall be the larger of 20 times the outside diameter or the HDPE manufacturer’s recommendations for minimum bending radius.

4. Open trench installation is only permitted within 25 feet of any handhole, structure, or other similar improvements, and any other requested locations approved by the Engineer.

5. At the discretion of the Engineer, verify the integrity of the conduit structure in a manner acceptable to the Engineer.

6. Tunneling under the pavement or water jetting shall not be permitted.

7. No excavations are permitted to cross any roadways or any other paved or other similarly improved areas. At these locations, install conduits by boring method unless otherwise directed or approved in writing by the Engineer. Where indicated in the contract documents and at all roadway and stream crossings, install conduit sections with external protection as specified herein.

8. No direct-buried cable is allowed.

9. Unless otherwise indicated in the contract documents, installation of Schedule 40 PVC conduit or approved alternative is allowed only in open trench runs or when approved by the Engineer.

10. Seal all conduit openings using ETCO duct plugs or approved equal, or as directed by the Engineer, at all conduit openings at the junction boxes, handholes, and building entrances.

11. Thread and cap all rigid steel conduit ends with standard conduit caps until wiring is installed. Before wiring is installed, replace caps with threaded insulating bushing in accordance with Article 2523.03 N of the Standard Specifications.

12. Depth of all bores shall be a minimum of 48 inches unless otherwise specified in the plans.

13. Maintain the typical offsets from referenced locations as shown in the plans.

14. Maintain the minimum depth throughout the length of all conduit installations.

15. Maintain a minimum of 2 feet of separation when underground conduits parallel an existing facility.

16. Maintain a minimum of 2 feet vertical separation when crossing existing utilities.

17. Conduit shall be installed with minimal splices between handholes and structures as shown on contract documents.

18. All mechanically joined conduit splices shall use compression couplings designed for underground placement and blown-in fiber installation.

19. Butt fusion welding and solvent welding of conduits will not be allowed.

20. All conduit splices shall be designed to be watertight to 200 psi.

21. Conduit splicing is incidental to the connected items of work.

22. The Contractor is responsible for protecting and maintaining the conduit throughout construction and until final acceptance.

23. To avoid possible damage to buried conduit from exposure to traffic, livestock and other hazards, complete trenching of laterals, trenching around culverts, construction of aerial inserts and similar operations as soon as practicable behind all segment installations.

24. If more than 48 hours lag is expected behind a segment installation, install additional protective measures acceptable to the Engineer.

25. Backfill trenches and other excavations in lifts of 6 inches or less in compacted depth. Compact each layer thoroughly before placing subsequent layers.

26. Remove all cinders, broken concrete, or other hard or abrasive materials in the backfill material

before commencing backfilling operations.

**27.** Remove and dispose of surplus and unsuitable materials upon completion of the backfilling operations in the area.

**28.** Place and carefully hand tamp backfill under and around the structures in lifts not to exceed 4 inches in loose thickness. Use a suitably sized mechanical tamper for all areas inaccessible to rollers.

**29.** Perform operations in a manner that minimizes soil erosion and employs appropriate storm water pollution prevention measures during all construction operations.

**30.** Maintain work areas in a neat, clean, and orderly condition at all times.

**31.** Upon completion of conduit/cable placing operations and any other work in an area, remove all debris, materials, tools, and equipment from the area and restore the disturbed area(s) to original or better condition within 24 hours or as soon as practicable as determined by the Engineer. Backfill all excavations and grade all disturbed areas during the restoration process.

**32.** Remove and dispose of rock and debris excavated and remaining after backfilling as directed by the Engineer.

**33.** Replace or reconstruct features removed as a part of the work, such as sidewalks, driveways, curbs, roadway pavement, unpaved areas, or any other items.

**34.** Immediately repair or replace any unauthorized disturbance or damage. Replace improved landscaping, lawns, scrubs, and hedge removed or damaged during construction in a manner acceptable to the Engineer. Re-sod damaged lawns using like grasses.

**35.** Complete restoration according the applicable sections of the Standard Specifications.

**36.** Use equipment and construction methods subject to the approval of the Engineer that cause minimal displacement of the soil.

**37.** Furnish competent supervision at all times at the site of plowing operations to assure compliance with the contract documents.

**38.** The equipment shall be capable of extending the plow in order to maintain the required minimum depths under all terrain conditions.

**39.** The reel carrier shall be of adequate size and be configured so that the reel sizes being used can be safely handled.

**40.** Avoid damaging any paved surfaces, ditches, or other similar surface features. Immediately repair any damage to such features to the satisfaction of the Engineer.

**41.** Perform plowing in accordance with standard industry practices using a prime mover with hydrostatic type steering and a vibratory plow. The design of the plowshare shall be such that the buried conduit passing through the plow shall not bind and shall not be bent in a radius less than 20 times the outside diameter of the conduit and maintains the structural integrity of the conduit. The feed chute shall have a removable gate for the purpose of inspection and to allow the conduit to be removed from or inserted into the feed chute at any intermediate point between splice locations. The conduit path inside the feed chute shall have low friction surfaces and be free of burrs and sharp edges to prevent damage to the conduit as it passes through. Smooth any welds before use. Internal guide rollers shall not be used. Exercise care during the plowing operation to avoid conduit damage. Feed the conduit into the ground through the plow loose and at no tension.

**42.** Excavate as needed start and finish pits and pits at points of intersection in advance of plowing. Expose ends of casings and crossings of foreign utilities before the start of plowing operations for a conduit segment. Exercise care in the use of trenching and excavating tools and equipment to avoid damaging installed and intersecting conduits or other facilities.

**43.** Restore plow furrowed areas to conform to the surrounding terrain using a rubber-tired tractor or heavy truck or a vibratory roller having a weight of 3 tons and a drum width between 4 and 6 feet or by other suitable means approved by the Iowa DOT.

**44.** Excavate open trench straight as practicable. Shape the trench to be smooth, free from any sharp edges, and clear of debris and loose rock. Excavate only gradual grade changes.

**45.** Do not leave trenches unattended at any time or open during non-working hours unless approved in writing by the Engineer. Install barriers or other protective measures to prevent livestock or persons from falling into an open trench when appropriate.

**46.** Notify the Engineer immediately if solid rock is encountered at any location. Excavate rock trenches using a rock saw or other suitable equipment. The excavation, backfill, and road crossings in solid rock areas shall conform to the requirements stated above unless specifically exempted in this section.

**47.** Rock excavation shall be considered extra work and shall be paid as a separate cost item. Obtain approval from the Engineer before commencing any rock excavation.

**48.** Bore all crossings beneath roadways, streets, other paved surfaces, railroads, or other structure in accordance with requirements and regulations of the authority having jurisdiction and as directed in the contract documents.

**49.** Limit bore hole sizes to the outside diameter of the conduit being placed.

**50.** Locate bore pits a minimum of 2 feet from the edge of pavement or shoulder unless otherwise directed by the Engineer.

**M. Final Acceptance.**

**1.** As-built record plans will be the responsibility of, and completed by, an on-site representative of the Engineer. As such, it will be the responsibility of the Engineer's representative 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.

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

**4.** 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.

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

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

**150646.04 METHOD OF MEASUREMENT.**
Measurement for the quantities of various items involved in the construction of ITS Infrastructure will be as follows:

**A. Device Cabinets.**
By count

**B. Handholes.**
By count.

**C. Meter**
By count.

**D. Power Connection.**
Per count.

**E. Power Installed Foundation.**
Per count.

**F. ITS Poles.**
Per count.

**G. Wire and Cable.**
Linear feet installed.

**H. Conduit.**
Per linear foot as measured on the finished surface above conduit installed.

**150646.04 BASIS OF PAYMENT.**
Payment for the quantities of the various items involved in construction of ITS Infrastructure will be the contract unit price as follows:

**A. Device Cabinets.**

**1.** Each.

**2.** Payment is full compensation for equipment, installation of device cabinets, mounting materials, cable pulling, routing and management, cable termination, and all necessary electric grounding materials.

**B. Handholes.**

**1.** Each.

**2.** Payment is full compensation for materials, equipment, excavation, and installation of the handholes.

**C. Meters.**

**1.** Each.

**2.** Payment is full compensation for materials, installation and coordination with electrical service provider to establish electrical service and a site.

**D. Power Connections.**

1. Each.

2. Payment is full compensation for connection of electrical service within device cabinets between power source and device cabinet.

**E. Power Installed Foundation.**

1. Each.

2. Payment is full compensation for equipment, installation of power installed foundation, surface excavations, repair or restoration of any nearby areas and other incidental items.

**F. Poles.**

1. Each.

2. Payment is full compensation for equipment, installation of all poles and accessories, conduit entrances, attachments, all necessary electric grounding materials, and other incidental items.

**G. Wire and Cable.**

1. Per linear foot.

2. Payment is full compensation for materials, equipment, and installation of the wiring/cable size and type specified between the power source and device cabinet.

**H. Conduit.**

1. Per linear foot.

2. Payment is full compensation for materials, equipment, and installation of the wiring/cables between the power source and device cabinet.

## ADDITIONAL BIDDING ATTACHMENTS

**Equipment and Materials List for Submittal Requirements.**

| DESCRIPTION | MANUFACTURER | CATALOG NUMBER |
|---|---|---|
| HANDHOLE, 24”x36”x36” | | |
| GROUND ROD | | |
| EXOTHERMIC WELDING KIT | | |
| HDPE CONDUIT | | |
| SCHEDULE 80 HDPE CONDUIT | | |
| RIGID STEEL CONDUIT AND FITTINGS | | |
| DUCT PLUGS | | |
| DUCT SEAL | | |
| #4 XHHW COPPER CABLE (POWER) | | |
| #4 XHHW COPPER CABLE (GROUND) | | |
| #2 XHHW COPPER CABLE (POWER) | | |
| #2 XHHW COPPER CABLE (GROUND) | | |

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