SP-150919
(New)

SPECIAL PROVISIONS
FOR
ITS INFRASTRUCTURE INSTALLATION

Dallas County
NHS-080-3(282)118—11-25

Effective Date
November 15, 2022

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.

150919.01 DESCRIPTION.

A. General Requirements.

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

2. This project involves installing cabinets, poles, and foundations; and supplying and installing conduit, attachments, handholes, and tracer wire deemed necessary for an ITS Infrastructure installation designed for use with future proposed ITS fiber and device deployments and other uses planned by the Iowa DOT. Separate contracts will 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.

3. 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.

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

5. 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.

6. The Contractor will need to coordinate with any other projects within the corridor. 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.

B. 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. The following documents are intended to be complementary and to describe and provide for a complete project.

- Specifications of the Underwriter's Laboratories, Inc.
- National Electric Code
- MUTCD
- American National Standards Institute, Telecommunications Industry Association, Electronic Industries Association (ANSI/TIA/EIA) latest editions.

C. Contractor's Responsibility.

1. Coordination with Utilities.

a. 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.

b. 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.

c. 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.

2. One Call Locating.

Until final written acceptance of the overall project by the Engineer and their locate partners, 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. The contractor should contact Iowa One-Call to get added to the Distribution List. For receiving notification requests only, Iowa One-Call can be reached at ialead@occinc.com.

3. 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.

4. Material and Equipment Storage and Construction Site Access.

a. 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.

b. 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.

c. 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

5. 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.

D. Contractor Submissions.

1. 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.

2. Construction Schedule.
- **a.** 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.
- **b.** Major items of work to be included on the schedule are installation of conduit, handholes, device poles and footings, device cabinets, and electrical installations.
- **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.

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 Engineer 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.

E. Disruption to Existing Fiber Networks.

1. Planned Work Near Existing Fiber Networks.

a. The Contractor shall ensure continuous operation of the existing fiber networks and systems during construction of the project.

b. The Contractor shall not work on splicing, disconnecting and/or in any way disrupting normal operation of the existing fiber networks or systems without approval from all affected parties. Parties include the Iowa DOT, and the Iowa Communications Network (ICN). The Contractor shall provide a written request to the Iowa DOT and the respective parties for approval at least ten calendar days before work is done near an existing fiber network or equipment. A copy of the written request shall be submitted to the Engineer in all cases. In addition to the written request, the Contractor shall submit the work plan and schedule for approval by the Engineer. The work plan shall include all fiber strands and the parties possibly affected.

2. Allowable Working Hours.

a. The Contractor shall only access or disrupt existing fiber between Midnight and 6:00 AM on working days unless otherwise approved by the Engineer.

b. The Contractor shall be responsible for repairing, to Iowa DOT's satisfaction and at no cost to Iowa DOT, any damage the Contractor causes to the existing fiber networks and systems during the life of the project.

c. In the event of disruption, the Contractor shall simultaneously notify the Engineer and affected parties and immediately stop all work in progress and shall expend all of its efforts to restore the disrupted system(s) and/or correct the problem causing the disruption. The notice shall include the type of facility damaged and the extent of the damage.

d. The Contractor shall remain on site until the Iowa DOT notifies that the disrupted systems are fully operational. Unplanned disruptions lasting longer than a given duration shall result in the assessment of liquidated damages.

e. The Contractor will not be granted an extension of time for delays caused by repairing disrupted systems.

3. Liquidated Damages.

a. Unplanned disruptions to the existing fiber-optic network will result in impacts to the traveling public, increase fuel consumption, vehicle operating costs, pollution, and time needed for Iowa DOT administration, engineering, inspection, and supervision, and other inconveniences and harm far in excess of those resulting from delay of most projects.

b. Accordingly, the Contractor agrees:

1) To pay $500.00 liquidated damages per 60 minutes, for each 60 minute period that the Contractor fails to restore the proper operation of an existing fiber-optic network element following an unplanned disruption lasting longer than 6 hours.

2) To authorize the Engineer to deduct these liquidated damages from any money due or coming due to the Contractor.

F. As-Built Documentation.

1. General.

a. 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.

b. 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.

2. GPS Data Recording Staking Assistance.

a. The Engineer's on-site representative will be responsible for collecting GPS data of all installations including, but not limited to conduit routing and depth, 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.

b. 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.

150919.02 MATERIALS.

This Article consists of the material requirements necessary to complete construction of the ITS Infrastructure project, in place, as described in the contract documents.

A. General.

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. Handholes.

1. General.

a. 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.

b. 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.

c. Water absorption shall not exceed 2% of the original weight of material under test conditions per "Standard Test Method for Water Absorption of Plastics" ASTM D-570.

d. The handhole shall be functional without failure throughout a temperature range of -50ºF to +170ºF.

e. The handhole walls shall not deflect more than 0.024 inches per foot of length of box when installed and subject to an ASTM C-857 TIER 22 load.

f. Handholes shall meet ANSI/SCTE 77 standards and be verified by a registered third party and stamped by a registered Professional Engineer.

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

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

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

2. Fiber Marker.

a. Supply Rhino Part No. TVF78OO or approved equivalent markers at all 24 inch by 36 inch by 36 inch handhole locations noted in the plans.

b. Markers shall be 78 inch, orange, polyester resin with reinforcing fibers, and remain flexible from -40°F to +140°F.

c. Place custom warning decals on all sides, the Engineer shall provide prior approval of decals.

C. Conduit.

1. High Density Polyethylene (HDPE) Conduit.

a. High Density Polyethylene (HDPE) conduit shall be smooth wall orange in color.
b. Comply with ASTM F 2160 (conduit) and ASTM D 3350 (HDPE material), minimum SDR 13.5, and NEMA TC-7 EPEC-B standards.
c. Sequential foot markings printed on HDPE.
d. A custom message of stated material specifications that product meets shall be printed a minimum of every 10 feet.
e. Continuous reel or straight pieces to minimize splicing.
f. For dissimilar conduit connections provide an adhesive compatible with both materials.

D. Wire and Cable.

1. Tracer Wire.
a. Single conductor copper clad steel, No. 10 AWG with orange colored jacket.
b. Contractor shall use a Tracer-Lock Connector (No. TL-LUG-SS) or approved equivalent on all mainline and lateral connections.

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

3. Grounding and Bonding.
a. Follow Article 4185.11 of the Standard Specifications and install quantity and size according to the plans. Ground shall be bonded to copper clad metal and driven electrodes using an exothermic weld.
b. Grounding wire for test stations shall be bare solid No. 6 AWG copper wire.

E. Device Cabinets.

1. 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 Grimes, Iowa, and deliver the device cabinets to the field for installation or to the Contractor's construction yard for storage.

F. Cabinet Foundations.

1. All concrete shall meet the requirements of Article 2403 of the Standard Specifications and current supplements. Use Class C concrete for cabinet foundations and all other non-paving concrete construction.

G. Power Connections.

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

H. Poles.

1. All steel ITS 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 Grimes, Iowa, and deliver the poles to the field for installation or to the Contractor's construction yard for storage. Furnish all work, apparatus, and materials to construct and install the steel poles for the planned ITS system.

I. Power Installed Foundation.

1. 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 Grimes, Iowa, and deliver the power installed foundations to the field for installation or to the Contractor's construction yard for storage.

150919.03 CONSTRUCTION.

This Article consists of the construction details necessary to complete construction of the ITS Infrastructure project, in place, as described in the contract documents.

A. General.

1. The Contractor shall stake, per the Iowa State Plane South coordinates provided in the plans, all handhole, cabinet, proposed conduit alignment (every 50 feet unless noted on the plans) and pole locations prior to construction and for approval by the Engineer. 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 Contractor shall notify the Engineer when staking is complete and allow 48 hours for the Engineer to review for approval.

2. 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.

B. 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 coarse 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.

C. Conduit.

1. General.

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

b. 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.

c. 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.

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

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

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

g. 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 document and at all roadway and stream crossings, install conduit sections with external protection as specified herein.

h. 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.

i. Seal all conduit openings using an approved sealing compound (duct seal) at all conduit openings at the junction boxes handholes, poles, cabinets, and building entrances.

j. Thread and cap with standard pipe caps all rigid steel conduit ends until installing wiring. Per Article 2523.03, N of the Standard Specifications replace caps with approved conduit bushing during and after wire installation.

2. Installation Clearances.

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

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

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

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

3. Conduit Splicing.

a. Conduit shall be installed in continuous runs between handholes, foundations, and structures unless otherwise directed by the Engineer.

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

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

d. All conduit splices shall be watertight to 200 psi.

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

4. Facilities Protection.

a. The contractor is responsible for protecting and maintaining the conduit throughout construction and until final acceptance.

b. 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.

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

5. Backfilling.

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

b. Remove all cinders, broken concrete, or other hard or abrasive materials in the backfill material before commencing backfilling operations.

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

d. 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. Operate pneumatic or other mechanical tampers in accordance with the manufacturer's recommendations.

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

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

g. 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.

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

6. Surface Restoration.

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

b. 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.

c. Complete restoration according the applicable sections of the Standard Specifications.

7. Plowing.

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

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

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

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

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

f. 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.

g. 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.

h. 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.

8. Bored Crossings.

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

b. 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

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

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

D. Wire and Cable.

1. General.

a. All installations and connections shall comply with the contract documents and all generally accepted codes and standards.
b. Install cable connectors in accordance with Standard Road Plan RM-40 and the contract documents at the base of all breakaway poles, cabinets, or other installations for all non-low voltage installations unless otherwise directed by the Engineer. All costs associated with these connectors are incidental to the cost of the connected items of work.
c. Direct bury of wire and cable is not allowed.
d. All electrical and grounding cable shall comply with electrical and grounding testing required per Section 2523 of the Standard Specifications. The electrical and grounding testing shall be witnessed by the Engineer or Engineer's Representative. The contractor shall provide a 24 hour notice prior to testing. The contractor shall submit testing documentation prior to the end of the project.
e. The Engineer shall resolve all conflicts.

2. Tracer Wire.
a. Install, splice, and test for continuity tracer wire in all conduit installations as indicated on the contract documents.
b. Where new tracer wire is installed, the Contractor shall:
- Splice tracer wire only in handholes to form a continuous network using splice kits listed for wet locations.
- Test all tracer wire for continuity, with approval by the Engineer prior to final acceptance.

c. Labeling Requirement
- Place tags on all tracer wire identifying where individual cable run originated, where it ends, along with direction of the tracer wire in every test station and hand hole.
- Tracer wire tags shall be self-laminating polyester material.
- Tracer wire tags shall have black text with a white background.
- Tracer wire tags shall be Panduit part number S075X150YAJ or approved equal.
- See plan sheet N.23 for labeling details.

3. Grounding/Bonding.
a. Ground all installations as indicated in the contract documents.
b. Installation and testing of grounds is incidental to the cost of the connected items of work.
c. Ground all installations in accordance with the requirements of NEC and Article 2523.03, M of the Standard Specifications. Supply and install additional grounding rods and equipment as necessary to satisfy such requirements at no additional cost to the Iowa DOT.
d. Tracer wire shall be connected to ground bars in all cabinet locations or ground rods if no ground bar exists at a cabinet location

E. Device Cabinets.

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 exterior 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 device cabinet using duct plugs or as directed by the Engineer

F. Cabinet Foundations.

1. General.
a. Install cabinet foundations in accordance with the contract documents and the manufacturer's recommendations.
b. All cabinet foundations shall include a concrete maintenance pad area that is cast and reinforced as a single unit with the cabinet foundation dimensioned as shown in the contract documents.
c. Prepare and submit for Engineer approval, design plans and details for all cabinet foundations at no additional cost to the Contracting Authority.
d. Contact the Engineer a minimum of 1 week in advance to arrange a field review prior to placing the cabinet foundation.
e. 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.

2. Installation Details.
a. Construct all foundations as located by the Engineer. Securely rest all foundations on firm undisturbed ground and set level to the proper elevation.
b. Form the upper portion of all concrete foundations and for all instances where the excavation is irregular in shape to provide the proper dimensions. Forming materials shall be level and braced to avoid displacement, warping, or deflection from the specified pattern during construction and curing.
c. Install and secure anchor bolts, conduits, and reinforcement before concrete placement. Use a rigid template to position anchor bolts in accordance with the appropriate pattern. The center of the template and the center of the concrete base shall coincide unless otherwise directed by the Engineer.
d. Install a sufficient number of conduits sized as indicated in the contract documents. All conduits shall be located as indicated in the contract documents.
e. Place all concrete within 90 minutes of batching and consolidate using a high-frequency vibrator during construction.
f. Modification of a foundation after construction is not allowed.
g. Cover all anchor bolts to protect them against damage and to protect the public from possible injury until erecting.
h. Allow a minimum of 7 calendar days curing of concrete foundations before setting cabinets.

3. Improper Construction.
a. Remove and reconstruct, at no additional cost to the Contracting Authority, all foundations improperly constructed or with improperly installed anchor bolts, conduit, or any other foundation components as determined by the Engineer.

G. Power Connections.

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.

H. Poles.

1. General
- **a.** If pole has structural damage do not erect and notify Engineer.
- **b.** Repair any surface damage to galvanized components using a zinc-rich paint acceptable to the Engineer.

2. Pole Erection.
- **a.** Erect poles and securely bolt to the power installed foundation base plate such that the pole is vertical.
- **b.** 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.

I. Power Installed Foundation.

1. General.
- **a.** Install the power installed foundations in accordance with the contract documents and the manufacturer's recommendations.
- **b.** Contact the Engineer a minimum of 1 week in advance to arrange a field review prior to placing the power installed foundation.
- **c.** 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.

2. Installation Details.
- **a.** Construct all power installed foundations as located by the Engineer and set level and to the proper elevation.
- **b.** Hand dig with shovel after power installed foundation is in place in order to install conduits into the provided conduit entrances.
- **c.** Install a sufficient number of conduits sized as indicated in the contract documents. All conduits shall be located as indicated in the contract documents.

3. Improper Construction

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

J. Removal Items.

Remove items as indicated on the plans. Unless otherwise specified on the plans, the removal items shall become the property of the Contractor. The Contractor is responsible for salvaging and/or disposal of the material. All costs incidental to the removal of these items shall be included in the respective pay items.

150919.04 METHOD OF MEASUREMENT.

A. Handholes.
Measurement for all handholes shall be per each for the bid items Handhole, Type 24”x36”x36” and Handhole, Type I ITS.

B. Conduit.
Measurement for all conduit shall be per linear foot for the bid items Conduit, Furnish and Install, HPDE, 2 Inch; Conduit, Furnish and Install, HPDE, 3 Inch; Conduit, Furnish and Install, HDPE, 2 Inch, Bored; and Conduit, Furnish and Install, RSC, 2 Inch.

C. Wire and Cable.
Measurement for all wire and cable shall be per linear foot for the bid items Cable, Furnish and Install, No. 6 AWG; Cable, Furnish and Install, No. 4 AWG; Cable, Furnish and Install, No. 2 AWG; and Cable, Furnish and Install, No. 10 Tracer Wire.

D. Device Cabinets.
Measurement for device cabinets shall be at the contract unit price per each for the bid items Cabinet, Pole Mount, Install Only and Cabinet, Ground Mount, Install Only.

E. Cabinet Foundations.
Measurement and payment for cabinet foundations shall be paid for at the contract unit price per each for the pay item Cabinet Foundation.

F. Power Connections.
Measurement for all power connections shall be per each for the bid items Power Connection and Meter Pedestal, Furnish and Install.

G. Poles.
Measurement for all steel poles shall be per each for the bid item Steel Pole 45 Foot, Install Only.

H. Power Installed Foundation.
Measurement and payment for power installed foundations shall be per each for the bid item Power Installed Foundation, Install Only.

I. Removal.
Measurement for removals shall be per lump sum for the bid item Removal of ITS Devices and Infrastructure.

150919.05 BASIS OF PAYMENT.

A. Handholes.

1. Payment is full compensation for:
- The furnishing and installation of all handholes,
- Including all surface excavations, repair or restoration of any nearby areas, concrete, proper water/moisture drainage materials, all necessary electric grounding materials and installation,
- Furnishing and installing all handhole markers at Handhole, Type 24”x36”x36” locations, and testing of the grounding rods.
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

B. Conduit.

1. Payment is full compensation for:
- The furnishing and installation of all conduits per the contract documents,
- Including all surface excavations or surface preparation work, repair or restoration of any disturbed areas to pre-construction conditions, proper water/moisture drainage materials,
- Conduit mounting on new or existing infrastructure, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

C. Wire and Cable.

1. Payment is full compensation for:
- Including the proper installation of the wire and cable into existing conduit and new conduit systems, supply and installation of splices and connectors, and slack, coiled, or stored wires or cable,
- All required electrical and grounding testing per Article 2523.03, U of the Standard Specifications, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

D. Device Cabinets.

1. Payment is full compensation for:
- The installation of all 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.

E. Cabinet Foundations.

1. Payment is full compensation for:
- The installation of all cabinet foundations,
- Including all surface excavations, repair or restoration of any nearby areas, concrete, steel reinforcement, and anchors, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

F. Power Connections.

1. 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.

G. Poles.

1. Payment is full compensation for:
- The installation of all poles and accessories,
- Including fitting the appropriate bolt pattern to the transformer base foundation base plate,

all conduit entrances and attachments, all necessary electric grounding materials, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

H. Power Installed Foundation.

1. Payment is full compensation for:
- The installation of all power installed foundations,
- Including all surface excavations, repair or restoration of any nearby areas, bolts, and bolt mounting assemblies for connection to poles or other structures, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

I. Removal.

Payment for removals shall be at the contract unit price per lump sum for the item Removal of ITS Devices and Infrastructure.

ATTACHMENT
EQUIPMENT AND MATERIALS LIST FOR SUBMITTAL REQUIREMENTS
Project No. IM-NHS-080-1(469)5--03-78 in the City of Council Bluffs in Pottawattamie County.

DESCRIPTION	MANUFACTURER	CATALOG NUMBER
HANDHOLE, TYPE 24”x36”x36”		
HANDHOLE, TYPE I ITS		
HANDHOLE MARKERS		
GROUND ROD		
EXOTHERMIC WELDING KIT		
DUCT SEAL		
DUCT PLUGS		
1C #10 TRACER WIRE		
#2 AWG COPPER WIRE		
#4 AWG COPPER WIRE		
# AWG COPPER WIRE		
METER PEDESTAL		
POWER CONNECTIONS		
2 INCH HDPE		
3 INCH HDPE		
2 INCH RSC		