SP-150430a
(New)

SPECIAL PROVISIONS
FOR
LIGHTING AND ITS INFRASTRUCTURE

Johnson County
IM-080-6(400)239--13-52

Effective Date
July 31, 2018

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

III <u>ADDITIONAL BIDDING ATTACHMENTS</u>

PART I
GENERAL REQUIREMENTS

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

This project involves supplying and installing conduit, conductors, handholes, pull rope, transformer pads, wood poles, steel poles with screw-in foundations, power supplies and cabling, and power terminations; as well as installing footings and control cabinets. The Iowa DOT plans to initiate separate contracts to relocate and maintain the ITS devices (cameras, sensors, radios) as shown in the plans as work by others.

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.

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. The following documents 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. MUTCD

1.02 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. 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.

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.

1.03 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, handholes, device poles and footings, 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.

1.04 Disruption to Existing Fiber Networks

A. Unplanned Disruption

1. Any unplanned disruptions determined by the Engineer to be caused by the actions of the Contractor shall be corrected by the Contractor at no additional cost to Iowa DOT.

2. In the case of an unplanned disruption and subsequent notification by the Engineer, the Contractor shall immediately stop all other work in progress and shall expend all of its efforts to restore the disrupted system(s) or correct the problem causing the disruption. The Contractor will not be granted an extension of time for delays caused by repairing disrupted systems. Unplanned disruptions shall result in the assessment of liquidated damages.

B. Liquidated Damages

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.
Accordingly, the Contractor agrees:

1. To pay $250.00 liquidated damages per 15 minutes for each 15 minute period that the Contractor fails to restore the proper operation of an existing fiber optic network element following an unplanned disruption.

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

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 Lighting and 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 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

Reinstall the device cabinets designed to house the control equipment required for the planned ITS system.

A. Materials

Contractor to reinstall existing ITS cabinet. Furnish all additional miscellaneous materials for complete cabinet installation of new stock only.

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 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.

C. Method of Measurement & Basis of Payment

1. Measurement and payment for device cabinets shall be paid for at the contract unit price per the bid item Reinstall Existing Its Cabinet.

2. Payment is full compensation for:
- The installation of all pole 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 and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

2.03 Transformer Pad Equipment

A. Materials

1. General

a. The following electrical equipment mounted on a transformer equipment pad rack: Dry-type transformer, separately mounted circuit breaker, disconnect switch, junction box, distribution panelboards and electrical equipment support rack.
b. Provide products that comply with requirements of NFPA 70.
c. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
d. Unless specifically indicated to be excluded, provide all required wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
e. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2. Referenced Standards

a. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
- C57.12.01, Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin-Encapsulated Windings.
- C57.96, Guide for Loading Dry-Type Transformers and Power Transformers.

b. National Electrical Manufacturers Association (NEMA):
- 250, Enclosures for Electrical Equipment (1000V Maximum).
- ST 20, Dry-Type Transformers for General Applications.
- TP 1, Guide for Determining Energy Efficiency for Distribution Transformers.
- AB 1, Mold-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures. (Equivalent to UL 489)
- KS 1, Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- PB 1, Panelboards.

c. Underwriters laboratories, Inc. (UL):
- 6, Standard for Electric Rigid Metal Conduit - Steel.
- 50, Enclosures for Electrical Equipment, Non-Environmental Considerations.
- 67, Standard for Panelboards.
- 98, Enclosed and Dead-Front Switches.
- 489, Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
- 506, Standard for Safety Specialty Transformers.
- 651B, Standard for Continuous Length HDPE Conduit.
- 1561, Standard for Safety Dry-Type General Purpose and Power Transformers.

d. NFPA 70 - National Electrical Code; National Fire Protection Association.

3. General Purpose Dry Type Transformer

a. Non-ventilated, air cooled, two winding type.

b. Cores:
- High grade, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses.
- Magnetic flux densities are to be kept well below the saturation point.

c. Coils:
- Core and coil assembly encapsulated in a proportional mixture of resin and aggregate to provide a moisture proof shock resistant seal.
- Totally enclosed, steel enclosure finished with a weather-resistant enamel.

d. Furnish Taps for Transformers as follows:
- 1 PH, 25 KVA and above: Two 2.5% FCAN and four 2.5% FCBN.

e. Efficiency:
- Standard efficiency.

f. Insulating material (600 V and below):
- 15KVA and above units: 220 DegC insulation with a 150 DegC rise.

g. Finish: Rust inhibited primer and manufacturers standard paint inside and out.

h. Standards: IEEC57.96, NEMA ST 20, NEMA TP 1, UL 1561.

4. Separately Mounted Circuit Breaker

a. Enclosure:
- NEMA 4 rated.
- Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
- No knockouts, external mounting flanges, hinged and gasketed door.
- Front operating handle padlockable in the OFF position and interlocked to prevent door from opening when breaker is ON.
- Suitable for service entrance.

b. General:
- Standards: NEMA AB1, UL 489,
- Unit construction.
- Over-center, toggle hand operated.
- Quick make, quick-break, independent of toggle handle operation.
- Manual and automatic operation.
- All poles to open and close simultaneously.
- Three position handle: On, off, and tripped.
- Molded-in ON and OFF markings on breaker cover.
- One-, two-, or three-pole as indicated on the drawings.
- Current and interrupting ratings as indicated on the contract documents.
- Bolt-on type.

c. Thermal magnetic type:
- Inverse time overload and instantaneous short circuit protection by means of a thermal magnetic element.
- Frame size 200A and below:
- Non-interchangeable, non-adjustable thermal magnetic trip units.

d. Standards: UL 489.

5. Safety Switches

a. General:
- Non-fusible.
- Suitable for service entrance when required.

- NEMA Type HD heavy-duty construction.
- Switch blades will be fully visible in the OFF position when the enclosure door is open.
- Quick-make/quick-break operating mechanism.
- Deionizing arc chutes.
- Manufacturer double-break rotary action shaft and switchblade as one common component.
- Clear line shields to prevent accidental contact with terminals.
- Operating handle: Red and easily recognizable, padlockable in the OFF position, interlocked to prevent door from opening when the switch is in the ON position with a defeater mechanism.

b. Ratings:
- Voltage and amperage: As indicated on the contract documents.
- Short circuit withstand: 10,000A.

c. Accessories to be provided as required:
- Neutral kits
- Ground lug kits.

d. NEMA 4 rated enclosure:
- Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.

e. Standards: NEMA KS 1, UL 98.

6. Distribution Panelboards

a. Standards: NEMA PB 1, NFPA 70, UL 50, UL 67.

b. Ratings:
- Current, voltage, number of phases, number of wires as indicated on the contract documents.
- Panelboards rated 480VAC: 14,000 amp minimum short circuit rating or as indicated on the drawings.

c. Construction:
- Interiors factory assembled and designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.
- Main lugs: Solderless type approved for copper and aluminum wire.

d. Bus Bars:
- Main bus bars shall be plated aluminum or copper sized to limit temperature rise to a maximum of 65°C above an ambient of 40°C. They shall be drilled and tapped and arranged for sequence phasing of branch circuit devices.
- Ground bus: Solderless mechanical type connectors.
- Neutral bus bars: Insulated 100 PCT rated or 200 PCY rated when indicated on the Drawings and with solderless mechanical type connectors.

e. Enclosure:
- Boxes: Code gage galvanized steel, furnish without knockouts.
- Trim assembly: Code gage steel finished with rust inhibited primer and manufacture's standard paint inside and out.
- Trims cover live parts with switching device handles assessable.
- Less than or equal to 12 inches deep with gutter space in accordance with NFPA 70.
- Clear plastic cover for directory card mounted front of enclosure.
- NEMA 3R rated: Doors gasketed and lockable with corrosion resistant chrome-plated combination lock and catch, all locks keyed alike.

f. Overcurrent and Short Circuit Protective Devices:
- Main overcurrent protective device: Molded case circuit breaker.
- Branch overcurrent protective devices: Molded case circuit breaker.
- Factory installed circuit breakers.

g. Molded Case Type Circuit Breakers:
- Standard: UL 489.
- Unit construction.
- Over-center, toggle handle operation.
- Quick-make, quick break, independent of toggle handle operation.
- Manual and automatic operation.
- All pole open and close simultaneously.
- Three position handle: On, off, and tripped.
- Molded-in ON and OFF markings on breaker cover.
- One-, two-, or three-pole as indicated on the contract documents.
- Current and interrupting ratings as indicated in on the contract documents.
- Bolt on type.
- Thermal magnetic type: Inverse time overload and instantaneous short circuit protection by means of a thermal magnetic unit.
- Non-interchangeable, non-adjustable thermal magnetic trip units.

7. Junction Boxes

a. NEMA 4 rated enclosure:
- Size as shown on plans.
- Body and cover: 14 GA steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
- Seams continuously welded and ground smooth.
- No knockouts.
- External mounting flanges.
- Hinged or non-hinged cover held closed with stainless steel screws and clamps.
- Cover with oil-resistant gasket.

b. Miscellaneous Accessories:
- Weld nuts for mounting optional panels and terminal kits.
- Terminal blocks: Screw post barrier-type, rated 600 volt, and 20 ampere.

c. Standards: NEMA 250, UL 50.

8. Electrical Equipment Support Rack

a. Material requirements:
- Galvanized steel: ASTM A123/123M or ASTM A153/A153M.
- Mounting hardware:
- Galvanized steel.
- Stainless steel.
- Anchorage as per contract documents.
- Field touch-up of galvanized surfaces.
- Zinc-rich primer.
- One coat, 3.0 mils, ZRC by ZRC Products.

B. Construction

1. Examination

a. Verify that field measurements are as shown on drawings.

b. Verify that conditions are satisfactory for installation prior to starting work.

2. Installation

a. Install equipment per manufacturer's instructions.

b. Junction Boxes:
- Fill unused punched-out, tapped, or threaded hub openings with insert plugs.
- Size boxes to accommodate quantity of conductors enclosed and quantity of conduits connected to the box.

- NEMA 4 rated enclosures at all locations.

c. Device mounting heights:
- Disconnect switch (to center of handle): 54 inches.
- Separately mounted circuit breaker (to center): 54 inches.
- Panelboard (to top): 72 inches.

d. Pad Grounding:
- Size all grounding conductors and bonding jumpers in accordance with NFPA 70, Article 250, except where larger sizes are shown.
- Remove paint, rust, or other non-conducting material form contact surfaces before making ground connections.
- Do not splice grounding conductors except at ground rods.
- Install ground rods and grounding conductors in undisturbed soil.
  - Provide excavation required for installation of ground rods and ground conductors.
  - Use driving studs or suitable means to prevent damage to the threaded ends of sectional rods.
  - Unless otherwise specified, connect conductors to ground rods with compressor type connectors or exothermic weld.
  - Provide sufficient slack in grounding conductors to prevent conductor breakage during backfill or due to ground movement.
  - Backfill excavation completely, thoroughly tamping to provide good contact between backfill materials and ground rods and conductors.
- Do not use exothermic welding if it will damage the structure the grounding conductor is being welded to.
- Supplemental grounding system:
  - Provide the following grounding in addition to the equipment ground conductor supplied with the feeder conductors whether or not shown on the drawings.
  - Equipment support rack. Connect metallic structure to a ground rod with a minimum of No. 6 AWG conductor
  - Transformer separately derived grounding system. Install the system bonding jumper at the transformer.

C. Method of Measurement & Basis of Payment

1. Measurement and payment for all Transformer Equipment Pad materials, i.e. junction boxes, separately mounted circuit breakers, disconnect switches, dry-type transformers, distribution panelboards and electrical equipment support racks, shall be paid for at the contract unit price per each for the bid items Transformer Equipment Pad.

2. Payment is full compensation for:
- The furnishing and installation of all materials,
- Including all excavations, repair or restoration of any nearby areas, concrete, proper water/moisture drainage materials, all necessary electric grounding materials and installation, and
- Furnishing all materials, labor, equipment, and other incidental items necessary to meet the requirements of the contract documents.

2.04 Poles

Furnish all work, apparatus, and materials to construct and install the device poles designed to mount future ITS equipment to as required for the planned ITS system.

A. Materials

1. General

a. All steel poles shall be tapered and 45 feet in length excluding the transformer base.

b. The 45 feet steel poles shall utilize sway-reducing pole stiffeners or have other means incorporated into the design to meet deflection requirements.

c. Ensure each pole has an approved grounding lug that is readily accessible through the handhole.

d. Poles shall include a removable end cap at the top of the pole with a J-hook cable support above the upper handhole.

e. Ensure the poles and base plates are hot gip galvanized inside and out according to ASTM A123.

f. All poles shall be designed in accordance with the 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." All poles shall be designed to support loadings specified in this document and be capable of withstanding winds up to 80 mph without failure. Minimum Loading requirements shall be based on an isotach wind velocity for the area of installation according to 2013 AASHTO isotach wind chart with a 1.3 gust factor. Calculations and detailed drawings shall be submitted demonstrating compliance with the AASHTO specification. All materials and products shall be manufactured in the United States of America, and comply with ASTM or AASHTO specifications. Mill certifications shall be supplied as proof of compliance with the specifications. The Fabricator shall be certified under Category I, "Conventional Steel Structures" as set forth by the American Institute of Steel Construction Quality Certification Program. Proof of this certification will be required to ensure that the fabricator has the personnel, organization, experience, procedures, knowledge, equipment, capability and commitment to fabricate quality pole structures. All welding shall be in accordance with Sections 1 through 8 of the American Welding Society (AWS) D1.1 Structural Welding Code. Tackers and welders shall be qualified in accordance with the code. Tube longitudinal seam welds shall be free of cracks and excessive undercut, performed with automatic processes, and be visually inspected. Longitudinal welds suspected to contain defects shall be magnetic particle inspected. All circumferential butt-welded pole and arm splices shall be ultrasonically or radiographically inspected.

g. All poles shall be designed to support the specified camera and any other identified attachments and shall be stiffened or otherwise manufactured to meet allowable deflection criteria contained herein. Pole design shall assume the following loadings:

Camera and Mounting Bracket
Weight: 12 pounds
Surface Area: 1.5 square feet
Mounting Height: 40 feet

Roadway Traffic Sensor
Weight: 4.2 pounds
Surface Area: 1.5 square feet
Mounting Height: 20 feet

Surface Temperature and Surface State Sensors
Weight: 11.5 pounds
Surface Area: 2.0 square feet
Mounting Height: 20 feet

Wind Sensor
Weight: 2.2 pounds
Surface Area: 2.0 square feet
Mounting Height: 15 feet

Air Temperature and Humidity Sensor
Weight: 1.5 pounds

Surface Area: 0.5 square feet
Mounting Height: 10 feet

Device Cabinet
Weight: 200 pounds
Surface Area: 6 square feet
Mounting Height: 5 feet

h. The pole top deflection shall not exceed one inch in a 30 mph (non-gust) wind. Close consideration must be given to the effective projected area of the equipment to be mounted on the pole along with the weight when designing the pole to meet the specified deflection performance criteria. The calculations shall include a pole, base plate, and anchor bolt analysis. The pole calculations shall be analyzed at the pole base, at 5 foot pole intervals/segments and at any other critical pole section. At each of these locations, the following information shall be given:
- The pole's diameter, thickness, section modulus, moment of inertia, and cross sectional area.
- The centroid, weight, projected area, drag coefficient, velocity pressure, and wind force of each pole segment.
- The axial force, shear force, primary moment, total moment, axial stress, bending stress, allowable axial stress, allowable bending stress, and combined stress ratio (CSR).
- The pole's angular and linear deflection.

i. All pole shafts shall conform to ASTM A595 Grade A with a minimum yield strength of 55 ksi or ASTM A572 with a minimum yield strength of 65 ksi. The shaft shall be round, have a constant linear taper of 0.14 inches per foot, and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Longitudinal seam welds within 6 inches of complete penetration pole to base plate welds shall be complete penetration welds. The shaft shall be hot dip galvanized per the requirements of the contract documents.

j. Base plates shall conform to ASTM A36 or A572 Grade 42. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration butt weld with backup bar. Plates shall be hot dip galvanized per the requirements of the contract documents.

k. Anchor bolts shall conform to the requirements of ASTM F1554 Grade 55, be full length galvanized according to ASTM F2329, and be Unified Coarse Thread Series with Class 2A tolerance. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The nuts shall be heavy hex, meet the requirements of ASTM A 563, DH, and be galvanized according to the requirements of ASTM F2329 or ASTM B 695, Class 55, Type I. Washers shall meet the requirements of ASTM F 436 and be galvanized.

l. The hand hole opening shall be reinforced with a minimum 0.432 inch wide hot rolled steel rim. The minimum outside dimension shall be 6 inches by 9 inches. Unless otherwise required, the bottom lip of this handhole shall be 18 inches from the pole base.

Construction

1. General

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 anchor plate blister or 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.

C. Method of Measurement & Basis of Payment

1. Measurement and payment for all steel poles shall be paid for at the contract unit price per each for the bid items Steel ITS Pole, 45 Foot and Steel ITS Pole, Install Only.

2. Payment is full compensation for:

- The furnishing and installation of all poles and accessories per the plans,
- 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.

2.05 Power Installed Foundation (ITS Pole Only)

A. Materials

None. Iowa DOT provided.

B. Construction

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.

d. Modification of a footing after construction is not allowed.

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.

C. Method of Measurement & Basis of Payment

1. Measurement and payment for power installed foundations shall be paid for at the contract unit price per each for the bid item Power Installed Foundation, Install Only.

2. 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.

PART III
ADDITIONAL BIDDING ATTACHMENTS

3.01. Submittal Requirements

Project No. IM-080-6(400)239--13-52 in Johnson County.

DESCRIPTION	MANUFACTURER	CATALOG NUMBER
Dry-type Transformers		
Separately Mounted Circuit Breakers		
Disconnect Switches		
Distribution Panelboards		
Support Rack Materials		
Junction Boxes		
Steel ITS Pole, 45 Foot		
BILL OF MATERIALS (3.02)		

3.02 Bill of Materials Submittal Table

The selected Contractor is required to submit the completed table post-award of the contract for Engineer review.

Bill of Materials

Item No.	*Item Description*	*Unit*	*Quantity*	*Unit Price*	*Extended*
BILL OF MATERIALS FOR: TRANSFORMER EQUIPMENT PAD					
1	CONCRETE EQUIPMENT PAD AND MOUNTING RACK	EACH	4		
2	200A ENCLOSED CIRCUIT BREAKER	EACH	1		
3	60A DISCONNECT SWITCH	EACH	2		
4	37.5 KVA SINGLE PHASE TRANSFORMER	EACH	1		
5	15 KVA SINGLE PHASE TRANSFORMER	EACH	3		
6	JUNCTION BOX	EACH	5		
7	480V, 1PH DISTRIBUTION PANEL	EACH	1		
BILL OF MATERIALS FOR: ELECTRICAL CIRCUITS					
1	#10 AWG USE-2/RHW-2 CONDUCTOR (COPPER)	LF	1800		
2	#8 AWG USE-2/RHW-2 CONDUCTOR (COPPER)	LF	4080		
3	#6 AWG USE-2/RHW-2 CONDUCTOR (COPPER)	LF	5947		
4	#3 AWG USE-2/RHW-2 CONDUCTOR (COPPER)	LF	336		
5	#1 AWG USE-2/RHW-2 CONDUCTOR (COPPER)	LF	4366		
6	#3/0 AWG USE-2/RHW-2 CONDUCTOR (COPPER)	LF	284		
7	#1 AWG USE-2/RHW-2 CONDUCTOR (ALUMINUM)	LF	662		
8	#1/0 AWG USE-2/RHW-2 CONDUCTOR (ALUMINUM)	LF	1324		
9	#4/0 AWG USE-2/RHW-2 CONDUCTOR (ALUMINUM)	LF	7620		
10	#350 AWG USE-2/RHW-2 CONDUCTOR (ALUMINUM)	LF	9648		
11	2" SCH 40 PVC CONDUIT, TRENCHED	LF	4890		
12	3" SCH 40 PVC CONDUIT, TRENCHED	LF	1368		
13	TWO 3" SCH 40 PVC CONDUITS, TRENCHED	LF	2027		
14	2" SCH 80 PCV CONDUIT, TRENCHED	LF	180		
15	3" SCH 80 PVC CONDUIT, TRENCHED	LF	120		
16	TWO 3" SCH 80 PVC CONDUITS, TRENCHED	LF	40		
17	2" SCH 80 PCV CONDUIT, BORED	LF	476		
18	3" SCH 80 PVC CONDUIT, BORED	LF	1200		
19	2" RIGID STEEL CONDUIT	LF	106		