

SECTION NO. 19

SPECIAL PROVISIONS – STREETLIGHT SPECIFICATIONS

NUMERICAL LISTING

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SECTION NO. 19

SPECIAL PROVISIONS – STREETLIGHT SPECIFICATIONS

19-01 STREETLIGHT SPECIFICATIONS: The street lighting portion of this project shall be constructed in accordance with the STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS, AND BRIDGES as issued by the Texas Department of Transportation (TxDOT), as it may be amended from time to time.

19-02 QUALIFICATIONS: All electrical work must be performed by an electrical contractor licensed in the State of Texas and be prequalified for Streetlights by the City of Arlington. Contractor must also be certified by Oncor to perform the connection of the controller to the power source. City reserves the right to require documentation of credentials prior to any work being performed. (Rev. 8/2018)

19-03 BURN-IN PERIOD: If this contract involves the installation of luminaires and their connection to the lighting system, final acceptance of the work will not be made until the luminaires have been energized with electrical power for at least three (3) calendar days without a failure occurring. The Contractor shall correct, at his own expense, all failures that occur prior to the final acceptance of the work. In the event that more than five percent (5%) of the luminaires or their components fail prior to final acceptance of the work, the City may direct the Contractor to replace, at the Contractor's expense, all luminaires included in the work with a new lot of luminaires acceptable to the City.

19-04 RESPONSE TIME: Contractor shall repair any failure within forty-eight (48) hours after receipt of notification from the City. If the Contractor fails to make repairs within the forty-eight (48) hour period, the City may make the necessary repairs and bill the Contractor accordingly.

19-05 TEMPORARY LIGHTING: The Contractor shall maintain existing lighting levels throughout the construction process, unless otherwise approved by the City. Contractor shall provide for installation, maintenance, and removal of temporary lighting systems. Items are considered subsidiary to unit prices bid for roadway lighting.

19-06 MATERIALS:

A. **POLES:**

The design of the completed assembly of poles and hardware shall equal or exceed the latest AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS. Poles shall be in accordance with the City's Street Lighting Poles details. Each pole shall be 2-section steel davit type luminaire poles and include either single or twin davit type arms to support the luminaires. Each pole shall also include anchor bolts and, transformer bases. Guys, struts, rods, stay braces, or clamps of U-bolts shall not be used, unless otherwise noted. (Rev 2/2021)

1. Pole Assemblies: When the term pole is used, it shall include the entire pole assembly including the pole, the davit arm(s), the transformer base, the anchor bolts, the bolt covers, and all other appurtenances required for a complete and in place installation.

2. Mounting Height: The pole assembly shall provide a luminaire mounting height of 40-feet for major collectors and arterials. The pole assembly shall provide a luminaire mounting height of 28-feet for local and minor collector streets.

B. DAVIT ARMS:

The single davit arm or twin davit arms shall be a separate section that telescopes the pole shaft by 1-foot. Each arm shall have a 9-foot span and a nominal radius of 9-feet for major collectors and arterials. The arm shall have a 9-foot nominal arm span for local and minor collectors, in accordance with the City's Assembly Luminaire Arm detail.

C. TRANSFORMER BASE:

1. The transformer base (TB-17) shall be cast aluminum with all necessary fittings and attachments in accordance with the City's Twin Davit Pole details. The transformer base shall be so designed to afford the lighting standard the quality of "breaking away" under vehicular impact. The base shall break upon impact of a vehicle weighing approximately two thousand (2,000) pounds and traveling at a speed of twenty (20) miles per hour or faster. It shall meet the structural and wind load requirements specified above and shall conform to the requirements of the latest AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
2. A door opening with a removable door shall be provided in the side of the base approximately 8.56-inches x 8.94-inches x 11-inches in size. Each transformer base shall be furnished with four (4) galvanized, 1-inch diameter bolts, each with a hex nut and two (2) washers suitable for attaching the pole to the transformer base.

D. SURFACE PREPARATION:

After fabrication, all welds shall be mechanically cleaned to remove detrimental weld flux slag deposits. All exposed surfaces of the pole assembly shall have a galvanized finish.

1. Poles located in the Entertainment District or the Downtown Overlay Districts shall be powder coated black over a galvanized finish.
2. Poles located in any minor/major arterial or minor/major collector shall be powder coated bronze over a galvanized finish.
3. Poles located in neighborhoods shall have a galvanized finish. (Rev. 4/20/2021)

E. LUMINAIRES:

All arterial and collector street LED luminaires shall be RoadFocus LED Cobra Head, Duralight Cobra Head (DURA-STR25-4K-120-2-BK-SC), or equivalent 100W Type II LED roadway lighting horizontal luminaire. All residential street LED luminaires shall be RoadFocus LED Cobrahead, Duralight Cobra Head (DURA-STR15-4K-120-2 or 4-BK-SC), or equivalent 55W Type II or Type IV LED roadway lighting horizontal luminaire. The residential 55W Type II LED luminaires shall be used on straight stretch roads and the residential 55W Type IV LED luminaires shall be used on courts and intersections.

(Rev. 1/18/2023)

All luminaire coloring shall match the pole and davit arm they are attached to. All fixtures shall have ANSI 7-wire photocontrol receptacle. (Rev. 9/2021)

F. LIGHTING SYSTEM CONTROLLERS:

A LED rated ANSI C136.10 solid state photocontrol shall be furnished with each fixture. The photocontrol MOV shall have a rating of 1280J/40kA. The base shall be 140C rated. Enclosure shall be double thick and have a double thick lens. Electronics shall be full wave rectified, and have dual Zener diodes. Design life shall be 20+ years to match fixture life.

The Contractor shall furnish lighting system controllers. Each lighting system controller shall be 30 or 60 ampere, single or double pole relay rated for 120/240 volt control. The controller shall include a cast aluminum outdoor cabinet. The cabinet shall be finished with acrylic enamel.

G. EMS MARKERS:

The Contractor shall furnish Electronic Marker System (EMS) markers equivalent to 3M type 1256.

H. IN-LINE FUSE:

The Contractor shall furnish in-line fuses, disconnecting fuse holders and disconnect kits on arterials and major collectors as per the list below. Type 2 fuses and fuse holders shall be waterproofed and rated for 0 amperes at 600 volts.

Type of Fuse Holder or <u>Disconnect Kit</u>	<u>Homac</u> <u>Series</u>	<u>Fused?</u>
1F	SLK	Yes
1D	SDK	No
3F	FYC	Yes
3D	DYC	No
4F	YFC	Yes
4D	YDC	No

I. WIRE AND CABLE:

1. The wire and cable shall be furnished in the appropriate American Wire Gage (A.W.G.) sizes shown on the plans.
2. Ground wire shall be used to connect poles and other devices to grounding electrodes (ground rods). Ground wire shall be bare soft drawn copper wire having a size of A.W.G. No.6 unless otherwise noted.
3. Streetlight cable shall be used to connect streetlights to their power source or controller.

4. Bare wire grounding conductors shall be annealed, uncoated copper conforming to the NATIONAL ELECTRICAL CODE.
5. The complete assembly shall be packaged on reels having sufficient diameter to prevent inducing permanent set or injury to the cable. Each reel shall be adequately labeled to indicate the voltage, the insulation type, the number and size of conductors, the length of cable on the reel, and the trade name of the manufacturer.

19-07 INSTALLATION AND CONSTRUCTION:

A. GENERAL:

1. Unless otherwise specified, the work and materials required by this section shall be considered incidental to the system and no direct payment will be made for them.
2. **Contractor shall stake all new street light locations. The locations shall be accepted by the City prior to beginning work. The Contractor is solely responsible for verification of vertical and horizontal separation requirements of all utilities. The Contractor shall notify the City of any perceived conflicts with existing utilities. The City may select a more desirable location or to avoid utility conflicts.**

B. ELECTRICAL AND WIRING REQUIREMENTS:

1. Grounding and the NATIONAL ELECTRICAL CODE: All electrical equipment shall be fabricated and connected in accordance with the NATIONAL ELECTRICAL CODE published by the National Fire Protection Association and with all State and City codes.
 - a. All equipment, housings, cabinets and pedestals shall be grounded and bonded in accordance with the NATIONAL ELECTRICAL CODE.
 - b. All housings, enclosures, cabinets and pedestals shall be grounded with a third wire (equipment) ground.
 - c. All metal conduit shall be grounded and bonded in accordance with the NATIONAL ELECTRICAL CODE.
 - d. Metallic cable sheaths, metal conduit, transformer bases, anchor bolts, and metal poles and pedestals shall be made mechanically and electrically secure to form a continuous system and shall be effectively grounded. Bonding and grounding jumpers shall be copper wire or copper strap of not less than the same cross-sectional area as A.W.G. No.6.
 - e. A ground electrode shall be furnished and installed at each new or revised service point unless otherwise noted on the plans. When so noted, an existing ground electrode may be used. Ground electrodes shall be of copper weld ground rod having a diameter of at least 5/8-inch, with at least 8-feet of the

length being driven into undisturbed earth. The overall length of the ground electrode shall be sufficient to accommodate this requirement. Grounding conductors shall be at least A.W.G. No.6 and shall be of copper. Exposed grounding conductors on poles shall be enclosed in ½-inch (minimum) diameter conduit to a height of at least 8-feet above the ground.

2. Wiring Requirements

- a. The Contractor shall furnish and install all wire, cable, connectors and other incidental materials necessary to connect all new equipment and all existing equipment which is to be incorporated in or connected to the work to form a fully functional and properly operating installation and system, as applicable.
- b. Splices in cables and wiring that are part of the work shall be made only in pole bases or weatherproof cabinets. No in-line splices shall be made at any point in the work other than at such locations. No splices in any cable or wiring shall be made in conduits, in manholes or in pull boxes unless otherwise noted.

C. CONDUIT:

1. The Contractor shall furnish and install all conduits necessary to complete the work in accordance with the typical drawings, the plans and the other contract documents. Conduit and its installation shall conform to the NCTCOG SPECIFICATIONS unless otherwise noted. Unless otherwise noted, the type of conduit to be used shall be in conformance with the following:
 - a. **U-Guard** shall be used on the exterior surfaces of poles.
 - b. **Schedule 40 PVC Conduit** shall generally be used underground and in other conditions unless otherwise set forth above.
2. Conduit runs are shown in the plans and site sketches in schematic fashion and may be changed, if approved by the City and if the revised route will not result in increased cost to the City. To the extent practical, conduit runs shall be combined in the same trench to minimize the amount of trenching and backfilling.
3. Underground conduit shall be placed at a minimum depth of 36-inches measured from the top of curb. If the electric power is in the rear adjacent yard, the conductor trench shall be located as shown in the City's Standard Front Line Construction Easement Layout to Transformer detail.
4. Underground secondary service pole connections shall comply with the City's Underground to Overhead Electrical Connections details.
5. Conduits entering concrete foundations for poles, pedestals or control equipment cabinets shall extend approximately 2-inches above the foundations.

6. All metal conduits shall be equipped with bushings to protect the wires and cables from damage.
7. The open ends of all outside vertical conduits that are exposed to rain shall be equipped with weather heads. The weather heads shall be considered incidental to the associated conduit.
8. Power service shall not be located in the same conduit or pull box as other circuits.
9. A nylon pull string shall be placed in all empty conduit prior to the placement of paving.

D. FOUNDATIONS:

1. The Contractor shall install foundations, including all necessary reinforcing steel, for equipment and poles as required by the City's Foundation Details, the plans and these special provisions. Unless otherwise noted, Class "A" concrete shall be used for all foundations. Pre-cast foundations will not be allowed.
2. Foundations shall be monolithic with the exposed surfaces formed and finished to present a neat, smooth appearance. The Contractor shall ensure that the tops of all foundations for poles and pedestals are level and not more than 2-inches above finish grade for proper mounting of the poles. The bottom of each foundation shall rest on undisturbed earth. The concrete edges of the pier shall be chamfered.
3. The Contractor shall furnish and install in the foundation a copper clad steel ground rod with a diameter of at least 5/8-inch. The ground rod shall be installed, as shown in the typical drawings so that it extends into the surrounding undisturbed earth at an angle from the side of the foundation for a minimum of 8-feet. The ground rod shall be driven into place.
4. Unless otherwise noted, the ground rod shall extend approximately 3-inches above the foundation. The location of the ground rod shall not interfere with the entry, dressing or connection cables.
5. Forms for the concrete shall be rigid and securely braced in place. Templates shall be used to properly position and hold in place the necessary conduit, anchor bolts and the ground rod. Immediately prior to pouring the concrete, both the forms and the earth which will be in contact with the concrete, shall be thoroughly moistened.
6. After concrete is placed and the top smoothed off, the concrete shall be covered with wet cotton or burlap mats for at least ninety-six (96) hours. All bracing for anchor bolts shall not be subjected to any applied strain during this curing process.
7. Drill shaft shall be protected at all times.

E. LIGHTING SYSTEM CONTROLLERS:

1. The Contractor shall install lighting system controllers in accordance with the typical

drawings and the plans. Such installation shall include:

- a. Installation of electrical service;
 - b. U-guard on power pole to connect the controller with the streetlights and the streetlighting system;
 - c. Furnishing and installing needed wire and cable;
 - d. Connection of the controller to the power source, the streetlights, the system and other devices; and
 - e. Furnishing and installing needed mounting hardware.
2. The Contractor shall connect the controller to the system and the luminaires to be controlled to form a fully functional system.
 3. As part of installing an electrical service or controller, the Contractor shall furnish and install a ground rod and shall ground the electrical service and the cabinet to the ground rod, furnishing and installing all needed wire, grounding clamps and miscellaneous material.
 4. As part of installing the electrical service or controller, the Contractor shall furnish and install the in-line fuse/fuse holder required by the plans and Special Provisions. Fuses for local streets and minor collectors shall be in accordance with the City's Underground Source details.
 5. **CONTRACTOR SHALL CONNECT THE ELECTRICAL SERVICE TO THE POWER SOURCE AND TEST FOR A FULLY FUNCTIONAL SYSTEM.**
 6. The Contractor shall touch up any scratches in the finish of the lighting system controller's enclosure.

F. STREETLIGHT POLES:

1. The Contractor shall install streetlight poles and transformer bases and shall install the davit arms on the poles in accordance with the requirements of the typical drawings, the plans and the following requirements.
2. Direct bury of poles will not be allowed. The Contractor shall install the streetlight poles so that the pole is within two (2) degrees of vertical when loaded with the davit arms and luminaires shown on the plans.
3. The Contractor shall ground the pole to the ground rod.
4. When tightening bolts, there shall be no gaps between the base plate or transformer base and the foundation on all four bolts. If shims are necessary for leveling there shall be no gaps between the base plate or transformer base, the shims, and the foundation. All four bolts shall be tightened securely.
5. Following installation and plumbing of the pole, the Contractor shall install the bolt covers.

6. The Contractor shall touch up any damage to the finish of the pole, the davit arms, and the transformer bases which occurred during installation. Said touch up shall be performed in accordance with the paint manufacturer's recommendations.
7. The wiring and connections in the pole bases and transformer bases shall conform to the requirements of the typical drawings. In the event that a connection case arises that is not shown in the typical drawings, the principles implied by the cases shown shall be adhered to and the connections shall be subject to the approval of the City.
8. As part of the pole installation, the Contractor shall furnish and install disconnecting in-line fuse holders, with fuses, and disconnect kits in the pole base or transformer base. They shall be installed in a manner that will allow them to disconnect in the event that the pole is struck and knocked down or grossly deformed by the impact of a vehicle. The fuse holders and disconnect kits shall be connected to the streetlight circuit as shown on the typical drawings and the plans.

G. LUMINAIRES: The Contractor shall install luminaires of the sizes and types shown on the plans. The installations shall conform to the requirements of the typical drawings. As part of the luminaire installation, the Contractor shall do the following:

1. The Contractor shall assemble the luminaire as necessary and shall clean the entire optical system as necessary to render it free of dust, dirt, and other foreign material. The Contractor shall conform to cleaning instructions furnished by the luminaire manufacturer so as not to damage the optical system.
2. The Contractor shall furnish and install insulated conductors from the luminaire to the transformer base, connecting them to the luminaire, the in-line fuse and the streetlight circuits, to form a fully functioning streetlight system. The conductors shall be rated for 600 volts, A.W.G. No.12.
3. The Contractor shall install shorting caps in each fixture for streetlighting systems, or photo cells when applicable. If installing photo cells, the Contractor is to ensure the photo cells face the correct position on top of the fixture.

H. CABLE AND WIRE INSTALLATION:

1. Wherever cable or wire must be installed as part of the work, the Contractor shall furnish and install the appropriate type of cable or wire, including all necessary mounting, attachment and connection hardware, cable guys, anchors, guy guards, wire wrap, wire ties, terminal blocks, spade lugs, solderless connectors, in-line fuses and fuse holders, tape, waterproofing, ground rods and all other material necessary for proper installation in accordance with the requirements of the plans and typical drawings.
2. If a separate bid item is included for streetlight cable, it shall be the actual number of linear feet of each type of streetlight cable which has been furnished and installed under this section. For the purposes of payment, the measurement shall be the actual horizontal distance measured along the line of each span or conduit run. No

allowance will be given for cable risers on or within poles and no allowance will be given for any vertical runs below grade or within foundations.

- a. **No Splices:** Except as otherwise specifically noted in each instance, no splices shall be permitted in any wire or cable except in pole bases or equipment cabinets.
- b. **Protection of Wire and Cable Ends:** The Contractor shall water and moisture proof the raw ends of the wires and cables until they are properly terminated.
- c. **Cable in Conduit:**
 - i. Cable Lubrication: The Contractor shall lubricate cables and wires entering a conduit with talc, powdered soapstone, or other approved lubricant to prevent damage to the insulation during the installation process.
 - ii. Installation with existing circuits will not be allowed.
 - iii. Direct bury of cables will not be allowed.

I. EXCAVATING AND BACKFILLING:

1. Excavations required for the installation of conduit, cable, foundations and other equipment shall be performed so as to cause the least possible damage to the streets, sidewalks and other improvements. However, such excavations shall be sufficiently wide to permit effective repair of the pavement, sidewalks and improvements in a manner that will not require excessive maintenance. All such excavations shall be made in accordance with the typical drawings. Trenches shall not be wider than necessary for the proper installation of equipment, materials or foundations to be installed.
2. The Contractor shall furnish all materials necessary for backfilling and finishing the excavations. All backfill shall be in accordance with Section 12-31 Backfill & Backfill Material and with Section 12-32 Mechanically Compacted Backfill specifications.
3. Excavations shall not begin until immediately before the installation of the equipment or materials to be installed.
4. The Contractor shall maintain all backfilled excavations in a well filled and well maintained state to provide a smooth and well drained surface until final paving and grading is accomplished.

J. SITE RESTORATION:

Improvements such as pavement surfaces, sidewalks, curbs, gutters, curbs and gutters, base material and other improvements which are disturbed, and to the extent practical, shall be restored to the same texture and finish. The Contractor shall accomplish such restoration of all surfaces that are damaged by the Contractor in any way, whether such damage was

necessary or unnecessary. All such restoration shall be in accordance with the City's standard specifications and details.

19-08 SALVAGE OF CABLE AND EQUIPMENT: All equipment which is removed by the Contractor and not reused in the work shall be salvaged. Contractor shall coordinate with the City to determine which equipment is salvageable. Contractor shall provide five (5) business days notification to the City prior to start of construction to allow the City to conduct a walkthrough and identify salvageable equipment and poles. Contractor shall remove the identified salvageable poles and equipment and deliver to the City at 801 W. Main Street, Arlington, Texas 76013. Contractor shall coordinate with the City for delivery time of the salvaged poles and equipment. Existing wire, cables, direct bury streetlight poles, and any equipment that cannot be salvaged shall be removed and disposed of by the Contractor.

END OF SECTION