SECTION 260506 - WIRING FOR DETENTION EQUIPMENT

1. GENERAL
	* + 1. RELATED WORK SPECIFIED ELSEWHERE
				1. Detention Equipment: Section 111901.
			2. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
				5. Submittals Package: Submit the product data and the shop drawings specified below all at the same time as a package.
				6. Product Data: Catalog sheets, specifications, and installation instructions.
				7. Contract Closeout Submittals:

Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Director’s Representative. Include:

Operation and maintenance data for each product.

1. PRODUCTS
	* + 1. RACEWAYS, FITTINGS, AND ACCESSORIES
				1. Rigid Ferrous Metal Conduit: Steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
				2. Flexible Metal Conduit: Galvanized steel strip shaped into interlocking convolutions, UL categorized as Flexible Metal Conduit (identified on UL Listing Mark as Flexible Steel Conduit or Flexible Steel Conduit Type RW), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or International Metal Hose Co.
				3. Liquid-tight Flexible Metal Conduit: UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or Universal Metal Hose Co.
				4. Insulated Bushings: Threaded, malleable iron/zinc electroplate with 105 degrees C (minimum) plastic insulated throat; Appleton Electric Co.’s BU50I Series, Cooper/Crouse-Hinds’ 1031 Series, OZ/Gedney Co.’s IBC-50 Series, Raco Inc.’s 1132 Series, Steel City/T & B Corp.’s BI-901 Series, or Thomas & Betts Corp.’s 1222 Series.
				5. Plastic Bushings for 1/2 and 3/4 Inch Conduit: 105 degrees C minimum temperature rating; Appleton Electric Co.’s BBU50, BBU75, Blackburn (T & B Corp.’s) 50 BB, 75 BB, Cooper/Crouse-Hinds’ 931,932, or OZ/Gedney Co.’s IB-50, IB-75, Raco Inc.’s 1402, 1403, Steel City/T & B Corp.’s BU-501, BU-502, or Thomas & Betts Corp.’s 222, 223.
				6. Connectors and Couplings:

Locknuts: UL, steel/zinc electroplate; Appleton Electric Co.’s BL-50 Series, Cooper/Crouse-Hinds’ 11 Series, OZ/Gedney Co.’s 1-50S Series, Raco Inc.’s 1002 Series, Steel City/T&B Corp.’s LN-101 Series, or Thomas & Betts Corp.’s 141 Series.

Couplings (For Rigid Metal Conduit): Standard galvanized threaded couplings furnished by conduit manufacturer, or Allied Tube & Conduit Corp.’s Kwik-Couple.

Flexible Metal Conduit Connectors: Arlington Industries Inc.’s Saddle-Grip, OZ/Gedney Co.’s C-8T, 24-34T, ACV-50T Series, or Thomas & Betts Corp.’s Nylon Insulated Tite-Bite Series.

Liquid-tight Flexible Metal Conduit Connectors:

Dry Locations: Steel, malleable iron, zinc electroplate, insulated throat; Appleton Electric Co.’s STB Series, Cooper/Crouse-Hinds’ LTB Series, OZ/Gedney Co.’s 4Q-50T Series, Raco Inc.’s 3512 Series, Steel City/T & B Corp.’s LT-701 Series, or Thomas & Betts Corp.’s 5332 Series.

Wet Locations: OZ/Gedney Co.’s 4Q-TG Series (hot-dip/mechanically galvanized), or Thomas & Betts Corp.’s 3322 Series (PVC coated).

* + - * 1. Conduit Bodies (Threaded): Malleable iron or cast iron alloy bodies and covers with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds’ Condulets (Corro-free epoxy powder coat), or OZ/Gedney Co.’s Conduit Bodies (hot dipped galvanized). Stainless steel cover screws, covers gasketed to suit application.
				2. Expansion Fittings: Cooper/Crouse-Hinds XJG (Corro-free epoxy powder coat), or OZ Gedney Co.’s AX, EXE (end type), hot dipped galvanized.
			1. OUTLET, JUNCTION, AND PULL BOXES
				1. Galvanized Steel Boxes For Concealed Work: Standard type galvanized steel boxes and covers by Appleton Electric Co., Raco/Div. of Hubbell, or Steel City/T&B Corp.
				2. Galvanized Steel Junction and Pull Boxes For Exposed Work: Code gage, galvanized steel screw cover boxes by Hoffman Enclosures Inc., Hubbell/Wiegmann, or Rittal/Electromate.
				3. Threaded Type Boxes for Exposed Work:

Outlet Boxes:

For Dry, Damp Locations: Zinc electroplate malleable iron or cast iron alloy boxes by Appleton Electric Co., Cooper/Crouse-Hinds Co., or OZ/ Gedney Co., with zinc electroplate steel covers to suit application.

For Wet Locations: Malleable iron or cast iron alloy boxes with hot dipped galvanized or other specified corrosion resistant finish as produced by Cooper/Crouse-Hinds (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws, and malleable iron covers gasketed to suit application.

Junction And Pull Boxes:

For Dry, Damp Locations: Zinc electroplate cast iron boxes by Appleton Electric Co., Cooper/Crouse-Hinds, or OZ/Gedney Co., with zinc electroplate steel or cast iron cover.

For Wet Locations: Cast iron boxes by Cooper/Crouse-Hinds’ (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws and cast iron cover gasketed to suit application.

Conduit Bodies, Threaded (Provided with a Volume Marking):

For Dry, Damp Location: Zinc electroplate malleable iron or cast iron alloy bodies with zinc electroplate steel covers; Appleton Electric Co.’s Unilets, Cooper/Crouse-Hinds’ Condulets, or OZ/Gedney Co.’s Conduit Bodies.

For Wet Locations: Malleable iron or cast iron alloy bodies with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds’ Condulets (hot dipped galvanized or Corro-free epoxy power coat), or OZ/Gedney Co.’s Conduit Bodies (hot dipped galvanized) with stainless steel cover screws and malleable iron covers gasketed to suit application.

* + - * 1. Specific Purpose Outlet Boxes: As fabricated by equipment manufacturers for mounting their equipment thereon.
			1. CONDUCTORS (600 VOLTS AND UNDER) AND ACCESSORIES
				1. Date of Manufacture: No insulated conductor over one year old when delivered to the site will be acceptable.
				2. Acceptable Companies: American Insulated Wire Corp., BICC General Cable Industries Inc., Cerro Wire & Cable Co. Inc., Pirelli Cable Corp., Rome Cable Corp., or Southwire Co.
				3. Conductors: Annealed uncoated copper or annealed coated copper in conformance with the applicable standards for the type of insulation to be applied on the conductor.
				4. Types:

Power Wiring:

General: Rated 600V, NEC Type FEP, RHH, RHW, RHW-2, THHN, THW, THW-2, THWN, THWN-2, XHH, XHHW, XHHW-2.

Class 1 Wiring:

No. 18 and No. 16 AWG: Insulated copper conductors suitable for 600 volts, N.E.C. types KF-2, KFF-2, PAFF, PF, PFF, PGF, PGFF, PTFF, RFH-2, RFHH-2, RFHH-3, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, or ZFF.

Larger than No. 16 AWG: Insulated copper conductors suitable for 600 volts, in compliance with N.E.C. Article 310.

Conductor with other types and thickness of insulation may be used if listed for Class 1 circuit use.

Class 2 Wiring:

Multiconductor Cables: N.E.C. Types CL2P, CL2R, CL2.

Other types of cables may be used in accordance with N.E.C. Table 725-61 “Cable Uses and Permitted Substitutions”, as approved.

Class 3 Wiring:

Single Conductors No. 18 and No. 16 AWG: Same as Class 1 No. 18 and No. 16 AWG conductors, except that:

Conductors are also listed as CL3.

Voltage rating not marked on cable except where cable has multiple listings and voltage marking is required for one or more of the listings.

Multiconductor Cables: N.E.C. Types CL3P, CL3R, CL3.

Other types of cables may be used in accordance with N.E.C. Table 725-61 “Cable Uses and Permitted Substitutions”, as approved.

* + - * 1. Terminal Blocks and Connectors:

Terminal Blocks: Barrier type double screw terminals rated 300 V minimum, meeting UL94 requirements for materials Classed 94V-0.

Connectors: Plug and socket style, meeting UL94 requirements for materials classed 94V-0.

* + - * 1. Terminals: Nylon insulated pressure terminal connectors by Amp/Tyco/Electronics, Electrical Products Div./3M, Framatome Connectors/Burndy, Ideal Industries Inc., Panduit Corp., Thomas & Betts Corp., or Wiremold Co.
				2. Insulation Tapes:

Plastic Tape: Electrical Products Div./3M’s Scotch 88, Plymouth Rubber Co.’s Plymouth/Bishop Premium 85CW.

Rubber Tape: Electrical Products Div./3M’s Scotch 23, or Plymouth Rubber Co.’s Plymouth/Bishop W963 Plysafe.

* + - * 1. Cable Clamps and Clips, Cable Ties, Spiral Wraps, etc.: Wire management products by Catamount/T&B Corp., or Ideal Industries Inc.
			1. SUPPORTING DEVICES
				1. Channel Support System:

Channel Material: 12 gage steel.

Finish: Hot dipped galvanized.

Fittings: Same material and finish as channel.

UL Listed Systems:

B-Line Systems Inc.’s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).

Kindorf/T&B Corp.’s B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).

Unistrut Corp.’s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).

Versabar Corp.’s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

* + - * 1. Fastening Fittings for Existing Masonry: Kindorf/T&B Corp.’s E-243, E-244, E-245, or E-170, or Versabar Corp.’s VX-4310, VX-2308, VX-4308, or VX-4309.
				2. Pipe Straps: Two-hole steel conduit straps; Kindorf/T&B Corp.’s, C-144 Series.
				3. Pipe Clamps: One-hole malleable iron clamps; Kindorf/T&B Corp.’s HS-400 Series, or OZ/Gedney Co.’s 14-50 Series.
			1. MARKERS
				1. Markers:

Premarked, self-adhesive: by W.H. Brady Co., Ideal Industries, or Thomas and Betts Co.

Flexible sleeve markers; Plastic Extruded Parts Inc.’s FS series.

Snap-on markers; Plastic Extruded Parts Inc.’s RS series.

1. EXECUTION
	* + 1. INSTALLATION, GENERAL
				1. Electrical Work Contractor shall provide power wiring and raceway system from the power source (circuit breakers in panelboard) to the indicated control consoles/cabinets.
				2. Connect power wiring within the indicated control consoles/cabinets, provide power and control wiring and raceway system from the indicated control consoles/cabinets, etc. to the operating devices and appurtenances.
			2. RACEWAYS INSTALLATION
				1. Raceway Types and Locations:

Conduit: Run conduit concealed or exposed as indicated on drawings:

Install rigid ferrous metal conduit in all locations unless otherwise specified.

Flexible Metal Conduit:

Use for short runs to equipment such as interlocks, limit switches or other items requiring adjustments (dry locations).

Use 1 to 2 feet of flexible metal conduit for final connection to equipment subject to vibration (dry locations).

Liquid-tight Flexible Metal Conduit:

Use for short runs to equipment such as interlocks, limit switches or other items requiring adjustment (damp and wet locations).

Use 1 to 2 foot of liquid-tight flexible metal conduit for final conduit connection to equipment subject to vibration (damp and wet locations).

Gate System Equipment Construction as Raceway: Track boxes, steel structural tubing, or steel plates may be utilized as raceways where designed expressly for the purpose by the gate system equipment manufacturer.

* + - * 1. Conduit Ends:

Use 2 locknuts and insulated bushing on end of each conduit entering console/cabinet or galvanized steel box (plastic bushing may be used on 1/2 inch & 3/4 inch conduit).

Use insulated grounding bushings on the ends of conduits, which are not directly connected to the enclosure (such as stub-ups under equipment, etc.) and bond between bushings and enclosure with equipment grounding conductor.

* + - * 1. Expansion Joints: Use expansion joint fittings where conduits cross expansion joints.
			1. OUTLET, JUNCTION, AND PULLBOX INSTALLATION
				1. Boxes For Concealed Conduit System:

Install boxes of depth to suit job conditions and also comply with Article 370 of the National Electrical Code.

Use galvanized steel boxes with flush covers for junction and pull boxes.

* + - * 1. Boxes For Exposed Conduit System:

Use threaded type boxes for all Work with conduit sizes 1/2, 3/4 and 1 inch.

Use threaded type boxes for all Work with conduit sizes over 1 inch in wet locations.

Use galvanized steel junction and pull boxes for Work with conduit sizes over 1 inch in dry locations and damp locations.

* + - * 1. Specific Purpose Outlet Boxes: Use specific purpose outlet boxes to mount equipment when available and suitable for job conditions.
			1. CONDUCTOR INSTALLATION
				1. Install wiring in raceways.
				2. Wiring shall be continuous (no splices) except for plug-in connectors or terminal blocks for connections to motors, limit switches, and other electrical components to facilitate removal and replacement of these items.
				3. Protect wiring in track boxes with wire trough or chase. Encase wiring in plastic sheathing or rubber grommets when passing through metal components and near moving parts.
			2. SUPPORTING DEVICE INSTALLATION
				1. Attachment of Conduit System:

Masonry Construction: Attach conduit to masonry construction by means of pipe straps or pipe clamps and masonry anchorage devices.

Channel Support System: Attach conduit to channel as indicated on drawings.

* + - 1. IDENTIFICATION, LABELING, AND MARKING
				1. Identify conductors with markers at terminal strips, cabinets, consoles and pullboxes (designations shall correspond with point to point wiring diagrams).

END OF SECTION 260506