

**BIDDERS BULLETIN**

**PROJECT:** Wallace Public Schools  
Classroom & Shop Addition  
Wallace, Nebraska

**BULLETIN NUMBER**

BB-1

**ISSUED BY:**

Grant Creager

**PROJECT #:** 16-1026

**DATE ISSUED:** October 19th, 2016

*This bulletin is issued by the Architect to all known bidders before receipt of proposals, for the purpose of explaining, interpreting, or modifying the original plans and specifications. When enumerated by the bidder upon the proposal sheet, the information or instructions given hereon will be equally binding upon all parties as if included in the original plans and specifications.*  
**BIDDER MUST ENTER THE NUMBER OF THIS BULLETIN ON HIS PROPOSAL SHEET**

**GENERAL INFORMATION**

**BB-1, ITEM #1: Bid Date Change**

The bid date is **November 1<sup>st</sup>**, 2016 at 2:00 PM Central Time and not on October 27th, 2016.

**THE FOLLOWING ITEMS ARE APPLICABLE TO THE SPECIFICATIONS**

**BB-1, ITEM #2: Substitutions**

The following products and manufacturers will be considered approved equal for the products in which they are listed below. However, this does not relieve the supplier from providing equipment as specified, and if equipment is submitted which does not meet the intent of the specifications, it will in fact be rejected.

Foam-Control Plus+ Architectural Grade EPS (Requires R-10minimum)

**BB-1, Item #3: In reference to Invitation to Bidders**

The date of October 27<sup>th</sup>, 2016 is incorrect. The correct bid date is November 1<sup>st</sup>, 2016.

**THE FOLLOWING ITEMS ARE APPLICABLE TO THE DRAWINGS:**

**BB-1, Item #4: Sheet I-001, Finish Schedules & Legends**

\*Material List:

- \* P-102: Pittsburgh Paint at Menards, 518-1, Delicate White
- \*Add P-103: Pittsburgh Paint at Menards, Gray to match existing restroom color. New Restroom wall color.

\*Roof Finish Schedule should read Room Finish Schedule

**BB-1, Item #5: Sheet I-201, Casework Elevations**

\*Note #13, Backsplash to be separate 4" nominal dimension, NOT integral with countertop

**BB-1, Item #6: Sheet I-202, Casework Sections**

\*Note #5, Edge banding clarification, also applies to specification section, 3mm edge banding on all doors, drawers, and shelf fronts, all other bandings to be 1mm.

\*Install vertical grade plastic laminate on the bottom side of "ALL" butcher block countertops prior to cutting sink openings.

**BB-1, Item #7: Sheet A-601, Doors, Windows, Frames, & Schedules**

\*Windows W1, W2, & W5 to have p-lam edge sills, see Detail 5, IC-002

**END OF BB-1**, Mechanical & Electrical comments attached separately.

# Addendum 1



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**Date:** 10/19/2016

**Project Name:** Wallace Public Schools - Shop Replacement

**Project #:** 16071

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## General Specification Items:

GS1. The following manufacturers are approved to bid the project. Approval to bid does not constitute acceptance of the product for use in the building. Final approval must be obtained through the formal shop drawing submittal process. The list is presented by product application and not necessarily by specification reference.

A. Electric Unit Heaters:

1. Raywall

B. Fixture Carriers:

1. Watts Drainage

C. Louvers:

1. Greenheck

D. Pumps:

1. Armstrong

E. Radiant Tube Heaters:

1. Superior Radiant Products

F. Roof Hoods:

1. Greenheck

## Electrical Specification Items:

ES1. The following Spec Section is being issued in its entirety:

A. 260943 – Addressable Networked Lighting Controls

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**Submitted By:** Jeremy Klima, Ben Schmitt

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## **SECTION 26 0943 – ADDRESSABLE NETWORKED LIGHTING CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes addressable networked digital lighting controls.

#### **1.2 SUBMITTALS**

- A. Product Data: For each type of product (general device descriptions, dimensions, individual wiring details, nomenclature).
- B. Bill of Materials: Complete list of all parts needed to fully install selected system components.
- C. Shop Drawings:
  - 1. Floor Plans: Location, orientation, and coverage area of each sensor; groups; zones; scenes; and other specific design symbols and designations as required to define the installation, location, and configuration of all control devices.
  - 2. Point List and Data Bus Devices: Summary list of all control devices, sensors, and other devices connected to each data bus. Include remaining future device capacity of data bus.
  - 3. Wire Termination Diagrams and Schedules: Coordinate nomenclature and presentation with Drawings and block diagram. Differentiate between manufacturer-installed and field-installed wiring.
- D. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
  - 1. Show interconnecting signal and control wiring, and interface devices that prove compatibility of inputs and outputs.
- E. Room Interconnection Diagrams: Typical per room type (detailed drawings showing device interconnectivity of devices).
- F. Example Contractor Startup/Commissioning Worksheet: Must be completed prior to factory start-up.
- G. Field quality-control reports.
- H. Software licenses and upgrades required by and installed for operation and programming of digital and analog devices.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
- B. Software and Firmware Operational Documentation:
  - 1. Software operating and upgrade manuals.
  - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
  - 3. Device address list.
  - 4. Printout of software application and graphic screens.
- C. Address Drawing: Reflected ceiling plan and floor plans, showing data-bus-connected devices, address for each device, and device groups. The plans shall be based on construction plans, using the same legend, symbols, and schedules.
- D. As-Built Drawings: Shop drawings upgrade to reflect installed conditions.

#### **1.4 QUALITY ASSURANCE**

- A. In high humidity or cold environments, the sensors shall be rated for condensing humidity and -40 deg F operation.
- B. All applicable products must be UL/CUL Listed or other acceptable national testing organization.

- C. Contractor shall ensure that lighting system control devices and assemblies are fully compatible and can be integrated into a system that operates as described in the lighting control notes on drawings and as described within this specification. Any incompatibilities between devices, fixtures, and system controllers shall be resolved between the Contractor and the system provider, as required to ensure proper system operation and maintainability.

## 1.5 COORDINATION

- A. Coordinate lighting control components to form an integrated interconnection of compatible components.
- B. The installing contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.
- C. Comply with 47 CFR, Subparts A and B, for Class A digital devices.
- D. Comply with protocol described in IEC 60929, Annexes E and G, for lighting control devices, wiring, and computer hardware and software.
- E. Comply with UL 916.

## 1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Software: Failure of input and output to execute switching or dimming commands.
    - b. Failure of modular relays to operate under manual or software commands.
    - c. Device failure.
    - d. Damage of electronic components due to transient voltage surges.
  - 2. Warranty Periods:
    - a. Control Components: Three years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Digital Lighting Management (DLM) from WattStopper.
- B. Encelium Energy Management System from Osram Sylvania.
- C. nLight® Network Control System from Sensor Switch.
- D. Quantum Total Light Management from Lutron.
- E. Green Light from Crestron.
- F. ILC Lutron
- G. Approval prior to bid required for other manufacturers.

### 2.2 SYSTEM REQUIREMENTS

- A. Operation: Input signal from digital signal sources, switches, sensors, or other devices associated with signal input.
  - 1. Each input and control device is connected to a digital data bus.
  - 2. Each device has a digital address and can be operated by a digital signal.
  - 3. Each device can be assigned to any or all groups connected to a single data bus.
  - 4. Each dimming device may have as many as 20 lighting levels in 5 percent increments.
  - 5. Scenes can be programmed to devices and may be applied to groups.
- B. System Requirements:
  - 1. Components: Individually addressable control devices (such as relays, dimmers, and switches) that are operated from digital signals received through a data bus, from data-entry and -retrieval devices (such as

- PCs, hand-held infrared programming devices, and wired network connections). Devices also report status to data-entry and -retrieval devices through the bus.
2. Fixture Independence: Addressable control devices shall be mounted separately from the fixture and shall not be integrated into the fixture in manufacturing/assembly. Future removal of the addressable control device shall not require removal of the fixture, and future removal of the fixture shall not require removal of the addressable control device.
  3. Digital Control: Use peer-to-peer communication and distributed logic, where the failure of any single component within a scope shall be automatically isolated and not affect function of other spaces.
- C. System shall have an architecture that is based upon three main concepts:
1. Intelligent lighting control device.
  2. Standalone lighting control zones.
  3. Network backbone for remote or time based operation.
- D. Lighting control zones shall consist of one or more intelligent lighting control components, be capable of stand-alone operation, and be capable of being connected to a higher level network backbone.
- E. Each lighting control zone shall be capable of automatically configuring itself for default stand-alone operation without any start-up programming.
- F. Individual lighting zones must continue to provide a user defined default level of lighting control in the event of a system communication failure with the backbone network or the management software becoming unavailable.
- G. System shall be capable of operating a lighting control zone according to several sequences of operation. System shall be able to change a spaces sequence of operation according to a time schedule so as to enable customized time-of-day, day-of-week utilization of a space. Note operating modes should be utilized only in manners consistent with local energy codes.
1. Auto-On/Auto-Off (via occupancy sensors):
    - a. Zones with occupancy sensors automatically turn lights on when occupant is detected.
    - b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
    - c. Pressing a switch will turn lights off. The lights will remain off regardless of occupancy until switch is pressed again or the occupancy sensor times out, restoring the sensor to Automatic On functionality.
  2. Manual-On/Auto-Off (also called Semi-Automatic):
    - a. Pushing a switch will turn lights on.
    - b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
  3. Manual-On to Auto-On/Auto-Off:
    - a. Pushing a switch will turn lights on.
    - b. After initial lights on, zones with occupancy and/or photocell sensors turn lights on/off according to occupancy/vacancy and/or daylight conditions.
    - c. Sequence can be reset via scheduled (ex. daily each morning) events
  4. Auto-to-Override On:
    - a. Zones with occupancy sensors automatically turn lights on when occupant is detected.
    - b. Zone lighting then goes into an override on state for a set amount of time or until the next time event returns the lighting to an auto-off style of control.
    - c. Sequence can be reset via scheduled (ex. daily each morning) events
  5. Manual-to-Override On:
    - a. Pushing a switch will turn lights on.
    - b. Zone lighting then goes into an override on state for a set amount of time or until the next time event returns the lighting to an auto-off style of control.
    - c. Sequence can be reset via scheduled (ex. daily each morning) events
- H. Control software shall enable logging of system performance data and presenting useful information in a web-based graphical format and downloadable to .CSV files.
- I. System software interface shall have the ability to notify communication failures to system users via system and e-mail messages. E-mail messages shall be available in html and text formats.

- J. Surge Suppression: Factory installed as an integral part of control components or field-mounted surge suppressors complying with UL 1449, SPD Type 2.
- K. All system devices shall be capable of being given user defined names.
- L. All devices within the network shall be able to have their firmware reprogrammed remotely and without being physically uninstalled for purposes of upgrading functionality at a later date.
- M. All sensor devices shall have the ability to detect improper communication wiring and blink it's LED in a specific cadence as to alert installation/startup personnel.

### **2.3 BUS POWER SUPPLY**

- A. Description: Supply power to data bus as an NFPA 70, Class 2 control circuit.
  - 1. Primary Power: Field selectable, 120 and 277 V.
  - 2. Power Supply: Regulated to maintain the operating voltage under full load, and rated for full capacity of connected devices.
  - 3. Pilot Lights: Indicate data bus ground fault and data bus traffic.

### **2.4 CONTROLLER/GATEWAYS**

- A. Description: The controller/gateways link the distributed data buses to all other data buses with a dedicated lighting control network included with the system. A link is also provided for the Owner's Ethernet network to provide computer configuration, control, analysis, and maintenance. The controller/gateways operate independently and continue to process local inputs and schedules when disconnected from the dedicated lighting control network or Owner's Ethernet network. The controller/gateways shall provide local intelligence and features including the following:
  - 1. Integrated real-time clock with automatic daylight savings adjustment and leap-year correction.
  - 2. Integrated sunrise/sunset support based on the site location (latitude and longitude).
  - 3. Automatic time schedules, to control groups for scheduled occupancy with support for holiday exceptions.
  - 4. Digital outputs for additional control and interlocking with external equipment such as fans, valves, and security panels.
  - 5. Support data bus(es).
  - 6. Computer Monitoring and Configuration: The controller/gateway shall allow configuration, monitoring, and analysis from PCs on the Owner's Ethernet LAN.
- B. Each data bus shall have the capacity to control connected addressable devices, using NFPA 70, Class 2 control circuit.
  - 1. Each data bus shall have the capacity to control groups and scenes.
  - 2. LED indicator lights for Ethernet status (link, send, and receive), power-on, and network failure.
  - 3. Linking of switch and sensor inputs to control device outputs.
  - 4. Viewing control device output status.
  - 5. Controlling control device outputs.
  - 6. Setting device addresses.
  - 7. Assigning switch and sensor inputs and control device output modes.
- C. Allow connection of the following addressable control devices:
  - 1. Fluorescent fixture switching and dimming, for linear and compact lamps.
  - 2. Incandescent fixture switching and dimming.
  - 3. HID and HPS fixture switching and dimming.
  - 4. LED fixture switching and dimming.
  - 5. Occupancy and photoelectric sensors.
  - 6. Emergency lighting interface complying with UL 924.
- D. Stores system programming in nonvolatile memory.
  - 1. Switch to enable or disable software programming.

## **2.5 USER INTERFACE**

- A. Workstation:
  - 1. Lighting control system management software installed on Owner's PC, with Microsoft Windows operating system.
  - 2. Include licenses, documentation, and storage media and licensing for a minimum of one user.
- B. Infrared Programming Assistant: Handheld, with custom graphical user-interface software, supplied by the controller/gateway supplier to program the manual switches.

## **2.6 LIGHTING CONTROL SYSTEM MANAGEMENT SOFTWARE**

- A. The software shall provide for programming, configuring, and monitoring all devices connected to all data buses of the lighting control system, using application-specific software with Microsoft Windows-based, user-friendly software with graphical user-interface designed screens.
  - 1. The software shall be object oriented with pop-up menus and built-in help screens. All specified features of the data-bus-connected devices and those associated with controller/gateways shall be included in the software.

## **2.7 INCANDESCENT FIXTURE SWITCHING AND DIMMING MODULES.**

- A. Each device or zone shall be addressable and shall include on-off, fade, dimming, scene settings, and other standard control functions as required to meet the lighting control schedule functions. Control outlet and wiring shall be compatible with fixtures specified.
- B. Description: Comply with exponential dimming curve calibrated for the connected lamp type, group, and scene settings, and with light-level and configuration commands. Dimmer rise time shall be not less than 15 mic. sec.

## **2.8 FLUORESCENT FIXTURE SWITCHING AND DIMMING**

- A. Each device or zone shall be addressable and shall include on-off, fade, dimming, scene settings, and other standard control functions as required to meet the lighting control schedule functions. Control outlet and wiring shall be compatible with fixtures specified.
- B. Ballasts: Comply with requirements in Division 26 Section "LED Interior Lighting" for, electronic programmed-start, and the following:
  - 1. Starting Method: Programmed rapid start with antiflash (turns on at previously set light level).
  - 2. Dimming Range: 100 to 5 percent of rated lumens unless otherwise indicated.
  - 3. Ballast Factor: 1.0 at full output; 0.01 at full dim.
  - 4. Input Voltage Range: 108 to 305 V.

## **2.9 LED FIXTURE SWITCHING AND DIMMING**

- A. Each device or zone shall be addressable and shall include on/off, fade, dimming, scene settings, and other standard control functions as required to meet the Lighting Control Schedule functions. Control outlet and wiring shall be compatible with fixtures specified.
- B. Drivers: Comply with requirements in Division 26 "Interior Lighting" for LED and the following:
  - 1. Dimming Range: 100 to 5 percent of rated lumens, unless fixture specified is capable of lower outlet (match fixture).
  - 2. Input Voltage Range: 108 to 305V.

## **2.10 SENSORS**

- A. Sensors may be powered directly from the lighting control network or with a standalone power supply. Units powered with a standalone power supply shall interface with the lighting control system through an electrically isolated digital input.

- B. General Description: Ceiling-mounting, solid-state low voltage units.
  - 1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 20 minutes. Automatic sensitivity adjustment.
  - 2. Sensor Type: Sensors shall be dual-technology type (unless noted otherwise).
    - a. Corridors and Vestibules: PIR type sensors are acceptable.
  - 3. Sensor Output: Contacts rated to operate the connected power pack, complying with UL 773A. Sensor shall be powered from the power pack.
  - 4. Mounting:
    - a. Sensor: Suitable for mounting on a standard outlet box.
    - b. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind accessible cover.
  - 5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
  - 6. Bypass Switch: Override the on function in case of sensor failure.
- C. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.
  - 1. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
- D. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic/microphonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.
  - 1. Sensitivity Adjustment: Separate for each sensing technology.
  - 2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.

## 2.11 INDOOR PHOTOELECTRIC SENSORS

- A. Photo sensor shall be sensitive to all waveforms within the visible light spectrum.
- B. Spectral response of sensor shall match the sensitivity of the human eye.
- C. Full Range Dimming: Photo sensor shall be capable of controlling associated luminaires over their full dimming range. Daylight harvesting shall not be capable of turning associated luminaires off.
- D. Daylight harvesting sequence shall include a minimum 2 minute time delay to avoid cycling from rapidly changing sky conditions.
- E. Fade Rate: Fade rate from maximum to minimum light output shall be a minimum of 1 minute.
- F. Closed Loop Photosensor: Setpoint adjustable from 20-60 foot candles.
- G. Open Loop Photosensor: Minimum light sensor range of 20-700 foot candles.

## 2.12 RELAYS

- A. Relays: Electrically operated, mechanically held single-pole switch, rated at 20 A at 277 V. Short-circuit current rating shall be not less than 5 kA. With pilot light indicating when relay is closed and latched. Control shall be by digital data bus. Relay status shall be displayed when queried by lighting management software.
- B. Relay Panel: A single enclosure with incoming lighting branch circuits, relays, and connection to the digital control network.
  - 1. Enclosure: NEMA 250, Type 1, unless otherwise indicated.
  - 2. Barriers to separate low-voltage and line-voltage components.
  - 3. Directory: Cover mounted, identifying each relay with its device address and naming the load controlled.
- C. Individually Mounted Relays:
  - 1. Enclosure: Standard outlet box or NEMA 250, Type 1, unless otherwise indicated.
  - 2. Directory: Cover mounted, identifying each relay with its device address.

## 2.13 MANUAL SWITCHES AND PLATES

- A. Push-Button Switches: Modular, operating over the digital data bus.
  - 1. Each switch shall control the following functions, in coordination with lighting control schedule functions:
    - a. On.
    - b. Off.
    - c. Dimming, increase light level.
    - d. Dimming, decrease light level.
    - e. Return to preset light level.
  - 2. Match color and style specified in Division 26 Section "Wiring Devices."
  - 3. Integral IR receiver for programming.
- B. Wall Plates: Single and multigang plates as specified in Division 26 Section "Wiring Devices."

## 2.14 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG, complying with Division 26 Section "Conductors and Cables for Electrical."
- B. Class 2 Control Cables: Multiconductor cable with copper conductors sized per manufacturer for circuit load and voltage conditions.
- C. Class 1 Control Cables: Multiconductor cable with copper conductors sized per manufacturer for circuit load and voltage conditions.
- D. Digital and Multiplexed Signal Cables: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, for horizontal copper cable. Manufacturer may select cable Category (5e, 6, etc.).
- E. All cables shall be plenum rated.
- F. Where composite cables require more than two conductors, provide manufacturer's factory pre-terminated cable to connected lighting control devices. Cabling shall be plenum rated.
- G. Cable Color Code: Coordinate cable color to be unique from other building systems and match existing when applicable.
- H. Provide minimum 8 ft. slack in each cable segment for flexibility of device location adjustment.

## 2.15 EMERGENCY SHUNT RELAY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Lighting Control and Design, Inc.
  - 2. Watt Stopper (The).
- B. Description: Normally closed, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.
  - 1. Coil Rating: Coordinate coil voltage.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Engage manufacturer's representative to select devices, quantities, locations, and interconnecting cabling to achieve the control sequence specified in the lighting control schedule.
- B. Wiring:
  - 1. Comply with NECA 1.
  - 2. Wiring Method: Install cables in raceways except where installed in accessible ceilings. Conceal raceway and cables except in unfinished spaces. Support cables at intervals not exceeding 30".
  - 3. Route all low voltage cables separate from line-voltage conductors.
  - 4. Conductor/Cable Coordination: Verify and coordinate quantity and configuration of line voltage conductors and/or low voltage cables needed to interconnect dimming control devices with associated

lighting fixtures. Control method shall match. Note that dimming methods may require different conductor/cable configurations be used for different fixtures.

- C. Wall Devices:
  - 1. Provide junction box in wall with conduit stubbed up above nearest accessible ceiling space.
  - 2. Where cabling is routed in inaccessible locations (above hard ceilings, within floors, within walls), provide conduit routed from device to nearest accessible ceiling space.
- D. Sensors:
  - 1. Select, install, and aim sensors to achieve not less than 90 percent coverage of installed areas. Do not exceed coverage limited specified in manufacturer's written instructions.
  - 2. Adjust location of sensors to minimize activation of interior rooms from adjacent corridor activity per manufacturer's direction.
  - 3. Arrange control zones per plans and details. Individual rooms (defined by full height wall partitions or doors) shall be controlled independent of adjacent rooms. Multiple occupancy sensors in the same room or zone shall control all lighting fixtures associated with that room or zone. Rooms or zones shown with multiple branch circuits shall be provided with multiple control devices to accommodate control sequence.
- E. Emergency Lighting Interface:
  - 1. Install emergency relay on life safety lighting circuits indicated with automatic controls. Relay shall bypass automatic controls and illuminate life safety lighting circuit upon loss of adjacent normal branch lighting circuit source voltage. Locate in associated source electrical room within NEMA-1 enclosure.

### 3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, boxes, cabinets, and terminals. Comply with identification requirements specified in Division 26 Section "Electrical Identification."
- B. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with Division 26 Section "Electrical Identification."
- C. Identify all ceiling-mounted controls with data bus number and device address.
- D. Label each device cable within 6 inches of connection to wiring terminals/ports.

### 3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
  - 1. Test continuity of each circuit.
- B. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Test each bus controller using a portable PC.
  - 3. Activate light fixtures and verify that all fixtures are operating at 100 percent.
  - 4. Confirm correct communications wiring, initiate communications between devices and controller/gateways, and program the lighting control system according to approved configuration schedules, time-of-day schedules, and input override assignments.
  - 5. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Field Test Reports:
  - 1. Printed list of all points created from actual queries of all addressed control points to include ballasts, manual controls, and sensors.
  - 2. Event log verifying the performance of all devices generating event messages to include occupancy sensors, control buttons, alarm messages, and any other change of value messages.
  - 3. Trend data for all daylight zones covering a period of not less than one week and demonstrating performance consistent with the submitted computer models for those spaces.
- D. Lighting controls will be considered defective if they do not pass tests and inspections.

- E. Prepare test and inspection reports, including a certified report that identifies bus controllers included and describes query results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.
- F. Test and Inspection Report:
  - 1. Perform tests/inspections and submit report prior to Engineer’s final punch inspection.
  - 2. Report shall consist of any developed test result data and shall, at minimum, include a copy of this “Field Quality Control” Section of the specification to illustrate Contractor acknowledgement of tests and inspections.
    - a. Contractor shall indicate successful completion by initialing individual test and inspection requirements listed above on the copy. Initialing indicates that tests and inspections were performed for specified work with a successful outcome. Work not found to be in compliance was corrected and retested/reinspected successfully or has been specifically clarified and noted above by the Contractor.
    - b. Acknowledgement of Tests and Inspections:  
 “Tests and inspections have been successfully completed as specified, or have been clarified/noted above.
      - 1) Representative Company Name: \_\_\_\_\_
      - 2) Representative Personnel Name: \_\_\_\_\_
      - 3) Representative Personnel Signature: \_\_\_\_\_
      - 4) Date of Report: \_\_\_\_\_”
- G. Upon completion of initial programming, engage engineer, architect, and Owner while onsite to confirm time and scene controls/adjustments prior to final programming. Provide 2 weeks notice. Time may be required outside of normal business hours to confirm lighting for those hours of operation.

**3.4 ADJUSTING**

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions and to assist Owner’s personnel in making program changes. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

**3.5 SOFTWARE SERVICE AGREEMENT**

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for three years.
- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within three years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
  - 1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

**3.6 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the control unit and operator interface.

**END OF SECTION 26 0943**