SECTION 25 5600
MONITORING AND CONTROL OF ELECTRICAL EQUIPMENT

GENERAL

1.1 SUMMARY
   A. Monitoring and Control of systems include the following:
      1. Lighting Systems
   B. Related Sections:
      1. 26 0943 Lighting Control Devices

1.2 REFERENCES
   A. Refer to section 25 0000.

1.3 SYSTEM DESCRIPTION
   A. Include all components not specifically indicated or specified, but necessary to make the
      system function within the intent of the specification

1.4 SUBMITTALS
   A. Submit products not specified but required for integration of systems.
   B. Refer to section 25 0000 for additional requirements.
   C. Plug Fest Plan – submit a plug fest plan that includes at a minimum the following:
      1. Attendees
      2. Architecture
         a. IP
         b. MSTP
      3. Vendor and system specific protocols
      4. Process and Methodology
      5. Equipment

1.5 QUALITY ASSURANCE
   A. Install equipment according to manufacturer’s recommendations.
   B. Refer to section 25 0000 for additional requirements.

1.6 WARRANTY
   A. Refer to section 25 0000.

PRODUCTS

2.1 NONE

EXECUTION

3.1 LIGHTING CONTROLS SYSTEM
   B. Integrate via BACnet IP communications protocol with lighting control system.
   C. Integration connection to be through the secondary Network Integration Card port on the
      Building Level Controller of the Integrated Automation System.
   D. At a minimum, map the following points into Integrated Automation System:
      1. For each room:
         a. Occupancy sensor
b. General lighting switch
c. Dimmer (where applicable)

E. All user functions shall be performed from the Niagara Integrated Automation System, without logging into Native Lighting Control Software.

F. Refer to Software Functional Matrix below to determine which software functions shall be performed utilizing Native Lighting Control Software and which functions shall be performed using Niagara Integrated Automation System.

G. Software Functional Matrix

<table>
<thead>
<tr>
<th>Native Lighting Control Software</th>
<th>Niagara Integrated Automation System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-up, program and configure the lighting system</td>
<td></td>
</tr>
<tr>
<td>Assignments of lighting loads to control strategies</td>
<td></td>
</tr>
<tr>
<td>Configuration of all lighting system zones</td>
<td></td>
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<tr>
<td>Configuration maintenance</td>
<td></td>
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<tr>
<td>Remote configuration</td>
<td></td>
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<td></td>
<td>All End-User functions</td>
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<tr>
<td></td>
<td>View lighting floorplans</td>
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<td></td>
<td>All reporting</td>
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<tr>
<td></td>
<td>All Monitoring</td>
</tr>
<tr>
<td>Import Niagara Schedules</td>
<td>All scheduling shall be initiated, controlled and managed from Niagara Integrated Automation System</td>
</tr>
<tr>
<td></td>
<td>All trending shall be configured, initiated, controlled, archived and managed from Niagara Integrated Automation System.</td>
</tr>
<tr>
<td>Not Acceptable to generate Alarms in Native Lighting Control Software and pass to Niagara except Low Battery Alarm and Offline Controller Alarm</td>
<td>All alarming shall be configured, initiated, controlled, archived and managed from Niagara Integrated Automation System. Except Low Battery Alarm and Offline Controller Alarm may be configured in Native Lighting Control Software only if not possible in Niagara.</td>
</tr>
<tr>
<td></td>
<td>Read and Acknowledge: Low/Failed Battery Alarm</td>
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<tr>
<td></td>
<td>Read and Acknowledge: Offline Controller Alarm</td>
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<tr>
<td></td>
<td>Read and Write: Light Zone State: State of the defined lighting zone – ON or OFF</td>
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<tr>
<td></td>
<td>Read and Write: Light output level of the defined lighting zone, from 100% (maximum light output) to 0% (minimum light output)</td>
</tr>
<tr>
<td></td>
<td>Read and Write: Light output level of the defined lighting zone, In Foot-candles, maximum light output to minimum light output.</td>
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<tr>
<td></td>
<td>Read: Occupancy State. State of the defined occupancy sensor – occupancy detected or not detected</td>
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<tr>
<td></td>
<td>Read: Photo Sensor Daylight Readings: Reports daylight readings by photo sensors</td>
</tr>
<tr>
<td></td>
<td>Read and Write Shed Status: Reports the total current load reduction achieved according to the system-defined prioritization, defined in watts</td>
</tr>
<tr>
<td></td>
<td>Read: Lighting Energy Consumption by Zone</td>
</tr>
</tbody>
</table>
H. Provide user the capability to switch lights on/off and/or dim at room level.
I. Provide each lighting zone with an associated schedule, runtime trend log, audit log, and associated command override.
J. Any command failure shall be alarmed via the alarm console.
K. Graphics:
   1. Room Level Graphics showing representation of typical room type w/ point statuses.
   2. Each zone shall have an associated floor plan graphic with links to associated schedule and override commands
   3. Floor level summary graphics - thermal graphics showing occupancy, lumen and dimming levels.
   4. Building level summary graphics of all zone statuses and zone power consumption.
   5. Campus level lighting graphic showing buildings and building power consumption.

3.2 PLUG FEST
L. Conduct and lead the coordination effort to present a plug fest of integrated systems as shown on Network Architecture diagram.
M. Include Plug Fest as a milestone on Project Construction Schedule.
N. Verify communication capabilities of each integrated vendor prior to installation of each system.
O. Provide and coordinate testing methodology with system vendors.
P. Test architecture will mimic monitored building systems. Testing methodology will also include read/write capabilities as required.
Q. Verify through auto-discovery of BACnet network or registry list of Modbus network – availability of all required point lists.
R. Goal of the plug fest is to find and resolve any integration, latency and / or interoperability type issues.
S. Provide adequate power, high speed local area network for system connections.
T. Owner’s Representative will monitor all IT network activities.

END OF SECTION 255600