Galleon II

Area/Site Luminaire

Engineering Specification

Revision 1.00
8.24.21

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the exterior lighting system as described in this specification and as shown on the drawings.

1.02 RELATED SECTIONS

A. Section [260923 - Occupancy Sensors:] Occupancy sensors used in conjunction with central dimming control system.
B. Section [25000 – Integrated Automation] Building integrator shall provide integration of the lighting control system with Building Automation Systems

1.03 REFERENCES

A. ANSI/NFPA 70, National Electrical Code

B. FCC 47 CFR Part 15 Part B & C, Federal Code of Regulation (CFR) testing standard for electronic equipment

C. IESNA LM-79, Electrical and Photometric Measurements of Solid-State Lighting Products

D. IESNA LM-80, Approved Method for Measuring Lumen Maintenance of LED Light Sources

E. IESNA TM-15-11, Luminaire Classification System for Outdoor Luminaires

F. IESNA TM-21-11, Projection of Long Term Lumen Maintenance of LED Light Sources

G. UL1598, Standard for Safety of Luminaires

H. IESNA TM-30, Method for evaluating light source color rendition

I. ANSI C78.377-2017, Electric Lamps — Specifications for the Chromaticity of Solid-State Lighting Products

J. ANSI/IEEE C62.41-2:2002 Transient Surge Requirements

K. IEC 60598-1 (IEC 605.29), Ingress Protection, IP Rating

L. ISTA-1A, Packaging Compression, Vibration and Drop

M. IEC C62.262, Impact Resistance, IK Rating

N. ANSI C136.31 American Standard for Roadway and Area Lighting Equipment – Luminaire Vibration

O. ASTM B117 Salt Spray Test

P. ASTM D 1654-08 Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

Q. RoHS, Restriction of Hazardous Substances Directive

R. DLC, DesignLights Consortium

S. TAA, Trade Agreements Act

T. ISO 9001, Global Benchmark for Quality Management

U. ICES-005, Issue 5 Canadian Lighting Equipment EMC Standard

1.03 DRAWINGS

A. The drawings, which constitute a part of these specifications, indicate the general location of the luminaires. Data presented on these drawings is as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification of all dimensions, routing, etc., is required.

B. Specifications and drawings are for assistance and guidance, but exact locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 COORDINATION REQUIREMENTS (when controls are present)

A. Coordination
   1. Coordinate the placement of sensors and other user input devices

2. Coordinate the placement of daylight sensors to achieve optimal daylight dimming

B. Prewire meeting: conducted on-site or during design meeting with lighting control system manufacturers or designated representative prior to commencing work as part of the manufacturer's standard practice and startup services. Manufacturer to review with the installer:
   1. Installation of lighting and connections to lighting control system
   2. Lighting control network wiring
   3. Network IT requirements
   4. Low voltage wiring requirements
   5. Sensor coverage requirements
   6. Daylight control requirements
   7. Installer responsibilities
      a. Startup and training schedule and actions

1.05 DRAWINGS

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1.06 QUALITY ASSURANCE

A. Product shall conform to requirements outlined in NFPA 70

B. Luminaire manufacturer needs to demonstrate an excess of 30 years of experience in manufacturing outdoor luminaires for the North American market and 10 years of experience in manufacturing LED luminaires and controls for the North American market.

C. System components:
   1. Listed by an OSHA Nationally Recognized Testing Laboratory specifically for the electronic ballast/driver loads. Provide evidence of compliance upon request.
   2. Listed by FCC specifically for the required wireless communication protocols. Provide evidence of compliance upon request.

D. Luminaire shall be fully assembled and individually electrically tested prior to shipment.

E. Manufacturers of LED luminaires shall demonstrate a suitable testing program incorporating high heat, high humidity and thermal shock test regimens to ensure system reliability and to substantiate lifetime claims. HTHH (85/85), HTLT (Lifetime) max Tc allowed by supplier, TS (-40~85C) for minimally 3,000 hrs.

F. The sole use of IESNA LM-80 data to predict luminaire lifetime is not acceptable. TM-21 Calculator will be used for all lumen maintenance predictions.

G. At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRI. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 7 years after the date of manufacture. Every light engine will be traceable back to this database.

H. Luminaires shall be provided with a 5-year warranty. Components included in the limited warranty include LEDs, drivers, surge modules, transformers, control modules, paint finish, and all other electrical and mechanical components originally purchased with the luminaire. Definition of LED failure cannot exceed 10% of total LED count. Exclusions for drivers and third-party controls will not be accepted. See written warranty for details.

I. Luminaire to be manufactured in an ISO:9001 Certified location.

J. Product family must have 5-years historical failure data that demonstrates DPPM failure rate of less than 0.5%.

1.07 SUBMITTALS

A. Luminaire manufacturer to provide product data on luminaires that must include:

1. Thermal test report using TM-21 Calculator for the luminaire at 40°C ambient
2. IESNA LM-79 for each luminaire from a NVLAP accredited photometric laboratory
3. LM-80 test report for a minimum of 13,000 hours
4. Driver specification sheet
5. LED Product Data Sheet
6. Ingress Protection report tested to IP66
7. Vibration testing tested to ANSI C136.31 3G
8. Optical assembly Impact test rated to IK10 per IEC C62.262
9. Installation instructions – trilingual (English, Spanish, French)
10. Paint and Salt Spray test ASTM B117 for 3,000hrs Must have option for 5,000 hours (costal condition)

11. ASTM D1654 7 @ 2,000 with the option of ASTM D1654 9 at 5,000 hours (coastal Condition)
12. TM-30 spectral data
13. Packaging: Vibration, Shock (Drop) and Compression testing (reference ISTA 1A procedure)
14. UL NOA, Notice of authorization file number
15. ROHS compliant documentation
16. FCC SDOC document for unintentional, and FCC intentional radiator certification if wireless radio included.
17. DLC Compliant Product ID reference
18. ISO9001 certification for manufacturing facility
19. Dimensional information

1.08 DELIVERY, STORAGE AND HANDLING

A. Ensure products are delivered as shipped, including pallet assembly and packaging has not been damaged in shipment.

B. Store products in a clean, dry location in manufacturers original packaging.

C. Store products in an environment that meets products ambient and storage temperature per products specification sheets.

D. Store products in an environment that meets products relative humidity of less than 90 percent, non-condensing as outlined on the product specification sheets.

E. The contractor is responsible for complete installation of the entire system according to strict factory standards and requirements.

F. Handling: packaging will include clear installation instructions for all components with typical illustrations of installation locations and connections. The installing contractor can easily match each package to the layout on the design floor plans.

G. Packaging will be in accordance with ISTA-1A

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND LUMINAIRES

A. Acceptable Manufacturer: Cooper Lighting Solutions

B. Manufacturer and luminaire: Subject to compliance with these specifications, luminaires shall be Cooper Lighting Solutions Galleon GALN-SAX-XX-XA

2.02 LED LUMINAIRES

A. General: Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.

B. Technical Requirements. Material and specifications for each luminaire are as follows:

1. General Requirements

a. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply).

b. Reported lumen maintenance (using DOE Energy Star TM-21 Calculator) shall be greater than 96% per TM-21-11 after 78,000 hours of luminaire operation in an ambient environment of 40ºC (104ºF). This data must be TM-21 compliant and derived from the EnergyStar.gov TM-21 Calculator.

c. Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of the luminaire.

d. Each luminaire shall be listed with Underwriters Laboratory, Inc. under UL1598 for luminaires, or an approved equivalent standard from a nationally recognized testing laboratory.

e. Luminaire shall DLC approved.

f. Country of manufacture will be TAA compliant

2. Electrical Requirements

a. Operation Voltage: The fluctuations of line voltage shall have no visible effect on the luminous output. The luminaire shall operate as below (Select one):

I. 50/60 HZ ±3 HZ AC line over a voltage ranging from 108 VAC to 305 VAC
II. 50/60 HZ ±3 HZ AC line over a voltage ranging from 312 VAC to 528 VAC

b. Power Factor: The luminaire shall have a power factor of 0.9 or greater.

c. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.

d. Surge Suppression: The luminaire circuitry shall include surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall be field-replaceable. The SPD shall operate as below (Select one):

   I. The SPD protects the luminaire from damage and failure for common and differential mode transient peak currents up to 10 kA (minimum). SPD must conform to UL 1449 and has been tested procedures in ANSI/IEEE C62.41-2:2002 category C high exposure and ANSI C136.2 10kV BIL to an enhanced test level The SPD shall fail in such a way that the luminaire will no longer operate.

e. RF Interference testing must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B or C, Section 15 regulations concerning the emission of electronic noise for entire luminaire construction.

f. RF Interference testing must meet emission limits referred in ICES-005, Issue 5 concerning the emission of electronic noise for entire luminaire construction.

g. Luminaire shall provide a 0-10V dimming driver with minimum 10% dimming.

h. Luminaire must accommodate all the following as options: NEMA 3-PIN, NEMA 7-PIN, and Zhaga 4-PIN receptacle.

i. Luminaire must have a configuration which offers the capability to incorporate an integrated security camera and all associated network gear capable of communicating using ethernet/fiber optic or cellular networks.

3. Optical Requirements

   a. Optical Assemblies: LEDs shall be provided with discrete over-optic elements to provide an IES Type II, III, IV or V distribution. Optical assemblies shall have a minimum efficiency of 85% regardless of distribution type. All LEDs and optical assemblies shall be mounted parallel to the ground when the fixture is installed at 0 degree tilt. All LEDs shall provide the same optical pattern such that the failure of individual LEDs will not constitute a loss in the distribution pattern.

   b. Luminaire manufacturer must provide optional House Side Shield option to be field or factory installed. House Side Shield must not affect luminaire EPA nor protrude from the luminaire more than 1/4” below the bottom plane of the fixture.

c. No more than XX% of the total luminaire lumens shall be in the 80º to 90º range and no lumens will be emitted above 90º. BUG rating shall not exceed BX-U0-GX.

d. Light Color/Quality: The LEDs used in the luminaire are binned within 5-McAdam's Ellipse per ANSI C78-377.

e. Light Color/Quality: The luminaire shall have a nominal correlated color temperature (CCT) of 4,000K +/-275K. The color rendition index (CRI) shall be a minimum 70.

I. For nominal 4000K, target with tolerance is 3895 is +/- 275K....etc

Nominal CCT Category (K)	Target CCT and Tolerance (K)	Target Duv
2200	2238 ± 102	0.0000
2500	2460 ± 120	0.0000
2700	2725 ± 145	0.0000
3000	3045 ± 175	0.0001
3500	3465 ± 245	0.0005
4000	3985 ± 275	0.0010
4500	4503 ± 243	0.0015
5000	5029 ± 283	0.0020
5700	5667 ± 355	0.0025
6500	6532 ± 510	0.0031

f. XX% of the total luminaire lumens shall be to the street side of the luminaire.

g. The light engines shall be constructed such that the failure of one LED will not result in the loss of the entire LED module.

h. The optic assemblies shall be protected against dust and moisture intrusion per the requirements of IP66 (minimum) to protect all internal components.

i. The optic assemblies shall be protected against mechanical impact to withstand an IK10 rating.

j. Each refractor or lens shall be made from UV inhibited high impact optical grade polycarbonate and be resistant to scratching. Optical assemblies shall have an

enhanced, post-molded UV inhibitor treatment that protect to at least 88% transmissivity after 6,000hours of direct UV exposure.

k. Each optical distribution shall be field-rotatable 90° and shall have indicator molded into the optics to indicate house side versus street side.

4. Thermal Management

a. The rated operating temperature range shall be -40°C (-40ºF) to +40°C (104ºF) with the option of a +50ºC (122ºF) configuration.

b. The thermal management (of the heat generated by the LEDs) shall be sufficient capacity to assure proper operation of the luminaire over the expected useful life. Must demonstrate using the TM-21 Calculator that LED will not exceed max operating temperature at outdoor ambient tested temperature of 50°C.

c. Electrical compartment temperatures not to exceed 85°C at its hottest point with the highest density of electronic components in the enclosure at a maximum ambient temperature of 50°C.

d. The LED manufacturer's maximum thermal pad case temperature for the expected life shall not be exceeded at maximum drive current.

e. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

f. When conducting testing required for TM-21 Calculator, must demonstrate case temperature for the LED was taken at the hottest point on the surface.

g. TM-21 Calculator report data must either represent the exact configuration of the fixture or a configuration of maximum LEDs at highest drive current.

h. Driver must be thermally protected such that the fixture will go into a protective mode if operating temperatures exceed rated parameters. Fixture must maintain full output at minimally 50°C ambient condition.

5. Physical and Mechanical Requirements

a. Heavy-wall die-cast aluminum housing. Housing shall be designed to allow water runoff on the top of the housing when mounted horizontally.

b. Luminaire shall include a die-cast aluminum mounting arm to universally accommodate pole drill patterns from 1-1/2" to 4-7/8". Standard mounting arm must mount to round and square poles without the use of an adapter. Standard

mounting arm to act as electrical enclosure for all fixture wiring during installation.

c. The housing assembly shall be protected against mechanical impact to withstand an IK10 rating.
d. The maximum weight of the luminaire and mounting arm combined shall be XX lbs. and the maximum effective projected area shall not exceed X.XX ft^2.
e. The housing shall meet the requirements for NEMA/UL wet location and be UL 1598 listed.
f. The luminaire shall be ingress protected against dust and moisture intrusion per the requirements of IP66 (minimum) to protect all internal components.
g. The assembly and manufacturing process for the LED luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration. Luminaire shall withstand vibration, meeting ANSI C136.31 American Standard for Roadway and Area Lighting Equipment – Luminaire Vibration for normal and bridge operation (3G minimum in all 3 planes tested in heaviest configurations).
h. Housing and door frame shall be aluminum with a nominal 2.5 mil thick paint finish able to withstand a 3000-hour salt spray test as specified in ASTM Designation: B117.
i. Luminaire must offer a coastal construction option which applies a finish coating to the paint to achieve a minimum of 5,000-hours per ASTM B117, with a minimum scribe rating of 9 per ASTM D1654.
j. Luminaire to be packaged in a suitable carton that withstands ISTA-1A testing requirements for packaging vibration, shock (drop) and compression. Luminaires and components to be packaged in a way to avoid breakage, bending, and scoring finishes.