

# **Solano Community College District**

## **Lighting Standards**



Prepared for:

Solano Community College  
4000 Suisun Valley Road  
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FINAL SUBMITTAL  
1-29-2016

Approved 3-16-16 by Board of Trustees

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## **Design Standard for Lighting**

### **Purpose:**

This design standard has the purpose of specifying complete luminaires with a level of quality which meets the requirements throughout the Solano Community College District for all renovation and new building projects.

### **Design Standards:**

- All lighting shall be designed per the latest edition of the California Electrical Code, California Energy Code, and California Green Energy standards.
- Comply with the recommendations of the Illuminating Engineering Society (IES).
- Comply with applicable ANSI standards pertaining to lamp materials, lamp ballasts, drivers, transformers, and luminaire.
- Comply with applicable NEMA standards pertaining to lighting equipment.
- Comply with fallout and retention requirements of CBC for diffusers, baffles, louvers, and the like.
- Provide all structural and seismic supports as required by the California Building Code and approved by DSA.
- All lighting fixtures, and their placement in the building, shall be selected with future maintenance in mind.
  - No fixture shall be selected or mounted that will require more than one person to service the fixture.
  - Nor shall they be located where a 6-10 foot ladder can not readily access the fixture for re-lamping or other maintenance.
- Provide luminaires and lampholders which comply with UL standards and have been UL listed and labeled for location and use indicated.
- Fixtures shall have a minimum 5-year warranty from the manufacturer.
- Provide spares as noted:
  - Furnish 2 percent extra lens or louvers for each size and type of luminaire.
  - Furnish 5 percent extra drivers for each size and type of fixture.
  - Furnish 10% extra lamps for each site and type installed.
- Light Emitting Diode (LED) technical requirements:
  - Luminaire manufacturers shall have a minimum of five (5) years' experience in the manufacture and design of LED products. All LED sources shall be of proven quality from established and reputable LED manufacturers. Acceptable LED manufacturers unless otherwise noted are:
    - Cree, Inc.
    - Philips Lighting
    - Osram Optronics Semiconductors.
    - Nichia
    - GE Lumination
  - LED luminaires and components shall be UL listed.
  - LEDs shall have a rated source life of 50,000 hours under normal operating conditions. LED "rated source life" is defined as the time when a minimum of 70% initial lumen output remains.
  - LED's shall be adequately protected from moisture or dust in interior applications.

- Luminaire assembly shall include a method of dissipating heat so as to not degrade life of source, electronic equipment, or lenses. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Thermal management shall be passive design. The use of fans or other mechanical equipment is not allowed.
- LED drivers shall have reverse polarity protection, open circuit protection and a minimum 80 percent efficiency. Class A noise rating.
- LED fixtures shall be capable of full and continuous dimming. There shall be no visible flicker to the unaided eye over the dimming range.
- Photometry shall comply with IESNA LM-79 “Electrical and photometric measurements of solid state lighting products”
- Luminaires shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.
- The LED arrays shall be constructed such that a failure of an individual LED will not result in the loss of the entire array.

Interior lighting shall be designed with the following considerations:

- Interior lighting shall be LED based. The use of non-LED fixtures is not allowed without the approval of the district on a case by case basis.
- Where lighting control systems are required per Title 24, the system shall include lighting relay control panels, daylight harvesting, motion sensors, switch inputs, and connections to other building systems (fire alarm, security and energy management systems for HVAC.)
- For classrooms supporting AV presentations:
  - Provide multi-level switching and/or dimming to switch front of class to support AV presentations while allowing some light in the student area for note taking.
  - Provide a lighting control location at front of class for easy control by instructor.
- Restroom lighting is recommended to be specified with lenses for ease of cleaning. Avoid installation of lighting over stalls (hard to maintain).
- Consider the high surface brightness of LEDs and specify downlights with diffusing lenses or recessed LED arrays within the fixtures to minimize glare.
- Undercabinet lighting shall be low profile and easily integrate into the furniture.
- Non-electric supplied exit signs shall be non-radioactive photoluminescent signs. Tritium powered (radioactive) exit signs are prohibited for installation on campus.
- 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.
- Luminaire shall be high efficacy with a minimum of 60 lumens per watt.
- Where recessed luminaires are installed in cavities intended to be insulated, provide IC rated luminaire or other code approved installation.
- Recessed 2’x4’ luminaires shall employ concealed LED’s with a center panel.
- Luminaires installed under canopies, roof or open porches, and similar damp or wet locations, shall be UL listed for damp or wet locations.
- Recessed luminaires shall have the frame compatible with ceiling material installed at particular location. Provide proper factory trim and frame to fit location and ceiling material.

- Finishes:
  - Manufacturer's standard finish (unless otherwise indicated) over a corrosion resistant primer.
  - Interior Light Reflecting Finishes: White or specular finish with not less than 85 percent reflectance.
- Light Transmitting Components:
  - Plastic diffusers, molded or extruded of 100 percent virgin acrylic.
  - Prismatic acrylic, extruded, flat diffusers, 0.125 inch overall thickness, unless otherwise noted

Exterior Lighting shall be designed with the following considerations:

- Confirm the color kelvin temperature rating with respect to security, proximity to observatories, and as directed by District. For example, the International Dark-Sky Association recommends a warmer 3000K rating or lower for minimizing light pollution and visual comfort. However, parking areas and higher security locations may consider a cooler 5000K rating or higher for increased visibility.
- There is a need to connect exterior fixtures to on site lighting circuits, some on night lighting circuits. Verify requirements for each of the campuses or as directed by the District.
- Provide accent lighting for building (i.e. entrances.) Entrance lighting is important as there are as many night school students as day.
- Add provision for art and accent landscape lighting to surrounding area from any renovation, remodel or new construction including, but not limited to controls of lighting and point of connection.
- Provide documentation regarding dark sky issues and write up requirements that lights must have cut offs to cover intended area but no more. Comply with Title 24 and consider minimizing light pollution.
- Coordinate placement of fixture with landscape plan to ensure trees and brush do not conflict with lights.
- Parking lots, major walkways, pathways, stairs, and intersections should be sufficiently lit to meet safety standards. Provide adequate lighting for safety without over lighting.
- State of California minimum photometric foot candles for various areas must be met.

**Approved Manufacturers:**

Interior Lighting

- Recessed 2' x 4' LED Troffer
  - Manufacturer: Lithonia Lighting
  - Model: 2VTL

Exterior Lighting

- Parking Lot Lighting
  - Manufacturer: McGraw-Edison
  - Model: 20' pole with double and single LED luminaire - GLEON.
  - Color: AP Grey

- Parking Lots Vallejo Center
  - Manufacturer: RAB
  - Model: Tapered pole with LED luminaire – ALED5T52N
  - Color:
- Pedestrian Walkway
  - Manufacturer: RAB
  - Model: 15' tapered pole, with luminaire - ALED5T52N.
  - Color: Custom Sandtext.
- Pathway LED Lighting
  - Manufacturer: Landscape Forms, Inc., Hawthorne.
  - Model: Hawthorne.
  - Color: Stormcloud.
  - Mount: Surface.
- On Property Roadway Lighting
  - Manufacturer: GE Lighting Solutions
  - Model: Evolve LED Roadway Lighting – ERXI
  - Color:
- Finishes:
  - Verify pole and fixture colors with District. Finishes shall be highly durable.

**Substitutions Allowed**

- No substitutions allowed.

**Associated Design Standards and Specifications:**

- 26 05 19 – Wires, Cables and Connectors
- 26 05 48 – Supporting Devices