	Title: YALE OFFICE OF FACILITIES PROCEDURE MANUAL Chapter: 01 - Yale Design Standard Division: 26 Electrical Standards	Section: 26 56 00 Requirements for Exterior Lighting
		Date: 10/11/21 Posted March 2022
		Author: Office of Utilities and Engineering

Date	Description of Change	Pages / Sections Modified	ID
6/15/16	Entire document	-	mgl44
10/14/21	Dark-Sky performance requirements	-	CJ
11/18/21	Control requirements	-	JR

PART 1 - INTRODUCTION

1.1 PURPOSE

A.

1. This section contains design criteria for general, exterior-use luminaires and poles, and their associated lighting control methods.


1.2 REFERENCE DOCUMENTS

1. International Energy Conservation Code (IECC) 2015
2. ASHRAE 90.1 Energy Standard for Buildings 2013

PART 2 - GENERAL DESIGN REQUIREMENTS


2.1 System Design and Performance Requirements

- A. Design an exterior lighting system that balances, safety, security, efficiency, and cost while minimizing light pollution on campus. Refer to guidelines outlined by the International Dark-Sky Association, darksky.org, and provide exterior lighting that follows the guidelines and a) only in areas that need it and only on when needed, b) no brighter than necessary, c) that minimizes blue light emissions and d) is shielded and pointing downward.
- B. Design and locate all exterior luminaires to minimize illumination of adjoining private property not owned by Yale University or its affiliates.
- C. The goal of exterior lighting is to light pathways, areas of circulation, and to provide adequate light for a sense of security. The design shall **not** light building facades and landscaping, or provide any other illumination that compromises energy conservation or ecological protection requirements
- D. Provide lighting that is easily maintainable
 1. Design and locate all exterior luminaires to minimize damage from vandalism.
 2. Design exterior luminaires, poles, and foundations to withstand sustained winds of minimum 90 miles per hour.
 3. Avoid luminaires that use unusual lamps.
 4. Avoid custom fixtures; however, minor modifications to stock fixtures are acceptable.
- E. Lighting controls and timers to be selected in coordination with the Yale Office of Facilities , Utilities and Engineering. Lighting controls shall be in accordance, at a minimum, with the requirements below.
 1. Auto turn OFF lights when daylight is available.
 2. ~~Building façade and landscape lighting shall be auto turn OFF between 12a.m. and 6a.m., or between business closing and opening.~~
 3. ~~Other exterior lighting than mentioned above,~~ and lighting for signage, shall auto turn lights down to 50% power, for at least one of the following conditions:

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- a. From 12a.m. to 6a.m, ~~or between business close and open~~
- b. When no activity has been detected, for no longer than 15 minutes.
- 4. Luminaires for parking areas greater than 78W and mounting height 24 feet or less from the ground shall auto reduce the power by at a minimum of 50% when no activity has been detected, for no longer than 15 minutes. No more than 1500W of lighting shall be controlled together.
- 5. All time switches shall be able to retain programming during a loss of power of at least 10 hours.
- 6. Building exterior areas/locations shall have the following lighting power allowances:

Area Type	Power Allowance
Uncovered Parking Area	0.04 W/ft ²
Building Grounds	
Walkways/ramps less than 10ft wide	0.5 W/linear foot
Walkways/ramps more than 10ft wide, plaza areas, special feature areas	0.1 W/ft ²
Dining areas	0.65 W/ft ²
Stairways	0.7 W/ft ²
Pedestrian tunnels	0.12 W/ft ²
Building Entrances/Exits	
Pedestrian/Vehicle entrances and exits	14 W/linear foot of opening
Entry Canopies	0.2 W/ft ²
Loading Docks	0.35 W/ft ²
Uncovered entrances and gatehouses/guard stations	0.5 W/ft ²
Uncovered loading areas for emergency vehicles	0.35 W/ft ²

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2.2 Submittals

- A. Submit the following design and construction documentation.
 1. Designer Submittals
 - Submit an exterior illumination plan showing footcandles at ground level.
 - Submit catalog cuts.
 2. Construction Documents
 - Submit shop drawings and product data.

PART 3 - MINIMUM PRODUCT REQUIREMENTS

3.1 Manufacturers

- A. In areas of campus with cohesive exterior lighting, select luminaires consistent with existing and consider reusing luminaires, relocating them as applicable to the project. Generally, these include the following manufacturers:
 1. Sentry
 2. Phillips
 3. Lithonia
- B. In areas of campus where public safety requires the placement of an emergency blue light call box, select product Ramtel PLC-8A-LED, or an equivalent product that is ADA compliant and accepted by Yale Public Safety.
- C. In areas without consistent exterior lighting, select luminaires in consultation with Yale Office of Facilities Planning to ensure appropriate design section while maintaining high standards of quality, energy efficiency, maintainability, and cost-effectiveness.

3.2 Materials

- A. Use aluminum poles and stainless-steel hardware (including the grounding screw). Do not use break-away poles unless the poles are located adjacent to vehicular thoroughfares and are in accordance with AASHTO guidelines.

3.3 Equipment

- A. Use at least two feet of flexible cord to connect luminaires that are movable for aiming or relamping to an adjacent junction box. Specify fittings for strain relief.
- B. Do not provide luminaires with fuses.

3.4 Cleaning and Adjusting

Clean & adjust luminaires at the end of the construction period. If necessary, aim the lights after dark.