



Port of Oakland Exterior Lighting Policy

Port of Oakland Sustainability Opportunities Program

Purpose:

The Port of Oakland through its *Sustainability Opportunities Program* seeks to mitigate the impact of exterior lighting on the surrounding community and to conserve energy. Under the Port of Oakland's Lighting Policy, the Port and Port of Oakland tenants shall comply with the prescribed lighting measures to prevent potential lighting pollution that may be generated by development and operations and to conserve energy in all areas under the jurisdiction of the Port of Oakland.

Area and Lighting Systems Covered by Policy:

Policy shall apply to all new development or modification that includes the construction of exterior lighting systems at the Oakland International Airport, harbor facilities, and commercial, retail, and industrial mixed-use areas which include the Airport Business Park, Jack London Square and Embarcadero Cove Areas.

Exterior lighting systems proposed for the following development shall be covered by the Policy: automobile and aircraft parking areas, roadways, medians, sidewalks, container yards, rail and joint intermodal facilities, biking and walking pathways, architectural and landscape ornamental lighting fixture installations, building exterior wall and roof mounted lighting fixtures, storefront and marketing areas, and billboards and signs.

Port Staff and Port and Tenant Engineering and Architectural Design Consultants:

Port of Oakland Engineering staff, Port contracted Engineering and Architectural Consultants and technical representatives responsible for design of tenants' facilities shall comply with the mitigation measures presented herein.

Tenants:

Exterior lighting plans shall comply with the mitigation measures specified in the *Port of Oakland Exterior Lighting Policy* for glare control and energy conservation stated herein, prior to issuance of Port of Oakland Building Permit.

General Mitigation Measures and Practices:

Design of exterior lighting shall generally follow Illuminating Engineering Society of North America (IESNA)- *Recommended Lighting Levels for Exterior Lighting*. The *Dark-Sky Association* further recommends that lighting designers minimize illumination levels, pole height and spacing, glare, lighting system depreciation and life-cycle cost, (see *Lighting Criterion Schedule*). Additionally, lighting pollution mitigation measures include specifying full cutoff light fixtures, horizontally oriented lamps (bulb), and low-reflectivity architectural surfaces.

Lighting Plan Submission Requirements:

Plans submitted by Port Engineering Staff, tenants and consultants for a Port of Oakland Building Permit or project review and approval, which propose the installation of exterior lighting for a new development or a modification to existing area shall clearly indicate the following:

- 1) Location and quantity of lighting fixtures
- 2) Proposed lux or footcandle levels
- 3) Specified type(s) and manufacturer(s) fixture(s), manufacturer's photometric data sheet, lamp wattage, top shield and side guard cut sheets
- 4) Pole height and spacing
- 5) Bi-level illumination plan operated by automatic shutoff controllers, photocells and/or astronomical timer system (high/full for high activity operation level; and low, approx. 50% or less of full illumination for security/low night activity level).
- 6) Calculation on plan sheet indicating the lamp wattage in full activity operation mode and power usage in security/low night activity mode (if applicable)
- 7) Calculation of lighting watts/ft² for all exterior lighting systems (Total watts of all light fixtures / ft² of the lighted area that at least receive the min. fc)
- 8) Building exterior type and color of architectural finishes
- 9) Written request for any exemption from the lighting policy accompanied by all supporting documentation of reasons for consideration.

Lighting Policy Technical Liaison:

Contact Joseph Hu at jhu@portoakland.com or (510) 627-1665, if you need additional information on Policy compliance requirement.

ASHRAE and State Legislation Development:

The State of California Energy Commission (CEC) has contracted a team of engineering firms in response to a Senate bill to develop standards for energy conservation and lighting pollution mitigation requirements for outdoor lighting. The proposed legislation is entitled: ***Senate Bill 5X Outdoor Lighting Standards***. The draft bill is scheduled for completion in July 2003. The enforcement of the standard may be facilitated through an amendment to the California Energy Code-Title 24 or adoption into the Title 24 of the existing Federal ASHRAE/IESNA 90.1-1999, which mandates standards for energy conservation of outdoor lighting systems. The Port of Oakland Lighting Policy will be evaluated and the Executive Director will make appropriate revisions to the Policy as necessary to be consistent with the CEC Standards.

Lighting Criterion Schedule:

Illumination Subject Area	Recommended IESNA, Dark-Sky Assoc. Lighting Level (fc)	Required Uniformity Avg./Min. (fc/fc)	Port Policy Glare Mitigation Requirements	Energy Conservation Requirements
Auto Parking Lots Retail Centers, Airport	2.4 Avg.	4/1	Full cut-off fixtures	Photocells, timers optional
Aircraft Parking Areas	2 Avg.	4/1	Provide Pole height less than 80 feet, full cut-off fixtures, install side shields and visors, review of AOA lighting by local Air Traffic Control Rep.	Photocells, timers, bi-level, push button hi level energizing with auto shut-off of hi level after specified period
Roadways and Streets (Maintained by Port or Tenants)	0.6 Avg.	6/1	Full cut-off fixtures, install side shields and visors	Photocells
Driveway Entrances	0.6 Min.	NA	Illumination level to match fc/lx level of street or parking area	Photocells
Rail/Intermodal Facilities	5 Avg.	3/1	Full cut-off fixtures, fully equipped with shields, guards	Bi-level lighting plan, Photocells, and timers
Container/Shipping Yards	5 Avg.	3/1	Full cut-off fixtures, fully equipped with shields, guards	Bi-level lighting plan, Photocells and timers, shutoff plan for fixtures illuminating estuary (berth position)
Biking/Walking Pathways	See tables 5,6,7,and 8 in IESNA RP-8-00	4/1	Full cut-off fixtures, max. height less than 28 feet	Photocells
Sidewalks/medians	See tables 5,6,7,and 8 in IESNA RP-8-00	4/1	Full cut-off fixtures, max. height less than 35 feet	Photocells
Architectural/Landscaping	1 Avg.	4/1	Minimize use of up-lights, less than 100W, Aim on specific subject (i.e. tree, sign, monument)	Photocell, timer optional
Storefronts/Marketing Areas	10 Avg.	NA	Direct light downward, minimize spill into adjoining areas, minimize light level contrast between pedestrian and vehicle travel areas	Timer control system
Building Exterior –Light Colored Surfaces	5 Avg.	NA	Aim downward	Photocell, timer
Building Exterior –Dark Colored Surfaces	20 Avg.	NA	Illumination aimed downward	Photocell, timer
Billboards	15 Avg.	NA	Light from the top down	Photocell
Sports Fields near residential park areas	30-50 (infield) Avg. 20-30 (outfield) Avg.	4/1	Plant trees on perimeter of field, full cut-off fixtures, top shields, minimize height of poles	Photocell and timer controls, bi-level for non use periods

Glossary of Terms:

AOA: Aircraft Operations Area, secure area for aircraft movement

Footcandle: Unit of measure of illumination lumen/ft² (fc).

Full Cutoff Light Fixtures: A light fixture with a light distribution with no illumination (lumens) above the horizontal.

Fully Shielded: Top shields and side guards constructed in such a manner that all light emitted by the fixture, either directly from the lens or diffusing element, or by the lens or reflective surfaces is projected below the horizontal plane of the fixture.

Glare: The sensation that illumination is greater than the luminance to which the eyes are adapted and may cause annoyance, discomfort, and loss of visibility.

IES: Illuminating Engineering Society, body that establishes recommended illumination practices, IESNA - Illuminating Engineering Society of North America is the originator of International Dark Sky Association recommendations.

Lumens: SI (System International) unit of measure of luminous used to measure light emitted by lamps (bulbs).

Lux: Metric measurement of illumination 1 lux= 1 lumen/square meter (10.76 lx = 1 fc).

Photometrics: Fixture/lamp performance characteristics.

Shield: An opaque baffle placed along the top edge of a lighting fixture to control light distribution in the vertical direction.

Side Guards: Opaque baffles placed on the side or sides of a lighting fixture to control light distribution in the horizontal direction.

Uniformity: The measure of the consistency or evenness of illumination: Uniformity ratio is calculated as the Maximum (fc, lx) to minimum (fc, lx) or Average (fc, lx) to minimum (fc/lx).