

# City Policy for Exterior and Site Lighting



## PURPOSE:

Encourage quality site lighting design while providing a sense of safety and security by reducing excessive light levels, light trespass and glare.

## DESIGN PRINCIPLES:

- The use of lighting should be integrally designed as part of the built environment and should reflect a balance for the lighting needs with the contextual ambient light level and surrounding nighttime characteristics of our community. In conjunction with the Zoning Ordinance, recommended light level guidelines and uniformity ratios established by the Illumination Engineering Society of North America (IESNA) in the IESNA Lighting Handbook (current edition) should be considered when determining appropriate lighting design solutions. All exterior lighting design require the approval of the Development Review Board (DRB).
- Lighting designs must be designed to minimize glare, light trespass, energy conservation and to maintain dark skies. The lighting designers should consider utilizing per-curfew and post-curfew lighting designs with automatic control systems to eliminate excessive light during non-active hours of site and building operation.
- Full cut-off fixtures, mounting heights and shielding must be utilized to effectively control glare and light trespass.
- Any exterior lighting designs shall take into account all existing and proposed exterior lighting sources.
- Architectural lighting, if proposed, shall be included with the DRB application. Architectural lighting should only be utilized at the pedestrian scale and to highlight special features. Lighting of expansive wall planes, towers and roofs or the use of architectural lighting that results in "hot spots" must be avoided.
- Landscape lighting, if proposed, shall be included with the DRB application. Landscape lighting should only be utilized to accent landscaping, be pointed away from property lines, and fixtures shall contain extension shields to minimize glare and light source visibility. In areas with the Environmentally Sensitive Lands Overlay (ESL), lighting must be shielded and directed downward.

## ILLUMINANCE RECOMMENDATIONS

Ambient Light Level *	Recommended Maintained Footcandles ( <i>based on IESNA RP-20-98</i> ) (horizontal fc measured at grade)	
	Average	Maximum
E-1 – Intrinsically Dark Areas	1	4
E-2 – Estate/Rural Areas	1.5	6
E-3 – Suburban Areas	2	8
E-4 – Urban/Pedestrian Activity Areas	2.5	10

## LIGHT TRESPASS LIMITATIONS

Ambient Light Level *	Recommended Maintained Footcandles ( <i>based on IESNA RP-33-99</i> ) (vertical fc measured six (6) feet above grade at property line)
E-1 – Intrinsically Dark Areas	0.1
E-2 – Estate/Rural Areas	0.3
E-3 – Suburban Areas	0.8
E-4 – Urban/Pedestrian Activity Areas	1.5

\* Refer to the Design Standards & Policy Manual for general Environmental Zone Locations (E-#). These locations are a guide, but are not conclusive and are subject to the approval of the DRB.

## Planning and Development Services

7447 E. Indian School Road, Suite 105, Scottsdale, AZ 85251 ♦ [www.ScottsdaleAZ.gov](http://www.ScottsdaleAZ.gov)

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## SUBMITTAL REQUIREMENTS:

### Exterior On-Site Lighting Details:

- All exterior fixture lighting manufacture cut sheets (to be provided on 24" x 36" paper). Each cut sheet shall clearly identify the light fixture manufacture number utilized, the plan cross-reference identification, and be legible. (State law prohibits Mercury Vapor lighting.)
  - Plan identification symbol or abbreviation
  - Fixture graphic
  - Fixture type
  - Fixture add-ons, if utilized
  - Lamp type utilized
  - All photometric data
  - Candela distribution curve

### Photometrics:

- Photometric plans shall be provided for the entire site addressing Zoning Ordinance, rezoning cases (ZN), conditional use permit cases (UP), Development Review Board cases (DR), Design Guidelines, and this City Policy for Exterior and Site Lighting. Additional information may be required by staff after they have evaluated the design.
- There is a minimum of two photometric studies required for each project. They are: (1) a horizontal illuminance analysis for the site, and (2) a vertical light trespass analysis around the perimeter of the site. Each plan requires the following information:
  - A point-by-point foot-candle reading. The horizontal photometric plan grid points, utilizing distinctive grid point symbols (example: \*), shall have a maximum spacing of ten (10) feet between each point across the entire site, and shall extend ten (10) feet beyond the property line or area of site. The vertical photometric plan grid point shall be provided only along the property line or edge of site with a maximum spacing of ten (10) feet between each point.
  - A foot-candle reading shall also be provided under at least one of each light fixture type.
  - The plan shall include the lighting templates generated by the lighting design software program to calculate the foot-candle readings. The template shall be for the fixture and lamp specified on the plans. The plan's fixture type identification shall match the cut sheets, electrical site plans, and the lighting schedule. This information shall be provided in a summary table.
  - The plan shall identify the initial maximum, minimum, and average illuminance on the horizontal photometric plan and vertical photometric plan.
  - The plan shall identify the total maintained maintenance (light loss) factor utilized.
- The total maintained light loss factor for all horizontal photometric analysis shall not be below 0.70.
  - Plans shall only include one horizontal reading across the entire site. Only the building footprint shall be masked out from the reading. (Acceptable additional horizontal reading grids may be: gas station canopies, ATM drive-thrus, walk-up ATMs, and parking garage entries/exits. When separate grids are utilized on the same plan, a separate grid symbol (example: %) must be utilized, and a separate maintained maximum, minimum, and average illuminance shall be provided for the grid.)
- The light trespass plan (vertical illuminance) shall provide point-by-point foot-candle readings six (6) feet above the grade along the entire property line, with the reader at 90-degrees nadir and aimed perpendicular into the site. All light trespass plan readings shall be based on the initial illuminance, 1.00.
- The horizontal illuminance photometric plan, and the vertical light trespass plan may be combined into one sheet if the readings utilize distinctive symbols, a separate summary table for all fixtures utilized, and separate total light loss factors are utilized.
- The photometric plan(s) shall provide a lighting fixture summary table that presents the following information:
  - Plan identification symbol or abbreviation
  - Fixture type (include the manufacture product identification catalog number)
  - Lamp type (include the manufacture product identification catalog number and wattage)
  - Lamp lumens
  - Lamp degree Kelvin
  - Fixture lens height above lowest adjacent finished grade
  - Total light loss factor utilized

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