LEED BD+C: Schools | v2 - Schools 2007

Light pollution reduction

SSc8 | Possible 1 point

Glossary

Intent

Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.

Requirements

For interior lighting

All non-emergency interior lighting, with a direct line of sight to any openings in the envelope (translucent or transparent), shall have its input power reduced (by automatic device) by at least 50% between the hours of 11 PM and 5 AM. After hours override may be provided by a manual or occupant sensing device provided that the override last no more than 30 minutes.

OR

All openings in the envelope (translucent or transparent) with a direct line of sight to any non-emergency lighting shall have shielding (for a resultant transmittance of less than 10%) that will be controlled/closed by automatic device between the hours of 11 PM and 5 AM.

AND

For exterior lighting, excluding physical education spaces

Only light areas as required for safety and comfort. Do not exceed 80% of the lighting power densities for exterior areas and 50% for building facades and landscape features as defined in ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments. Meet exterior lighting control requirements from ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.

All projects shall be classified under one of the following zones, as defined in IESNA RP-33, and shall follow all of the requirements for that specific zone:

LZ1 — Dark (park and rural settings)
Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.01 horizontal and vertical footcandles at the site boundary and beyond. Document that 0% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2 — Low (residential areas)
Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.10 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal and vertical footcandles 10 feet beyond the site boundary. Document that no more than 2% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

LZ3 — Medium (commercial/industrial, high-density residential)
Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal and vertical footcandles 15 feet beyond the site. Document that no more than 5% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

LZ4 — High (major city centers, entertainment districts)
Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.60 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal and vertical footcandles 15 feet beyond the site. Document that no more than 10% of the total initial designed site lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

Sports field lighting (physical education spaces)
Automatic Shutoff: All sports lighting shall be automatically controlled to shut off no later than 11PM. Manual override shall be provided to avoid disruption of school sponsored sporting events.

Trespass calculations: All trespass calculations shall be submitted for two conditions: (1) With the sports lighting turned off and all other site lighting turned on, the light trespass requirements are as stated above, and (2) with just the sports lighting on, the

light trespass requirements for horizontal and vertical footcandles may be increased to the following illuminance levels:

LZ1 = 0.10
LZ2 = 0.30
LZ3 = 0.80
LZ4 = 1.50