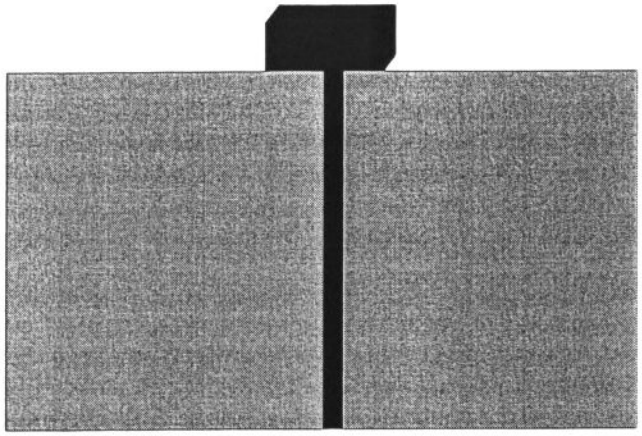
85 Attachment 8

Guidelines for Exterior Lighting

Figure 1

Fully Shielded Fixture:
no light emitted below the lowest light emitting part of the fixture
and no restriction as to amount at various angles below the horizontal.



Full Cutoff Fixture:
additionally restricts the amount of light emitted in the "glare zone"
(90-80 degrees below horizontal) to 10% of the total light output:

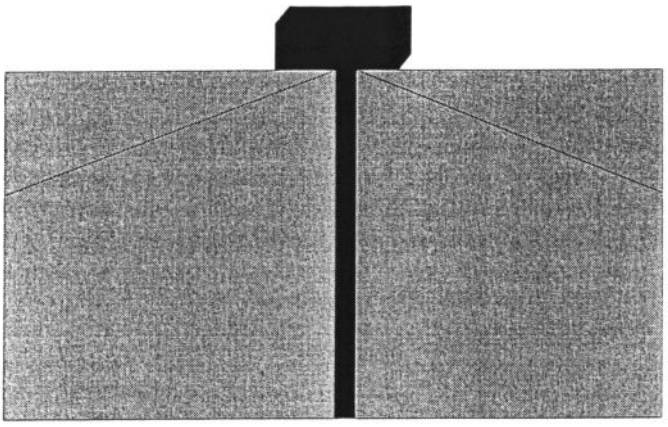


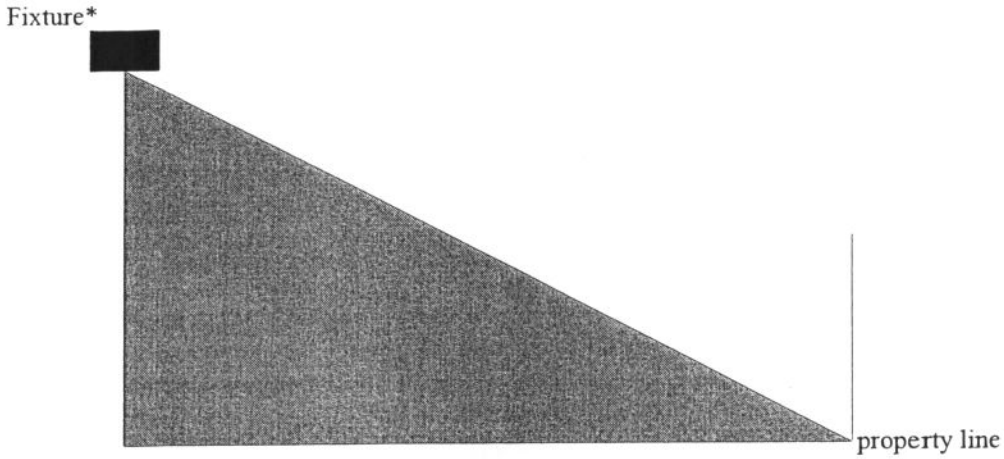
Figure 2

Examples of Acceptable/Unacceptable Lighting Fixtures

Figure 3

Calculating Fixture Height in relation to distance to property line.

Without available photometric data to execute a lighting plan, Fixture Placement set-backs can help to reduce incidence of light trespass and glare across property lines.



A fully shielded or full cutoff fixture will generally contain light to a site to reduce light trespass if this formula is followed:

Divide the distance (D) to the property line by three and add three feet to equal the maximum Mounting Height (MH).

Formula: MH no greater than 1/3 Distance to Property line plus 3 feet
(The Kennebunkport Formula)

For example:

Maximum Mounting Height	Distance to Property line
15	36
12	27
9	18
6	9

* Assumes common full cutoff fixture. Asymmetrical "sharp cutoff" full cutoff fixtures that have steeper cutoff angles or shielding at the "house side" may be placed closer to property boundaries provided their cutoff angles do not result in light trespass and footcandle measurements can be provided on a lighting plan.

Table 1

Limits of Illumination Target Areas for Parking Lots

	Illuminance Levels						Uniformity		
IESNA Document	**EMIN**	**EMAX**	**EAVE**	**EV-MIN**	**EV-AVE**	**ESC-MIN**	**MAX/MIN**	**AVE/MIN**	**MAX/AVE**
Lighting for Parking Facilities RP-20-98									
Medium	0.6		2.4				20:1	4:1	
Low	0.2		0.8				20:1	4:1	
High	0.9		3.6				20:1	4:1	

Light levels indicated are for active use of the facility during open business hours:

High:
Large shopping centers over 300,000 square feet of retail space.

Medium:
Community shopping centers between 5,000 square feet and 299,000 square feet of retail space

Low:
Neighborhood shopping retail of less than 5,000 square feet.

After hours, light levels may be cut by 50% or more.

Table 2

Limits of Illumination for Target Areas: Car Dealerships, Sidewalks, Walkways, and Gas Stations

	Illuminance Levels						Uniformity		
IESNA Document	**EMIN**	**EMAX**	**EAVE**	**EV-MIN**	**EV-AVE**	**ESC-MIN**	**MAX/MIN**	**AVE/MIN**	**MAX/AVE**
Lighting for Exterior Environments RP-33-99									
Sidewalks (Roadside) and Type A Bikeways									
Commercial areas			1		2		10:1		
Intermediate areas			0.5		1		10:1		
Residential areas			0.2		0.5		10:1		
Walkways Distant from Roadways and Type B Bikeways									
Commercial areas			0.5		0.5		10:1		
Intermediate areas			0.5		1		10:1		
Residential areas			2		0.5		10:1		
Car Dealerships									
Secondary Business Districts									
Adjacent to roadway		5 - 10					5:1		
Other rows		2.5 - 5					10:1		
Entrances		2.5 - 5					5:1		
Driveways		1 - 2					10:1		
Service Stations or Gas Pump Area									
Approach			1.5 - 2						
Driveways			1.5 - 2						
Pump island			5						
Service areas			2 - 3						

Table 3

Limits of Illumination for Roadways

IESNA Document		Illuminance Levels						Uniformity		
		EMIN	EMAX	EAVE	EV-MIN	EV-AVE	ESC-MIN	MAX/MIN	AVE/MIN	MAX/AVE
Roadway Lighting ANSI-RP-8-00										
Walkways/ Bikeways; Mixed use	High Pedestrian Conflict			2	1.0				4.0	
Walkways/ Bikeways; Pedestrian use only	High Pedestrian Conflict			1	0.5				4.0	
Walkways/ Bikeways; Pedestrian use only	Mediuim Pedestrian Conflict			0.5	0.2				4.0	
Collector (R2&R3)	High-Medium-Low Pedestrian Conflict			1.2 - 0.9 - 0.6					4.0	
Local	High-Medium-Low Pedestrian Conflict			0.9 - 0.7 - 0.4					4.0	