

## **PART 1 ZONING REGULATIONS**

### **SECTION 1-4700 LIGHTING STANDARDS**

#### **1-4701 INTENT**

The purposes of the outdoor illumination standards are to:

- (1) Provide adequate lighting for safety and security;
- (2) Reduce light pollution, light trespass, glare, sky glow impacts, and offensive light sources;
- (3) Prevent inappropriate, poorly designed or installed outdoor lighting;
- (4) Encourage quality lighting design, light fixture shielding, uniform light intensities, maximum lighting levels within and on property lines, and lighting controls;
- (5) Promote efficient and cost effective lighting and to conserve energy; and
- (6) Provide an environmentally sensitive nighttime environment that protects significant wildlife habitat.

#### **1-4702 APPLICABILITY**

The lighting standards contained in Part 1, Section 4700 shall apply to all exterior lighting, including illumination from outdoor signs and any interior lighting from buildings or structures that affect the outdoor environment, unless otherwise excepted or exempted herein. All uses that require Arapahoe County approval of a Final Development Plan, Master Development Plan, Administrative Site Plan, Subdivision Development Plan or Use by Special Review shall conform to these lighting standards.

- (1) Conformance at the Time of Building Permit Application: These requirements shall be met prior to a final inspection for any building

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permit for new development or any redevelopment in accordance with the appropriate process requirements for the application.

- (2) Replacement of Fixtures: If an existing non-standard light fixture is removed, it shall only be replaced with a conforming light fixture or fully shielded and mounted and in compliance with Illuminating Engineers Society of North America (IESNA) standards for full cut-off.
- (3) Replacement of Lamps: To the extent that compliance with this section can be achieved by replacement of a lamp within a light fixture, such lamp shall be replaced after failure of the lamp.
- (4) Single Family Detached Development: The lighting standards contained herein shall not apply to SFD except for the following: a) existing unshielded mercury vapor light fixtures shall be removed, replaced or shielded after failure of the lamp with light fixtures or shields that meet the requirements of this section, and b) all replacement lighting and lighting for new SFD development shall meet requirements for glare and light trespass as set forth in Section 1-4701 and Section 1-4703. SFD on parcels consisting of 100 acres or larger and zoned A-E and A-1 shall be exempt from any of the lighting standards contained herein.
- (5) Exemptions: The standards of this section shall not apply to the following types of exterior lighting:
  - (A) Ornamental Lighting: Ornamental landscape lighting where the maximum wattage of any single light fixture does not exceed the equivalent of fifteen watts incandescent or one hundred lumens and is not used from 12:00 a.m. to dusk.
  - (B) Strings of Light: Strings of light on residential properties shall be exempt from the requirements of this chapter.

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- (C) Aviation Lighting: Lighting used exclusively for aviation purposes. All heliport lighting shall be turned off when the heliport is not in use.
  
- (D) Right-of-Way Lighting: Public lighting located within the right-of-way is exempt from these lighting regulations except for requiring full cut-off fixtures on luminaries greater than 3,200 lumens (section 24-82-902, C.R.S.)

## **1-4703 OUTDOOR LIGHTING DESIGN STANDARDS**

For all lighting subject to these regulations, no person shall install or maintain any exterior lighting that fails to meet the requirements of this section. Exterior lighting shall meet the following design standards:

- (1) Shielded from View: The illumination from a lamp that emits more than 900 lumens shall be fully shielded from view from adjacent properties and public right-of-ways, except as otherwise permitted herein. Fixtures shall meet the IES standards for fully shielding, full cut-off and mounting of fixtures.
  
- (2) Light from Buildings and Signs: Illuminance levels shall not exceed 10 footcandles measured as initial horizontal illuminance, except as otherwise permitted herein. The initial illuminance level is measured following 100 hours of operation. The illuminance levels at building entrances and windows may exceed the maximum allowed by 100% to a distance of 5 feet from the building in order to accommodate light spillage from within the building and light from signage. The maximum outdoor illuminance level must be achieved at a distance of 10 feet from the building or use.
  
- (3) Maximum Initial Line-of-Sight Illuminance: PWD staff may request an analysis of line-of-sight on a case-by-case basis dependent on site conditions. The maximum initial line-of-sight illuminance is measured at

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the property line, measured five and one-half feet above grade aimed in a direct line of sight to the brightest light fixture visible from such point, shall not exceed 0.3 footcandles or 0.1 footcandles on residential properties.

(4) Light Source Requirements: All outdoor light fixtures should utilize one the following bulb types: metal halide, induction lamp, compact fluorescent, incandescent (including tungsten-halogen) , high pressure sodium and LED. Alternatives are permitted provided they are authorized by the Planning Division Manager and meet the requirements for an Exception as detailed in Section 1-4703.01 based on IESNA (Illuminating Engineers Society of North America) recommendations.

(5) Signs: Pan channel signs (letters only) shall not exceed maximum luminance ratings (unit of brightness). Enforcement will occur on a complaint basis for LED or luminance greater than 1000 candela per meter squared or 1000 nits. All lighting of signage shall comply with the adopted Signage Regulations (Section 3700).

(6) Standards for Lights adjacent to Property Zoned Residential or Next to Public Right-of-Way: Any light fixture located within fifteen feet from a property line within or next to a residential zoning district, or within ten feet of a public right-of-way shall be:

- (A) Aimed away from the property line or right-of-way;
- (B) Classified as a IESNA Type III or Type IV; and
- (C) Shielded on the side facing the residential property or public right-of-way.

(7) Maximum Light Fixtures on Poles: There shall be no more than two light fixtures per pole except for sports lighting and lighting for public recreational facilities.

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(8) Canopy lighting: Lighting fixtures mounted on canopies shall be installed such that the bottom of the light fixture or its lens, whichever is lower, is recessed or mounted flush with the bottom surface of the canopy and parallel to the ground. A full cut off light fixture may project below the underside of a canopy. All light emitted by an under canopy fixture shall be substantially confined to the ground surface directly beneath the perimeter of the canopy. No lighting except that permitted by the sign ordinance, shall be permitted on the top or sides of a canopy.

(9) Flag Poles: A flagpole may be illuminated by one upward aimed fully shielded spotlight light fixture which shall not exceed 3500 lumens (50 watts metal halide). The light fixture shall be placed as close to the base of the flagpole as reasonably possible.

(10) Strings of Lights: No person shall use a string of lights on property with non-residential uses except for the following:

(A) Strings of lights may only be used if:

(a) They are approved by the Planning Division Manager as part of an outdoor illumination plan or landscape plan approved by the Planning Commission and/or Board of County Commissioners. Such as plan must comply with all of the standards of these regulations. The use of such lighting shall be to create ambiance and pleasing pedestrian spaces in an energy efficient manner. Low wattage or low voltage fixtures and luminaries are required. Such lighting is limited to pedestrian areas including plazas, patios, landscape features, and primary entries into buildings. No such illumination is allowed in any required landscaped setback adjacent to a street; or

(b) For lighting displays from the last Thursday in November through the last Thursday in January.

## **1-4703.01 EXCEPTIONS**

The Planning Division Manager or designee is authorized to grant exceptions to these regulations in accordance with the following standards:

- (1) Equivalent Material: The Division Manager may approve any such alternate provided that the proposed design, material or method provides an approximate equivalent method of satisfying the standards of these regulations and comply with IESNA recommendations.
  
- (2) Exceptions: The Division Manager may grant an exception from the provisions of this section if the Division Manager finds that:
  - (A) There are special circumstances or conditions applying to the land, buildings, or outdoor light fixtures for which the exception is sought, which circumstances or conditions are unique to such land, buildings or outdoor light fixtures and do not apply generally to the land, buildings or outdoor light fixtures in the subdivision:
  
  - (B) The granting of the exception will generally be consistent with the purpose of this section and will not be injurious to the subdivision or otherwise detrimental to the public welfare; and
  
  - (C) The exception is a minimum change that provides the relief requested.
  
- (3) Temporary Lighting Exemption: The Division Manager may grant an exception from the requirements of this section for temporary structures and uses that comply with Sections 1-3900 and 1-4000 of the Zoning Regulations, if the Division Manager finds the following:

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- (A) The proposed lighting is designed in such a manner as to minimize light trespass and glare as described in Section 1-4701.

## **1-4704 SUBMITTAL PROCESS**

- When a lighting plan is necessary through a FDP, MDP, ASP, SDP or USR, the submittal requirements are determined by those regulations. When an approved PDP, ASP, FDP, SDP or USR does not adequately address lighting, these regulations shall govern. When an application is not part of a formal subdivision or zoning application and is being processed through the building permit process, the following standards and process will be required.

## **1-4705 SUBMITTAL REQUIREMENTS**

- These requirements may be modified as deemed necessary by the Planning Division Manager or designee.
- Lighting plan requirements:
  - (1) A site plan showing the location of all buildings and building heights, parking, and pedestrian areas on the lot or parcel;
  - (2) The location and description including mature height of existing and proposed trees;
  - (3) The location and height above grade of all light fixtures including building mounted fixtures;
  - (4) The type and lumen rating and wattage of each lamp source;
  - (5) The general style of the light fixture such as cut-off, lantern, coach light, globe, and a copy of the manufacturers catalog information sheet and IESNA photometric distribution type, including any shielding information such as house side shields, and internal and exterior shields;

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- (6) Control descriptions including type of controls (timer, motion sensor, time clock, etc. ), the light fixtures to be controlled by each type, and control schedule. How lights shall be controlled during post-curfew hours must be addressed in the plan;
- (7) Aiming angles and diagrams for sports lighting light fixtures;
- (8) A photometric plan, which shows the initial horizontal illuminance on a ten feet by ten feet minimum grid across the entire site and a minimum of ten feet beyond the lot or parcel property line. The grid shall also indicate maximum to minimum uniformities for each specific use area such as parking and circulation areas, pedestrian areas, and other common public areas; and
- (9) If required by staff, a lighting calculation indicating “Maximum Initial Line-of-Sight Illuminance” as described in Section 1-4703 (3).

## **1-4706 DESIGN REQUIREMENTS**

- The style, color and design of the fixtures shall be compatible with the overall design concept and use of materials for the building, site and area of the lighting plan.

## **1-4707 INSTALLATION AND MAINTENANCE STANDARDS**

- Operation and maintenance cost of the lighting system shall be the responsibility of the property owner.
- Requirements for maintenance shall include replacement of bulbs and light fixture, regular cleaning and replacement of light fixtures as needed.

## **1-4708 HOURS OF OPERATION**

Standards for the Operation of Light Fixtures: All light fixtures shall operate in accordance with the requirements of this section.

- (1) Pre-curfew: Pre-curfew light levels shall meet the standards specified in Section 1-4709.
  
- (2) Post-curfew: Post-curfew light levels shall meet the standards specified in Section 1-4709. Post-curfew lights shall be operated as follows:
  - (A) When Lights are to be Turned Off: Lights shall be controlled by automatic timers and turned off by 10:00 PM or within one hour of the close of the facility unless otherwise stated in the chart. After 10:00 p.m., controls such as motion sensors are required during post-curfew hours. Motion sensors or timers may also be used to activate additional lighting during emergency situations.
  
  - (B) Parking Lot Light Fixtures: All parking lot light fixtures, except the minimum necessary for security, shall be extinguished by 10:00 p.m. or within one hour after the close of the facility, and remain extinguished until dusk or one hour prior to the commencement of business, whichever is later. Security levels may include one of the following as determined by the Planning Division Manager: 1) no more than one footcandle, 2) 80% reduction in light level, or 3) one pole mounted fixture near the main entrance(s).
  
  - (C) Non-Essential Lighting: All non-essential lighting shall be turned off after the close of business or 10:00 p.m. whichever is more restrictive. Non-essential lighting includes but is not limited to lighting of landscaping, architectural features, tennis courts, ball fields, etc.

## **1-4709 Maximum Lighting Standards**

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- No person shall operate any device, which makes light in excess of the levels specified in this section. Light from any light fixture shall not exceed any of the following limits for its appropriate zoning district classification or use classification set forth in the table below. Any request to vary from these standards must be approved through Section 1-4703.01 for an Exception. In the event an applicant requests lighting levels at the higher levels specified by any use classification, such area shall use the minimum amount of light necessary to light only the use area. The remaining area on such a property shall use the lower standards for the zoning district classification.
- The following charts specify the lighting criteria based upon general land use categories. The land uses are divided between the Urban Service Area, Rural Area, and Eastern Community Planning Areas as defined by the Comprehensive Plan.

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## Urban Service Area

	<b>1) Single family Attached, Multi-family residential</b>	<b>2) Commercial, office, industrial</b>	<b>3) Public &amp; semi public use</b>
<b>Maximum initial horizontal illumination</b>	5 f.c. building entries and parking lots	10 f.c. building entries and parking lots, 20 f.c. under canopies, 20 f.c. on a **limited basis.	10 f.c. building entries and parking lots
<b>Maximum initial lamp lumens rating for all cut-off luminaire</b>	3,500 lumens  or 8500 lumens for six or more parking spaces	21,500 lumens or 24,000 lumens for 5 acre parking lots or greater	13,500 lumens
<b>Post-curfew maximum initial horizontal illuminance rating</b>	Entry lights may be left on. All other lighting except for parking lot and pedestrian circulation in commons areas shall be turned off	Landscape, building façade and non-circulation lighting shall be turned off.  Parking lots with more than 2 poles and pedestrian circulation lighting shall be reduced to *security levels.	Landscape, building façade, and non-circulation lighting shall be turned off.  Parking lots with more than 2 poles and pedestrian circulation lighting shall be reduced to *Security levels.
<b>Controls</b>	Required post curfew	Required post curfew	Required post curfew
<b>Maximum allowable pole height</b> (includes base and luminaire)	20 feet in parking lots  15 feet in all other areas	25 feet in parking lots (35 feet for parking lots of 5 or more acres in size) 20 feet in all other areas	20 feet in parking lots within or adjacent to residential zones, otherwise 25 feet

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## Urban Service Area/Rural Area/Eastern Community Planning Areas

	<b>4) Parking structures/covered parking use</b>	<b>5) Private Recreation</b>	<b>6) Public recreation Use</b>	<b>7) Emergency Facility Use</b>
<b>Maximum initial horizontal illumination</b>	10 f.c. within structure and at vehicle and pedestrian entries. 50 f.c. at the entrances for up to 20 feet during daylight hours.  5 f.c. for uncovered portions of parking areas and external pedestrian circulation areas.	The lesser of 30 f.c. or the IESNA standards for the specific sports venue.  5f.c. in parking lots and pedestrian areas	The lesser of 50 f.c. or the IESNA standards for the specific sports venue.  5 f.c. in parking lot and pedestrian areas.	5 f.c. at bldg. Entries, under canopies and emergency parking areas.  5 f.c. in parking lots and pedestrian circulation areas
<b>Maximum initial lamp lumens rating for all cut-off luminaire</b>	13,500 lumens	23,000 lumens for sports field  8500 lumens in other areas	107,000 lumens (sports fields only)  13,500 lumens in other areas	8500 lumens
<b>Post-curfew maximum initial horizontal illuminance rating</b>	Same as pre-curfew except that all non-circulation and non-parking area lighting shall be turned off.	No lighting except that for minimum *security levels permitted after curfew	Sports field or court lighting to be turned off 30 minutes after last event. 3 f.c. max for pedestrian circulation and parking areas for a maximum of one hour after last event.  *security levels	Same as pre-curfew except landscape, recreational and non-circulation lighting shall be turned off

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			thereafter.	
<b>Controls</b>	Automatic day-light controls required	Required post curfew	Required post curfew	Required post curfew
<b>Maximum allowable pole height</b> (includes base and luminaire)	15 feet on uncovered upper parking levels	20 feet in residential zones, 25 feet in all other zones.		20 feet in parking lots that are within or adjacent to residential zones, otherwise 25 feet

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## Rural Area/Eastern Community Planning Area

	<b>1) Single Family/ Attached Multi- family residential</b>	<b>2) Commercial, office, industrial-B-1,B-3, B- 4, I-1, I-2, MU</b>	<b>3) Public &amp; semi public use- schools, churches</b>
<b>Maximum initial horizontal illumination</b>	5 f.c. building entries and parking lots	5 f.c. building entries and parking lots, 15 f.c. under canopies	5 f.c. building entries and parking lots
<b>Maximum initial lamp lumens rating for all cut-off luminaire</b>	3,500 lumens	13,500 lumens (250 watts on 35 foot poles)	8,500 lumens
<b>Post-curfew maximum initial horizontal illuminance rating</b>	Entry lights may be left on. All other lighting except for parking lot and pedestrian circulation in commons areas shall be turned off	Landscape, building façade and non- circulation lighting shall be turned off.  Parking lots with more than 2 poles and pedestrian circulation lighting shall be reduced to *security levels.	Landscape, building façade, and non-circulation lighting shall be turned off.  Parking lots with more than 2 poles and pedestrian circulation lighting shall be reduced to *security levels.
<b>Controls</b>	Required post curfew	Required post curfew	Required post curfew
<b>Maximum allowable pole height (includes base and luminaire)</b>	20 feet in parking lots 15 feet in all other areas	25 feet in parking lots (35 feet for parking lots of 5 or more acres in size) 20 feet in all other areas	20 feet in parking lots within or adjacent to residential zones, otherwise 25 feet

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\*Security levels may include one of the following as determined by the Planning Division Manager: 1) 1 f.c. or less, 2) 80% reduction in lighting equipment left on, or 3) one pole mounted fixture near the main entrance(s).

\*\*A limited basis may include a main feature such as the front row of vehicles, a highlighted vehicle on a pad, retail canopies similar to gas stations and fast food canopies as long as the lighting equipment is full cutoff.