Efficiency Works

February 6, 2018

Night Sky Initiative
Nature in the City Objective CP2: 

*Work cross-departmentally and with external partners toward a darker night sky.*

Night Sky Initiative Goals:

- Maintain safety and security
- Develop and implement best practices in outdoor lighting
- Reduce light pollution
- Support human and ecological health
**Sustainable Approach**

**TRIPLE BOTTOM LINE**

**Outdoor Lighting Considerations**

**SOCIAL**
Safe and effectively lit roadways and other areas, minimized light pollution and glare, and a visible night sky.

**ECONOMIC**
Energy cost, replacement cost, installation cost, maintenance cost.

**ENVIRONMENTAL**
Human and wildlife health, energy efficiency.
Night Sky Initiative

Education
- Lighting Series
- Saddlebrook retrofit
- Local business & resident outreach/rebate opportunities
- Articles for Neighborhood Newsletter, Soapbox, CityNews
- Social media campaign
- Citizen science
Technical/Code Work
Code changes:
- 2017-Night sky friendly lighting on all residential and commercial buildings
- 2018- site lighting
Monitoring Work:
- Establish baseline and benchmarks
- One monitor currently (Hilton)
IDA Certification

- Soapstone and Red Mountain
- Continue Citizen Science opportunities
What is Light Pollution?

- Sky glow
- Light trespass
- Glare
  - Nuisance
  - Discomfort
  - Disability
- Clutter
What is Light Pollution?

- Sky glow
- Light trespass
- Glare
- Clutter
Outdoor Lighting Best Practices:

- Light only where you need it
- Light only when you need it
- Shield lights and direct them downward
- Use the minimum amount of light needed
- Select the most energy efficient lighting
- Select lamps with warmer colors
Lighting Best Practices

**Good for nighttime usage**
- **2700K** Extra Warm White
- **3000K** Warm White

**Good for daytime usage**
- **3500K** White
- **4000K** Cool White
- **6000K** Daylight
**Lighting Facts Label**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Light Output (Lumens)</td>
<td>336</td>
</tr>
<tr>
<td>Watts</td>
<td>6</td>
</tr>
<tr>
<td>Lumens per Watt (Efficacy)</td>
<td>60</td>
</tr>
<tr>
<td>Color Accuracy</td>
<td>86</td>
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</tbody>
</table>

**Light Color**

- Correlated Color Temperature (CCT): 3013 (Bright White)
- Warm White: 2700K
- Bright White: 3000K
- Daylight: 4500K
- 6500K


All results are according to IESNA LM-79-2008. Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.
Night Sky Initiative – Focus Areas

- Land Use and Building Code Updates
- Pursue International Dark Sky Certification for Soapstone Natural Area
- Monitoring for sky quality in key locations throughout the City
- Education, training and outreach
- Pilot projects and case studies
- Consider other actions and future ordinances to support night sky objectives
# How the City Regulates Lighting

<table>
<thead>
<tr>
<th></th>
<th>Residential Code</th>
<th>Energy Code</th>
<th>Land Use Code</th>
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<tbody>
<tr>
<td>Single-Family Detached</td>
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<td>Single-Family Attached</td>
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<td>Duplex</td>
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<tr>
<td>Multi-Family</td>
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<tr>
<td>Commercial</td>
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<td>X</td>
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</tbody>
</table>

X – Likely to be added in 2018
What the City DOES Currently Regulate

Light Placement:
- Buildings, parking lots, walkways, plazas, landscape areas
- Spillover lighting (foot-candles)
- Impacts to adjacent properties
- Impacts to natural features

Light Fixtures:
- Efficiency
- Shielding
- Glare
- Brightness

Operations
- Timing
- Dimming
What the City DOES NOT Currently Regulate

**Light Fixture Specifications:**
- Color temperature (Kelvin)
- Lumens
- Wattage
- Pole height
- Specific technology (e.g., LEDs)
Potential Land Use Code Updates

- Creation of lighting zones and/or limits specific to different land use types
- Maximum pole height/mounting height
- Limits on color temperature
- Limits on lumens emitted
- Limits on backlight, uplight and glare (BUG ratings)
- Hours of operation, automatic controls
- Require full cutoff and down directional fixtures for single family residential development
- Exemptions for holiday decorations, string lights, sculptures, etc.
Comparable Communities

- Flagstaff, AZ (first Dark Sky Certified city)
- Tucson, AZ
- Boulder, CO
- Eugene, OR
- Plymouth, MN
- Homer Glen, IL
Pop Quiz!
During what stage(s) in the process is outdoor lighting reviewed?

Select all that apply:

A. Development review (pre-hearing)
B. Final plan compliance
C. Building permit review
D. Post-construction

A. 27%
B. 24%
C. 25%
D. 24%
Which types of outdoor lighting are regulated by Fort Collins codes?

Select all that apply:

A. Building lighting
B. Parking lot lighting
C. Street lighting
D. Pedestrian walkway/plaza lighting
E. Decorative/landscape lighting
F. Canopies/outdoor sales areas
Which of the following are currently required?

Select all that apply:

A. Color temperature <3000K
B. Full cutoff, fully shielded fixtures
C. Automatic dimming after business hours
D. Motion sensors on the back side of buildings
E. No light spill into natural areas
Land Use Code Requirements

• Minimum & maximum foot-candle levels depending on location
• Light fixtures must be:
  • Concealed
  • Fully shielded
  • Full cut-off
• Up-light, spill-light, glare, contrast & brightness should be minimized
• Natural areas/features should be protected from light spillage
Choose your top 3:

A. Energy efficiency
B. Public safety
C. Security (for properties)
D. Saving money (upfront or over time)
E. Public health
F. Wildlife health
G. Aesthetics / design
H. Other
www.fcgov.com/nightsky
Bright light glare makes traffic signage hard to read.
*Commercial & Multi-Family Projects

Land Use Code Section 3.2.4 – Site Lighting

• Lighting evaluated in the development review process
• Applies to lighting for:
  • Buildings
  • Parking lots
  • Walkways
  • Plazas
  • Landscape
• Ensure that functional/security needs are met without adversely impacting adjacent properties & neighborhood
• Considers light source, level of illumination, hours of illumination & need for illumination
Energy Code Requirements

*Commercial & Multi-Family Projects

• Applies to:
  • Building façades
  • Parking lots & garages
  • Canopies (sales and non-sales)
  • Outdoor sales areas

• Requires:
  • Automatic controls to dim lighting by at least 50% two hours after normal business closing
  • Outdoor lighting must be turned off 30 minutes after sunrise
*Commercial & Multi-Family

Dark Night Skies:

- Light should be shielded so the lamp itself is not visible beyond the property line.
- All exterior lighting fixtures (new buildings) shall have the “Fixture Seal of Approval” from the International Dark-Sky Association (IDA).
- Lighting placement shall conform to IDA Model Lighting Ordinance for Lighting Zone 1 (low ambient lighting):
  - Lighting may be used for safety and convenience but it is not necessarily uniform or continuous.
  - After curfew, most lighting should be extinguished or reduced as activity levels decline.
*Single-Family Detached, Attached & Duplex Housing

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Energy Efficiency:

- A minimum of 75% of light fixtures should be high efficiency lamps

OR

- A minimum of 50% of lighting fixtures shall contain only LED lamps