CHAPTER 15 – STREET LIGHTING
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CHAPTER 15 – STREET LIGHTING

15.1 GENERAL

The Developer shall coordinate all aspects of design and installation of new or upgraded street lighting.

15.1.1 Fort Collins (City Limits Only) Street Lighting

All street lighting of public streets in the City of Fort Collins will be designed and installed by the City in accordance with these Standards for lighting. Exceptions to reduce lighting requirements may be approved by the Local Entity Engineer for parts of developments bordering rural areas.

15.1.2 Loveland (City Limits Only) Street Lighting

All street lighting of public streets in the City of Loveland will be designed by the City in accordance with these Standards. The City will be responsible for all costs involving the material and installation of street lights on arterial and major collector streets. On all other streets, the Developer will be responsible for all costs involving the design, material, and installation of street lights.

The street lighting design shall be commenced by the City of Loveland only after the developer has provided to the City the required electrical design deposit, along with electronic files of the overall utility design sheet(s) and the street plan design sheet(s). These items must be submitted to the City prior to the submittal of any land use application that requires the submittal of preliminary Public Improvement Construction Plans. Upon completion of the street lighting design by the City, the design engineer shall show the locations of all proposed street lights in the final Public Improvements Construction Plans as described in the checklist contained in **Appendix E.**

15.1.3 Underground Service

Street lighting shall be installed with underground electric service on all newly developed dedicated public streets in the City. Curb returns shall be installed after the installation of the electrical system, including underground vaults.

The Developer is responsible for coordinating with the appropriate utility company all aspects of design and installation.

15.2 PURPOSE

The purpose of streetlight installations shall be to illuminate the public traveled ways to a level that provides for the safe passage of public traffic, both vehicle and pedestrian.

15.2.1 Residential Areas

All lighting in residential areas shall be installed to minimize light pollution (light directed skyward) and light trespass (light spilling onto neighboring properties).

15.2.2 Design Guidelines

Uniform lighting will be used on new projects involving Arterial and Collector streets. The guidelines shall be the most recent editions of the American National Standard Practice for Roadway Lighting (ANSI/IES RP-8), the Colorado Department of Transportation Lighting Design Guidelines and supplemental revisions or guidelines approved by the Local Entity. All fixtures, poles, and designs will be reviewed and approved by the power provider.

A. Pole Loading

Streetlight poles, attachments to poles (mast arms, luminaires, banners, etc.) and pole foundations shall withstand loading due to forces from wind and ice loading as specified in the most recent American Society of Civil Engineers ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures. Interpretation of exposure and risk categories used to determine ultimate wind speeds specified in ASCE/SEI 7 shall be reviewed and approved by the local entity engineer.

15.2.3 Layout Criteria

A. Mounting Height.

Streetlight mounting height shall not exceed 20 feet in residential areas. In areas other than residential, the mounting height shall not exceed 40 feet.

B. Signalized Intersections.

Signalized intersections will be lighted using combined streetlights and mast arms. Mounting of signals will be perpendicular to the flowline.

C. Railroad Crossing Lighting.

Railroad crossing lighting will conform to the Railroad-Highway Grade Crossing Handbook (FHWA).

D. Lighting in Undercrossings.

All bridge underpasses, where vehicles, pedestrians, bicyclists, or equestrians may be present, shall require lighting.

E. Attached Sidewalks.

Install street lighting behind sidewalks where sidewalks attached to the curb are used with a minimum clearance of 1 foot from back of walk to street side of support pole.

F. Detached Sidewalks.

For sidewalks detached from the curb, install street lighting with a minimum of 2 feet clearance from back of curb to roadway side of support pole and 2 feet clear from all walks (1 foot on Local Streets).

G. Drawings.

Except within the Local Entity power service territories, drawings for installations will be prepared by the Developer with assistance from the power provider and approved by the Local Entity Engineer prior to installation. In new subdivisions, a street lighting plan will be required prior to approval of the subdivision.

H. Permission for Alternate Designs.

Alternate designs for fixtures, if approved by the Local Entity Engineer, may be used if installed in more than 20 locations.

I. Fire Hydrant Conflicts.

When locating proposed lighting, avoid possible conflicts with fire hydrants.

J. Roundabout Lighting.

Lighting columns should be arranged around the perimeter of the roundabout in a simple ring, with the lights equidistant from the center and from each other. Lighting should extend at least 200 feet back along each approach road. Mounting height should be uniform throughout the intersection and not less than on any approach road. Minimum horizontal illuminance at the curblines should be as given in **Table 15-1**. The minimum illuminance required should not be less than the highest level of lighting for any of the approach roads.

15.3 LIGHTING SYSTEMS DESCRIPTIONS

These lighting standards apply to all new street lighting systems.

15.3.1 Cobra-Head Style Luminaire

The cobra-head style luminaire with a type-2, type-3, or type-4 distribution pattern and full-cutoff optics mounted on poles shall be the standard construction for Collector and Arterial streets. The backlight, uplight and glare (B-U-G) ratings of the luminaire shall not exceed B2-U0-G2.

15.3.2 Acorn-Style Fixture – Loveland (City Limits Only)

An acorn-style fixture with a Type-3 distribution mounted on poles shall be used on Local streets.

15.3.3 Old English Fixture – Fort Collins (City Limits Only)

An Old English-style fixture with a Type-3 distribution pattern and full cut-off optics mounted on poles shall be used on Local streets. The B-U-G ratings of the fixture shall not exceed B2-U0-G2.

15.3.4 Light Types and Location of Use

Specific light types (HPS, LED, etc.) shall be installed according to Local Entity requirements. Refer to **Table 15-2** and **Table 15-3.** Poles or luminaries, that are equivalent to those described below, may be approved by the Local Entity's appropriate representative.

Table 15-1
Recommended Street Illumination Levels

Street Classification	Pedestrian Area Classification	Average Maintained Illuminance Values	Illuminance Uniformity Ratio (Average to Minimum)
Arterial	High Medium Low	17 lx (1.7fc) 13 lx (1.3 fc) 9 lx (0.9 fc)	3 to 1
Collector	High Medium Low	12 lx (1.2 fc) 9 lx (0.9 fc) 6 lx (0.6 fc)	4 to 1
Local	High Medium Low	9 lx (0.9 fc) 7 lx (0.7 fc) 4 lx (0.4 fc)	6 to 1
Pedestrian Area Classification Definitions:			
High:	A business area of a municipality where ordinarily there are many pedestrians during night hours. This definition applies to densely developed business areas outside, as well as within the central part of a municipality. The area contains land use which attracts a relatively heavy volume of night time vehicular and/or pedestrian traffic on a frequent basis.		
Medium:	Those areas of a municipality often with moderately heavy night time pedestrian activity such as in blocks having libraries, community recreation centers, large apartment buildings, industrial buildings, or neighborhood retail stores.		
Low:	A residential development, or a mixture of residential and small commercial establishments, with few pedestrians at night.		
Note:	Values in table assume typical asphalt roadway surface (pavement classification R2 or R3). Consult the IES document for other pavement surfaces.		
Source:	Illuminating Engineering Society RP-8 (8).		

Table 15-2
Loveland (City Limits Only) Street Light Requirements

Street Classification	Lighting System
6-lane Arterial	400-W cobra, semi-cutoff style, fiberglass pole, 38-foot mounting height
2 and 4-lane Arterial	250-W cobra, semi-cutoff style, fiberglass pole, 32-foot mounting height
Major Collector	150-W cobra, semi-cutoff style, fiberglass pole, 27-foot mounting height
Minor Collector	70-W acrylic acorn, fiberglass pole, 15-foot mounting height
Local/Lane	70-W acrylic acorn, fiberglass pole, 15-foot mounting height

Table 15-3
Fort Collins (City Limits Only) Street Lighting Requirements

Street Classification	Maximum Spacing (ft)	Recommended Lumen Output	Luminaire Style	Luminaire Final Height (ft)
6-Lane Arterial	150	10,500	Cobra-Head	32
4-Lane Arterial	150	9,000		
2-Lane Arterial	180			
Collector	200	7,200		
Local - Commercial	175	6,400		
Local - Industrial	200			
Local - Connector	200	5,500	Old English	18
Local - Residential	300			

Where possible, streetlights shall be staggered on alternate sides of the roadway. However, for "T" intersections, the light shall be located as prescribed in section 15.5.

Notes:

1. Local residential streets shall have one light at each intersection. If the intersection lights would exceed 300 feet apart on a straight street, mid-block lights shall be added so lights do not exceed 300 feet spacing. If the street has a curve, judgment shall be used to reduce the spacing to less than 300 feet.
2. Collector street widths vary depending upon the allowance for parking between the curb and bike lane. If the street has a curve, judgement shall be used to reduce the spacing to provide adequate lighting levels for small target visibility.
3. 6-Lane Arterial street lights shall be placed on EACH side of the street spaced no greater than 150 feet apart (not staggered). Exception: College Avenue between LaPorte Avenue and Magnolia shall have LED area lights spaced 100 feet apart. Please refer to section 15.8.1 for further details.
4. For all street classifications, crosswalks that are located away from intersections shall include additional lighting to provide adequate lighting levels for small target visibility.
5. All new street developments shall use LED type luminaires.

15.4 SPACING

This chapter is restricted to lighting on public streets and rights-of-way. The Designer shall design the spacing of all street lighting according to **Table 15-4**.

Table 15-4
Loveland (City Limits Only) Street Lighting Spacing

Classification	Luminaries	Spacing	Layout
Major Arterial	400-W Cobra	120–150 feet	Staggered layout
Minor Arterial	250-W Cobra	150–175 feet	Staggered layout
Major Collector	150-W Cobra	150 feet	Staggered layout
Minor Collector	70-W Acorn	160–200 feet	Staggered layout
Local/Lane	70-W Acorn	160–200 feet	Staggered layout

15.5 POSITIONING AT INTERSECTIONS

In general, the nighttime visibility of a pedestrian or hazardous object within an intersection is enhanced by increased contrast between the object and the surrounding street area. The optimum contrast (and hence safety) is achieved when the street lights are situated to silhouette (or backlight) objects in the intersection. Therefore, street lights at intersections are required to be placed on the downstream side of the intersecting street, as viewed by a motorist approaching the intersection in the lane directly beneath the luminaries. See **Figure 15-1**. The positioning of light standards at intersecting streets shall be as noted in **Table 15-5**.

Table 15-5
Intersection Light Locations

Major Collectors/Arterials	4 lights, one on each corner
Arterials/Arterials	4 lights, one on each corner
Collector/Collector	2 lights, one on opposite corners
Local/Collector	2 lights, one on opposite corners
Local/Local	1 light on one corner
End of Cul-de-sac	1 light

15.6 LIGHT POLE OFFSET DISTANCES

Distance behind back of walk for local streets shall be at least 1 foot, and must be within easements or right-of-way on Local residential streets. For Major Collectors and Arterials, the light must be offset at least 2 feet from the back of curb and provide a clearance space between the light pole and edge of walk that equals or exceeds the required sidewalk width.

15.7 STREET LIGHTING CLEARANCE REQUIREMENTS FOR TREES

Street trees (full shade) shall not be placed within 40 feet of a street light. Ornamental trees shall be no closer than 15 feet to any street light.

15.8 COLLEGE AVENUE – SPECIAL CONDITION

The following specifications apply only to College Avenue in Fort Collins (city limits only).

15.8.1 LaPorte to Magnolia

From LaPorte Avenue to Magnolia Street, College Avenue shall be lighted with a minimum of four LED luminaires at each intersection. Between intersections, there shall be one LED luminaire at 100-foot spacing or equivalent, as determined by the Light and Power Utility. Minimum lumen output shall be 30,000 lumens per luminaire. The correlated color temperature shall not exceed 3000 K.

15.8.2 Other College Avenue Blocks

The remainder of College Avenue shall have a minimum of four LED luminaires at each intersection and two LED luminaires spaced at approximately 150 feet or as determined by the Light and Power Utility.

15.9 INSTALLATION SEQUENCE

Underground electrical installation shall not begin until after curb and sidewalk is installed, unless other arrangements have been made with the appropriate light and power department for each Local Entity. Curb returns shall not be installed on any street until after electrical installation, to facilitate the installation of underground vaults and other facilities.

15.9.1 Fort Collins (City Limits Only)

In Fort Collins (city limits only), refer to the City of Fort Collins Utilities' most recent version of the document titled "Electric Service Standards" for installation policies, practices and procedures.