

CHAPTER 15 – STREET LIGHTING

TABLE OF CONTENTS

Section	Title	Page
15.1	General	15-1
15.1.1	Fort Collins (City Limits Only) Street Lighting.....	15-1
15.1.2	Loveland (City Limits Only) Street Lighting	15-1
15.1.3	Underground Service.....	15-1
15.2	Purpose	15-1
15.2.1	Residential Areas	15-2
15.2.2	Guidelines.....	15-2
15.2.3	Layout Criteria	15-2
	A. Mounting Height.....	15-2
	B. Signalized Intersections.....	15-2
	C. Railroad Crossing Lighting.....	15-2
	D. Lighting in Undercrossings.....	15-2
	E. Attached Sidewalks.....	15-2
	F. Detached Sidewalks.....	15-2
	G. Drawings.....	15-2
	H. Permission for Alternate Designs.....	15-3
	I. Fire Hydrant Conflicts.....	15-3
	J. Roundabout Lighting.....	15-3
15.3	Lighting Systems Descriptions	15-3
15.3.1	Refractor Style Cobra	15-3
15.3.2	Acorn-Style Fixture – Loveland (City Limits Only)	15-3
15.3.3	Old English Fixture – Fort Collins (City Limits Only).....	15-3
15.3.4	Light Types and Location of Use.....	15-3
15.4	Spacing.....	15-5
15.5	Positioning at Intersections.....	15-5
15.6	Light pole Offset Distances	15-6
15.7	Street Lighting in Medians.....	15-6
15.8	College Avenue – Special Condition	15-6
15.8.1	LaPorte to Magnolia.....	15-6
15.8.2	Other College Avenue Blocks	15-6
15.9	Installation Sequence.....	15-6
15.9.1	Fort Collins (City Limits Only)	15-7

LIST OF TABLES

Table 15-1 Recommended Street Illumination Levels.....	15-4
Table 15-2 Loveland (City Limits Only) Street Light Requirements	15-4
Table 15-3 Fort Collins (City Limits Only) Street Lighting Requirements	15-5
Table 15-4 Loveland (City Limits Only) Street Lighting Spacing.....	15-5
Table 15-5 Intersection Light Locations	15-6

LIST OF FIGURES

Figure is Located at End of Chapter

Figure 15-1 Street Light Placement at Intersections

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 shining on or negatively affecting the neighboring residents.

15.2.2 Guidelines

Uniform lighting will be used on new roadway projects involving Arterial and Collector streets. The guidelines shall be the IES Lighting Handbook, Fifth Edition, and the Design Manual of the Colorado Division of Highways, most recent edition and supplemental revisions or guidelines approved by the Local Entity. All fixtures, poles, and designs will be reviewed and approved by the power provider.

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.

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 197 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 Refractor Style Cobra

The refractor style cobra with a Type-3 semi-cutoff distribution pattern mounted on poles shall be the standard construction for Collector and Arterial streets.

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 mounted on poles shall be used on Local streets.

15.3.4 Light Types and Location of Use

Specific light types (HPS, Mercury, 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	Area Classification	Average Maintained Illuminance Values	Illuminance Uniformity Ratio (Average to Minimum)
Arterial	Commercial	17 lx (1.7fc)	3 to 1
	Intermediate	13 lx (1.3 fc)	
	Residential	9 lx (0.9 fc)	
Collector	Commercial	12 lx (1.2 fc)	4 to 1
	Intermediate	9 lx (0.9 fc)	
	Residential	6 lx (0.6 fc)	
Local	Commercial	9 lx (0.9 fc)	6 to 1
	Intermediate	7 lx (0.7 fc)	
	Residential	4 lx (0.4 fc)	
Area Classification Definitions:			
Commercial:	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.		
Intermediate:	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.		
Residential:	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

Roadway Classification	Wattage (HPS)	Spacing (Feet)	Foot-Candles	Uniformity Ratio
Residential				
Local	70	See Note 1	0.2	N/A
Collector	150	290	0.4	5:1
Arterial	150	190	0.5	4:1
Intermediate				
Local	150	275	0.4	5:1
Collector	150	175	0.6	3:1
Arterial	250	125	1	4:1
Commercial				
Local	150	175	0.5	4:1
Collector	250	190	1.3	3:1
Arterial (NOT College Avenue)	250	125	1	4:1
Arterial (College Ave N of Harmony Rd)	400	118 ²	3.5	2:1
Arterial (College Ave S of Harmony Rd)	250	118 ²	1.9	2:1

Where possible, streetlights shall be staggered on alternate sides of the roadway. However, for "T" intersections, the light should be located on either corner of the intersection of the street that ends.

Notes:

1. Local residential streets shall have one light at each intersection. If the intersection lights would exceed 320 feet apart on a straight street, mid-block lights shall be added so lights do not exceed 320 feet spacing. If the street has a curve, judgment shall be used to reduce the spacing to less than 320 feet.
2. College Avenue street lighting shall be either twin lights on median mounted standards, or placed on EACH side of the street spaced at 118 feet (not staggered). Exception: College Avenue between LaPorte Avenue and Magnolia shall have specially designed 1000-W metal halide lighting on 100 ft. standards.

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 IN MEDIANS

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 1000-watt metal halide luminaires at each intersection. Between intersections, there shall be one 1000-watt metal halide luminaire at 100-foot staggered spacing or equivalent, as determined by the Light and Power Utility.

15.8.2 Other College Avenue Blocks

The remainder of College Avenue shall have a minimum of four 400-watt H.P.S. luminaires at each intersection and twin 400-watt H.P.S. luminaires spaced at approximately 118-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 Light and Power Utility’s pamphlet entitled “Electric Construction Policies, Practices and Procedures.”