

Efficiency Works Business: Fort Collins lighting ordinance compliance training

September 5, 2023

Safety minute and housekeeping items

Food and beverages

- Help yourself throughout
- Garbage cans in the back

Restrooms

In the hallway back towards the front entrance on the right hand side

Guest check-in and public area

- All guests should have checked in at the security desk and received a visitor badge
- Visitors must stay in the public area unless escorted by a Platte River employee

Emergency protocols

- Emergency exits
- Meeting location/find a Platte River employee

Upcoming events and trainings

Selling Energy – "Selling in 6" licensees

- Quarterly webinars
 - Next webinar: October 12th @ 8:30am on Overcoming objections to your proposal
- Monthly mastermind coaching calls with Mark Jewell
- On demand access to 6 minute training videos and segment guides
- Become a listed service provider to access Selling Energy offerings: https://efficiencyworks.org/service-providers/

Efficiency Works Business events

- November Service provider social and awards
- Register for Efficiency Works events: https://efficiencyworks.org/resources/events/

City of Fort Collins lighting standards

Arlo Schumann – city planner





City of Fort Collins Lighting Standards

For Minor Amendments and Retrofit Projects

Arlo Schumann

City Planner – Development Review



Fort Collins Lighting Code



What does the city regulate?

- City regulates exterior (site and building) lighting under section 3.2.4 of the Land Use Code (LUC)
 - This applies to all Commercial and Multifamily properties in the city.
 - Does not apply to Single Family Dwellings or Duplexes (Building Code)
 - Does not apply to interior lighting
 - Does not apply to lighting in the Right of Way (Streetlights)
- New exterior lighting standards took effect on March 26, 2021

Why does the city regulate?

- From the Code's Purpose Statement:
 - to ensure adequate exterior lighting for the safety, security, enjoyment and function of the proposed land use; conserve energy and resources; reduce light trespass, glare, artificial night glow, and obtrusive light; protect the local natural ecosystem from damaging effects of artificial lighting; and encourage quality lighting design and fixtures

Fort Collins Lighting Code



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Why we're here today?

- What are the City's Standards for retrofit projects?
- What do we need to comply to the standards?
- ➤ How we Review Projects
- Basic Components of the Code
- What Should Plans Look Like
- Help & Resources

How do we review projects?



3.2.4

- (A) Purpose
- (B) General Standard
- (C) Design Standards
- (D) **Existing Lighting**
- (E) Conformance with All Applicable Codes
- (F) Exceptions
- (G) Prohibited Lighting
- (H) Lighting Context Areas
- (I) Limits to Off-Site Impacts
- (J) Site lumen limit
- (K) Athletic and Recreational Fields
- (L) Alternative Compliance

How do we review projects?



What do I need to do? Will this project require a Minor Amendment?

Is determined in 3.2.4(D) Existing Lighting

Scope	Requires Minor Amendment?	Applicable Code Sections				
		3.2.4(A) Purpose	3.2.4(C) Design Standards (CCT!)	3.2.4(I) B-U-G Ratings & Light Trespass	3.2.4(J) Lumen Budget	All of 3.2.4
Add 3+ fixtures to existing or Replace 3+ existing fixtures or Replace between 10-50% existing fixtures	Yes	X	Х	Х		
Add less than 3 or Replace less than 3 or Less than 10%	No (Director Review & Approval)	X	Х	Х		
Add 3+ existing fixtures or Replace 10-50% (Over a ten year period)	Yes	Х	Х	X		
Replace more than 50% (at once or over 10 years) Must comply with the entire section.	Yes	X	Х	Х	Х	Х
Major amendments must comply with the entire section		Х	Х	Х	Х	Х



Lighting Context Areas

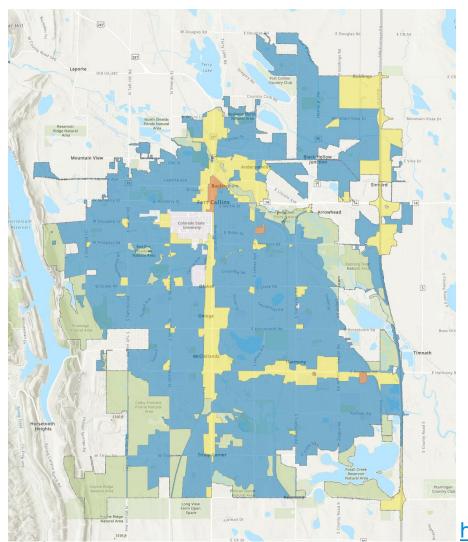
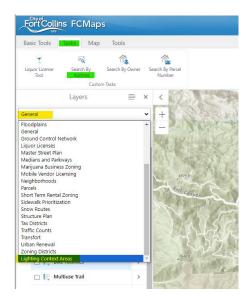


Table 3.2.4-1 Lighting Context Area						
Lighting Context Area	Land Use	Corresponding Zone Districts				
LC0	Natural Area/Conservation Easement	P-O-L (City Natural Areas)				
LC1	Single Family/Multi-Family/Light Industrial/Employment/ Portions of Harmony District	P-O-L (City Parks); R-U-L; U-E, R-F; N-C-L; R-C; L-M-N; M-M-N; I; E; T				
LC2	Commercial/Industrial/Portions of Harmony District/High Density Residential	C-N; C-C; C-C-N; C-C-R; C-G; C-L; H-C; I , R-D-R, D, H-M-N				
LC3	Portions of Downtown,24-Hour Emergency Medical Sites	D, M-M-N				



https://gisweb.fcgov.com/HTML5Viewer/Index.html?viewer=FCMaps



B-U-G Rating



To determine the allowed BUG rating you need:

- 1. The Lighting Context Area
- 2. The Mounting Height
- 3. Distance from Property Line
- 4. Orientation

Table 3.2.4-2 Maximum Allov	wable Backlight Ratings.			
Mounting Condition	LC0	LC1	LC2	LC3
Greater than 2 mounting heights from the property line or not ideally oriented	B1	B3	B4	B5
1 to less than 2 mounting heights from the property line and ideally oriented	B1	B2	B3	B4
0.5 to less than 1 mounting heights from the property line and ideally oriented	В0	B1	B2	B3
Less than 0.5 mounting heights from the property line and ideally oriented	B0	В0	В0	B1

				∠* EXPAND		
Table 3.2.4-3 Maximum Allowable Uplight Ratings.						
	LC0	LC1	LC2	LC3		
Allowed Uplight Rating	UO	UO	U1	U2		
Allowed light emission above 90 degrees for street or area lighting	0%					

				· EA
Table 3.2.4-4 Maximum Allov	vable Glare Ratings.			
Mounting Condition	LC0	LC1	LC2	LC3
Greater than 2 mounting heights from the property line	GO	G1	G1	G2
2 or less mounting heights from the property line and ideally oriented				
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0



Color temperature

All lighting shall have a nominal correlated color temperature (CCT) of no greater than 3000 Kelvin



Light Trespass Limitations

It is typically not required to provide photometric data for Minor Amendment projects.

Natural Areas, Natural Habitat Buffer Zones or River Landscape Buffers

Lighting Context Area	Maximum Horizontal Illuminance
Natural Habitat Buffer Zones and River District Landscape Buffers	0.0
LC0	0.0
LC1	0.1
LC2	0.3
LC3	0.8



Site Lumen Limit (Lumen Budget)

- Typically not required unless adding/replacing more than 50% of fixtures.
- Two methods to calculate the budget.
 - Parking Stall Method (10 or less)
 - Hardscape Method
- Base allowance and bonuses are determined by the Lighting Context Area

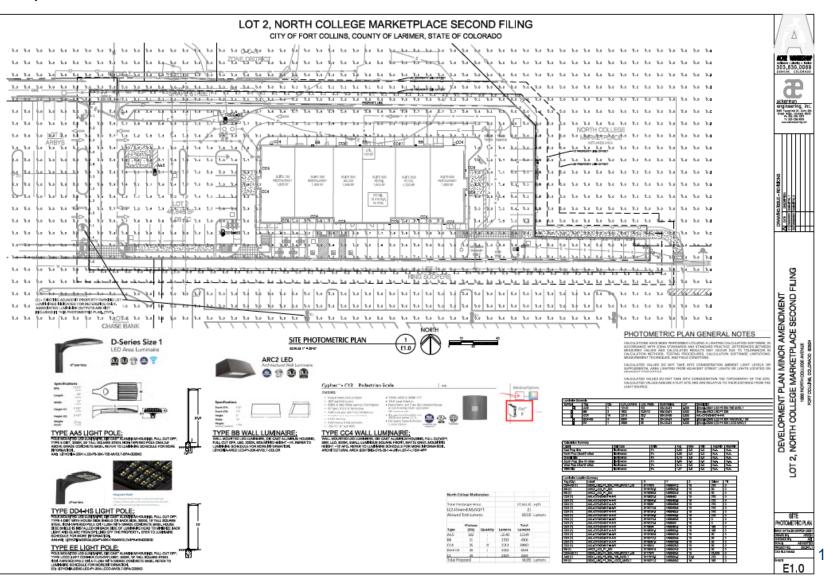
						_
Scope	Requires Minor	Applicable Code				
	Amendment?	Sections				
		3.2.4(A)	3.2.4(C)	3.2.4(I)	3.2.4(J)	All of
		Purpose	Design	B-U-G Ratings &	Lumen	3.2.4
			Standards	Light Trespass	Budget	
			(CCT!)			
Add 3+ fixtures to existing	Yes	Х	х	Х		
or						
Replace 3+ existing fixtures or						
Replace between 10-50% existing fixtures						
Add less than 3	No	Х	Х	Х		
or	(Director Review &					
Replace less than 3	Approval)					
or						
Less than 10%						
Add 3+ existing fixtures	Yes	Х	Х	Х		
or						
Replace 10-50%						
(Over a ten year period)						
Replace more than 50% (at once or over 10	Yes	Х	Х	Х	Х	Х
years) Must comply with the entire section.						
Major amendments must comply with the		Х	Х	Х	Х	Х
entire section						





Lighting Plans need to have two basic components:

- 1. A Site Plan
- 2. Lighting Data and Notes





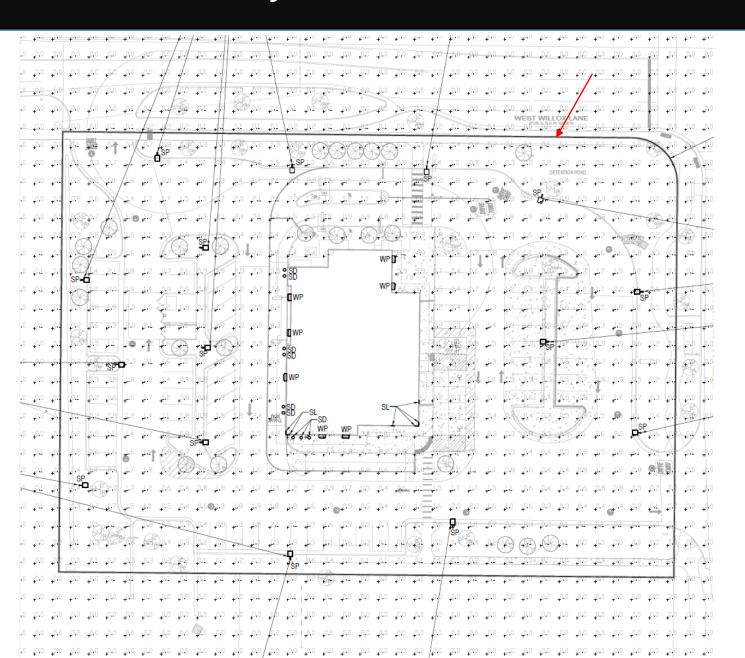
The Site Plan

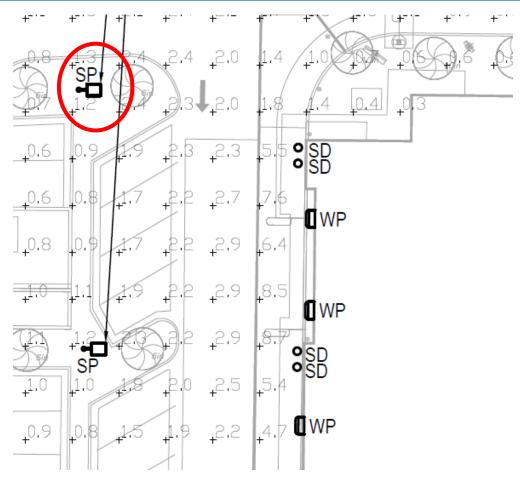
- Needs to show the major elements of the site. (Property Boundary, Buildings, Parking Areas, Landscape Areas, Walks)
- Needs to show fixture location, an indication of orientation, and a notation that connects it to the fixture schedule
- Optional: Mounting height, distance of fixture(s) to property line, other notes, photometric data a

Don't have a site plan?

- Check in with the owner or rep to see if they have plans
- Contact Zoning to see if there are existing development plans (lighting, site or even landscape plans)
- In a pinch an aerial from FCmaps could work
- It's ok to draw overtop existing plans or use them as a basis for new plan







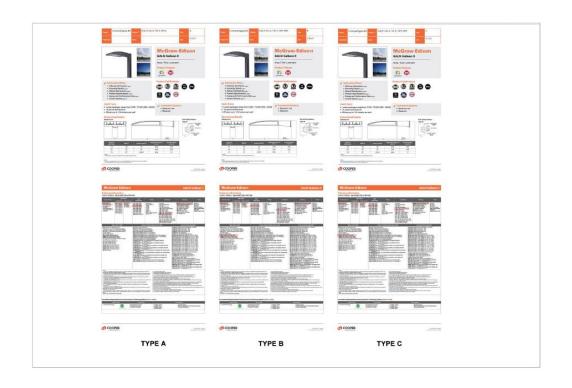


Lighting Data And Notes

- Each lighting plan should have a set of fixture schedules and notes that incorporate the following data.
 - An ID Label/Tag (corresponds to label on site plan)
 - A quantity of each fixture type
 - The lumen output for each luminaire
 - Mounting height
 - B-U-G rating
 - Spec'd Color Temp (3000K or less)
 - Lighting Context Area classification
 - Lumen budget and utilization (if required)
- Optional data
 - Symbol, Manufacturer, Catalog Number
 - Cut sheets for each fixture



Luminaire S	Schedule	9							
Symbol	Qty	Tag	Mtg.	Arrangement	LLF	Lum Lumens	Description	Luminaire	BUG Rating
			Ht.					Watts	
-	18	Α	20	Single	1.000	4411	GALN-SA1A-730-U-5WQ	33	B3-U0-G1
	15	В	20	Single	1.000	3049	GALN-SA1A-730-U-T4W-HSS	33	B0-U0-G1
	5	С	20	Single	1.000	3035	GALN-SA1A-730-U-T4FT-HSS	33	B0-U0-G1
-	2	D	20	Single	1.000	2529	GALN-SA1A-730-U-5MQ-GRSBK	33	B1-U0-G0
-	2	F	20	Single	1.000	2198	GALN-SA1A-730-U-5WQ-GRSBK	33	B1-U0-G0



North Co	llege Marke	etplace			
Total Har	dscape Are	a:		27,812.00	sq ft
LC2 Allov	ved LMS/SC	(FT:		2.5	
Allowed	Total Lume	ns:		69,530	Lumens
Туре	Wattage (EA)	Quantity	Lumens	Total Lumens	
AA5	102	1	12149	12149	
BB	11	3	1502	4506	
CC4	26	14	2213	30982	
DD4-HS	38	2	3322	6644	
EE	38	1	2669	2669	
Total Pro	posed			56,950	Lumens

Help & Resources



Fort Collins Zoning: https://www.fcgov.com/zoning/ zoning@fcgov.com 970-416-2745

- Process Minor Amendments
- Can help with existing development plans
- Minor Amendment Application: https://www.fcgov.com/zoning/what.php

Lighting Regulations: https://www.fcgov.com/developmentreview/lighting-regulations

- Compliance Calculator
- Lighting Code
 - Municode Link:
 https://library.municode.com/co/fort_collins/codes/land_use?nodeId=ART3GEDEST_DIV3.2SIPLDEST_3.2.4EXSI
 LI
- Context Map
 - FCmaps: https://gisweb.fcgov.com/HTML5Viewer/Index.html?viewer=FCMaps
- Arlo Schumann (Planning) aschumann@fcgov.com

Fort Collins lighting ordinance tool

Clanton and Associates





FORT COLLINS ORDINANCE TOOL

Kaiti Phelan Engineer II kaitlyn@clantonassociates.com



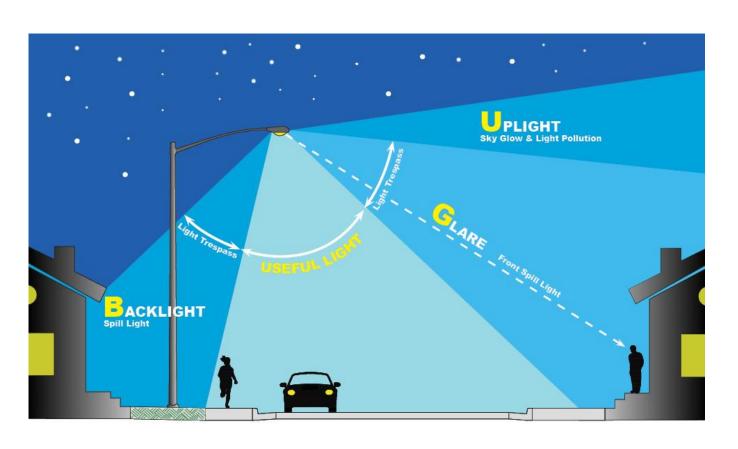
Nancy Clanton PE, FIES, FIALD,LEED Fellow



Kaiti Phelan Engineer II, EIT



IES TM15-11



Luminaire classification system for outdoor luminaires

BUG LCS

- . Backlight
- . Uplight
- . Glare

OFF SITE IMPACTS- BACKLIGHT "B"

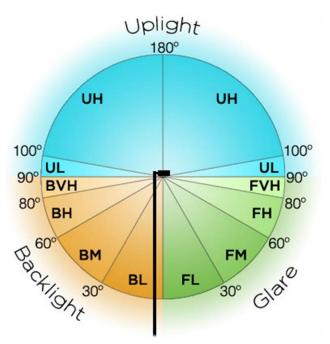


Table 3.2.4-2 Maximum Allowable Backlight Ratings.							
Mounting Condition	LC0	LC1	LC2	LC3			
Greater than 2 mounting heights from the property line or not ideally oriented	B1	В3	B4	B5			
1 to less than 2 mounting heights from the property line and ideally oriented	B1	B2	В3	B4			
0.5 to less than 1 mounting heights from the property line and ideally oriented	В0	B1	B2	В3			
Less than 0.5 mounting heights from the property line and ideally oriented	В0	В0	В0	В1			

Closer to the property line, the more stringent "B" value

OFF SITE IMPACTS- UPLIGHT "U"

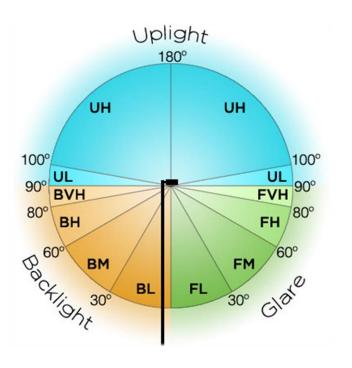


Table 3.2.4-3 Maximum Allowable Uplight Ratings.						
	LC0 LC1 LC2 LC3					
Allowed Uplight Rating	U0	U0	U1	U2		
Allowed light emission above 90 degrees for street or area lighting	0%					

OFF SITE IMPACTS- GLARE "G"

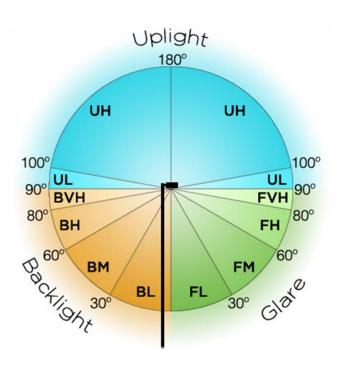


Table 3.2.4-4 Maximum Allowable Glare Ratings.							
Mounting Condition	LC0	LC1	LC2	LC3			
Greater than 2 mounting heights from the property line	G0	G1	G1	G2			
2 or less mounting heights from the property line and ideally oriented	G	5	5	G2			
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1			
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1			
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0			

PARKING SPACE METHOD

Parking Space Method

Properties up to 10 spaces (including Handicap)

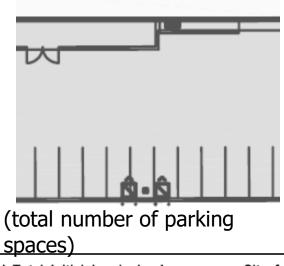


Table 3.2.4-6 Allowed Total Initial Luminaire Lumens per Site for Non-Residential Outdoor Lighting, per Parking Space Method.

May only be applied to properties up to ten parking spaces (including handicapped accessible spaces).

LC0	LC1	LC2	LC3
350 lumens per space	490 lumens per space	630 lumens per space	840 lumens per space

HARDSCAPE AREA METHOD

Base Allowance (tradable)

Table 3.2.4-7 Allowed Total Initial Lumens per Site for Non-Residential Outdoor Lighting, Hardscape Area Method.

May be used for any project. When lighting intersections of site drives and public streets or roads, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting. Top level, exterior parking garage decks are included as Hardscape Areas.

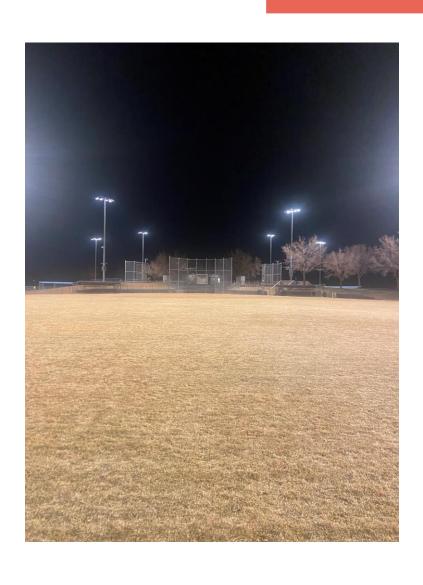
	LC0	LC1	LC2	LC3
Base Allowance	0.5 lumens per square foot of hardscape	1.25 lumens per square foot of hardscape	2.5 lumens per square foot of hardscape	5 lumens per square foot of hardscape

HARDSCAPE AREA METHOD

Additional Allowance (non-tradable)

	LC0	LC1	LC2	LC3
Building Façades. This allowance is lumen per unit area of building façade that are illuminated. To use this allowance, luminaires must be aimed at the façade.	0		8 lumens per square foot	16 lumens per square foot
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non-sales areas. To use this allowance, luminaires must be within 0.5 mounting heights of the sales lot area.	0	4 lumens per square foot	8 lumens per square foot	16 lumens per square foot
Outdoor Dining. This allowance is lumen per unit area for the total illuminated hardscape of outdoor dining. In order to use this allowance, luminaires must be within 0.5 mounting heights of the hardscape area of outdoor dining. This allowance includes rooftop dining.	0	1 lumen per square foot	5 lumens per square foot	10 lumens per square foot
Gasoline Station. This allowance is lumens per installed fuel pump. Both sides of a two-sided pump qualify as one allowance.	0	4,000 lumens per pump	8,000 lumens per pump	8,000 lumens per pump

ATHLETIC AND RECREATIONAL FIELDS

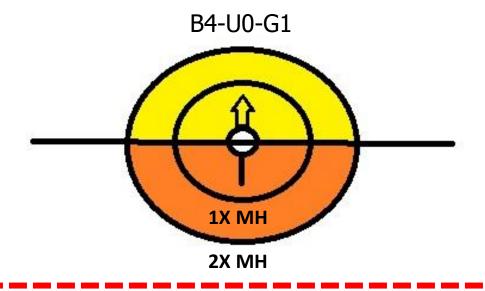


- Maximum CCT of 5700 Kelvin
- Limit off-site impacts to the maximum extent practical
- Lighting controls
 - Dimmable to 10%
 - Local or remote manual control with at least two preset illuminance levels
 - Lights shall automatically extinguish one hour after play.
 - Field lighting aimed upward shall be controlled separately from downward-directed field lighting



MOUNTING HEIGHT EXAMPLES

• LC2



Property Line

Table 3.2.4-2 Maximum Allowable Backlight F	Ratings.			
Mounting Condition	LC0	LC1	LC2	LC3
Greater than 2 mounting heights from the property line or not ideally oriented	B1	В3	B4	B5
1 to less than 2 mounting heights from the property line and ideally oriented	B1	B2	В3	В4
0.5 to less than 1 mounting heights from the property line and ideally oriented	В0	B1	B2	В3
Less than 0.5 mounting heights from the property line and ideally oriented	В0	В0	В0	B1

Table 3.2.4-3 Maximum Allowable Uplight Ratings.				
	LC0	LC1	LC2	LC3
Allowed Uplight Rating	U0	U0	U1	U2
Allowed light emission above 90 degrees for street or area lighting		0%		

Table 3.2.4-4 Maximum Allowable Glare Ratings.					
Mounting Condition	LC0	LC1	LC2	LC3	
Greater than 2 mounting heights from the property line	G0		60 61 61	G0 G1 G1	G2
2 or less mounting heights from the property line and ideally oriented		Gi	GI	G2	
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1	
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1	
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0	

MOUNTING HEIGHT EXAMPLES

• LC2

B4-U0-G1

Property Line

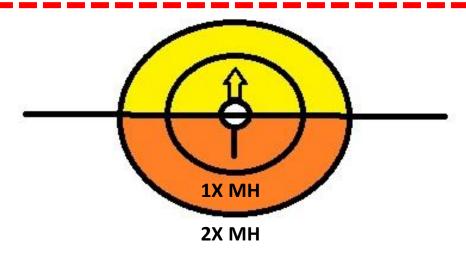


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Mounting Condition	LC0	LC1	LC2	LC3
Greater than 2 mounting heights from the property line	G0		G0 G1 G1 G	G2
2 or less mounting heights from the property line and ideally oriented		Gi	Gi	G2
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0

MOUNTING HEIGHT EXAMPLES

• LC2

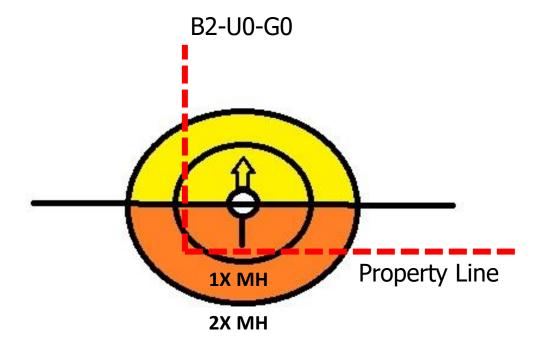


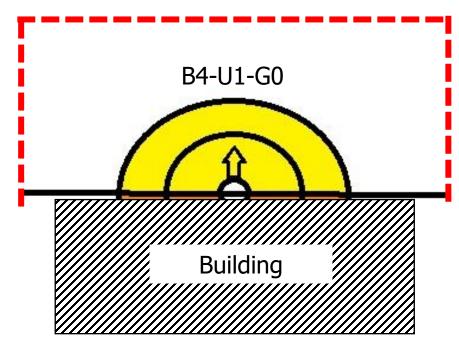
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2 or less mounting heights from the property line and ideally oriented		Gi	GI	G2
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0

MOUNTING HEIGHT EXAMPLES





Property Line

Table 3.2.4-2 Maximum Allowable Backlight Ratings.								
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Allowed Uplight Rating	U0 U0 U1						
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2 or less mounting heights from the property line and ideally oriented	GU	Gi	Gi	G2			
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1			
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1			
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0			

MOUNTING HEIGHT EXAMPLES

• LC2

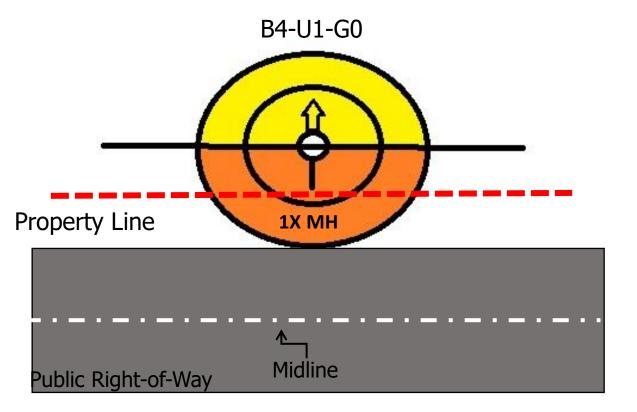


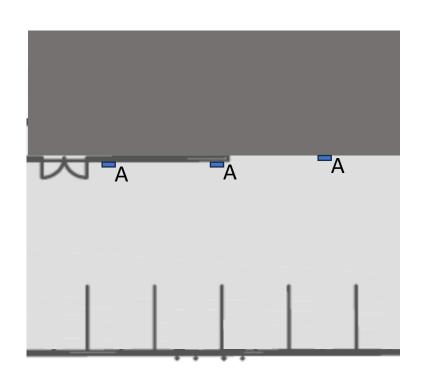
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2 or less mounting heights from the property line and ideally oriented	Gu	GI	GI	G2			
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1			
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1			
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0			



PARKING LOT METHOD

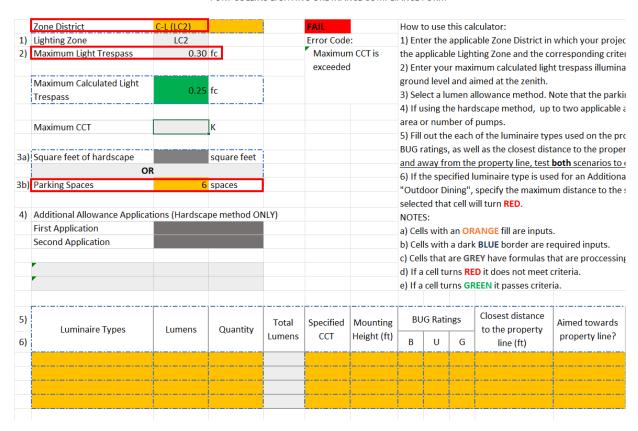


- Small parking lot for storefront
- Located in LC2
- 6 parking spaces
- Light trespass calculated at 0.25fc

PARKING LOT METHOD

Table 3.2.4-6 Allowed Total Initial Luminaire Lumens per Site for Non-Residential Outdoor Lighting, per Parking Space Method.						
May only be applied to properties up to ten parking spaces (including handicapped accessible spaces).						
LC0	LC1	LC2	LC3			
350 lumens per space	490 lumens per space	630 lumens per space	840 lumens per space			

PARKING LOT METHOD- STEP 1



- Step 1: Fill out base information
 - Input the lighting zone district
 - Input maximum calculated light trespass
 - Input total initial lumen base allowance from Table 3.2.4-6

PARKING LOT METHOD-STEP 2



- Step 2: Fill out luminaire information from provided cutsheets
 - Fill out luminaire type
 - Input initial total lumens
 - CCT
 - BUG Rating

Luminaire	Initial Luminaire Lumens Each	ССТ	BUG Rating
Δ	1050	3000K	1-0-0

PARKING LOT METHOD-EXAMPLE CUTSHEET

Stonco

by (Signify)

Wall mount

LytePro

LPW7 small wall sconce



Stonco LytePro LED small wall sconce LPW7 features outstanding value in a compact, architectural design, and combines energy savings with good photometric performance. LPW7 is ideal for entryways, corridors, facade and other wall/surface lighting applications.

Qty:	
	Oty:

Ordering guide

Example: LPW7-10-NW-G3-2-120-PCB-BZ

	Options										
Prefix	_	Wattage	LED Color/Gen	Distribution	Voltage	Photocor	ntrol	Locatio	on	Finish	
LPW7		10		2							
LPW7	LytePro 7 LED small wall sconce	10 10W	NW-G3 Neutral White 4000K 70 CRI Generation 3 3000K 70 CRI Generation 3 3000K 70 CRI Generation 3	2 Type 2	120 120V 208 20BV 240 240V 277 277V UNV 120-277V (50/60Hz)	PCB P	ione hotocontrol lutton ¹	BAC ³	Meets the requirements of the Buy American Act of 1933 (BAA)	WH BZ DGY MGY	d Black White Bronze Dark Gray Medium Gray Medium Gray Ler specified Specify optional color or RAL (ex: OO-LGP or OC-RAL7024) Custom color (Must supply color chip for required factory quote)

Stocked luminaires - Ordering guide

Catalog Number	Description	Master Pack, Qty	UPC Code
LPW7-G3-8-BZ	LPW7, 250mA, 4000K, 120-277V, Bronze textured paint	6	622252813858
LPW7-G3-8-DGY	LPW7, 250mA, 4000K, 120-277V, Dark gray textured paint	6	622252813841

Stocked accessories - Ordering guide (Must be ordered separately)4

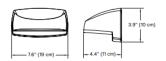
Catalog Number	Description	Master Pack, Qty	UPC Code
LPWCVRPLT-BZ ²	LPW Universal wall cover mounting plate, Bronze textured paint	(none)	190096144860

- 1 Must specify voltage.
- ² Other colors available upon request as made-to-order
- 3 Failure to properly select the "BAC" suffix could result in you receiving product that is not BAA compilant product with no recourse for an BNA or refund. This BAC designation hereunder does not address (i) the applicability of, or evaliability of a waiver under, the Trade Agreements Act. or (ii) the 'Buy America' domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies.
- 4 Consult Signify to confirm whether specific accessories are BAA-compliant.

LPW7 LytePro

LED small wall sconce

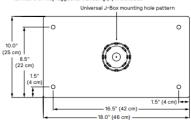
Dimensions



Luminaire weight: 4 lbs (1.8 kg)

Accessory dimensions (ordered separately)

LPWCVRPLT LPW Universal wall cover mounting plate, 0.08" aluminum, bronze textured paint (used to cover larger pre-existing opening or surfaces, field installed). Offers same J-Box pattern as luminaire or may lagged to wall using (4) knockouts.



LED Wattage and Lumen Values

		LED		Average	Type 2				
Ordering Code	Total LEDs	Current (mA)	Color Temp.	System Watts	Lumen Output	BUG Rating	Efficacy (LPW)		
LPW-7-10-NW-G3-2	18	250	4000	9.7	1050	B1-U0-G0	108		
LPW-7-10-WW-G3-2	18	250	3000	9.7	1051	B1-U0-G0	108		

alues from photometric tests performed in accordance with IESNA LM-79 and are representative of the configurations shown.

Actual performance may vary due to installation and environmental variables, LED and driver tolerances, and field measurement considerations. It is highly recommended to confirm performance with a photometric layout.

NOTE: Some data may be scaled based on tests of similar (but not identical) luminaires. Contact factory for configurations not shown

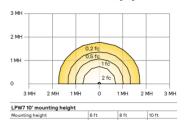
Predicted lumen depreciation data

Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions Ly₀ is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-11, bublished Ly₀ pours limited to 6 times actual LED test hours

Ambient Temperature °C	Calculated L ₇₀ Hours	L ₇₀ per TM-21	Lumen Maintenance % at 60,000 hrs
up to 40°C	>200,000 hours	>60,000 hours	>92%

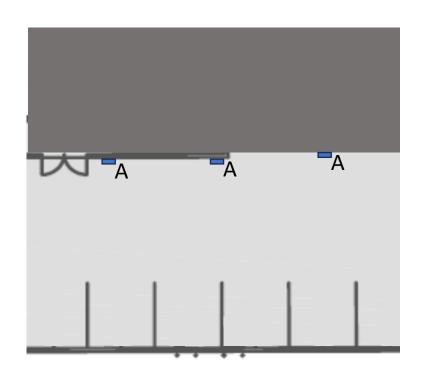
Optical distribution

Based on LPW7-10-NW-G3-2 at 10' mounting height





PARKING LOT METHOD-STEP 3



- Step 3: Fill out information from application
 - Quantity
 - Mounting height
 - Closest distance to property
 - Aimed towards property line?

Luminaire	Quantity	Mounting height
Α	3	16

PARKING LOT METHOD-STEP 3

FORT COLLINS LIGHTING ORDINANCE COMPLIANCE FORM

Total base allowance

Total lumens application 1

Total lumens application 2

Total base lumens

Total Lumens

3,780 lumens

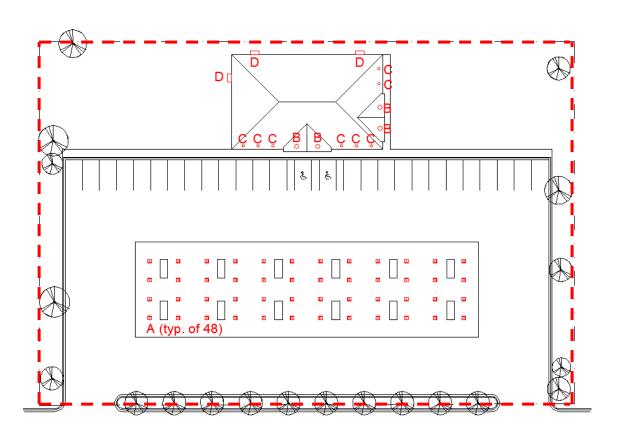
- lumens

lumens

Zone District	C-L (LC2)			PASS		How to	use this	alculator:									
) Lighting Zone	LC2			Error Code	:	1) Ente	r the appl	icable Zone District ir	which your project	is located. The ider	tification of the apl	icable Zone District info	orms the	complia	nce for	m to apply	
) Maximum Light Trespass	0.30	fc				the app	olicable Lig	hting Zone and the c	orresponding critei	a.							
						2) Ente	r your ma	ximum calculated ligi	ht trespass illumina	nce values. Calculat	ion points should be	e spaced at no more tha	an ten (1	0) ft, loc	ated at	the	
Maximum Calculated Light						ground	level and	aimed at the zenith.									
Trespass	0.25	fc				3) Sele	elect a lumen allowance method. Note that the parking space method is only applicable for properties with up to ten (10) parking spaces. f using the hardscape method, up to two applicable additional allowance applications may be selected. Input the quantity of the corresponding unit										
						4) If us						ing unit					
Maximum CCT	3000	K				area o	number	of pumps.									
Waximum cci	5000	IX.				5) Fill o	out the ead	h of the luminaire ty	pes used on the pro	ject, with the initial	lumen output, quar	tity, CCT specified, mo	unting he	eight abo	ve finis	hed grade,	
-) C f f						BUG ra	itings, as v	vell as the closest dis	tance to the proper	y line of that specif	c luminaire type. <u>If</u>	the luminaire type has	installati	ons aime	ed both	towards	
a) Square feet of hardscape	00	square feet				and aw	ay from t	he property line, test	both scenarios to	nsure compliance.							
	OR					6) If th	e specifie	l luminaire type is us	ed for an Additiona	Allowance Applicat	ion, specify the app	lication. If the applicati	on is for	"Outdoo	or Sales	Lots" or	
b) Parking Spaces		spaces				"Outdo	oor Dining	", specify the maximi	um distance to the :	pecified area of tha	t luminaire type. If a	n application that was	not selec	ted in st	ep four	(4) is	
						selecte	d that cell	will turn RED.									
Additional Allowance Appli	cations (Hardsc	ape method OI	NLY)			NOTES	:										
First Application						a) Cells	with an C	RANGE fill are input	s.								
Second Application						b) Cells	with a da	rk BLUE border are r	equired inputs.								
								GREY have formulas t		information from in	nputs. DO NOT char	ge these cells.					
								RED it does not meet									
						e) If a	cell turns (GREEN it passes crite	ria.								
s) !			Total	Specified	Mounting	BUC	Ratings	Closest distance	Aimed towards		Distance from	Mounting heights		/IUM ALI		PASS/	
Luminaire Types	Lumens	Quantity	Lumens	CCT	Height (ft)			to the property	property line?	Application	boundary of application, if	to property line	BU	G RATIN	IGS	FAIL	
5)			Lumens	CCI	neight (It)	В	UG	line (ft)	property line:		specified (ft)	to property line	В	U	G	FAIL	
Type A	1,050.00	3	3150	3000	16	1	0 0	15	No -			0.94	2	1	1	PASS	
	i							1									
					1												
	Ti Ti																
Add'l lumen allowance 1	-	lumens															



HARDSCAPE METHOD



- Service Station location in LC1
- Must use hardscape method because it has more then 10 spaces
- 35,000 sqft of hardscape
- Light Trespass does not exceed 0.1fc anywhere on the property line

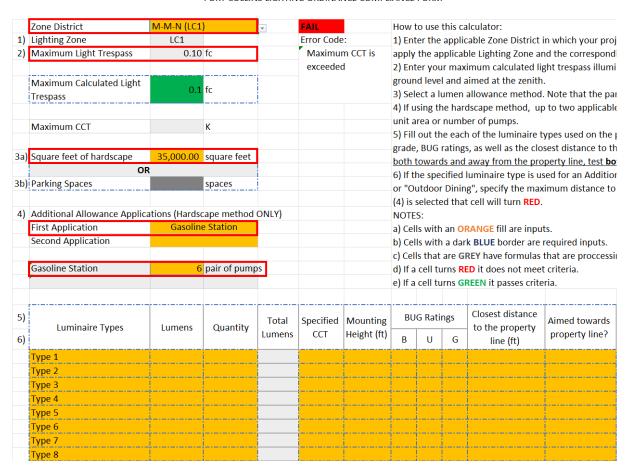
HARDSCAPE METHOD

Table 3.2.4-7 Allowed Total Initial Lumens per Site for Non-Residential Outdoor Lighting, Hardscape Area Method.

May be used for any project. When lighting intersections of site drives and public streets or roads, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting. Top level, exterior parking garage decks are included as Hardscape Areas.

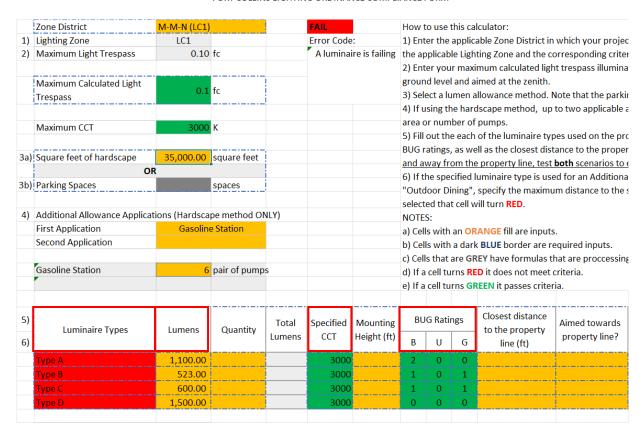
	LC0	LC1	LC2	LC3
Base Allowance	0.5 lumens per square foot of hardscape	1.25 lumens per square foot of hardscape	2.5 lumens per square foot of hardscape	5 lumens per square foot of hardscape
	LC0	LC1	LC2	LC3
Building Façades. This allowance is lumen per unit area of building façade that are illuminated. To use this allowance, luminaires must be aimed at the façade.	C)	8 lumens per square foot	16 lumens per square foot
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non-sales areas. To use this allowance, luminaires must be within 0.5 mounting heights of the sales lot area.	0	4 lumens per square foot	8 lumens per square foot	16 lumens per square foot
Outdoor Dining. This allowance is lumen per unit area for the total illuminated hardscape of outdoor dining. In order to use this allowance, luminaires must be within 0.5 mounting heights of the hardscape area of outdoor dining. This allowance includes rooftop dining.	0	1 lumen per square foot	5 lumens per square foot	10 lumens per square foot
Gasoline Station. This allowance is lumens per installed fuel pump. Both sides of a two-sided pump qualify as one allowance.	0	4,000 lumens per pump	8,000 lumens per pump	8,000 lumens per pump

HARDSCAPE METHOD-STEP 1



- Step 1: Fill out base information
 - Input the lighting zone district
 - Input maximum calculated light trespass
 - Input total initial lumen base allowance from Table 3.2.4-7
 - Pick additional allowance application
 - Input number of gasoline station pair of pumps

HARDSCAPE METHOD- STEP 2



- Step 2: Fill out luminaire information from provided cutsheets
 - Fill out luminaire type
 - Input initial total lumens
 - CCT
 - BUG Rating

Luminaire	Initial Luminaire Lumens Each	ССТ	BUG Rating
Α	1,100	3000K	2-0-0
В	523	3000K	1-0-1
С	600	3000K	1-0-1
D	1,500	3000K	0-0-0

HARDSCAPE METHOD-EXAMPLE CUTSHEET

Type D Cutsheet



ARC1 LED Architectural Wall Luminaire









20

Specifications Depth (D1): Depth (D2): Height: 5* Width: 11"





The Lithonia Lighting ARC LED wall-mounted luminaires provide both architectural styling and visually comfortable illumination while providing the high energy savings and low initial costs for quick financial payback.

ARC1 delivers up to 3.000 lumens with a soft. non-pixelated light source, creating a visually comfortable environment. The compact size of ARC1, with its integrated emergency battery backup option, is ideal for over-the-door applications.

ARC LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C		Ар					
Luminaire	Standard Em, U C	Cold EM, -20 C							
ARC1 LED	4W		1,500	2,000	3,000				
ARC2 LED	4W	8W	1.500	2.000	3,000	4.000	6.500		

Ordering	Ordering Information			EXAMPLE: ARC1 LED P2 40K MVOLT PE						
Series	Package	Color Temperature	Voltage	Options		Finish				
ARCILED	P1 1,500 lumens P2 2,000 Lumens P3 3,000 Lumens	30K 300CK 40K 400CK 50K 500CK	MVOLT 3471	E4WH Emergency battery backup, CEC compilar PE Batton type protected first dash-to-drawn DMG 6-10 ⁴ /d imming usine pulsed conting usine pulse of the pulse	operation are (for use with	DDBXD DNAXD DNAXD DWHXD DSSXD DDBTXD DBLBXD DNATXD DNATXD DWHGXD DSSTXD	Dark bronze Black Black Instaral a kuminum White Sandotino Fectured dark bronze Fectured dark Tectured a haminum Fectured black Fectured sandotine Fectured sandotine			

Accessories WSRRW DORAD III Surface - mounted back box (specify finish)

1 347V not available with E4WH

ARC1 LED Rev. 03/02/22

Performance Data

Lumen Output Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts.

1	nact actory to performance data on any comignations not anominate.																
ı	Performance System Watts	30K (3000K, 80 CRI)					40K (4000K, 80 CRI)				50K (5000K, 80 CRI)						
ı		Lumens	LPW	В	U	G	Lumens	LPW	В	U		Lumens	LPW	В	U	G	
ı	P1	11W	1,376	127	0	0	0	1,454	134	0	0	0	1,464	135	0	0	0
ľ	P2	17W	2,035	121	1	0	-1	2,151	128	1	0	1	2,165	129	1	0	1
	P3	25W	2,859	117	1	0	1	3,021	123	1	0	1	3,041	124	1	0	1

Electrical Load

Performance	System Watts	Current (A)								
Package	System wates	120V	208V	240V						
P1	11W	0.111	0.061	0.053	0.047	0.045				
P2	17W	0.139	0.081	0.071	0.063	0.060				
P3	25W	0.208	0.122	0.108	0.097	0.081				

Lumen Output in Emergency Mode (4000K, 80 CRI)

Option	
E4WH	620

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Amt	pient	Lumen Multiplier
0°C	32°F	1.04
10°C	50°F	1.02
20°C	68°F	1.01
25℃	77°F	1.00
30°C	86°F	0.99
40°C	104°F	0.97

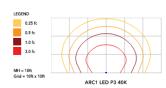
Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11). To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	0.97	>0.96	>0.95	>0.91

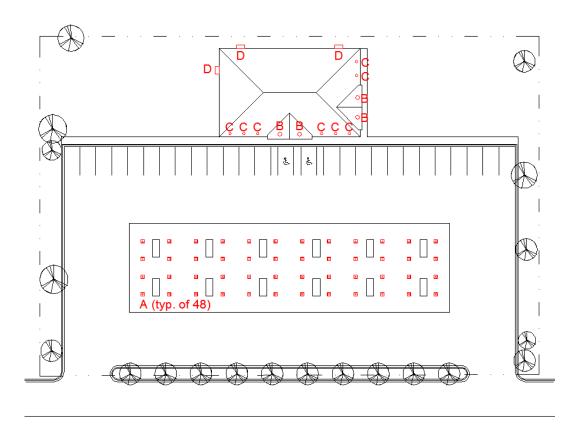
Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit the Lithonia Lighting ARC LED homepage. Tested in accordance with IESNA LM-79 and LM-80 standards.





HARDSCAPE METHOD- STEP 3



- Step 3: Fill out information from application
 - Quantity
 - Mounting height
 - Closest distance to property
 - Aimed towards property line?
 - Application

Luminaire	Quantity	Mounting height
Α	48	20
В	4	12
С	8	12
D	3	12

HARDSCAPE METHOD- STEP 3

FORT COLLINS LIGHTING ORDINANCE COMPLIANCE FORM

Total base lumens

Total Lumens

Total lumens application 1

Total lumens application 2

lumens

64,192 lumens

64,192 lumens

- lumens

Zone District	M-M-N (LC1)			PASS		How t	to use this o	alculator:								
Lighting Zone	LC1			Error Code	:	1) Ent	er the appli	cable Zone District ir	n which your projed	t is located. The ider	tification of the apll	icable Zone District info	orms the	complia	nce for	m to apply
Maximum Light Trespass	0.10	fc				the ap	oplicable Lig	hting Zone and the o	corresponding crite	ria.						
						2) Ent	er your ma	ximum calculated lig	ht trespass illumina	nce values. Calculat	ion points should be	spaced at no more tha	an ten (10) ft, loc	ated at	the
Maximum Calculated Light						groun	ıd level and	aimed at the zenith.								
Trespass	0.1	†C										roperties with up to ter				
							•		to two applicable a	additional allowance	applications may be	selected. Input the qu	antity of	the corr	espond	ling unit
Maximum CCT	3000	K					or number o									
								•				tity, CCT specified, mou	-	_		
Square feet of hardscape	#########	square feet	1								c Iuminaire type. <u>If t</u>	the luminaire type has i	installatio	ns aime	ed both	towards
OI								ne property line, test				toration (Eatherness P. 19			C I.	1 -4-11
Parking Spaces		spaces					-	* * * * * * * * * * * * * * * * * * * *				ication. If the application				
							_	·, specity the maximi will turn RED .	um distance to the	specified area of that	гипппане туре. Іт а	n application that was	not selec	tea in St	ep rour	(4) IS
Additional Allowance Applica	tions (Hardsca	pe method O	NLY)			NOTE		WIII LUTTI KED.								
First Application	Gasoline	•						RANGE fill are input	·s							
Second Application								rk BLUE border are r								
										र information from ir	nputs. DO NOT chan	ge these cells.				
Gasoline Station	6	pair of pump	ıs			d) If a	cell turns F	ED it does not meet	criteria.			_				
						e) If a	cell turns (REEN it passes crite	ria.							
			Total	Specified	Mounting	BU	G Ratings	Closest distance	Aimed towards		Distance from	Mounting heights	MAXIM			PASS/
Luminaire Types	Lumens	Quantity	Lumens		Height (ft)			to the property	property line?	Application	boundary of application, if	to property line	BU	G RATIN	IGS	FAIL
			Lumens	CCI	rieigiit (it)	В	UG	line (ft)	property line:		specified (ft)	to property line	В	U	G	TAIL
	1,100.00	48	52800	3000	20	2	0 0	20	No	Gasoline Station		1.00	2	0	1	PASS
Гуре А	F22.00	4	2092	3000	12	1	0 1	35	No	Gasoline Station		2.92	3	0	1	PASS
Гуре А Гуре В	523.00	-	4800	3000	12	1	0 1	35	No	Gasoline Station		2.92	3	0	1	PASS
	600.00	8			12	0	0 0	5	No	Gasoline Station		0.42	0	0	1	PASS
Гуре В		3	4500	3000	12											
Гуре В Гуре С Гуре D	600.00	3	4500	3000	12											
Type B Type C Type D Add'l lumen allowance 1	600.00	3	4500	3000	12											
Гуре В Гуре С Гуре D	600.00 1,500.00 24,000	3	4500	3000	12											
Type B Type C Type D Add'l lumen allowance 1	600.00 1,500.00 24,000	3 lumens lumens	4500	3000	12											







D-Series Size 1 LED Area Luminaire

Width

PROPERTY

LINE

Height H1:

Height HZ₁ 3-1/2" Weight 27 bs (max): (X/4)

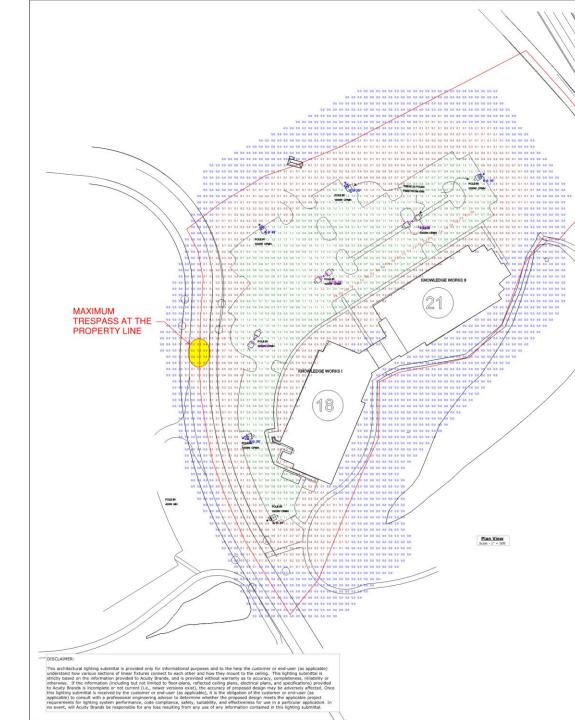
Readings shown are based on a total LLF of as shown at grade. Data references the extrapolated performance projections in a 25c ambient based on 10,000 hrs of LED testing (per IESNA LM-80-08 and projected per IESNA TM-21-

Please refer to the "luminaire locations" for mounting

	Product information can be obtained at www.Lithonia.com or
through	your local agency.

Statistics					
Description					
Lot Summary	×	1.0 fc	2.2 fc	0.3 fc	7.3
Spill Light Summary	+	0.3 fc	2.2 fc	0.0 fc	N
Vertical	×	1.4 fc	2.3 fc	0.4 fc	5.8

Schedule Symbol							Number Lamps		Lumens Per	Light Loss Factor		
0:0	А	1	Lithonia Lighting	DSK1 LED P3 30K TSM MVOLT	DSX1 LED P3 30K T5M MVOLT	LED	1	DSX1_LED_P3_30 K_TSM_MVOLT.ies	12118	0.92	204	TYPE VS, BUG RATING: B4 - U0 G2
	В	4	Lithonia Lighting	DSK1 LED P3 30K T3M MVOLT	DSX1 LED P3 30K T3M MVOLT	LED	1	DSX1_LED_P3_30 K_T3M_MVOLT.les	11338	0.92	102	TYPE III, MEDIUM BUG RATING: 82 U0 - G2
ê.	С	1	Lithonia Lighting	DSKI LED P3 30K TFTM MVOLT	DSX1 LED P3 30K TFTM MVOLT	LED	1	DSX1_LED_P3_30 K_TFTM_MVOLT.let 6	11672	0.92	102	TYPE IV, SHORT, BUG RATING: B2 U0 - G2
•	A2	2	Lithonia Lighting	DSX1 LED P4 30K TSM MVOLT	DSX1 LED P4 30K T5M MVOLT	LED	1	DSX1_LED_P4_30 K_TSM_MVOLT.ies	13963	0.92	250	TYPE VS, BUG RATING: B4 - U0 G2





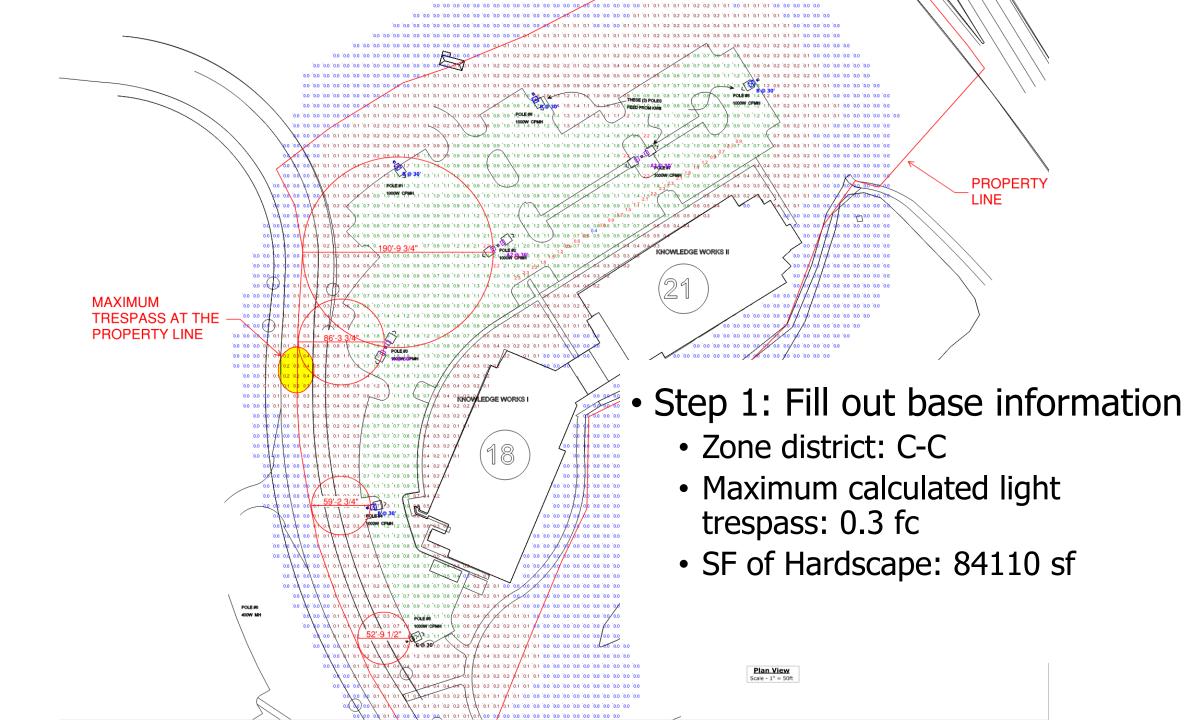
2

ంర 18

Bldg

Drawing No.

4/16/2019 Scale



Schedule												
Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens Per Lamp	Light Loss Factor	Wattage	Distribution
0.0	Α	1	Lithonia Lighting	DSX1 LED P. 30K F5M MVOLT	DSX1 LED P3 30K T5M MVOLT	LED	1	DSX1_LED_P3_30 K_T5M_MVOLT.les	1	0.92	204	TYPE VS, BUG RATING: B4 - U0 - G2
	В	4	Lithonia Lighting	DSX1 LED P3 30K F3M MVOLT	DSX1 LED P3 30K T3M MVOLT	LED	1	DSX1_LED_P3_30 K_T3M_MVOLT.ies		0.92		TYPE III, MEDIUM, BUG RATING: B2 - U0 - G2
•	С	1	Lithonia Lighting	DSX1 LED P. 30K TFTM MVOLT	DSX1 LED P3 30K TFTM MVOLT	LED	1	DSX1_LED_P3_30 K_TFTM_MVOLT.ie s		0.92		TYPE IV, SHORT, BUG RATING: B2 - U0 - G2
•	A2	2	Lithonia Lighting	DSX1 LED P4 30K F5M MVOLT	DSX1 LED P4 30K T5M MVOLT	LED	1	DSX1_LED_P4_30 K_T5M_MVOLT.ies		0.92	250	TYPE VS, BUG RATING: B4 - U0 - G2

• Step 2: Fill out luminaire information

- Fill out luminaire type
- Input initial total lumens
- Quantity
- CCT
- BUG Rating



D-Series Size 1

LED Area Luminaire











Specifications EPA: 1.01 ft²

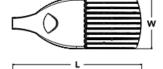
Length: 33" (83.4 on)

13" (33.0 cm)

Height H1: 7-1/2" (19.4 cm)
Height H2: 3-1/2"

Width:

Height H2: 3-1/2"
Weight 27 |bs | 11224g|





Notes Type

Hit the Tab key or mouse over the page to see all interactive elemen

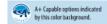
EXAMPLE: DSX1 LED P7 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

Introduction

Number

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 750W metal halide in pedestrian and area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.



Ordering Information

DSX1 LED					
Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX1 LED	Forward optics	30K 3000 K	T1S Type I short T5VS Type V very short	MVOLT ³	Shipped included
	P1 P4 P7	40K 4000K	T2S Type II short T5S Type V short	120 4	SPA Square pole mounting
	P2 P5 P8	50K 5000 K	T2M Type II medium T5M Type V medium	2084	RPA Round pole mounting
	P3 P6 P9		T3S Type III short T5W Type V wide	240 4	WBA Wall bracket
	Rotated optics		T3M Type III medium BLC Backlight control ²	277 4	SPUMBA Square pole universal mounting adaptor *
	P10 ¹ P12 ¹		T4M Type IV medium LCCO Left corner cutoff ³	347 45.	RPUMBA Round pole universal mounting adaptor 6
	P11 ¹ P13 ¹		TETM Forward throw RCCO Bight corner cutoff?	480 45	Shinned senarately

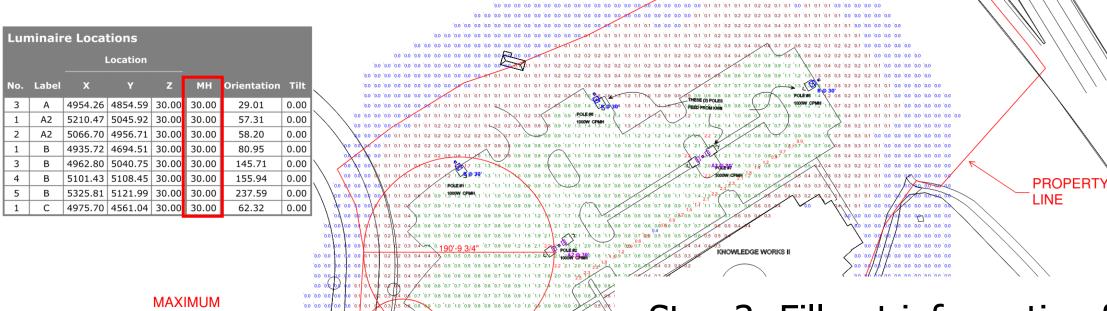
			medium			KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish) ⁷						
Control op	tions				Other	options	Finish (requ	ved)				
Shipped i NLTAIR2 PIRHN PER PER5 PER7 DMG	nstalled nlight AIR generation 2 enabled ⁸ Network, high/low motion/ambient NEMA twist-lock receptace only (or Five-pin receptacle only (controls Seven-pin receptacle only (controls O-10v dimming wires pulled outsid external control, ordered separately Dual switching ^{10,11,14}	ontrols ordered separate) ** Indered separate) ** Indered separate) ** Indered separate) ** Indered separate index separate in	PIR PIRH PIR1FC3V PIRH1FC3V FAO	High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc hin High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc hin High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc hin High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc hin High High High High High High High High	HS SF DF L90 R90	ped installed House-side shield ¹⁷ Single fuse (120, 277, 347V) ⁴ Double fuse (208, 240, 480V) ⁴ Left rotated optics ¹ Right rotated optics ¹ sed separately Bird spikes ³⁸ External glare shield ³⁸	DDBXD DBLXD DMAXD DWHXD DDBTXD DBLBXD DNATXD DWHGXD	Dark bronze Black Matural aluminum White Textured dark bronze Textured black Textured natural aluminum Textured white				

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative performance data on any configurations not shown here.

Forward Op	ptics								
LED Count	Drive	Power	System	Dist.			30K K, 70 (RI)		
	Current	Package	Watts	Type	Lumens	В	U	G	LPW
				T1S	11,661	2	0	2	114
				T2S	11,648	2	0	2	114
				T2M	11,708	2	0	2	115
				T3S	11,339	2	0	2	111
				T3M	11,680	2	0	2	115
				T4M	11.426	2	0	3	112
30	1050	D2	102W	TETM	11,673	2	0	2	114
30	1050	P3	102W	TSVS	12,140	3	0	1	119
				TSS	12,150	3	0	1	119
				T5M	12,119	4	0	2	119
				T5W	12,040	4	0	- 3	118
				BLC	9,570	1	0	2	94
				LCCO	7,121	1	0	3	70
				RCCO	7,121	1	0	3	70
				T1S	13,435	3	0	3	107
				T2S	13,421	3	0	3	107
				T2M	13,490	2	0	2	108
				T3S	13,064	3	0	3	105
				T3M	13,457	2	0	2	108
				T4M	13,165	2	0	3	105
30	4350	0.4	125W	TFTM	13,449	2	0	3	108
30	1250	P4	12510	T5VS	13,987	4	0	1	112
				TSS	13,999	3	0	1	112
				T5M	13,963	4	0	2	112
				T5W	13,872	4	0	3	111
				BLC	11,027	1	0	2	88
				LCCO	8,205	1	0	3	66
				RCCO	8,205	1	0	3	66



MAXIMUM TRESPASS AT THE PROPERTY LINE

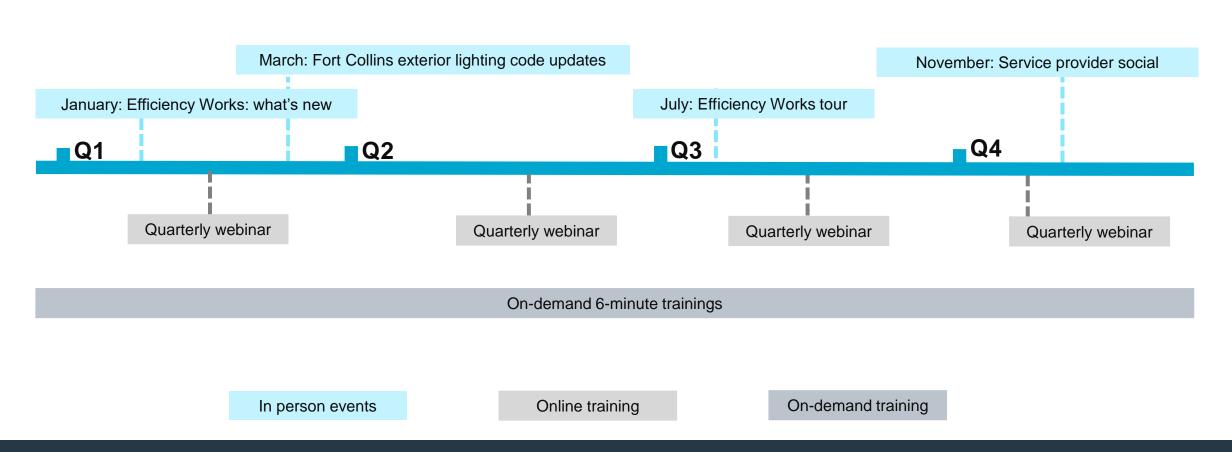
- Step 3: Fill out information from application
 - Mounting height: 30 ft
 - Closest distance to property:
 - A: 86'
 - B: 59'
 - C: 52'
 - A2: 190'
 - Aimed towards property line?
 - Application: N/A

CLANTON & ASSOCIATES

QUESTIONS?

2023 events and training

A variety of ways to participate





Service provider training portal

Free on demand, short videos on selling energy

Year long license to Selling in 6 commercial and industrial on-demand sales training

- Industry leading training boiled down into 6minute videos
- Over 100 videos on selling commercial energy upgrades
- Quarterly webinars starting 2023



Thank you for participating in Efficiency Works Business

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