



Cleveland Innerbelt Bridge Lighting – Tremont (City) Final Lighting Calculations

City of Cleveland - Surface Street Lighting

Zone	Description	Road Class	Area Class	Target F.C.	Actual F.C.	Target Min	Actual Min
S-1	Abbey Ave - Intermediate	Local	Intermediate	1.80	2.1	0.60	0.7
S-2	Abbey Ave - Residential	Local	Residential	1.00	3.5	0.30	0.6
S-3	University Ave	Local	Intermediate	1.80	2.5	0.60	1.1
S-4	W. 14th Street Extension	Local	Intermediate	1.80	2.8	0.60	0.8

Note: Lumens on ODOT Pole (Fixture A in Visual File) is set to zero for these analysis zones. Influence of ODOT light towers is not included in these light levels, per CPP standards.

City of Cleveland - Underpass

Zone	Description	Road Class	Area Class	Target F.C.	Actual F.C.	Target Min	Actual Min
U-1	Fairfield Underpass	Local	Residential	1.00	3.5	0.30	1.1
U-2	Kennilworth Underpass	Local	Residential	1.00	2.5	0.30	0.8
U-3	Starkweather Underpass	Local	Residential	1.00	2.2	0.30	0.6

Note: Lumens on ODOT Pole (Fixture A in Visual File) is set to zero for these analysis zones. Influence of ODOT light towers is not included in these light levels, per CPP standards.

City of Cleveland - Parking Lot

Zone	Description	Road Class	Area Class	Target F.C.	Actual F.C.	Target UR	Actual UR
R-1	Parking Lot	Local	Parking	1.0	1.0	5:1	2.5:1

NOT FOR REVIEW

City of Cleveland - Pedestrian Areas (Under Bridges)

Zone	Description	Road Class	Area Class	Target F.C.	Actual F.C.	Target UR	Actual UR
P-3	Abbey - N. sidewalk under I-90	-	Pedestrian	0.80	3.2	4:1	8.0:1
P-4	Abbey - S. sidewalk under I-90	-	Pedestrian	0.80	2.7	4:1	6.8:1
P-7	W. 14th Walk under I-90	-	Pedestrian	0.80	2.6	4:1	3.9:1

Note: Lumens on ODOT Pole (Fixture A in Visual File) is set to zero for these analysis zones. Influence of ODOT light towers is not included in these light analyses. Pedestrian walkways in area underneath bridge structures will not be affected by adjacent ODOT light towers.

City of Cleveland - Pedestrian Areas (Open Areas)

Zone	Description	Road Class	Area Class	Target F.C.	Actual F.C.	Target UR	Actual UR
P-1	North Plaza	-	Pedestrian	0.80	1.40	4:1	2.8:1
P-2	North Walk - Abbey Bridge BL-15	-	Pedestrian	0.80	1.80	4:1	2.3:1
P-5	South Plaza	-	Pedestrian	0.80	2.10	4:1	3.0:1
P-6	South Walk - Abbey Bridge BL-15	-	Pedestrian	0.80	1.70	4:1	2.1:1

Note: Lumens on ODOT Pole (Fixture A in Visual File) is set to 300,000 for these analysis zones. Influence of ODOT light towers is included in these light levels.

City of Cleveland - Pedestal "F"

PRELIMINARY VOLTAGE DROP CALCULATIONS

Voltage:240
 CUY-90-14.52

Wire Factor Used (Three - No. 2 AWG Wires)
 Wire Factor Used (Three - No. 4 AWG Wires)

Ohms/mft/1000
 0.3252
 0.5174

VOLTAGE DROP IN A SECTION = AMPS IN AND BEYOND SECTION (A) X SECTION LENGTH (FT) X WIRE FACTOR

From	Section		Feet	Fixt Type	At Point		Accum.	Ampere-Feet	AWG	Voltage Drop		% Drop	At Point
	To				Fixtures	Total				In Section	Accum.		
CIRCUIT 1													
F1-1	F1-2		120	cobra	1	1.25	1.25	150	2	0.05	4.71	1.96	F1-1
F1-2	F1-3		140	ACORN	1	0.24	1.49	209	2	0.07	4.66	1.94	F1-2
F1-3	F1-4		150	LP	1	2.00	3.49	524	2	0.17	4.59	1.91	F1-3
F1-4	F1-5		150	ACORN	1	0.24	3.73	560	2	0.18	4.42	1.84	F1-4
F1-5	F1-6		150	LP	1	2.00	5.73	860	2	0.28	4.24	1.77	F1-5
F1-6	F1-7		150	ACORN	1	0.24	5.97	896	2	0.29	3.96	1.65	F1-6
F1-7	F1-8		140	LP	1	2.00	7.97	1116	2	0.36	3.67	1.53	F1-7
F1-8	F1-9		140	ACORN	1	0.24	8.21	1149	2	0.37	3.30	1.38	F1-8
F1-9	F1-10		130	LP	1	2.00	10.21	1327	2	0.43	2.93	1.22	F1-9
F1-10	F1-11		100	ACORN	1	0.24	10.45	1045	2	0.34	2.50	1.04	F1-10
F1-11	F1-34		120	LP	1	2.00	12.45	1494	2	0.49	2.16	0.90	F1-11
F1-34	F1-21		100	BRANCH	X	7.68	20.13	2013	2	0.65	1.67	0.70	F1-34
F1-21	PB-F13		80	BRANCH	X	14.69	34.82	2786	2	0.91	1.02	0.42	F1-21
PB-F13	CC-F		10	X	0	0.00	34.82	348	2	0.11	0.11	0.05	PB-F13
CIRCUIT 2													
PB-F5	F2-1		90	U.P.	2	2.50	2.50	225	2	0.07	1.54	0.64	PB-F5
F2-1	F2-2		40	LP	1	1.25	1.25	50	2	0.02	1.47	0.61	F2-1
F2-2	F2-3		50	ACORN	1	0.24	1.49	75	2	0.02	1.45	0.61	F2-2
F2-3	F2-4		50	LP	1	1.25	2.74	137	2	0.04	1.43	0.60	F2-3
F2-4	F2-5		50	ACORN	1	0.24	2.98	149	2	0.05	1.38	0.58	F2-4
F2-5	F2-6		50	LP	1	1.25	4.23	212	2	0.07	1.34	0.56	F2-5
F2-6	F2-7		50	ACORN	1	0.24	4.47	224	2	0.07	1.27	0.53	F2-6
F2-7	F2-8		80	LP	1	1.25	5.72	458	2	0.15	1.19	0.50	F2-7
F2-8	F1-21		240	ACORN	1	0.24	5.96	1430	2	0.47	1.05	0.44	F2-8
F1-21	PB-F13		80	BRANCH	X	13.22	19.18	1534	2	0.50	0.58	0.24	F1-21
PB-F13	CC-F		10	BRANCH	X	5.92	25.10	251	2	0.08	0.08	0.03	PB-F13
CIRCUIT 3													
PB-F3	PB-F4		110	U.P.	2	4.00	4.00	440	2	0.14	5.15	2.14	PB-F3
PB-F4	PB-F2		40	LP	1	1.25	5.25	210	2	0.07	5.00	2.08	PB-F4
PB-F2	F3-3		120	LP	2	2.50	7.75	930	2	0.30	4.93	2.06	PB-F2
F3-3	F3-4		90	LP	2	4.00	11.75	1058	2	0.34	4.63	1.93	F3-3
F3-4	PB-F5		90	BRANCH	X	1.49	13.24	1192	2	0.39	4.29	1.79	F3-4
PB-F5	F3-8		70	X	0	0.00	13.24	927	2	0.30	3.90	1.63	PB-F5
F3-8	F3-13		500	LP	1	2.00	15.24	7620	2	2.48	3.60	1.50	F3-8
F3-13	PB-F13		100	BRANCH	X	15.96	31.20	3120	2	1.01	1.12	0.47	F3-13
PB-F13	CC-F		10	CAMERA	2	1.66	32.86	329	2	0.11	0.11	0.04	PB-F13

95.28

FIXTURES

Watts	Volts	Lamp Loss			
400	240	1.2 =	2.00	AMPS/FIXTURE - Shoebox and/or UP Light	
250	240	1.2 =	1.25	AMPS/FIXTURE - Shoebox and/or UP Light	
150	240	1.2 =	0.75	AMPS/FIXTURE - Shoebox (on 15' pole)	
58	240	1 =	0.24	Acorn (Tremont) Fixture	
50	120	1 =	0.42	Wall Accent Lights	
100	120	1 =	0.83	Camera	
				Amps (Rating)	Fuse
TOTAL AMPS OF CIRCUIT 1 =			34.82	/0.8	43.5
TOTAL AMPS OF CIRCUIT 2 =			25.10	/0.8	31.4
TOTAL AMPS OF CIRCUIT 3 =			32.86	/0.8	41.1

CONNECTED LOAD =

(LINE VOLTAGE X TOTAL CURRENT)/1000
 240 x 95.28 = **22.8672 KVA**

ENCLOSURE RATING=

(SUM OF CIRCUIT LOAD/0.8)=
 95.28 /0.8 = **119.1 Amps**
 Fuse= **200** (USE STANDARD 60, 100, OR 200)

Made by: Mark Hunter 10/6/2011
 Checked by: George Mohan 10/6/2011