Cambridge Community Development Department
344 Broadway
Cambridge, MA 02139

RE: Amgen Roof Parapet Lighting
Special Permit – Planning Board Meeting

To Whom It May Concern:

Amgen, Inc., as the parent company of Amgen Cambridge Real Estate Holding, Inc., the owner of the property located at 360 Binney Street, Cambridge, Massachusetts ("Building"), installed roughly 700 linear feet of neon lights around the roof-top parapet exterior in the year 2000, when the building was first constructed. These neon lights illuminated the roof-top wind screens with a soft blue light (see attached images) and served as an architectural feature of the Cambridge Skyline for over twenty (20) years. Then in the spring of 2020, Amgen had to remove these neon lights while replacing the building's roof and sealing all of the parapet cap stones. The intention at that time was to replace these neon lights with new LED lights that would consume much less power, while providing substantially the same illumination around the roof-top parapet.

Amgen had to pause this work because of project costs, schedule and COVID 19 delays. Now, Amgen has secured the necessary funding and is looking to install 700 linear feet of LED lighting fixtures around the roof-top parapet to restore the Building's original lighting motif.

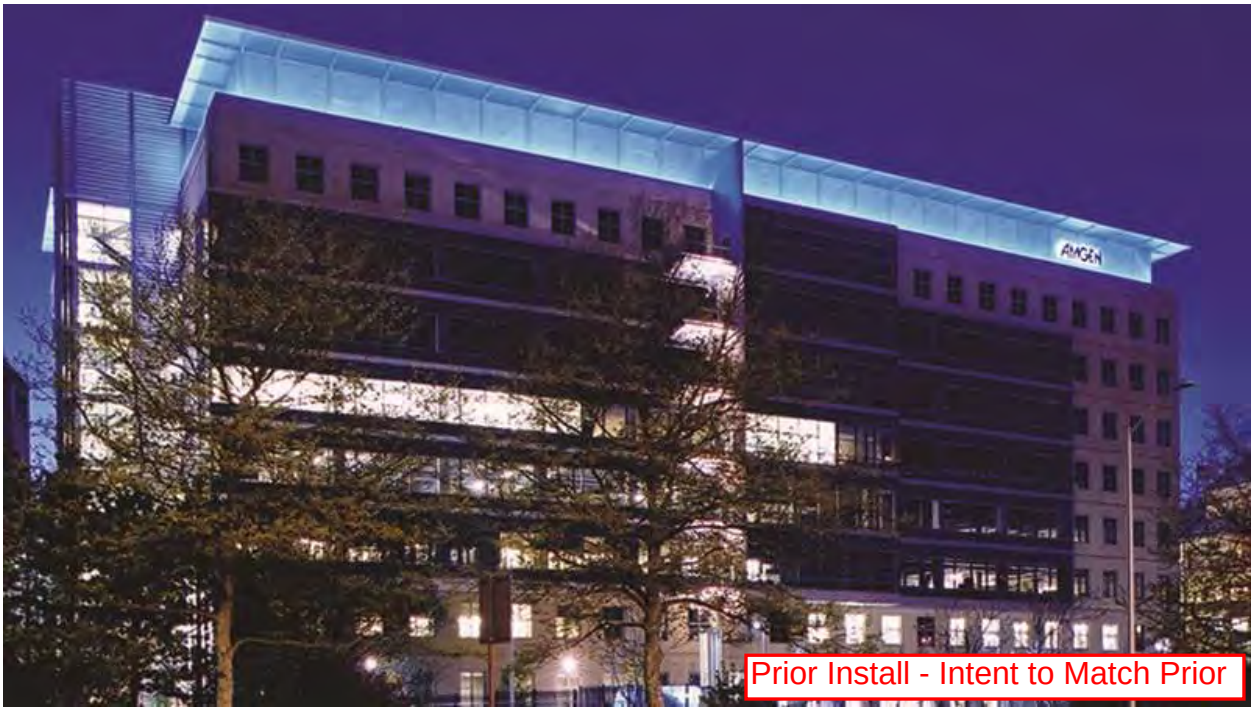
The updated lighting design for the Amgen parapet is a 1:1 replacement for the entire length of the existing parapet. Illuminance and luminance calculations were performed by the design team to determine the optimal optical distribution (30x60) and output of the specified fixture. Each fixture will be equipped with a visor accessory to minimize spill light into the sky. All fixtures mounted to the parapet will be dimmed per direction of the designer on site to further minimize spill light and ensure that neighboring buildings remain undisturbed by the updated lighting. To abide by the City of Cambridge's lighting ordinances and reduce energy consumption, all parapet lighting is scheduled to turn off or significantly dim between the hours of 12am and 6am. In summary, the fixture distribution, visor accessory, and dimmability of these updated fixtures will have minimal spill light and increased energy performance.

Best

Rebecca Caulfield, Director Preconstruction

1. AMGEN PARAPET LIGHTING IMAGES


AMGEN
Prior Install - Intent to Match Prior


AMGEN
Prior Install - Intent to Match Prior

2. AMGEN PARAPET LIGHTING LOCATIONS

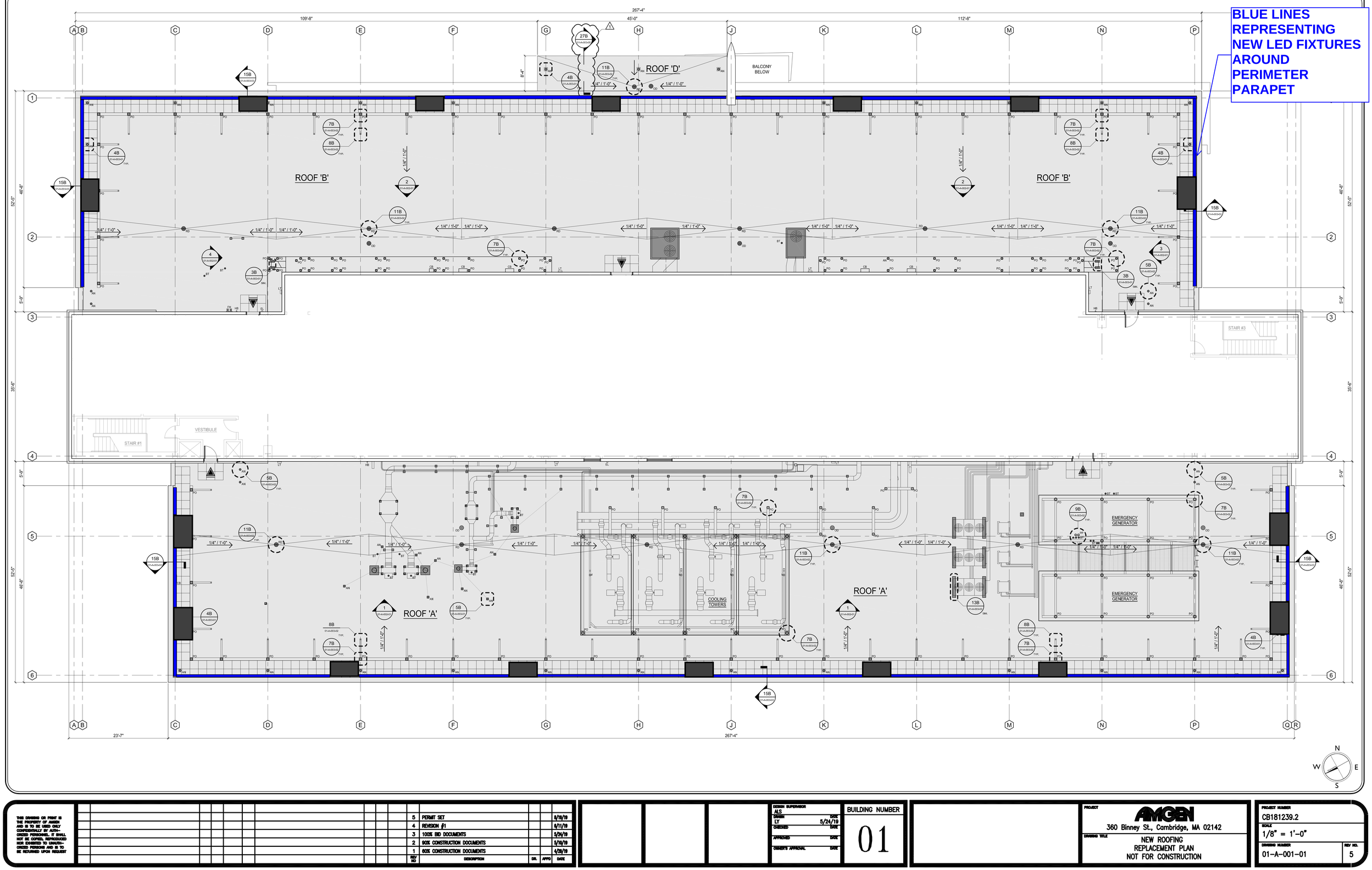
ROOF PLAN LEGEND

- HATCH INDICATES LIMIT OF WORK, TYPICAL
- HATCH INDICATES ROOF PENETRATIONS, TYPICAL
- WORK NOTE, TYPICAL
- ROOF ENTRY, TYPICAL
- CALL-OUT, TYPICAL
- CALL-OUT TAG, TYPICAL (00-000)
- ELEVATION TAG, TYPICAL (00-000)
- GRID TAG, TYPICAL
- GRID LINE, TYPICAL
- TAPERED INSULATION SLOPE, TYPICAL (0" / 0'-0")
- CURB / DUCT PENETRATION — REFER TO 01-A-003-03 / 18B
- VENT STACK ON CONCRETE CURB — REFER TO 01-A-003-03 / 13B
- DUCT SUPPORT W/ LIQUID FLASHING — REFER TO 01-A-003-01 / 3B
- METAL ANGLE W/ LIQUID FLASHING — REFER TO 01-A-003-01 / 3B
- ROOF DRAIN (RD) — REFER TO 01-A-003-02 / 11B
- OVERFLOW DRAIN (OD) — REFER TO 01-A-003-02 / 11B SIMILAR
- PIPE PENETRATION (PP) — REFER TO 01-A-003-02 / 9B
- BOOT FLASHING (BT) — REFER TO 01-A-003-02 / 8B SIMILAR
- ANCHOR TYPE I - CIRCULAR TUBE (AN) — REFER TO 01-A-003-01 / 5B
- ANCHOR TYPE II - SQUARE TUBE (AN) — REFER TO 01-A-003-01 / 5B SIMILAR
- ANCHOR TYPE III - SQUARE TUBE (AN) — REFER TO 01-A-003-01 / 4B
- STEEL POST TYPE I - SQUARE TUBE (PO) — REFER TO 01-A-003-02 / 7B
- STEEL POST TYPE II - CIRCULAR TUBE (PO) — REFER TO 01-A-003-02 / 7B SIMILAR
- EXTERIOR LIGHT - WALL MOUNTED (LT)
- EMERGENCY LIGHT - WALL MOUNTED (EL)
- HOSE BIB - WALL MOUNTED (HB)
- FIRE HYDRANT - WALL MOUNTED (FH)
- CIRCUIT BOX - WALL MOUNTED (CB)
- PERIMETER UP-LIGHT - PARAPET — REFER TO 01-A-003-02 / 15B
- PAVERS — REFER TO 01-A-003-02 / 15B

FURNISH AND INSTALL THE FOLLOWING:

1. A COMPLETE NEW INSULATED FULLY ADHERED HOT AIR WELDED .060-INCH THICK KETONE ETHYLENE ESTER (KEE) SINGLE-PLY MEMBRANE ROOFING SYSTEM AT ROOF AREAS A, B, C, & D
2. FULLY ADHERED SINGLE-PLY MEMBRANE,
3. 1/2" DENSDECK PRIME, ADHERED WITH INSULATION ADHESIVE.
4. POLYISOCYANURTE INSULATION CRICKETS AND SUMPS, ADHERED WITH INSULATION ADHESIVE.
5. (2) LAYERS - 2.5" POLYISOCYANURATE (TOTAL LTTR - 28.8) WITH JOINTS STAGGERED; ADHERED WITH INSULATION ADHESIVE.
6. FOR ROOF AREA C: INSTALL 1/2" FIRE RATED HIGH DENSITY RGID POLYISOCYANURATE INSULATION BOARD, ADHERED DIRECTLY TO THE EXISTING STEEL ROOF DECK.
7. 36 MIL SELF-ADHERED VAPOR BARRIER ADHERED TO EXISTING CONCRETE ROOF DECK AT ROOF AREAS A, B AND D, AND TO HIGH DENSITY INSULATION COVER BOARD AT ROOF AREA C.
8. .060-INCH KEE MEMBRANE HIGH WALL AND PARAPET WALL FLASHINGS.
9. .060-INCH KEE MEMBRANE FLASHINGS AT ALL ROOF PENETRATIONS.
10. .060-INCH KEE MEMBRANE FLASHINGS AT ALL CONTINUED: PRIMARY AND SECONDARY PENETRATIONS.
11. FLUID APPLIED MEMBRANE FLASHINGS AT IRREGULAR SHAPED ROOF PENETRATIONS.
12. ALL-PURPOSE SEALANTS AND MASTICS TO COMPLETE WATER TIGHTNESS OF THE NEW ROOFING SYSTEM.
13. ROOFING SYSTEM WARRANTY: 20 YEAR SINGLE SOURCE NO-DOLLAR LIMIT TOTAL SYSTEM WARRANTY
14. NEW PRESSURE TREATED 2X WOOD AND PLYWOOD BLOCKING, INCLUDING STAINLESS STEEL ANCHORS, SCREWS AND FASTENERS.
15. NEW 5/8" GYPSUM CORE FIBERGLASS MAT HIGH WALL AND PARAPET WALL SHEATHING.
16. .060-INCH KEE MEMBRANE HIGH WALL AND PARAPET WALL FLASHINGS.
17. NEW 22 GAUGE KYNAR COATED STEEL COPING CAPS AND ACCESSORIES.
18. NEW 24 GAUGE KYNAR COATED STEEL COUNTERFLASHINGS.
19. NEW INSULATED ROOF ACCESS HATCHES.
20. NEW HOT-DIPPED GALVANIZED PRIMARY ROOF DRAINS.
21. NEW PREFORMED RUBBER PAVERS AT THE PERIMETER OF ROOF AREAS A, B & C.
22. REINSTALLATION OF EXISTING PARAPET WALL LIGHTING FIXTURES.
23. REINSTALLATION OF EXISTING PERIMETER SAFETY RAILS AT ROOF AREA C.
24. RECONNECTION OF EXISTING ROOFTOP MECHANICAL EQUIPMENT AND DUCTWORK.
25. RECONNECTION OF EXISTING ELECTRICAL EQUIPMENT.
26. PSMKO 2705_T HEAVY DUTY THRESHOLDS AND FLASHING.

BLUE LINES REPRESENTING NEW LED FIXTURES AROUND PERIMETER PARAPET



REV NO	DESCRIPTION	DR.	APP'D	DATE
5	PERMIT SET			8/15/19
4	REVISION #1			8/11/19
3	100% BID DOCUMENTS			5/24/19
2	90% CONSTRUCTION DOCUMENTS			5/10/19
1	60% CONSTRUCTION DOCUMENTS			4/26/19

DESIGN SUPERVISOR: ALS
DRAWN: LY — DATE: 5/24/19
CHECKED — DATE
APPROVED — DATE
OWNER'S APPROVAL — DATE

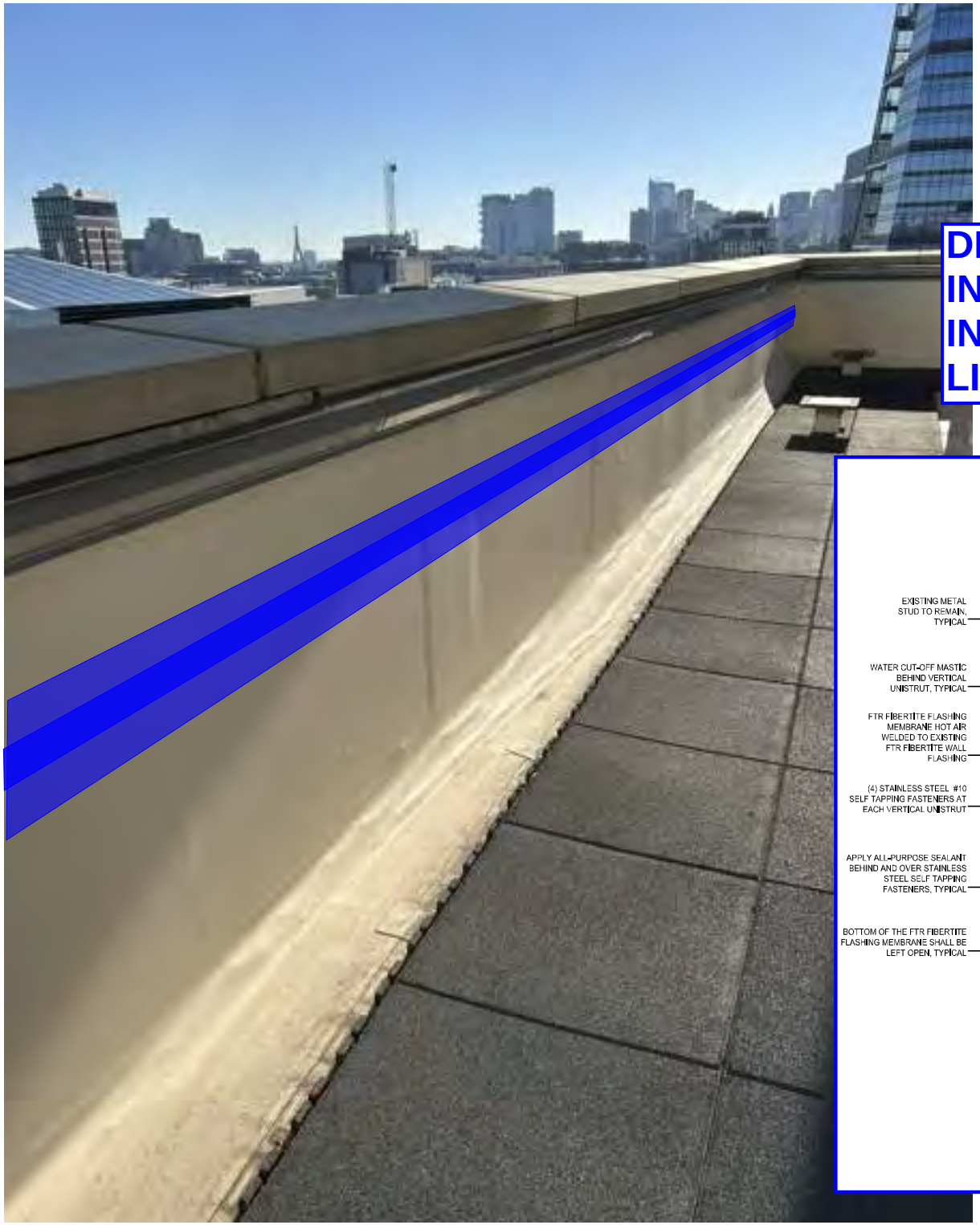
BUILDING NUMBER: 01

PROJECT: AMGEN
360 Binney St., Cambridge, MA 02142
DRAWING TITLE: NEW ROOFING REPLACEMENT PLAN NOT FOR CONSTRUCTION

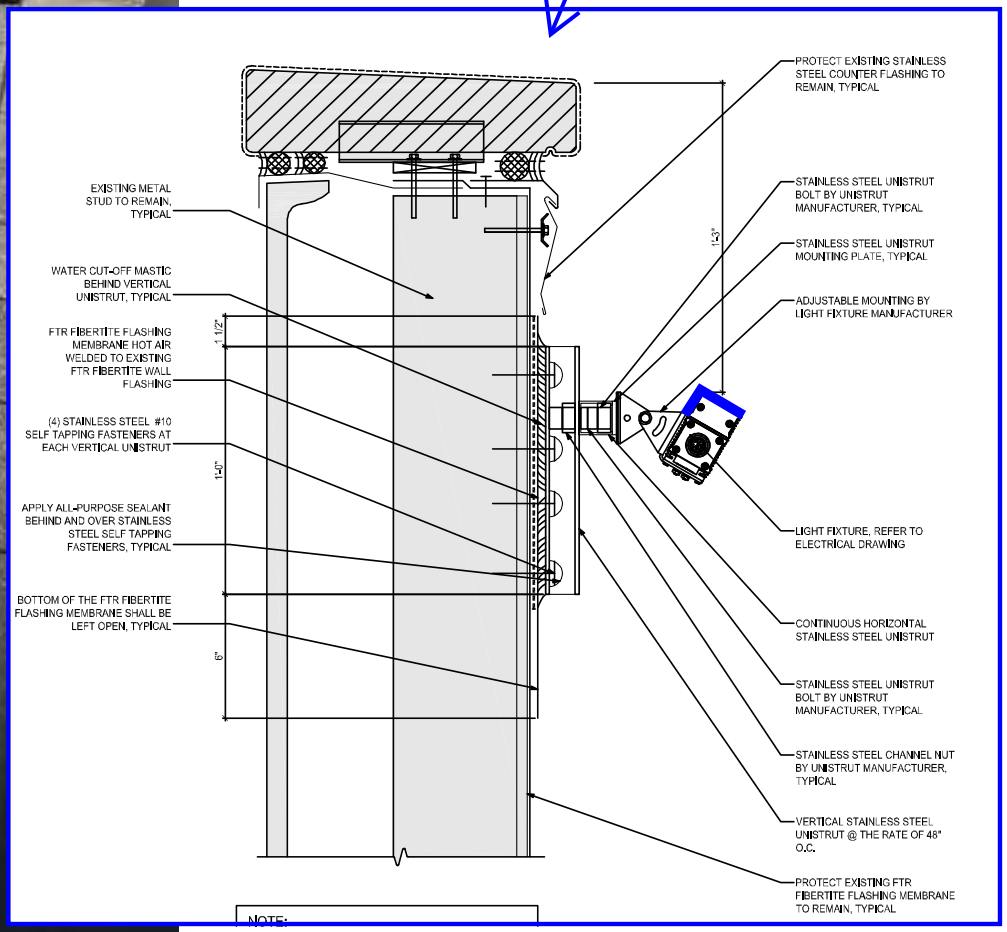
PROJECT NUMBER: CB181239.2
SCALE: 1/8" = 1'-0"
DRAWING NUMBER: 01-A-001-01
REV NO.: 5

3. AMGEN PARAPET LIGHTING MARK UP LOCATIONS & LIGHTING DETAIL


BLUE LINES REPRESENTING NEW
SECURED BRACKET & LED FIXTURES
AROUND PERIMETER PARAPET



DETAIL OF BRACKET & FIXTURE INSTALL. FIXTURE WILL ALSO INCLUDE VISOR ACCESSORY FOR LIGHT SPILL



4. AMGEN PARAPET LIGHTING MOCK UP REPORT (2020)

BR+A CONSULTING ENGINEERS
10 Guest Street, 4th Floor
Boston, MA 02135
617.254.0016
brplusa.com

NIGHTTIME LIGHTING MOCK-UP REPORT - 11-19-20

PROJECT	Amgen AMA 360 Binney Street Cambridge MA Roof Parapet Lighting
LOCATION	On-Site
DATE OF MOCK-UP	11/10/20
ATTENDEES	Robert Kinney / Amgen Royden Fejer / CBI Michael Chabot / Boston Light Source David Piers / Apex Boston Enrique Rojas, BR+A

AGENDA FOR THE MOCK-UP

1. An on-site mock-up was necessary since color changing LED fixture manufacturers do not run photometric tests for specific colors such as the science blue required for this project.
2. The purpose of the meeting was to illuminate the actual parapet structure and to review and study approximate fixture placement, output and color accuracy for two similar manufacturers.
3. Review the color accuracy of the LED fixtures pre-programmed to the science blue RGB provided by Amgen.
4. Demonstrate the color changing capabilities of each manufacturer.
5. Take luminance and illuminance meter readings of the illuminated parapet to compare against the preliminary agi32 software simulations.
6. Photograph mock-up.
7. Mock-up observations, conclusion and recommendations.

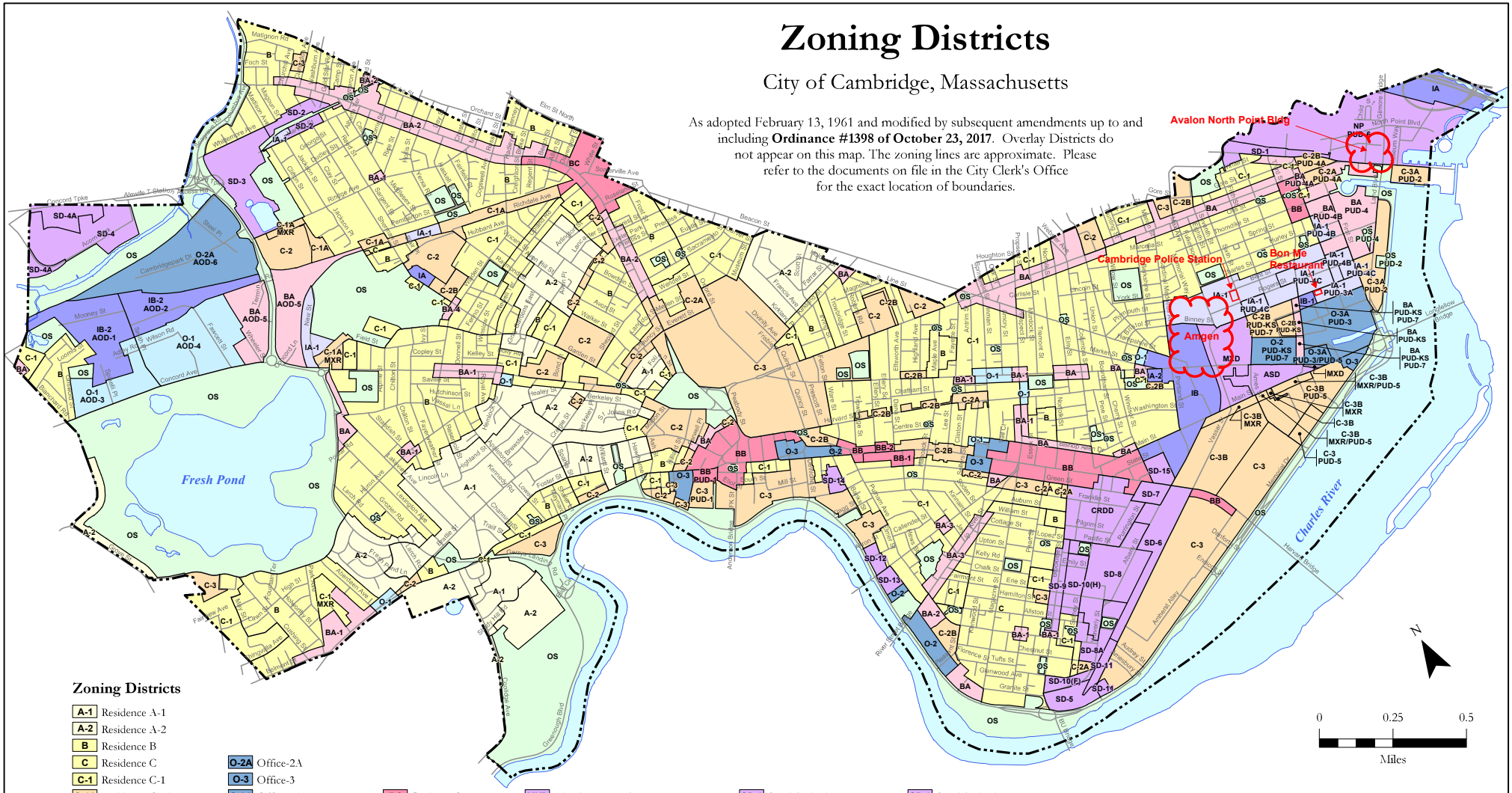
SUBMITTED BY Enrique Rojas, IALD,IES, LEED AP
Senior Associate
BR+A Consulting Engineers

INDEX

Zoning Districts

City of Cambridge, Massachusetts

As adopted February 13, 1961 and modified by subsequent amendments up to and including **Ordinance #1398 of October 23, 2017**. Overlay Districts do not appear on this map. The zoning lines are approximate. Please refer to the documents on file in the City Clerk's Office for the exact location of boundaries.



Zoning Districts

- A-1 Residence A-1
- A-2 Residence A-2
- B Residence B
- C Residence C
- C-1 Residence C-1
- C-1A Residence C-1A
- C-2 Residence C-2
- C-2A Residence C-2A
- C-2B Residence C-2B
- C-3 Residence C-3
- C-3A Residence C-3A
- C-3B Residence C-3B
- O-1 Office-1
- O-2 Office-2
- O-2A Office-2A
- O-3 Office-3
- O-3A Office-3A
- BA Business A
- BA-1 Business A-1
- BA-2 Business A-2
- BA-3 Business A-3
- BA-4 Business A-4
- BB Business B
- BB-1 Business-1
- BB-2 Business 2
- BC Business C
- BC-1 Business C-1
- IA-1 Industry A-1
- IA-2 Industry A-2
- IA Industry A
- IB-1 Industry B-1
- IB-2 Industry B-2
- IB Industry B
- MXD Mixed Use Development
- ASD Ames Street District
- AOD Alewife Overlay District
- PUD Planned Unit Development Overlay
- MXR Mixed Use Residential Overlay
- NP North Point District
- CRDD Cambridgeport Revitalization Development District
- SD-1 Special District-1
- SD-2 Special District-2
- SD-3 Special District-3
- SD-4 Special District-4
- SD-4A Special District-4A
- SD-5 Special District-5
- SD-6 Special District-6
- SD-7 Special District-7
- SD-8 Special District-8
- SD-8A Special District-8A
- SD-9 Special District-9
- SD-10(F) Special District-10(F)
- SD-10(H) Special District-10(H)
- SD-11 Special District-11
- SD-12 Special District-12
- SD-13 Special District-13
- SD-14 Special District-14
- SD-15 Special District-15
- OS Open Space

This map was prepared by the Community Development Department on December 7, 2017 and reflects the latest changes to zoning boundaries.

Map prepared by Brendan Monroe on December 7, 2017. CDD GIS C:\Projects\Zoning\Zoning11x17.mxd

District	Max. FAR	Min. Lot Area/DU	Min. Setback Front Yard	Min. Setback Side Yard	Min. Setback Rear Yard	Max. Height	Min. OS Ratio	General range of allowed uses
A-1	0.50	6,000	25	15 sum to 35	25	35	50%	single-family detached dwellings
A-2	0.50	4,500	20	10 sum to 25	25	35	50%	
B	0.50	2,500	15	7.5 sum to 20	25	35	40%	single- and two-family detached dwellings townhouse dwellings (by special permit)
C	0.60	1,800	(H+L) ÷ 4 at least 10	(H+L) ÷ 5 ≥7.5, sum ≥20	(H+L) ÷ 4 at least 20	35	36%	single- and two-family detached dwellings townhouse dwellings multifamily dwellings (apartments, condos) limited institutional uses
C-1	0.75	1,500	(H+L) ÷ 4 at least 10	(H+L) ÷ 5 at least 7.5	(H+L) ÷ 4 at least 20	35	30%	
C-1A	1.25	1,000	10	(H+L) ÷ 7	(H+L) ÷ 5	45	15%	single- and two-family detached dwellings townhouse dwellings multifamily dwellings (apartments, condos) some institutional uses
C-2	1.75	600	(H+L) ÷ 4 at least 10	(H+L) ÷ 5	(H+L) ÷ 4 at least 20	85	15%	
C-2A	2.50	300	(H+L) ÷ 5 at least 5	(H+L) ÷ 6	(H+L) ÷ 5 at least 20	60	10%	
C-2B	1.75	600	(H+L) ÷ 4 at least 10	(H+L) ÷ 5	(H+L) ÷ 4 at least 20	45	15%	
C-3	3.00	300	(H+L) ÷ 5 at least 5	(H+L) ÷ 6	(H+L) ÷ 5 at least 20	120	10%	
C-3A	3.00	300	(H+L) ÷ 5 at least 5	(H+L) ÷ 6	(H+L) ÷ 5 at least 20	120	10%	
C-3B	3.00/4.00	300	10	no min	no min	120	10%	
O-1	0.75	1,200	(H+L) ÷ 4 at least 10	(H+L) ÷ 5	(H+L) ÷ 4 at least 20	35	15%	most types of residential dwellings most institutional uses offices and laboratories
O-2	1.50/2.00	600	(H+L) ÷ 4 at least 10	(H+L) ÷ 5	(H+L) ÷ 4 at least 20	70/85	15%	
O-2A	1.25/1.50	600	(H+L) ÷ 4 at least 10	(H+L) ÷ 5	(H+L) ÷ 4 at least 20	60/70	15%	
O-3	2.00/3.00	300	(H+L) ÷ 5 at least 5	(H+L) ÷ 6	(H+L) ÷ 5 at least 20	90/120	10%	
O-3A	2.00/3.00	300	(H+L) ÷ 5 at least 5	(H+L) ÷ 6	(H+L) ÷ 5 at least 20	90/120	10%	
BA	1.00/1.75	600	no min	no min	(H+L) ÷ 5 at least 20	35/45	no min	most types of residential dwellings most institutional uses offices and laboratories most retail uses
BA-1	1.00/0.75	1,200	no min	no min	(H+L) ÷ 5 at least 20	35	no min	
BA-2	1.00/1.75	600	5	10	20	45	no min	
BA-3	0.75	1,500	(H+L) ÷ 4 at least 10	(H+L) ÷ 5	(H+L) ÷ 4 at least 20	35	30%	
BA-4	1.00/1.75 2.00 w/limitations	600	(H+L) ÷ 4 10′ w/limitations	(H+L) ÷ 5 10′ w/limitations	(H+L) ÷ 5 10′ w/limitations	35 or 44 w/limitation	no min	
BB	2.75/3.00	300	no min	no min	no min	80	no min	
BB-1	1.50/3.25	300	no min	no min	no min	55/90	15%	
BB-2	1.50/3.00	300	no min	no min	no min	45	15%	
BC	1.25/2.00	500	no min	no min	20	55	no min	
BC-1	2.75/3.00	450	no min	no min	20	50	no min	
IA-1	1.25/1.50	700	no min	no min	no min	45	no min	most types of residential dwellings most institutional uses offices and laboratories some retail uses most light industrial uses some heavy industrial uses
IA-2	2.75/4.00	no min	no min	no min	no min	70	no min	
IA	1.25/1.50	no min	no min	no min	no min	45	no min	
IB-1	1.50/3.00	no min	no min	no min	no min	60/70	no min	
IB-2	0.75	1,200	15	no min	no min	35	15%	
IB	2.75/4.00	no min	no min	no min	no min	120	no min	
IC	1.00	no min	no min	no min	no min	45	no min	
OS	0.25	N/A	25	15	25	35	60%	open space, religious, or civic uses

Notes on Zoning Regulations Table

Max. FAR = maximum allowed ratio of gross floor area on a parcel divided by the total land area of the parcel ("floor area ratio"). Where a **slash (/)** separates two figures, the first applies to non-residential and the second to residential & dormitory uses.

Min. Lot Area/DU = minimum allowed ratio of a parcel's lot area, expressed in feet, divided by the number of dwelling units on that parcel.

Min. Setback = minimum required distance between a parcel's lot line (front, side, or rear) and the wall of a building, in feet. The symbol **(H+L)** in a formula represents the height of the building plus the length of the building parallel to that lot line.

Max. Height = maximum allowed building height on a parcel, in feet. A **slash (/)** has the same meaning as under Max. FAR (see above).

Min. OS Ratio = minimum required ratio of usable open space on a parcel (not including parking) to total land area, expressed as a percentage.

General range of allowed uses gives an overview of the types of uses permitted by zoning in that district, but does not refer to specific allowed uses. *See Article 4 of the Zoning Ordinance for the detailed Table of Use Regulations.*

Special District	Brief Description and Overview of District Regulations *(except where otherwise noted, detailed regulations are in Article 17 of the Zoning Ordinance)*
MXD (incl. ASD)	Mixed Use Development District: Cambridge Center. Allows a mix of light industry, office, biotechnology manufacturing, retail, residential, hotel, entertainment, and institutional uses. Entire district has a limit on aggregate gross floor area and a minimum open space requirement. Includes "Ames Street District" (ASD). *See Article 14 of the Zoning Ordinance.*
CRDD	Cambridgeport Revitalization Development District. Allows a mix of light industry, office, retail, residential, hotel, and entertainment uses. Aggregate gross floor area of the entire district limited to 1,900,000 square feet of non-residential and 400,000 square feet (or 400 units) of residential. Limits on FAR and building heights vary. At least 100,000 square feet reserved for open space. *See Article 15 of the Zoning Ordinance.*
NP	North Point Residence, Office and Business District. Allows certain residential, office, laboratory, retail, and institutional uses. Maximum FAR 1.0, height 40 feet. *See Article 16 of the Zoning Ordinance.* Greater development density allowed through PUD-6 regulations: *See Article 13 of the Zoning Ordinance.*
SD-1	Along Monsignor O'Brien Highway in East Cambridge. Regulations similar to Industry A-1 with exceptions.
SD-2	Along Linear Park in North Cambridge. Regulations similar to Residence B with exceptions. Conversion to housing is encouraged.
SD-3	Near Alewife Station. Allows residential, office, institutional, and limited retail uses. Aggregate gross floor area of the entire district limited to 782,500 square feet not including MBTA facilities or existing residential buildings.
SD-4 SD-4A	Along Acorn Park in North Cambridge. Regulations similar to Office 2 with exceptions. Preservation of open space is encouraged.
SD-5	Along Memorial Drive in southern Cambridgeport. Regulations similar to Office 2 with exceptions.
SD-6	Along railroad tracks between Cambridgeport and MIT Campus Area. Regulations similar to Residence C-3 with exceptions.
SD-7	Along Massachusetts Avenue in Cambridgeport. Regulations similar to Business B (as modified by Central Square Overlay District) with exceptions.
SD-8	Between Albany and Sidney Streets in Cambridgeport. Regulations similar to Industry A-1 with exceptions.
SD-8A	Around Fort Washington Park in Cambridgeport. Regulations similar to Residence C-1A with exceptions. Conversion to housing is encouraged.
SD-9	Along Brookline Street in Cambridgeport. Regulations similar to Residence C with exceptions. Conversion to housing is encouraged.
SD-10(F) SD-10(H)	Two locations in southern Cambridgeport near Henry Street, Brookline Street, Sidney Street. Regulations similar to Residence C with exceptions. Conversion to housing is encouraged.
SD-11	Along railroad tracks and Memorial Drive in southeastern Cambridgeport / MIT Campus Area. Regulations similar to Office 2 with exceptions.
SD-12	Along Memorial Drive in Riverside. Regulations similar to Residence C-2B with exceptions. Creation of open space is encouraged.
SD-13	Along Memorial Drive in Riverside. Regulations similar to Residence C-2 with exceptions.
SD-14	Near Grant and Cowperthwaite Streets in Riverside. Regulations similar to Residence C-1 with exceptions. Preservation of neighborhood character is encouraged.
SD-15	At Massachusetts Ave and Albany Street. Regulations similar to Industry B with allowances for additional FAR and height.

City of Cambridge Zoning Reference Sheet

CAUTIONARY NOTE. This sheet is intended to serve as a quick reference to dimensional standards and use regulations defined in the Cambridge Zoning Ordinance. This sheet does not serve as a substitute for the Cambridge Zoning Ordinance, and the City of Cambridge does not guarantee that this sheet is fully consistent with the Zoning Ordinance. The print version of the Zoning Ordinance, together with any amendments adopted by the City Council subsequent to the most recent update to the print version, remains the official version of the Ordinance. If any discrepancies exist between the print version of the Zoning Ordinance and this sheet, then the print version of the Ordinance, together with any City Council amendments, shall be considered correct.

The full Zoning Ordinance is available online at
www.cambridgema.gov/CDD/zoninganddevelopment/Zoning

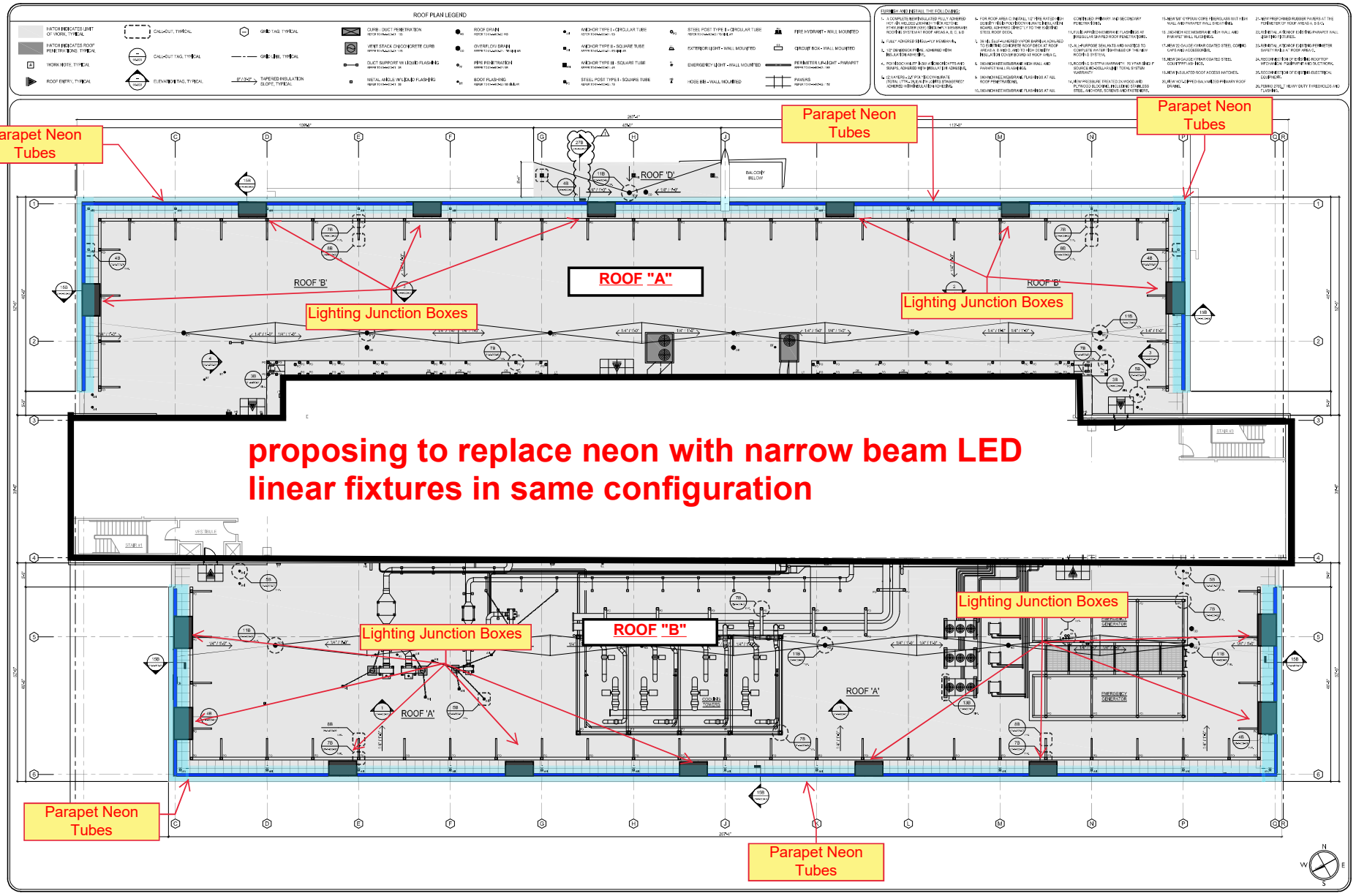
Planned Unit Development (PUD) Districts

PUD overlay districts provide flexible zoning standards for multi-site phased development with a variety of land uses and densities. A developer may choose to conform to PUD controls in lieu of the base district requirements, but must receive a special permit from the Planning Board. *See Articles 12 and 13 of the Zoning Ordinance.*

PUD-KS	Kendall Square. Mixed use with office, residential, retail, and a required public park. Max FAR 3.0 with restrictions. Max heights 65′-250′, with limitations adjacent to public open space.
PUD-1	Charles Square near Harvard. Medium density mixed use with commercial, office and residential. Max FAR 3.0. Max height 60′ with conditional increases to 110′.
PUD-2	East Cambridge Riverfront. Office, retail and residential. Max FAR 3.0, or 4.0 for residential uses. Max height 120′.
PUD-3 PUD-3A	Kendall Square, near riverfront. Mixed use with office, retail and residential. Max FAR 2.0-3.0. Max height 120′-230′, with conditions and allowances.
PUD-4 PUD-4A PUD-4B PUD-4C	East Cambridge along First and Binney Streets. Mix of retail, office, and residential. Max FAR 2.0-3.0 and max height 65′-85′, with conditions and allowances.
PUD-5	MIT at Kendall Square. Office and institutional development with required housing and ground floor retail. Total FAR 3.9. Heights allowed to 250′ for non-residential and 300′ for residential uses.
PUD-6	North Point. Residential with retail and office uses, community services, and public open space. Max FAR 3.0, incentives to encourage housing and development near transit. Max heights 85′-250′, some areas limited to 65′.
PUD-7	Kendall Square, "Volpe Center Parcel." Mix of commercial office/lab and residential with required open space, ground-floor active uses, and community space. Up to 3.25 million square feet of floor area. Max heights 250′-350′, one building up to 500′.

Alewife Overlay Districts (AOD-1,2,3,4,5,6)

These overlays modify the dimensional provisions of the base districts, generally allowing greater height and FAR by special permit from the Planning Board, but also imposing additional requirements for open space, permeability, setbacks, etc. *For details see Section 20.90 of the Zoning Ordinance.*



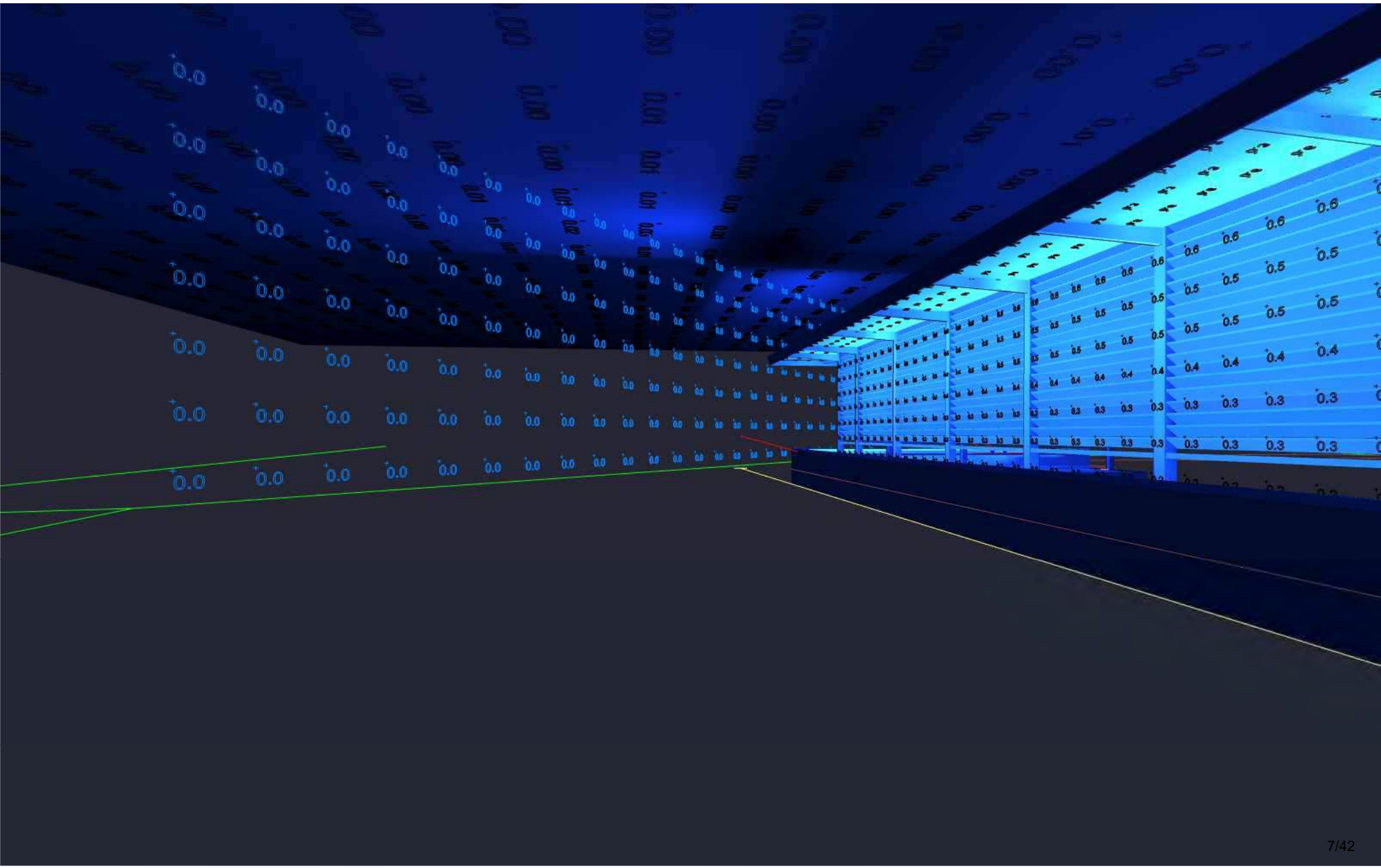
5	PERMIT SET	9/19/19
4	REVISION #1	8/21/19
3	100% BID DOCUMENTS	8/09/19
2	90% CONSTRUCTION DOCUMENTS	5/16/19
1	40% CONSTRUCTION DOCUMENTS	4/29/19

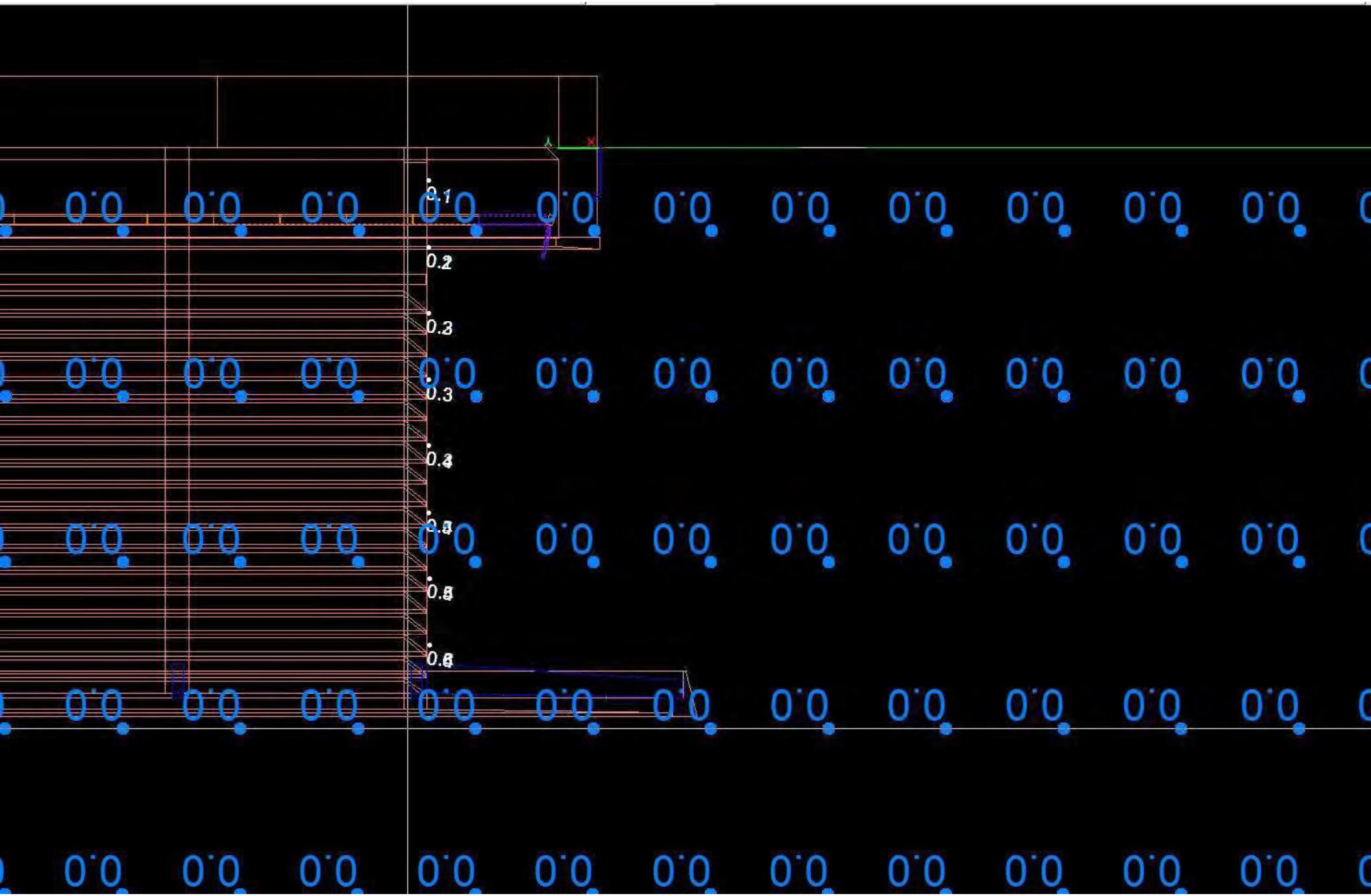
BUILDING NUMBER 01

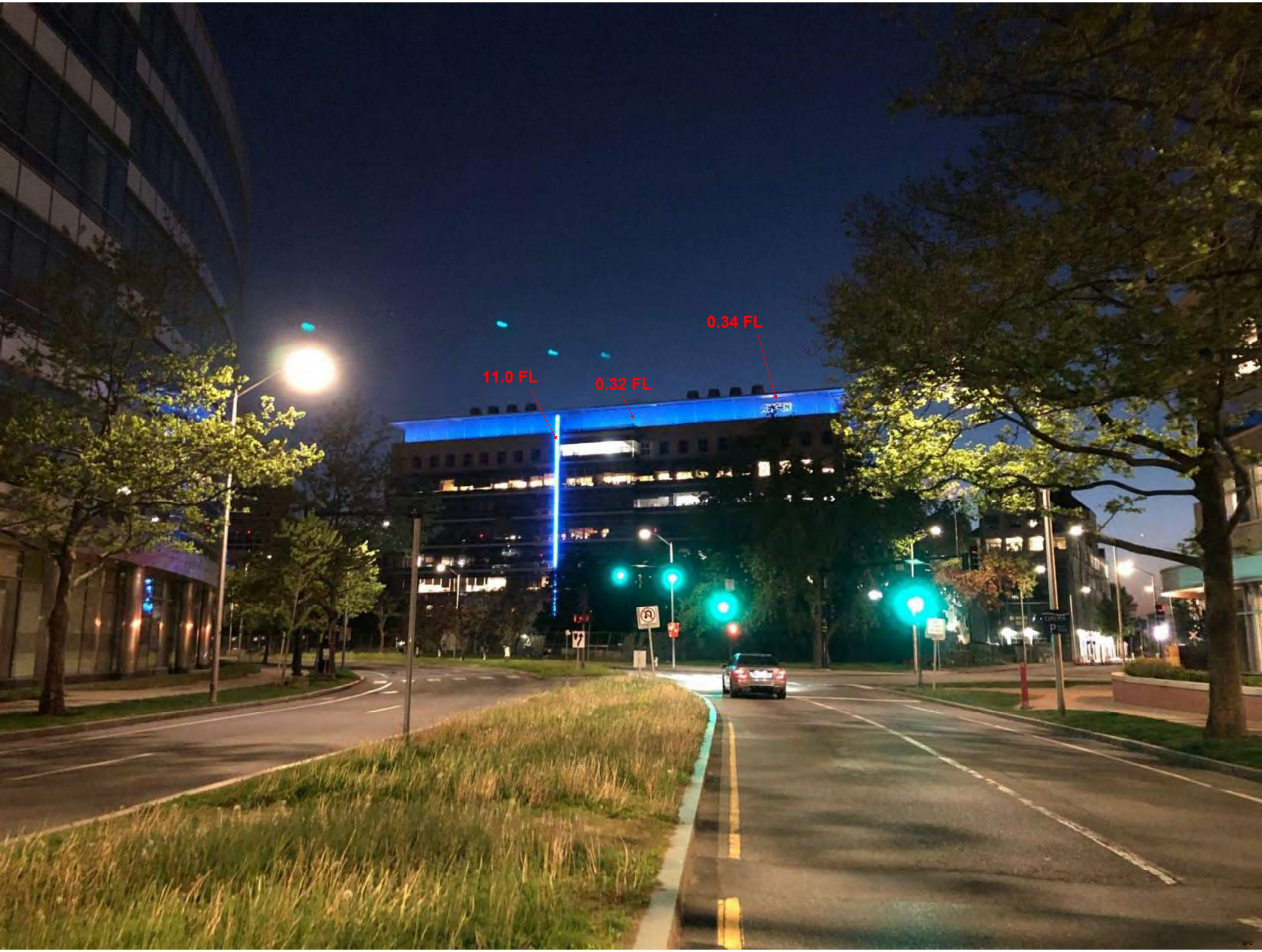
AMGEN
360 Binney St., Cambridge, MA 02142

NEW ROOFING REPLACEMENT PLAN NOT FOR CONSTRUCTION

CB181239.2
1/8" = 1'-0"
01-A-001-01
5

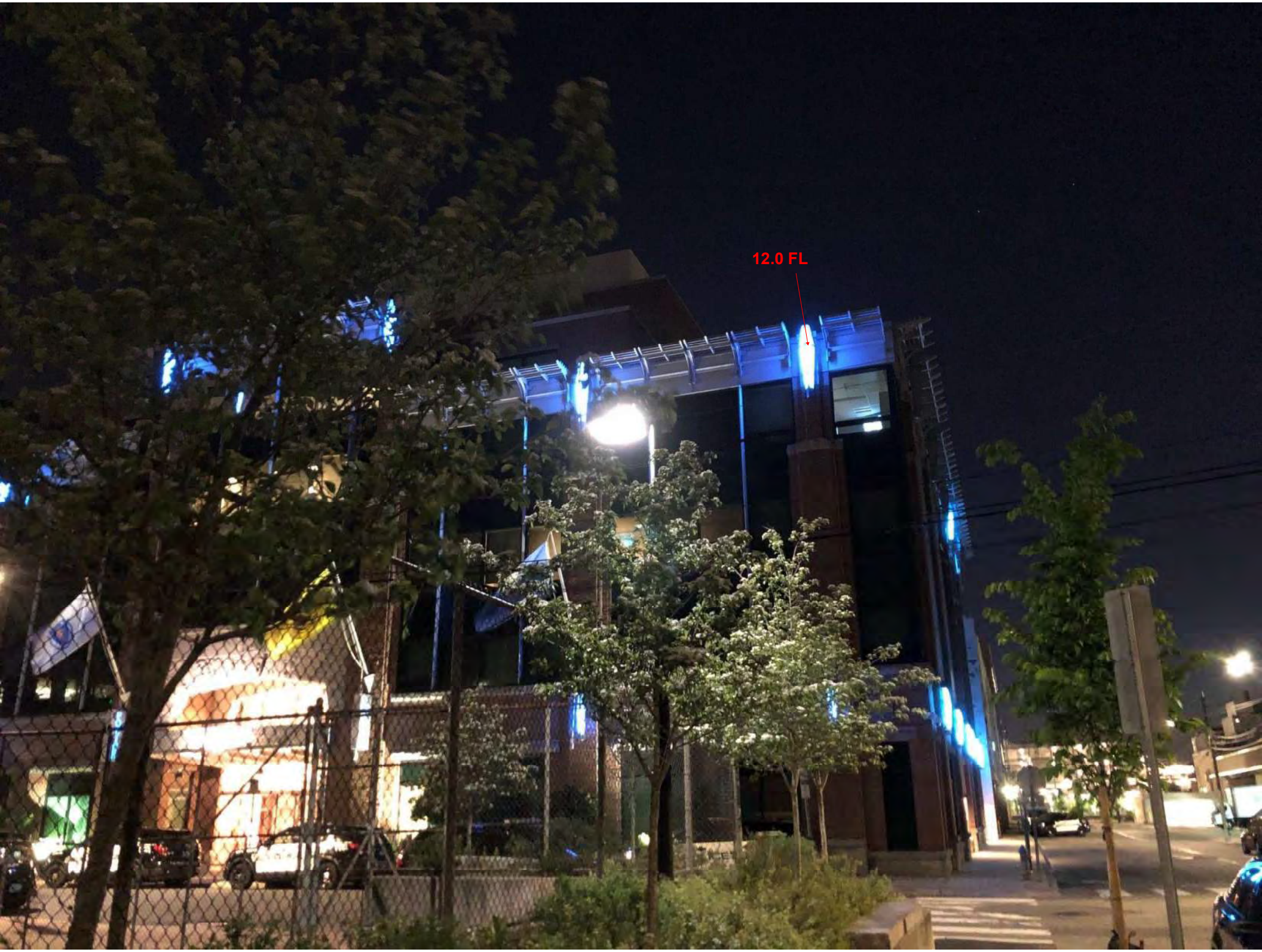



0.1
0.2
0.3
0.3
0.4
0.5
0.6


0.34 FL
11.0 FL
0.32 FL


8.0 FL
BON ME


5.4 FL


12.0 FL

S. **Lighting Zone ("LZ")** means an area or district within which particular lighting standards apply as set forth in this Ordinance. Lighting Zones are based on the U.S. Green Building Council's Leadership in Energy Environmental Design ("LEED") Light Pollution Reduction ("LPR") credit v4 BD+C four lighting zones and are delineated by reference to the Districts established in the Zoning Map of the City of Cambridge Zoning Ordinance ("Zoning Districts"). For the purposes of this Ordinance, only Lighting Zone 2 ("LZ2") and Lighting Zone 3 ("LZ3") are allowed in the City.

T. **Lighting Zone 2 ("LZ2")** means Low Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.10 horizontal and vertical foot candles (1.0 horizontal and vertical lux) at the LEED project boundary and no greater than 0.01 horizontal foot candles (0.1 horizontal lux) 10 feet (3 meters) beyond the LEED project boundary. LZ2 includes primarily residential districts, neighborhood business districts, light industrial areas with limited nighttime use and residential mixed-use areas. Document that no more than 2% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down). LZ2 includes all Zoning Districts not listed under Lighting Zone 3.

U. **Lighting Zone 3 ("LZ3")** means Medium Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical foot candles (2.0 horizontal and vertical lux) at the LEED project boundary and no greater than 0.01 horizontal foot candles (0.1 horizontal lux) 15 feet (4.5 meters) beyond the site. LZ 3 includes all other areas not included in LZ2, such as commercial/ industrial, and high-density residential. Document that no more than 5% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down). LZ3 includes the following Zoning Districts: Residence C-3; C-3A or C-3B; Office 2, 2A or 3; Business B or C; Industry B, B-1, B-2 or C; Special Districts 1, 3, 4, 4A, 5, 6, 7, 8, 11, 15 and any other Special Zoning District whose general zoning limitations derive from one of the previously listed base Zoning Districts; Mixed-Use Development District: Kendall Square ("MXD") and Cambridgeport Revitalization Development District ("CRDD"); all Planned Unit Development ("PUD") Zoning Districts and Alewife Overlay Districts ("AOD").

V. **Lumen** means the unit of measure used to quantify the amount of light produced by a lamp or emitted from a light fixture (as distinct from "watt" or other measure of a lamp's power consumption).

W. **Lux** means the SI (International System of Units) unit of illuminance. One lux equals one lumen per square meter and is approximately equal to 1/10 of a foot candle.

SUSTAINABLE SITES CREDIT

Light Pollution Reduction

This credit applies to:

New Construction (1 point)
Core and Shell (1 point)
Schools (1 point)
Retail (1 point)
Data Centers (1 point)
Warehouses and Distribution Centers (1 point)
Hospitality (1 point)
Healthcare (1 point)

INTENT

To increase night sky access, improve nighttime visibility, and reduce the consequences of development for wildlife and people.

REQUIREMENTS

Meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

Meet these requirements for all exterior luminaires located inside the project boundary (except those listed under "Exemptions"), based on the following:

- the photometric characteristics of each luminaire when mounted in the same orientation and tilt as specified in the project design; and
- the lighting zone of the project property (at the time construction begins). Classify the project under one lighting zone using the lighting zones definitions provided in the Illuminating Engineering Society and International Dark Sky Association (IES/IDA) Model Lighting Ordinance (MLO) User Guide.

Additionally, meet the internally illuminated signage requirement.

Uplight

OPTION 1. BUG RATING METHOD

Do not exceed the following luminaire uplight ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11, Addendum A.

TABLE 1. Maximum uplight ratings for luminaires	
MLO lighting zone	**Luminaire uplight rating**
LZ0	U0
LZ1	U1
LZ2	U2
LZ3	U3
LZ4	U4

OR

OPTION 2. CALCULATION METHOD

Do not exceed the following percentages of total lumens emitted above horizontal.

TABLE 2. Maximum percentage of total lumens emitted above horizontal, by lighting zones	
MLO lighting zone	**Maximum allowed percentage of total luminaire lumens emitted above horizontal**
LZ0	0%
LZ1	0%
LZ2	1.5%
LZ3	3%
LZ4	6%

AND

Light Trespass

OPTION 1. BUG RATING METHOD

Do not exceed the following luminaire backlight and glare ratings (based on the specific light source installed in the luminaire), as defined in IES TM-15-11, Addendum A, based on the mounting location and distance from the lighting boundary.

TABLE 3. Maximum backlight and glare ratings

	MLO lighting zone				
Luminaire mounting	LZ0	LZ1	LZ2	LZ3	LZ4
	Allowed backlight ratings				
> 2 mounting heights from lighting boundary	B1	B3	B4	B5	B5
1 to 2 mounting heights from lighting boundary and properly oriented	B1	B2	B3	B4	B4
0.5 to 1 mounting height to lighting boundary and properly oriented	B0	B1	B2	B3	B3
< 0.5 mounting height to lighting boundary and properly oriented	B0	B0	B0	B1	B2
	Allowed glare ratings				
Building-mounted > 2 mounting heights from any lighting boundary	G0	G1	G2	G3	G4
Building-mounted 1–2 mounting heights from any lighting boundary	G0	G0	G1	G1	G2
Building-mounted 0.5 to 1 mounting heights from any lighting boundary	G0	G0	G0	G1	G1
Building-mounted < 0.5 mounting heights from any lighting boundary	G0	G0	G0	G0	G1
All other luminaires	G0	G1	G2	G3	G4

The lighting boundary is located at the property lines of the property, or properties, that the LEED project occupies. The lighting boundary can be modified under the following conditions:

- When the property line is adjacent to a public area that is a walkway, bikeway, plaza, or parking lot, the lighting boundary may be moved to 5 feet (1.5 meters) beyond the property line.
- When the property line is adjacent to a public street, alley, or transit corridor, the lighting boundary may be moved to the center line of that street, alley, or corridor.
- When there are additional properties owned by the same entity that are contiguous to the property, or properties, that the LEED project is within and have the same or higher MLO lighting zone designation as the LEED project, the lighting boundary may be expanded to include those properties.

Orient all luminaires less than two mounting heights from the lighting boundary such that the backlight points toward the nearest lighting boundary line. Building-mounted luminaires with the backlight oriented toward the building are exempt from the backlight rating requirement.

OR

OPTION 2. CALCULATION METHOD

Do not exceed the following vertical illuminances at the lighting boundary (use the definition of lighting boundary in Option 1). Calculation points may be no more than 5 feet (1.5 meters) apart. Vertical illuminances must be calculated on vertical planes running parallel to the lighting boundary, with the normal to each plane oriented toward the property and perpendicular to the lighting boundary, extending from grade level to 33 feet (10 meters) above the height of the highest luminaire.

TABLE 4. Maximum vertical illuminance at lighting boundary, by lighting zone

MLO lighting zone	Vertical illuminance
LZ0	0.05 FC (0.5 LUX)
LZ1	0.05 FC (0.5 LUX)
LZ2	0.10 FC (1 LUX)
LZ3	0.20 FC (2 LUX)
LZ4	0.60 FC (6 LUX)

FC = footcandle

AND

Internally Illuminated Exterior Signage

Do not exceed a luminance of 200 cd/m² (nits) during nighttime hours and 2000 cd/m² (nits) during daytime hours.

Exemptions from Uplight and Light Trespass Requirements

The following exterior lighting is exempt from the requirements, provided it is controlled separately from the nonexempt lighting:

- specialized signal, directional, and marker lighting for transportation;
- lighting that is used solely for façade and landscape lighting in MLO lighting zones 3 and 4, and is automatically turned off from midnight until 6 a.m.;
- lighting for theatrical purposes for stage, film, and video performances;
- government-mandated roadway lighting;
- hospital emergency departments, including associated helipads;
- lighting for the national flag in MLO lighting zones 2, 3, or 4; and
- internally illuminated signage.

Mock-up Date: November 10, 2020 at 6:00 PM

Outdoor Conditions:

Temperature: 60° F

Wind: North East approximately 11 MPH

Sky Conditions: Clear

Meters Used:

Luminance (Spot) Meter: Sekonic Model L-758CINE set to measure Footlamberts FL

Illuminance Meter: Minolta T-10 set to measure Footcandle Fc

Two LED color changing RGB (color changing) fixture manufacturers were used in the mock-up. The fixtures measured 12'-0" in a set of three plug and play 4'-0" modules and DMX controllers.

The fixtures were pre-programmed to science blue RGB provided by Amgen: RGB 0-99-195

Measurement results:

Type L1: Lumenpulse Lumenfacade LOGH 48 RGBW 10° x 60° Beam spread with no louvers (local rep: Boston Light Source)

Bottom of Wall	5.0 FL
Mid-height	10.0 FL
Top of Wall	10.0 FL
Soffit	16.0 FL

Type L2: SSD Colourline Wet 20° x 40° Beam spread with no louvers (local rep: Apex Boston)

Bottom of Wall	0.67 FL
Mid-height	5.7 FL
Top of Wall	3.5 FL
Soffit	6 FL

Observations, Conclusions and Recommendations:

The fixtures that were evaluated in the mock-up were different beam spreads therefore a numerical comparison is not appropriate since the tighter beam fixture would yield a higher light intensity peak. The SSL fixture resembled the distribution and output that BR+A was looking for. However, it was concluded by BR+A and both of the lighting reps that a 30°x60° beam (offered by both manufacturers) would be the most suitable for the project in terms of light uniformity, light distribution and spill limitation beyond the canopy soffit edge.

The good news is that, either of the compared fixtures, will provide higher luminance levels than the original neon fixtures and the preliminary agi32 software calculations. Since both fixtures can be specified with dimmable DMX control the luminance levels can be tuned to similar levels of the previous neon installation. Also, since the output will need to be dimmed the added benefit is that the LED lamp life will be extended well beyond the published 70,000 hours /L70 Test.

It was concluded that the fixtures are to be mounted on stainless steel Unistrut channels at a height just below the parapet flashing cap. BR+A recommends a final review of the first few contractor installed fixture modules starting from one of the roof corners.

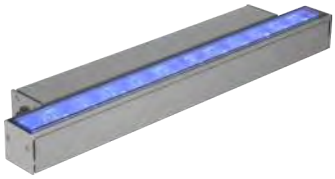
5. AMGEN PARAPET LIGHTING FIXTURE CUT SHEET

Specification Sheet

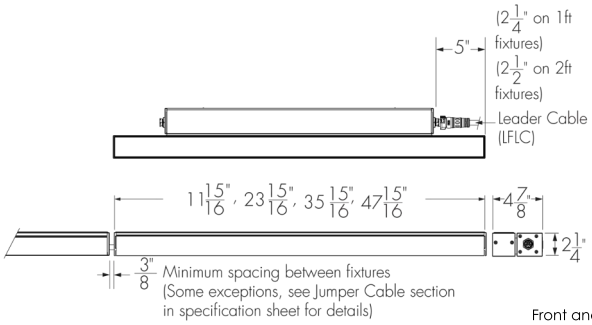
Lumenfacade
Max
Continuous Horizontal
LFM-CH
COLOR CHANGING

Project Name _____ **Qty** _____

Type _____ **Catalog / Part Number** _____



MRGBWP Configuration Shown



Front and Side Views
36 in Fixtures Shown

Photometric Summary (22 W/ft, Opticolor+ MRGBWP)

Symmetric

	Delivered Output (lm)	Intensity (Peak cd)
10°x10°	3,821	50,958
10°x30°	3,610	18,753
10°x60°	3,634	11,521
10°x90°	3,634	7,856
30°x30°	3,566	8,433
30°x60°	3,538	4,615
30°x90°	3,213	3,275
60°x60°	3,496	2,878
90°x90°	3,417	1,978
30°x10°	3,418	16,842
60°x10°	3,511	10,648
60°x30°	3,503	5,209
90°x10°	3,115	6,252
W (120°)	2,694	950

Asymmetric

NAS	3,763	22,970
WW	3,631	5,969
CAS	2,938	4,013

1. Based on MRGBWP full output, white set to 3000K, 48 in.
2. Photometric performance is measured in compliance with IESNA LM-79-24.
3. 10x10, 10x30, 10x60, 10x90, 30x30, 30x60, 30x90, 60x60, 90x90, 30x10, 60x10, 60x30, 90x10, W, NAS and CAS optics tested with CL lens. WW optic tested with HFR lens.
4. Refer to the Lumenfacade Max Color Changing Photometric Guide on Lumenpulse website for information on other color temperatures.

Description

The Lumenfacade Max made history as the first linear fixture to feature Opticolor™, Lumenpulse's groundbreaking mixed-at-source technology. Today, it continues to lead the way with Opticolor+™, delivering even greater color precision, flexibility, and performance. Powered by Optidrive™, Lumenfacade Max ensures maximum output, maximum consistency, and the unmistakable brilliance that defines Lumenpulse innovation.

Features

Length (Nominal)	**12:** 12 in, **24:** 24 in, **36:** 36 in, **48:** 48 in
Colors and Color Temperature (Opticolor™)	**MRGBA:** Opticolor™ Mix-at-Source Red, Green, Blue, PC Amber **MRGB:** Opticolor™ Mix-at-Source Red, Green, Blue
Colors and Color Temperature (Opticolor+™)	**MRGBWP:** Opticolor+™ Mix-at-Source Red, Green, Blue Plus White Settable Range 24K to 65K **MRGBWP Typical Color Rendering:** 2400K-5000K: 90+ CRI 2400K-6500K: 80+ CRI **MRGRBWP:** Opticolor+™ Mix-at-Source Red, Green, Royal Blue Plus White Settable Range 24K to 65K
Vibration Rating	**NVR:** Buildings and Fixed Structures **VRN:** Pole-Mounts **VRBO:** Bridges and Overpasses
Fixed Mounting Options	**FXH:** Fixed Mounting Horizontal (0° Pivot Limit)

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www.lumenpulse.com www.lumenpulse.com/products/5154

Résumé photométrique (22 W/ft, Opticolor, MRGBA)

Symmetric

	Delivered Output (lm)	Intensity (Peak cd)
10°x10°	3,480	46,417
10°x30°	3,289	17,082
10°x60°	3,310	10,494
10°x90°	3,311	7,156
30°x30°	3,248	7,682
30°x60°	3,223	4,204
30°x90°	2,927	2,983
60°x60°	3,184	2,622
90°x90°	3,113	1,802
30°x10°	3,114	15,341
60°x10°	3,198	9,699
60°x30°	3,191	4,745
90°x10°	2,838	5,695
W (120°)	2,454	865

Asymmetric

NAS	3,428	20,923
WW	3,307	5,437
CAS	2,676	3,656

1. Based on MRGBA full output, {mm}[1218mm].
2. Photometric performance is measured in compliance with IESNA LM-79-24.
3. 10x10, 10x30, 10x60, 10x90, 30x30, 30x60, 30x90, 60x60, 90x90, 30x10, 60x10, 60x30, 90x10, W, NAS and CAS optics tested with CL lens. WW optic tested with HFR lens.
4. Refer to the Lumenfacade Max Color Changing Photometric Guide on Lumenpulse website for information on other color temperatures.

Continuously Adjustable Mounting Options	**SMH:** Slim Adjustable Mounting Horizontal Continuously Adjustable (100˚ Pivot Limit) **WMCH6:** Wall Mounting Horizontal Continuously Adjustable, 6 in to Optical Center (180˚ Pivot Limit) **WMCH18:** Wall Mounting Horizontal Continuously Adjustable, 18 in to Optical Center (180˚ Pivot Limit)	**WMCH3:** Wall Mounting Horizontal Continuously Adjustable, 3.5 in to Optical Center (120˚ Pivot Limit) **WMCH12:** Wall Mounting Horizontal Continuously Adjustable, 12 in to Optical Center (180˚ Pivot Limit) **WMCH24:** Wall Mounting Horizontal Continuously Adjustable, 24 in to Optical Center (180˚ Pivot Limit)
Incrementally Adjustable Mounting Options	**WMiH3:** Wall Mounting Horizontal Incrementally Adjustable by 6˚, 3.5 in to Optical Center (120˚ Pivot Limit) **WMiH12:** Wall Mounting Horizontal Incrementally Adjustable by 6˚, 12 in to Optical Center (180˚ Pivot Limit) **WMiH24:** Wall Mounting Horizontal Incrementally Adjustable by 6˚, 24 in to Optical Center (180˚ Pivot Limit)	**WMiH6:** Wall Mounting Horizontal Incrementally Adjustable by 6˚, 6 in to Optical Center (180˚ Pivot Limit) **WMiH18:** Wall Mounting Horizontal Incrementally Adjustable by 6˚, 18 in to Optical Center (180˚ Pivot Limit)
Optical Accessories	**LV:** Radial Louver **LVAS:** Radial Louver Asymmetric **VS:** Visor	
Warranty	5-year limited warranty	

Performance

Maximum Delivered Output (Opticolor)	1,012 lm (6 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) 1,790 lm (10 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) 3,480 lm (22 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.
Maximum Delivered Output (Opticolor+)	1,145 lm (6 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) 1,917 lm (10 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) 3,821 lm (22 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.

Optic


10° x 10°


10° x 30°


10° x 60°


10° x 90°


30° x 30°


30° x 60°


30° x 90°


60° x 60°


90° x 90°


30° x 10°


60° x 10°


60° x 30°


90° x 10°


Wide 120°


Narrow Asymmetric


Asymmetric Wallwash


Ceiling Asymmetric

Color and Color Temperature


Opticolor+™ Mix-at-Source Red, Green, Blue Plus White Settable Range 24K to 65K


Opticolor+™ Mix-at-Source Red, Green, Royal Blue Plus White Settable Range 24K to 65K


Opticolor™ Mix-at-Source Red, Green, Blue, PC Amber


Opticolor™ Mix-at-Source Red, Green, Blue

Control

Maximum Delivered Intensity (Opticolor)	13,499 cd at nadir (6 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL Lens, DMX/RDM) 23,874 cd at nadir (10 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) 46,417 cd at nadir (22 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.
Maximum Delivered Intensity (Opticolor+)	15,271 cd (6 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) 25,575 cd (10 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) 50,958 cd (22 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.
Illuminance at Distance (Opticolor)	Minimum 1 fc at 116 ft (6 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) Minimum 1 fc at 155 ft (10 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) Minimum 1 fc at 215 ft (22 W/ft, 48 in fixture, MRGBA, 10° x 10°, CL lens, DMX/RDM) Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.
Illuminance at Distance (Opticolor+)	Minimum 1 fc at 124 ft (6 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) Minimum 1 fc at 160 ft (10 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) Minimum 1 fc at 226 ft (22 W/ft, 48 in fixture, MRGBWP, 10° x 10°, CL lens, DMX/RDM) Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.
Lumen Maintenance	L70 (15K) > 90,000 hrs Ta 25 °C (TM-21 reported) L70 > 150,000 hrs Ta 25 °C (projected)* L90 (15K) = 55,400 hrs Ta 25 °C (TM-21 reported) L90 = 55,400 hrs Ta 25 °C (projected)* *Estimated based on in-situ case temperature and LM-80 report

Physical

Housing Material	Low copper content extruded aluminum
Lens Material	Tempered glass
Hardware Material	Stainless steel
End Cap Material	Die cast aluminum
Gasket Material	Silicone
Surface Finish	**XD:** Luminaire treated with extra-durable, multi-step finish: zirconium pretreatment completed with corrosion-resistant primer and electrostatically-applied, powder coat paint finish

Finish

Certifications

Weight	5 lbs (12 in fixture) 9.3 lbs (24 in fixture) 14 lbs (36 in fixture) 17.5 lbs (48 in fixture)

Electrical and Control

Voltage	120 to 277 Volts (UL Certification) 220 to 240 volts (CE certification, Class I) 100 to 200 volts (PSE Certification) Note: For 208V, 220V, 240V, and 277V systems, the voltage drop must not fall below 195V. For 200V system with PSE Cerification, the voltage drop must not fall below 160V.
Wattage	**6W:** 6 W/ft, **10W:** 10 W/ft, **22W:** 22 W/ft
Control	**DMX/RDM:** DMX/RDM Enabled Dimming **DALI T8:** DALI 2 T8 Enabled Dimming 0.1% **LT:** Lumentalk **ETX:** ExtendX™
Inrush Current (Peak)	Meets NEMA-410 requirements (Based on voltage and control specifications, consult factory for details)

Environmental

Storage Temperature	-40 °F to 185 °F
Start-up Temperature	-40 °F to 122 °F
Operating Temperature	For 6 W/ft fixtures: -40 °F to 122 °F For 10 W/ft fixtures: -40 °F to 122 °F For 22 W/ft fixtures, UL Certification: -40 °F to 122 °F For 22 W/ft fixtures, CE Certification: -40 °F to 104 °F
Ingress Protection Rating	IP66 IP67 (suitable for applications with temporary immersion in water only (no permanent immersion), proper drainage around the fixture is required). Consult factory for details
Impact Resistance Rating	IK07 (CL lens), IK07 (HFR lens), IK06 (FR lens) Consult factory for IK08 lens option
Application Wind Speed	Luminaires were designed based on AASHTO 2013 standard to ensure highest quality and safety. Installation should be validated by a local project engineer to ensure the luminaires are suitable for the wind speed and exposure of the specific application
Environment	Wet location rating

Accessories (Order Separately)

Cables	**LFLC:** Lumenfacade Leader Cable **LFJC:** Lumenfacade Jumper Cable **LFTJ:** Lumenfacade T-Junction

Important

Virtual Patent Marking Notice

This website (https://www.lmpg.com/patents-trademarks) is provided to satisfy the virtual patent marking provisions of applicable jurisdictions. Some products listed may be covered by additional patents not referenced here.

Photometric Information

6 W/ft (MRGBWP)

Symmetric

	Delivered Output (lm)	Intensity (Peak cd)
10°x10°	1,145	15,271
10°x30°	1,082	5,620
10°x60°	1,089	3,452
10°x90°	1,089	2,354
30°x30°	1,069	2,527
30°x60°	1,060	1,383
30°x90°	963	981
60°x60°	1,048	862
90°x90°	1,024	593
30°x10°	1,024	5,047
60°x10°	1,052	3,191
60°x30°	1,050	1,561
90°x10°	934	1,874
W (120°)	807	285

Asymmetric

NAS	1,128	6,884
WW	1,088	1,789
CAS	880	1,203

Based on MRGBWP full output, white set to 3000K, 48 in.

10 W/ft (MRGBWP)

Symmetric

	Delivered Output (lm)	Intensity (Peak cd)
10°x10°	1,917	25,575
10°x30°	1,812	9,412
10°x60°	1,824	5,782
10°x90°	1,824	3,943
30°x30°	1,790	4,232
30°x60°	1,776	2,316
30°x90°	1,612	1,644
60°x60°	1,754	1,444
90°x90°	1,715	993
30°x10°	1,716	8,453
60°x10°	1,762	5,344
60°x30°	1,758	2,614
90°x10°	1,564	3,138
W (120°)	1,352	477

Asymmetric

NAS	1889	11,529
WW	1822	2,996
CAS	1475	2,014

Based on MRGBWP full output, white set to 3000K, 48 in.

22 W/ft (MRGBWP)

Symmetric

	Delivered Output (lm)	Intensity (Peak cd)
10°x10°	3,821	50,958
10°x30°	3,610	18,753
10°x60°	3,634	11,521
10°x90°	3,634	7,856
30°x30°	3,566	8,433
30°x60°	3,538	4,615
30°x90°	3,213	3,275
60°x60°	3,496	2,878
90°x90°	3,417	1,978
30°x10°	3,418	16,842
60°x10°	3,511	10,648
60°x30°	3,503	5,209
90°x10°	3,115	6,252
W (120°)	2,694	950

Asymmetric

NAS	3,763	22,970
WW	3,631	5,969
CAS	2,938	4,013

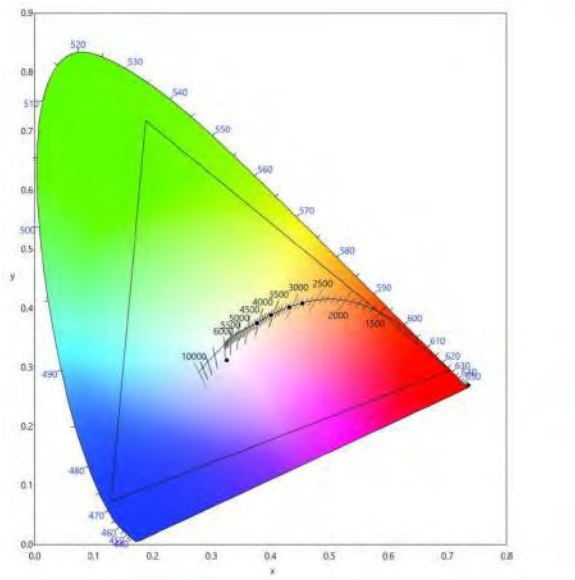
Based on MRGBWP full output, white set to 3000K, 48 in.

Photometric performance is measured externally in compliance with IESNA LM-79-24.
10x10, 10x30, 10x60, 10x90, 30x30, 30x60, 30x90, 60x60, 90x90, 30x10, 60x10, 60x30, 90x10, W, NAS and CAS optics tested with CL lens. WW optic tested with HFR lens.

Refer to Photometric Guide on Lumenpulse website for information on other color temperatures.

Color Point Information

MRGBWP



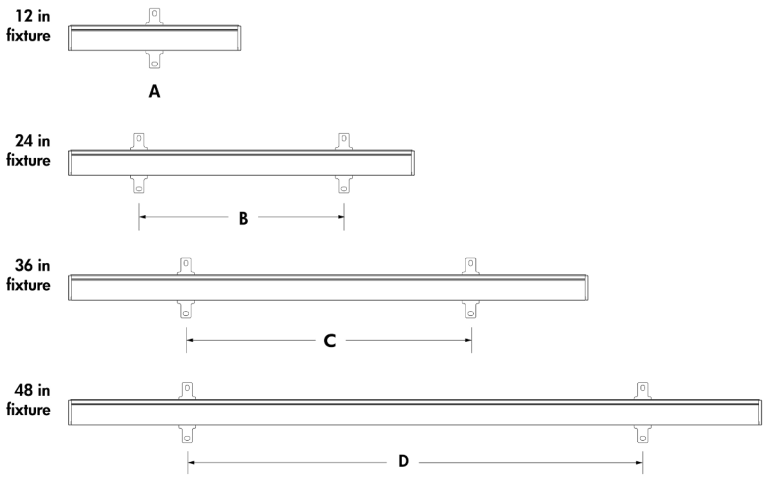
Dominant Wavelength and Chromaticity

	Dominant Wavelength	Chromaticity	
		Cx	Cy
Red	~628nm	0.7050	0.2949
Green	~531nm	0.1885	0.7178
Blue	~471nm	0.1298	0.0726
Amber	~591nm	0.5755	0.4126

	Cx	Cy
MRGBWP Full On	0.3261	0.3121
27K Optidrive	0.4545	0.4081
30K Optidrive	0.4318	0.4017
35K Optidrive	0.4010	0.3883
40K Optidrive	0.3773	0.3747

Values measured from Steady State Full on Optidrive @ 25°C ambient conditions.

Mounting Bracket Placement (Minimum and Maximum Distances)



Front view

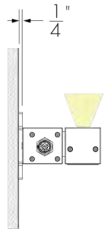
A - Bracket in the center of the fixture
B - Minimum 14 in to maximum 17 in
C - Minimum 20 1/2 in to maximum 23 1/2 in
D - Minimum 30 1/2 in to maximum 33 1/2 in

FXH mounting brackets shown.

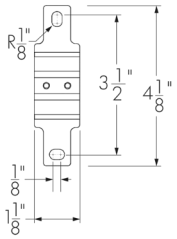
The mounting bracket(s) must be centered on fixture and as symmetrical as possible. Distances must be respected for all installations.

Mounting Options

FXH - Fixed Mounting Horizontal



FXH - Mounting Hole Pattern

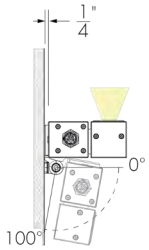


One mounting bracket provided for 12 in fixtures. Two mounting brackets provided for 24 in, 36 in and 48 in fixtures.

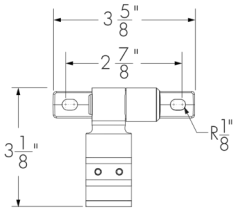
Weight of one FXH Mounting Bracket: 0.11 lbs.
Weight of two FXH Mounting Brackets: 0.22 lbs.

For proper hardware selection, use the dimensions of the mounting option, the weight and EPA values of the mounting option, and the weight and EPA values of the fixture and accessories for your engineering calculations.

SMH - Slim Adjustable Mounting Horizontal



SMH - Mounting Hole Pattern



Not suitable for pole-mounted or bridge and overpass applications.

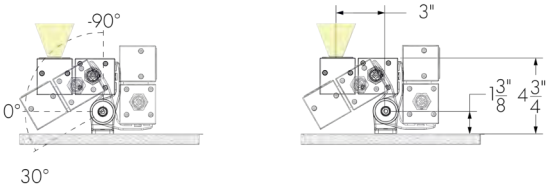
One mounting bracket provided for 12 in fixtures. Two mounting brackets provided for 24 in, 36 in and 48 in fixtures.

Weight of one SMH Mounting Bracket: 0.26 lbs.
Weight of two SMH Mounting Brackets: 0.53 lbs.

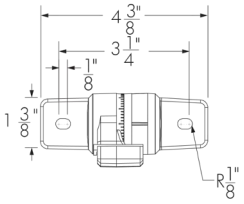
Not suitable when fixture is exposed to wind.

For proper hardware selection, use the dimensions of the mounting option, the weight and EPA values of the mounting option, and the weight and EPA values of the fixture and accessories for your engineering calculations.

WMCH3 - Wall Mounting Horizontal Continuously Adjustable, 3.5 in to Optical Center
WMiH3 - Wall Mounting Horizontal Incrementally Adjustable by 6˚, 3.5 in to Optical Center



WMCH3 WMiH3 - Mounting Hole Pattern



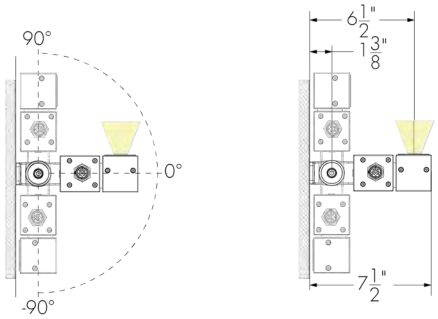
Not suitable for pole-mounted or bridge and overpass applications.

One mounting bracket provided for 12 in fixtures. Two mounting brackets provided for 24 in, 36 in and 48 in fixtures.

Weight of one WMCH3/WMiH3 Mounting Bracket: 0.62 lbs.
Weight of two WMCH3/WMiH3 Mounting Brackets: 1.23 lbs.

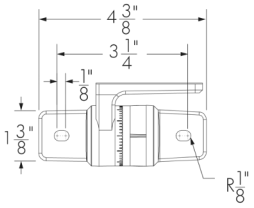
For proper hardware selection, use the dimensions of the mounting option, the weight and EPA values of the mounting option, and the weight and EPA values of the fixture and accessories for your engineering calculations.

WMCH6 - Wall Mounting Horizontal Continuously Adjustable, 6 in to Optical Center
WMiH6 - Wall Mounting horizontal Incrementally Adjustable by 6˚, 6 in to Optical Center

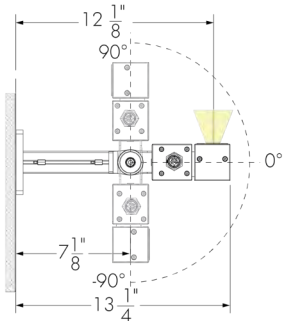


Weight of one WMCH6/WMiH6 Mounting Bracket: 0.62 lbs.
Weight of two WMCH6/WMiH6 Mounting Brackets: 1.23 lbs.

WMCH6 WMiH6 - Mounting Hole Pattern

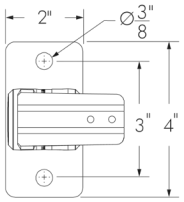


WMCH12 - Wall Mounting Horizontal Continuously Adjustable, 12 in to Cptical Center
WMiH12 - Wall Mounting Horizontal Incrementally Adjustable by 6˚, 12 in to Optical Center



Weight of one WMCH12/WMiH12 Mounting Bracket: 1.5 lbs.
Weight of two WMCH12/WMiH12 Mounting Brackets: 3 lbs.

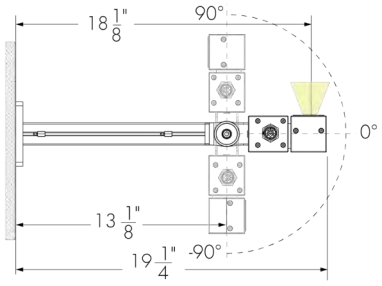
WMCH12 WMiH12 - Mounting Hole Pattern



One mounting bracket provided for 12 in fixtures. Two mounting brackets provided for 24 in, 36 in and 48 in fixtures.

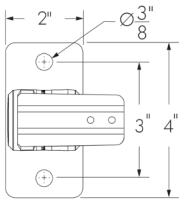
For proper hardware selection, use the dimensions of the mounting option, the weight and EPA values of the mounting option, and the weight and EPA values of the fixture and accessories for your engineering calculations.

WMCH18 - Wall Mounting Horizontal Continuously Adjustable, 18 in to Optical Center
WMi1H8 - Wall Mounting Horizontal Incrementally Adjustable by 6˚, 18 in to Optical Center

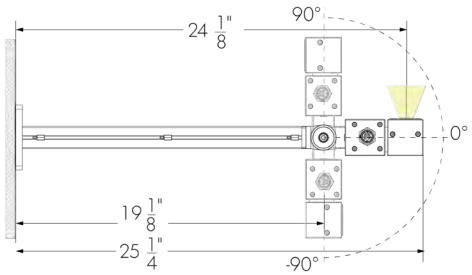


Weight of one WMCH18/WMiH18 Mounting Bracket: 2.09 lbs.
Weight of two WMCH18/WMiH18 Mounting Brackets: 4.19 lbs.

WMCH18 WMiH18 - Mounting Hole Pattern

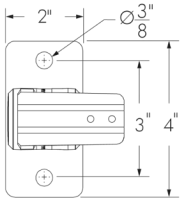


WMCH24 - Wall Mounting Horizontal Continuously Adjustable, 24 in to Optical Center
WMiH24 - Wall Mounting Horizontal Incrementally Adjustable by 6˚, 24 in to Optical Center



Weight of one WMCH24/WMiH24 Mounting Bracket: 2.65 lbs.
Weight of two WMCH24/WMiH124 Mounting Brackets: 5.29 lbs.

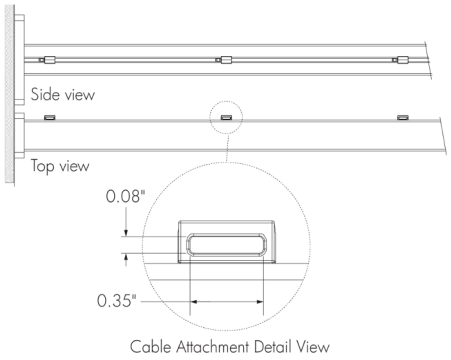
WMCH24 WMiH24 - Mounting Hole Pattern



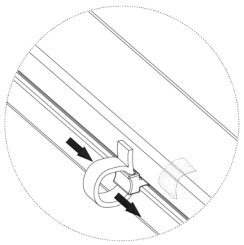
One mounting bracket provided for 12 in fixtures. Two mounting brackets provided for 24 in, 36 in and 48 in fixtures.

For proper hardware selection, use the dimensions of the mounting option, the weight and EPA values of the mounting option, and the weight and EPA values of the fixture and accessories for your engineering calculations.

Cable Management System for Wall Mounting Brackets



Cable Attachment Detail View

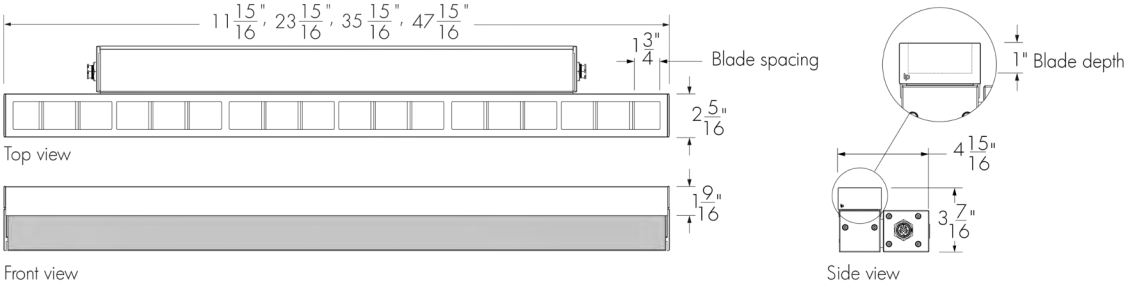

Cable tie as installed

1 cable attachment provided for WMCH6 and WMiH6 mounting arms.
2 cable attachments provided for WMCH12, WMiH12, WMCH18 and WMiH18 mounting arms.
3 cable attachments provided for WMCH24 and WMiH24 mounting arms.

Maximum cable tie size: 0.35 in width, 0.08 in thickness.
Cable ties for outdoor applications are recommended, provided by others.

Accessories

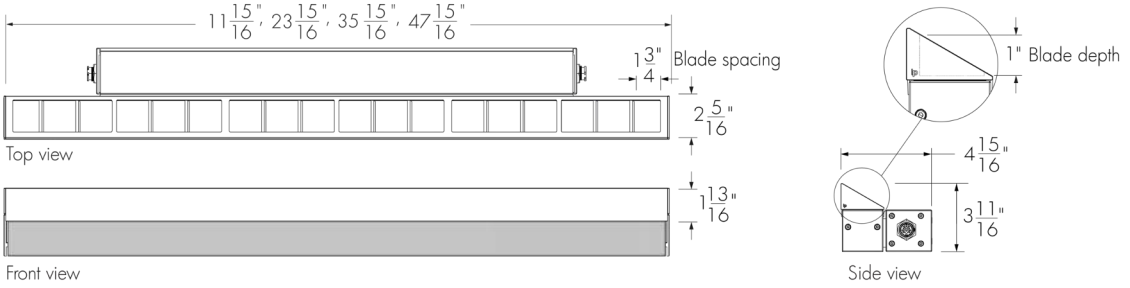
LV - Radial Louver



- A Radial Louver will affect beam distribution. Consult factory for application support.
- The Radial Louver is field installable. The Radial Louver can be combined with the Shield accessory; all other combinations are not possible.
- The exterior finish of the accessory will match the finish specified in the fixture order code (interior surface painted matte black).
- Not suitable for NAS, CAS and WW optics.
- Consult EPA Guide in the specification sheet for engineering calculations.

Weight of 12 in accessory: 0.65 lbs, and 24 in accessory: 1.25 lbs, weight of 36 in accessory: 1.75 lbs, weight of 48 in accessory: 2.3 lbs.
Note: the weight of the accessory is in addition to the weight of the fixture.

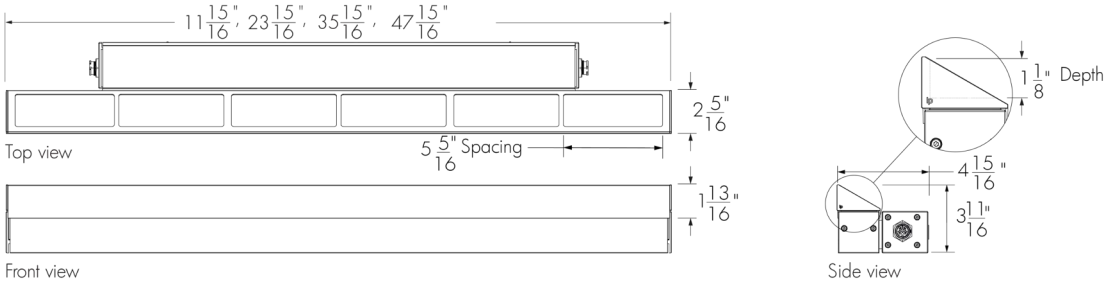
LVAS - Radial Louver Asymmetric



- A Radial Louver Asymmetric will affect beam distribution. Consult factory for application support.
- The Radial Louver Asymmetric is field installable. The Radial Louver Asymmetric can be combined with the Shield accessory; all other combinations are not possible.
- The exterior finish of the accessory will match the finish specified in the fixture order code (interior surface painted matte black).
- Consult EPA Guide in the specification sheet for engineering calculations.

Weight of 12 in accessory: 0.5 lbs, weight of 24 in accessory: 1 lbs, weight of 36 in accessory: 1.3 lbs, weight of 48 in accessory: 1.7 lbs.
Note: the weight of the accessory is in addition to the weight of the fixture.

VS - Visor



- A Visor will affect beam distribution. Consult factory for application support.
- The Visor is field installable. The Visor can be combined with the Shield accessory; all other combinations are not possible.
- The exterior finish of the accessory will match the finish specified in the fixture order code with the exception of the inside surface of the Visor end caps, which are painted the same colour as the fixture. Interior surface painted matte black.
- Consult EPA Guide in the specification sheet for engineering calculations.

Weight of 12 in accessory: 0.4 lbs, weight of 24 in accessory: 0.8 lbs, weight of 36 in accessory: 1.2 lbs, weight of 48 in accessory: 1.5 lbs.
Note: the weight of the accessory is in addition to the weight of the fixture.

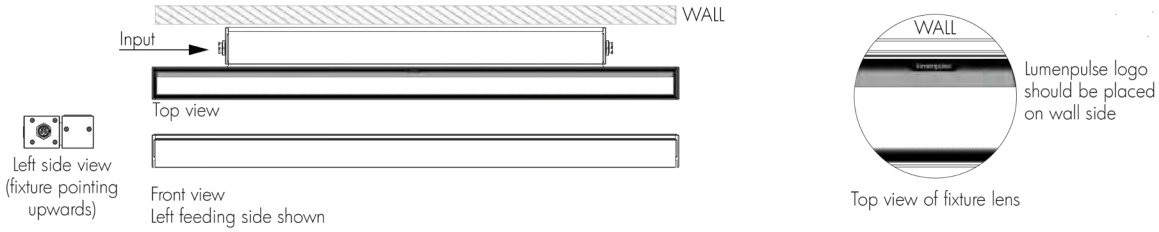
Lens and Optics Combinations Table

Lens/Optics	10x10	10x30	10x60	10x90	30x30	30x60	30x90	60x60	90x90	30x10	60x10	60x30	90x10	W	NAS	WW	CAS
CL Clear Lens	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⊗	✓
HFR Half-Frosted Lens	✓	✓	✓	✓	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	✓	✓	⊗
FR Frosted Lens	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ Lens option
⊗ Not available

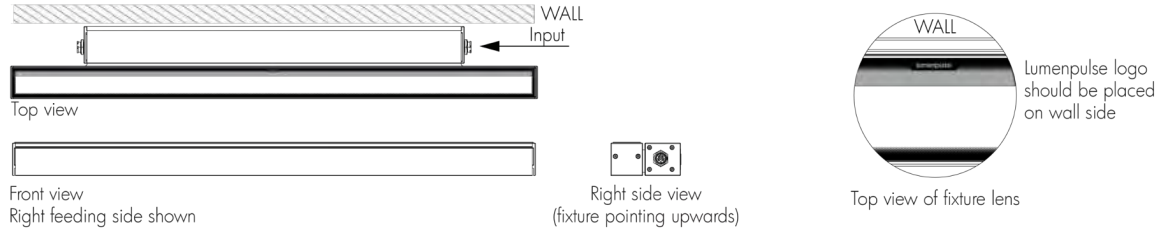
Half-Frosted Lens Details

Left Feeding Side



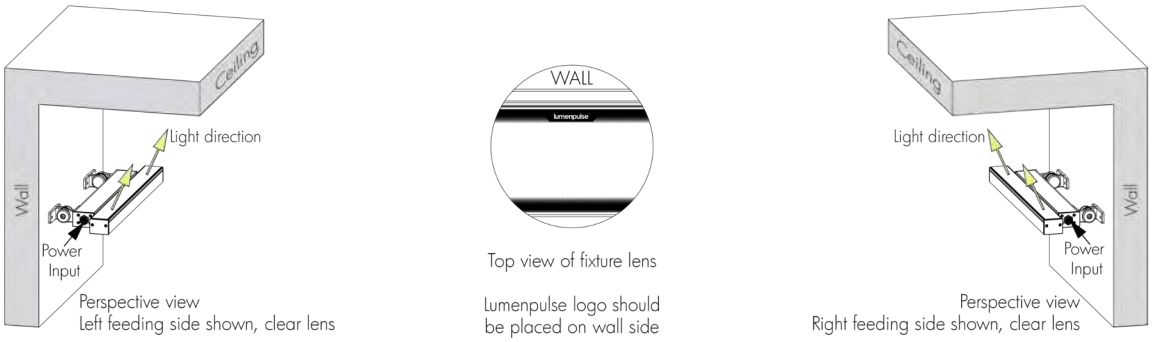
- Position frosted side of the lens and Lumenpulse logo along the wall.
- Fixture's feeding side is based on uplight installations. Feeding sides are reversed when fixture is used in a downlight application.

Right Feeding Side



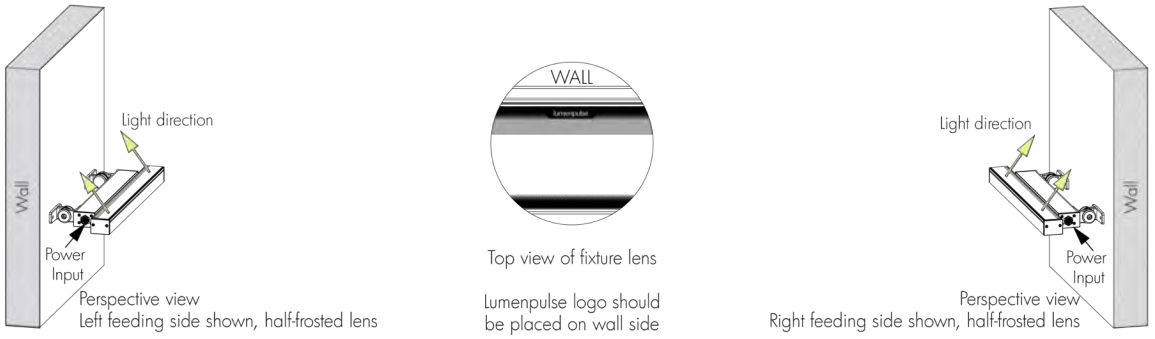
- Position frosted side of the lens and Lumenpulse logo along the wall.
- Fixture's feeding side is based on uplight installations. Feeding sides are reversed when fixture is used in a downlight application.

Ceiling Asymmetric Optic Details



- Always position Lumenpulse logo on lens along the wall.
- Fixture's feeding side is based on uplight installations. Feeding sides are reversed when fixture is used in a downlight application.
- **Ceiling Asymmetric optic guidelines:** 18 in minimum setback, 1:5 setback/canopy depth ratio (based on CL lens).

Narrow Asymmetric and Asymmetric Wallwash Optics Details



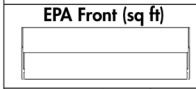
- Position frosted side of the lens and Lumenpulse logo along the wall.
- Fixture's feeding side is based on uplight installations. Feeding sides are reversed when fixture is used in a downlight application.
- **Narrow Asymmetric optic guidelines:** 12 in minimum setback,1:10 setback ratio (based on HFR lens).
- **Asymmetic Wallwash optic guidelines:** 6 in minimum setback,1:8 setback ratio (based on HFR lens).

EPA Guide - Fixture

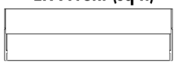
	12 in	24 in	36 in	48 in
EPA Top (sq ft)	0.403	0.928	1.333	1.858
EPA Front (sq ft)	0.241	0.483	0.726	0.968
EPA Side (sq ft)	0.099	0.099	0.099	0.099

EPA Guide - Fixture with Accessory

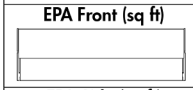
Fixture With Radial Louver Accessory

	12 in	24 in	36 in	48 in
EPA Top (sq ft) 	0.403	0.928	1.333	1.858
EPA Front (sq ft) 	0.367	0.736	1.105	1.474
EPA Side (sq ft) 	0.138	0.138	0.138	0.138

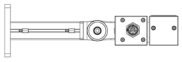
Fixture With Radial Louver Asymmetric Accessory

	12 in	24 in	36 in	48 in
EPA Top (sq ft) 	0.403	0.928	1.333	1.858
EPA Front (sq ft) 	0.379	0.760	1.141	1.522
EPA Side (sq ft) 	0.122	0.122	0.122	0.122

Fixture With Visor Accessory

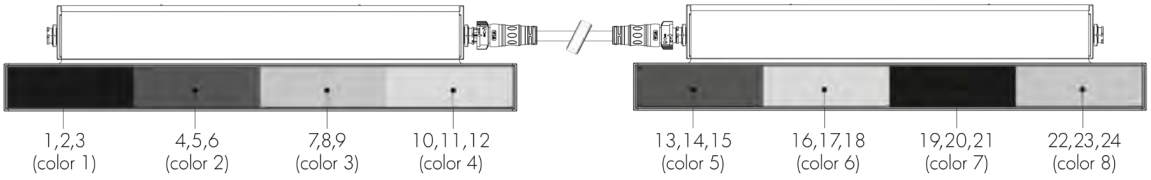
	12 in	24 in	36 in	48 in
EPA Top (sq ft) 	0.403	0.928	1.333	1.858
EPA Front (sq ft) 	0.379	0.760	1.141	1.522
EPA Side (sq ft) 	0.122	0.122	0.122	0.122

EPA Guide - Mounting Option

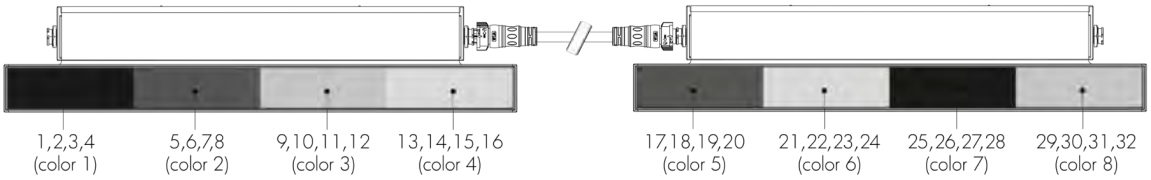
	EPA Top/Side (sq ft)	
FXH	N/A	
SMH	0.01	
WMCH3 WMiH3	0.04	
WMCH6 WMiH6	0.05	
WMCH12 WMiH12	0.15	
WMCH18 WMiH18	0.22	
WMCH24 WMiH24	0.30	

Resolution Details

DMX/RDM Control, Resolution Per Segment: Each 12 in Segment is Addressed Independently
DMX Addresses:

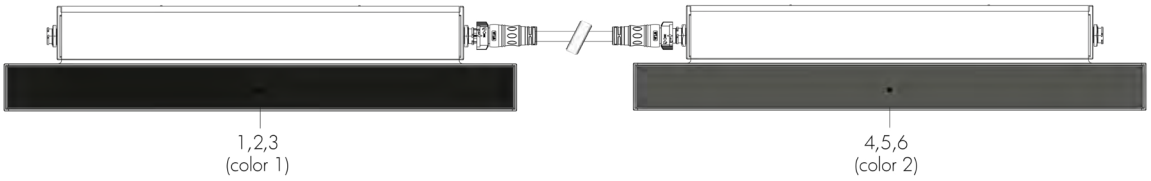


MRGB color mixing option

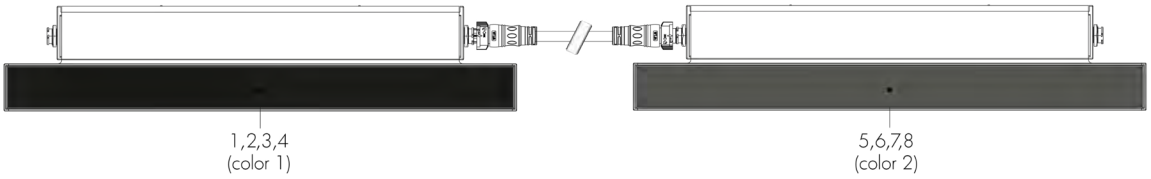


MRGBA, MRGBWP and MRGRBWP color mixing options

DMX/RDM Control, Resolution Per Fixture: Each Fixture is Addressed Independently
DMX Addresses:



MRGB color mixing option



MRGBA, MRGBWP and MRGRBWP color mixing options

- 48 in fixtures shown.
- Applicable for DMX/RDM control option only. Fixture resolution can be configured on-site within the LumenID V3 software. A DMX/RDM enabled CBX is required.

Wiring Color Code

DALI T8 and LT Control (XC3P2D)

UL Color Code	Use
Green	Ground
Black	Line
White	Neutral
Purple	0-10V + / Data +
Orange	0-10V - / Data -

DMX/RDM and ExtendX Controls (XC3P3D)

UL Color Code	Use
Green	Ground
Black	Line
White	Neutral
Red	Data +
Orange	Data -
Gray	Signal Common

Maximum Fixture Run Length Table

DMX/RDM Control (DMX/RDM)

Lumenfacade Max 6W/ft

Voltage	Resolution	120V	220V	240V	277V
Maximum Fixture Run Length	Per Foot	128ft	128ft	128ft	128ft

Lumenfacade Max 10W/ft

Voltage	Resolution	120V	220V	240V	277V
Maximum Fixture Run Length	Per Foot	120ft	128ft	128ft	128ft

Lumenfacade Max 22W/ft

Voltage	Resolution	120V	220V	240V	277V
Maximum Fixture Run Length	Per Foot	64ft	124ft	128ft	128ft

Based on 48 in fixtures, per foot resolution, DMX/RDM control, 10 ft Leader Cable for an end-to-end run with 1 ft Jumper Cables between fixtures. Refer to Typical Wiring Diagrams for Control Protocol specific run length rules.

ExtendX Control (ETX)

Lumenfacade Max 6W/ft

Voltage	Resolution	120V	220V	240V	277V
Maximum Fixture Run Length	Per Foot	184ft	424ft	464ft	512ft

Lumenfacade Max 10W/ft

Voltage	Resolution	120V	220V	240V	277V
Maximum Fixture Run Length	Per Foot	144ft	264ft	288ft	336ft

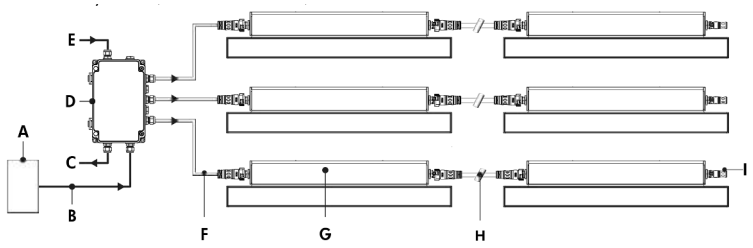
Lumenfacade Max 22W/ft

Voltage	Resolution	120V	220V	240V	277V
Maximum Fixture Run Length	Per Foot	68ft	124ft	136ft	156ft

Based on 48 in fixtures, per foot resolution, ETX control, 10 ft Leader Cable for an end-to-end run with 1 ft Jumper Cables between fixtures. Refer to Typical Wiring Diagrams for Control Protocol specific run length rules.

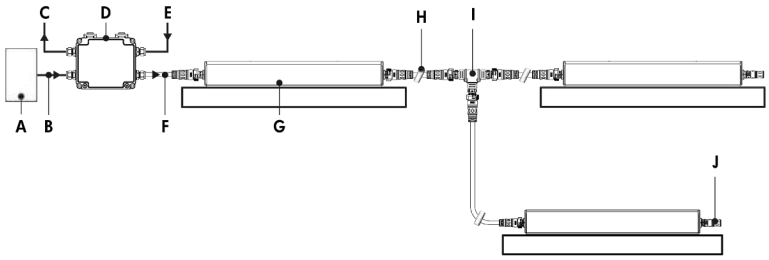
Typical Wiring Diagrams

Star Layout (DMX/RDM)



A - Third-party DMX/RDM controller
B - Data input (Belden 9841 or equivalent, by others)
C - Data output to next CBX (optional, not isolated/not boosted)
D - CBX-ST
E - Power input (120 to 277V, wiring by others)
F - Leader Cable (LFLC XC3P3D)
G - Lumenfacade Max Continuous Horizontal (LFM-CH)
H - Jumper Cable (LFJC XC3P3D)
I - DMX/RDM Terminator

Daisy Chain Layout (DMX/RDM)

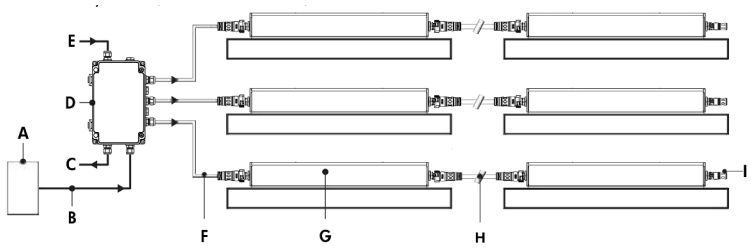


A - Third-party DMX/RDM controller
B - Data input (Belden 9841 or equivalent, by others)
C - Data output to next CBX (optional, not isolated/not boosted)
D - CBX-DS
E - Power input (120 to 277V, wiring by others)
F - Leader Cable (LFLC XC3P3D)
G - Lumenfacade Max Continuous Horizontal (LFM-CH)
H - Jumper Cable (LFJC XC3P3D)
I - Lumenfacade T-Junction (LFTJ XC3P3D, optional)
J - DMX/RDM terminator

Refer to installation instructions for additional wiring details.

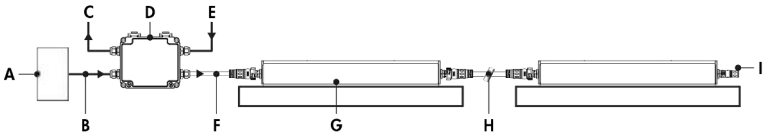
- Consult CBX installation instructions for additional wiring details.
- 50 ft maximum DMX/RDM "Stub" length.
- Maximum of 1 luminaire per "Stub".
- 1 DMX universe = 128 @ 4-channel controllable segments.
- Maximum of 4 DMX/RDM repeaters/CBX cascading in line.
- Maximum of 6 outputs per CBX-ST; maximum of 1 output per CBX-DS.
- Maximum of 64 DMX/RDM enabled fixtures per CBX output.
- Maximum DMX/RDM cable length of 800 ft ("Bus" and "Stubs").

Star Layout (ExtendX)



A - Third-party sACN/ArtNet controller
B - Data input (Cat5e or better, by others)
C - Optional Ethernet connection to next CBX
D - CBX-ST-ETX
E - Power input (120 to 277V, wiring by others)
F - Leader Cable (LFLC XC3P3D)
G - Lumenfacade Max Continuous Horizontal (LFM-CH)
H - Jumper Cable (LFJC XC3P3D)
I - DMX/RDM Terminator

Daisy Chain Layout (ExtendX)



A - Third-party sACN/ArtNet controller
B - Data input (Cat5e or better, by others)
C - Optional Ethernet connection to next CBX
D - CBX-DS-ETX
E - Power input (120 to 277V, wiring by others)
F - Leader Cable (LFLC XC3P3D)
G - Lumenfacade Max Continuous Horizontal (LFM-CH)
H - Jumper Cable (LFJC XC3P3D)
I - DMX/RDM Terminator

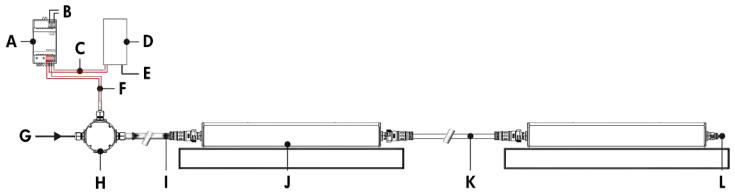
Refer to installation instructions for additional wiring details.

Maximum of 4 outputs per CBX-ST ENET; maximum of 1 output per CBX-DS ENET.

Consult CBX installation instructions for additional wiring details.

Lumenfacade T-Junction accessory is not compatible with ExtendX Control.

DALI 2 T8 (DALIT8)

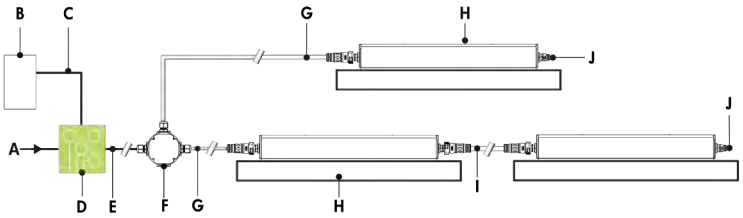


A - DALI bus power supply (by others)
B - Power input for DALI bus power supply (wiring by others)
C - Data output to DALI controller (wiring by others)
D - DALI controller (by others)
E - Power input for DALI controller (if required, wiring by others)
F - Data output to fixture (wiring by others)
G - Power input (120 to 277V, wiring by others)
H - Junction box (by others)
I - Leader Cable (LFLC XC3P2D)
J - Lumenfacade Max Continuous Horizontal (LFM-CH)
K - Jumper Cable (LFJC XC3P2D)
L - Sealing End Cap

- 64 DALI addressable device limitation (each fixture is an addressable device).
- DALI does not allow for control by foot, only by fixture.
- Commissioning may be required based on the selection of 3rd party DALI controller. Controller and commissioning provided by others.
- Less than 1% minimum dimming value.

Refer to installation instructions for additional wiring details and wiring diagram with Lumenfacade T-Junction accessory.

Lumentalk (LT)



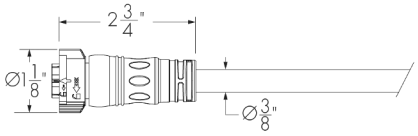
A - Power input (120 to 277V, wiring by others)
B - DMX/RDM controller (order separately from Lumenpulse, or by others)
C - Data wiring (by others)
D - Lumentranslator 2 (LTL2-DMX)
E - Power wiring (by others)
F - Junction box (by others)
G - Leader cable (LFLC XC3P2D)
H - Lumenfacade Max Continuous Horizontal (LFM-CH)
I - Jumper cable (LFJC XC3P2D)
J - Sealing End Cap

Refer to installation instructions for additional wiring details and wiring diagram with Lumenfacade T-Junction accessory.

- Consult factory for specific applications and maximum fixture count/cable length recommendations.
- For DMX applications: 1 DMX controller per Lumentalk network, maximum of 48 DMX channels per Lumentalk network (minimum step transition update rate is 1 second, minimum fade time between two colors is 1 minute). Consult factory for applications that require additional capabilities.
- Maximum of 1 transmitter (Lumentranslator or Lumenlink) per system.
- No third-party fixtures allowed on the same circuit.
- Consult factory for DALI Lumentalk applications.

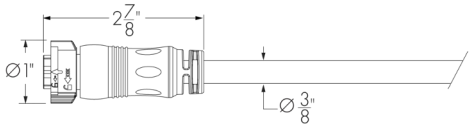
Leader Cable (Order Separately)

LFLC - Lumenfacade Leader Cable (XC3P2D)



UL version shown. Consult European specification sheet for CE cable details.

LFLC - Lumenfacade Leader Cable (XC3P3D)



UL version shown. Consult European specification sheet for CE cable details.

LFLC-**TYPE-CERTIFICATION-VOLTAGE-LENGTH-CONNECTOR/CABLE TYPE-CONNECTOR SHAPE-CABLE/CONNECTOR COLOR**

Please specify:
DALIT8, LT applications:
TYPE: CR/CH (Continuous Run or Continuous Horizontal); **CERTIFICATION**: UL or CE; **VOLTAGE:** 120_277; **LENGTH**: 10 ft, 25 ft, 50 ft, 100 ft, 150 ft or 200 ft; **CONNECTOR/CABLE TYPE:** XC3P2D (5x 16AWG X-lock size); **CONNECTOR SHAPE:** 180D (Straight Connector) or 90D (90˚ Angle Connector); **CABLE/CONNECTOR COLOR**: BK (Black) or WH (White) (connectors are the same color as the specified cable color).

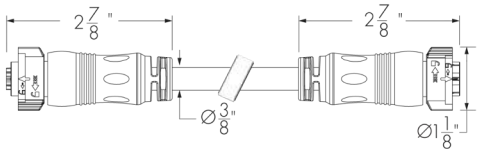
A waterproof sealing end cap is mandatory for any unused connector. One (1) included with every CR/CH XC3P2D Leader Cable.

DMX/RDM applications:
TYPE: CR/CH (Continuous Run or Continuous Horizontal); **CERTIFICATION**: UL or CE; **VOLTAGE:** 120_277; **LENGTH**: 10 ft, 25 ft, 50 ft, 100 ft, 150 ft or 200 ft; **CONNECTOR/CABLE TYPE:** XC3P3D (3x14AWG + 3x24AWG X-lock C-size); **CONNECTOR SHAPE:** 180D (Straight Connector); **CABLE/CONNECTOR COLOR**: BK (Black) or WH (White) (connectors are the same color as the specified cable color).

- Consult Lumenfacade Leader cable specification sheet for all available cable lengths and additional information.

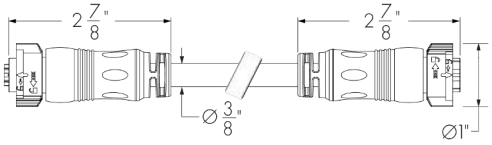
Jumper Cable (Order Separately)

LFJC - Lumenfacade Jumper Cable (XC3P2D)



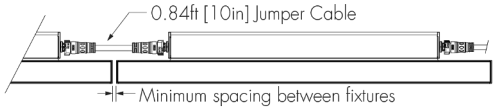
UL version shown. Consult European specification sheet for CE cable details.

LFJC - Lumenfacade Jumper Cable (XC3P3D)



UL version shown. Consult European specification sheet for CE cable details.

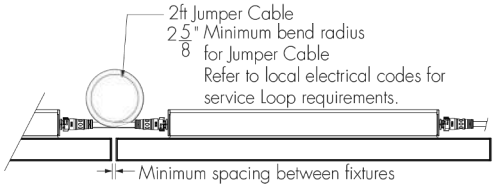
Installation with No Cable Loop



Straight Cable/No Cable Loop (0.84 ft Jumper Cable)
Minimum Spacing Between Fixtures

Fixture B Length \ Fixture A Length	12 in	24 in	36 in	48 in
12 in	5.3in Fixture Gap		2.75in Fixture Gap	
24 in				
36 in	2.75in Fixture Gap		**End-to-End*** 0.375in Fixture Gap	
48 in				

Installation with Cable Loop



Cable Loop (2 ft Jumper Cable)
Minimum Spacing Between Fixtures

Fixture B Length \ Fixture A Length	12 in	24 in	36 in	48 in
12 in	2.75in Fixture Gap		**End-to-End*** 0.375in Fixture Gap	
24 in				
36 in	**End-to-End*** 0.375in Fixture Gap		**End-to-End*** 0.375in Fixture Gap	
48 in				

***** When using 36 in and 48 in fixtures in End-to-End applications, fixtures must be spaced exactly 0.375 in apart to ensure proper connection.
Due to fixture construction and the lack of adjustment in the Jumper Cable, failure to comply with this spacing will result in a non-suitable jumper cable length and a non-continuous run.

***** If using an End-to-End Cable, plan mounting bracket spacing to accommodate 0.375 in spacing between fixtures.

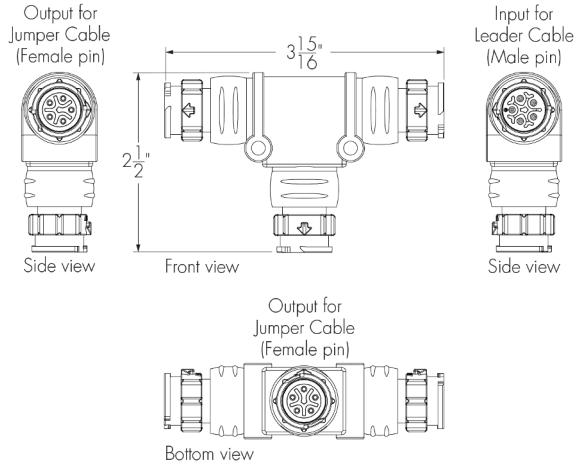
LFJC-**CERTIFICATION-VOLTAGE-LENGTH-CONNECTOR/CABLE TYPE-CONNECTOR SHAPE-CABLE/CONNECTOR COLOR**

Please specify:
CERTIFICATION: UL or CE; **VOLTAGE:** 120_277; **LENGTH**: 0.84 ft, 2 ft, 5 ft, 10 ft, 25 ft or 50 ft; **CONNECTOR/CABLE TYPE:** XC3P2D (5x 16AWG X-lock size) or XC3P3D (3x14AWG + 3x24AWG X-lock C-size); **CONNECTOR SHAPE:** 180D (straight connector); **CABLE/CONNECTOR COLOR**: BK (Black) or WH (White) (connectors are the same color as the specified cable color).

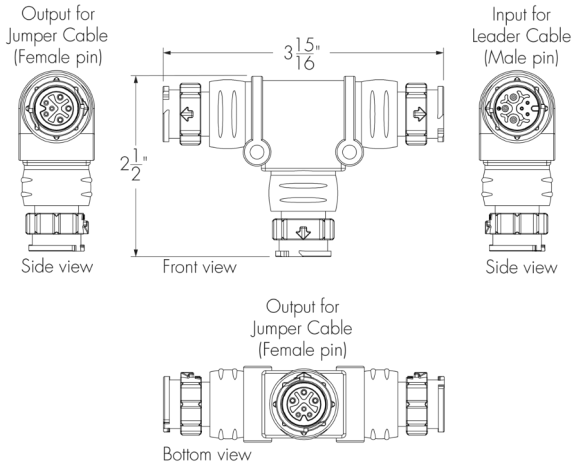
- Suitable for dimming/data and non-dimming applications.
- Consult Lumenfacade Jumper Cable specification sheet for additional information.

T-Junction (Order Separately)

LFTJ - Lumenfacade T-Junction (XC3P2D)
Available For DALI T8 and LT Control Options Only



LFTJ - Lumenfacade T-Junction (XC3P3D)
Available for DMX/RDM Control Option Only



LFTJ-**CONNECTOR/CABLE TYPE-CABLE/CONNECTOR COLOR**

Please specify:
CONNECTOR/CABLE TYPE: XC3P2D (5x 16AWG X-lock size) or XC3P3D (3x 14AWG + 3x24AWG) X-lock size; **CABLE/CONNECTOR COLOR**: BK (Black) or WH (White).

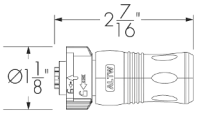
- Suitable for dimming/data and non-dimming applications with LFM fixtures.
- Consult factory for guidelines on the use of T-Junctions in a fixture run.
- Consult Lumenfacade T-Junction specification sheet for additional information.

- The T-Junction accessory can be used to connect a feed input, with a throughput to a localized run of fixtures and an output to the rest of your installation.
- Waterproof sealing end cap is mandatory for any unused connector. One (1) included with every T-Junction accessory.
- For DMX/RDM applications, an installation must not exceed 64 fixtures and 800 ft of cable. Additionally, each stub must not exceed 50 ft.

Lumenfacade T-Junction accessory is not compatible with ExtendX Control.

DMX/RDM Terminator (Included with Leader Cable)

148161 (Black) or 150394 (White) - DMX/RDM Terminator

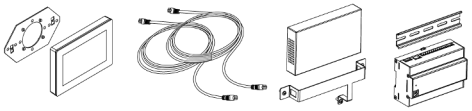


DMX/RDM terminator is mandatory at the end of a fixture run with T-junction for DMX/RDM applications

Please specify:
148161: Black (BK) or **150394:** White (WH)

Control Systems (Order Separately)

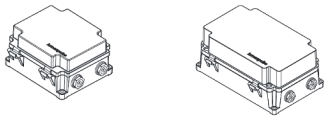
PHAROS - Pharos® Designer Lighting Control Kit



The Pharos Designer Lighting Contol Kit, available for 1 or 2 DMX universes, allows for complete control of large lighting installations.

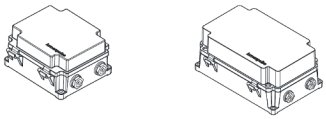
Control Boxes (Order Separately)

CBX-DMX/RDM - DMX/RDM Enabled (Daisy Chain or Star Configuration)



DMX/RDM control box. Up to six power and data outputs to fixtures or fixture runs. Consult CBX specification sheet and installation instructions for details. Lumenterminators provided with CBX (2x for Daisy Chain configuration, 6x for Star configuration), consult factory to order spares.

CBX-ENET - Ethernet Enabled (Daisy Chain or Star Configuration)



Ethernet control box. Up to four power and data outputs to fixture or fixture runs. Consult Ethernet CBX specification sheet and installation instructions for details.

Diagnostic And Addressing Tools (Order Separately)

LID - LumenID

The updated LumenID (LID) is now your all-in-one diagnostic and addressing solution for both DMX/RDM and Lumentalk (LT) systems. Engineered for versatility, it streamlines commissioning and troubleshooting across protocols—no need for multiple tools. Consult the LID specification sheet for full details.

Lumenfacade
Max
Continuous Horizontal
LFM-CH

COLOR CHANGING

How to Order

Housing	Type	Certification	Voltage	Length	Wattage	Color and Color Temperature	Optic	Lens	Feeding Side
LFM Lumenfacade Max	**CH** Continuous Horizontal	**UL** UL Compliant [1] **CE** CE Compliant (Class I) [2] **PSE** PSE Certification [3] [4] [5]	**120_277** 120 Volts to 277 Volts [6] **230** 220 to 240 volts [7] **100_200** 100 to 200 volts (PSE Certification) [8]	**12** 12 in **24** 24 in **36** 36 in **48** 48 in	**6W** 6 W/ft [9] [10] **10W** 10 W/ft **22W** 22 W/ft	**MRGBWP** Opticolor+™ Mix-at-Source Red, Green, Blue Plus White Settable Range 24K to 65K [11] [12] **MRGRBWP** Opticolor+™ Mix-at-Source Red, Green, Royal Blue Plus White Settable Range 24K to 65K [11] [12] [13] [14] **MRGBA** Opticolor™ Mix-at-Source Red, Green, Blue, PC Amber [11] **MRGB** Opticolor™ Mix-at-Source Red, Green, Blue [11]	**10x10** 10° x 10° [15] **10x30** 10° x 30° **10x60** 10° x 60° **10x90** 10° x 90° **30x30** 30° x 30° [16] **30x60** 30° x 60° [16] **30x90** 30° x 90° [16] **60x60** 60° x 60° [16] **90x90** 90° x 90° [16] **30x10** 30° x 10° [16] **60x10** 60° x 10° [16] **60x30** 60° x 30° [16] **90x10** 90° x 10° [16] **W** Wide 120° [16] **NAS** Narrow Asymmetric **WW** Asymmetric Wallwash [17] **CAS** Ceiling Asymmetric [16]	**CL** Clear Lens **HFR** Half-Frosted Lens **FR** Frosted Lens	**LF** Left Feeding Side **RF** Right Feeding Side feeding side to be verified by EC

Notes:

1. Available for 120_277 voltage option only.
2. Available for 230 voltage option only.
3. Available for the Japanese market only.
4. Available for 100_200V voltage option only.
5. Consult your local Sales Representative for PSE certification.
6. Available for UL certification only.
7. Available for CE certification only.
8. Available for PSE Certification only.
9. Consult factory for applications with 12 in fixtures.
10. Consult factory for applications with PSE Certification.
11. Fixtures are shipped from the factory in Optidrive™ Mode. Normal Mode can be activated onsite for DMX/RDM and LT fixtures. For DMX/RDM applications, Optidrive Mode requires a LumenID, LumenID software and onsite commissioning. For LT applications, Optidrive Mode requires a LumenID, LumentalkID software and onsite commissioning. Additionally, with Opticolor+™ the white CCT is configurable in the field from 2200K-8000K.
12. Consult factory for DALI T8 applications with MRGBWP or MRGRBWP and a CCT other than 3000K.
13. Longer lead time of 10-12 weeks.
14. Consult factory for photometric performance.
15. For best results use a miminum 6 in setback from surface. Contact factory for application support.
16. Can be combined with a CL or FR lens only.
17. Can be combined with a HFR or FR lens only.

lumenpulse™
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www.lumenpulse.com www.lumenpulse.com/products/5154

Lumenfacade
Max
Continuous Horizontal
LFM-CH

COLOR CHANGING

How to Order

Control	Vibration Rating [24]	Mounting Options [29]	Environment	Finish	Accessories [39] [40]	Buy America.n Act
DMX/RDM DMX/RDM Enabled Dimming [18] [19]	**NVR** Buildings and Fixed Structures [25]	**SMH** Slim Adjustable Mounting Horizontal Continuously Adjustable (100˚ Pivot Limit) [30] [31]	**XD** Extra durable multi-step finish [35]	**BK** Black Sandtex®	**NA** No Accessory	**BAA** Buy America.n [6] [42]
DALIT8 DALI 2 T8 Enabled Dimming 0.1% [12] [19] [20]	**VRN** Pole-Mounts [26] [27]	**FXH** Fixed Mounting Horizontal (0˚ Pivot Limit) [32]		**BRZ** Bronze Sandtex®	**LV** Radial Louver [30] [41]	
LT Lumentalk [19] [21]	**VRBO** Bridges and Overpasses [28]	**WMCH3** Wall Mounting Horizontal Continuously Adjustable, 3.5 in to Optical Center (120˚ Pivot Limit) [30] [31]		**SI** Silver Sandtex®	**LVAS** Radial Louver Asymmetric [30]	
ETX ExtendX™ [19] [22] [23]		**WMiH3** Wall Mounting Horizontal Incrementally Adjustable by 6˚, 3.5 in to Optical Center (120˚ Pivot Limit) [30] [31]		**WH** Smooth White	**VS** Visor [30]	
		WMCH6 Wall Mounting Horizontal Continuously Adjustable, 6 in to Optical Center (180˚ Pivot Limit) [31]		**BKTX** Textured Black		
		WMiH6 Wall Mounting Horizontal Incrementally Adjustable by 6˚, 6 in to Optical Center (180˚ Pivot Limit) [32]		**BRZTX** Textured Bronze Non-Metallic		
		WMCH12 Wall Mounting Horizontal Continuously Adjustable, 12 in to Optical Center (180˚ Pivot Limit) [31] [33]		**GRATX** Textured Medium Gray		
		WMiH12 Wall Mounting Horizontal Incrementally Adjustable by 6˚, 12 in to Optical Center (180˚ Pivot Limit) [34]		**GRNTX** Textured Green		
		WMCH18 Wall Mounting Horizontal Continuously Adjustable, 18 in to Optical Center (180˚ Pivot Limit) [31] [33]		**WHTX** Textured White		
		WMiH18 Wall Mounting Horizontal Incrementally Adjustable by 6˚, 18 in to Optical Center (180˚ Pivot Limit) [34]		**CC** Custom Color & Finish [36] [37] [38]		
		WMCH24 Wall Mounting Horizontal Continuously Adjustable, 24 in to Optical Center (180˚ Pivot Limit) [30] [31]				
		WMiH24 Wall Mounting Horizontal Incrementally Adjustable by 6˚, 24 in to Optical Center (180˚ Pivot Limit) [30] [31]				

Notes:

6. Available for UL certification only.
12. Consult factory for DALI T8 applications with MRGBWP or MRGRBWP and a CCT other than 3000K.
18. A Control Box (CBX) and LumenID (LID) must be specified.
19. Minimum dimming value is less than 1%.
20. DALI 2 T8 controller required, provided by others. DALI2 T8 control uses a single DALI short address.
21. A Lumentranslator 2 (LTL2) and LumenID (LID) must be specified for Lumentalk applications. Consult Lumentranslator 2 and Lumentalk pages and specification sheets for details.
22. An Ethernet CBX is required. Refer to the ETX configuration in the Ethernet CBX Specification Sheet for details.
23. ETX Control Option is not compatible with LFTJ T-Junction Accessory.
24. Consult factory for vibration rating requirements on vertical installations.
25. Available for all mounting options.
26. Available for FXH mounting option when combined with VRN vibration rating. All other mounting options may have installation limitations, and a review is needed for approval. Consult factory.
27. Consult factory for pole mounting accessories.
28. Available for FXH mounting option when combined with VRBO vibration rating. All other mounting options may have installation limitations, and a review is needed for approval. Consult factory.
29. One mounting bracket provided for 12 in fixtures. Two mounting brackets provided for 24 in, 36 in and 48 in fixtures.
30. Available with NVR vibration rating only. Installation limitations may apply for other vibration rating options, and a review is needed for approval. Consult factory.
31. Not suitable for bridge and overpass applications.
32. Vibration tested in accordance with ANSI 136.31 2018 at 3Gv.
33. Vibration tested in accordance with ANSI 136.31 2018 at 2.3Gv.
34. Vibration tested in accordance with ANSI 136.31 2018 at 4.6Gv.
35. Zirconium pretreatment completed with corrosion-resistant primer and electrostatically-applied powder coat paint finish.
36. Lumenpulse offers a wide selection of RAL CLASSIC (K7) colors with a smooth texture and high-gloss finish. Please consult factory for a list of available K7 colors, other RAL textures and glosses, or to match alternate color charts. Final color matching results may vary.
37. Setup charges apply for RAL colors. Consult factory for details.
38. Longer lead times can be expected for custom RAL color finishes.
39. Maximum one accessory per fixture.
40. The exterior finish of the accessory will match the finish specified in the fixture order code (interior surface painted matte black).
41. Available for 10x10, 10x30, 10x60, 10x90, 30x30, 30x60, 30x90, 60x60, 90x90, 30x10, 60x10, 60x30, 90x10 and W optics only.
42. Contact your Lumenpulse Sales Representative for more information on order volume details.

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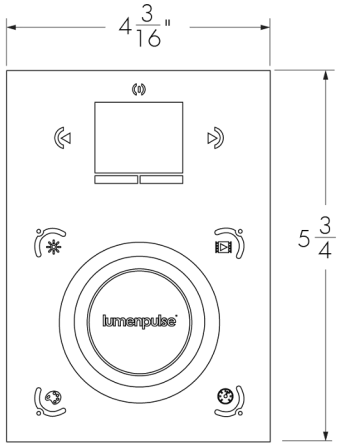
JC - R9

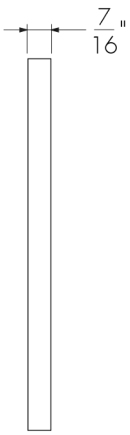
5.1 AMGEN PARAPET LIGHTING CONTROLS SPEC

Project Name _____ **Qty** _____

Type _____ **Catalog / Part Number** _____

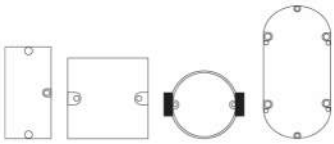


Front view



Side view

Mounting plate



- Universal back mounting plate
- Hole pattern to fit most standard junction boxes
- Extended back boxes are recommended for all installations

Content

- Lumentouch 2.0 hardware (stand alone wall mounted DMX controller)
- Mini-USB cable
- Micro SDCARD and adapter
- UL listed 6-7V DC power supply (100-240V AC input voltage) with connector block for DMX connection

Downloads (available on website)

- User manual
- Troubleshooting tips
- Quick Setup Guide
- Remote Protocol Guide
- Lumenstudio programming software (Hardware manager is part of the Lumenstudio Software download)

Description

Lumentouch 2.0 is an intuitive, touch sensitive DMX512 controller. An elegant update of the Lumentouch, the Lumentouch 2.0 provides increased scene and zone capabilities, an on-screen LCD display and a sleek glass finish. Users can program, modify and trigger lighting effects and shows, dimmers, speed and color, with just a simple touch. Designed for all manner of applications, the controller is adaptable to various sizes of recessed electrical boxes and easy to install.

Features

Interface	Touch sensitive control panel with sensitive wheel allows for accurate color selection
Clock and calendar	Integrated clock/calendar with Sunrise/Sunset triggering
Compatible Fixture Types	White DMX dimming, Dynamic White and Color Changing
Connections	MINI-USB connection for software programming, PC, MAC, tablet, Smartphone, can be used without a computer in stand alone mode, iPhone/iPad/Android remote and programming apps
Memory	Multi-zone microSD memory Micro SD (32GB max)
System Requirements	Compatible with Windows XP, Windows 7, Windows 8 and Windows 10 (32-bit or 64-bit)
Warranty	5-year limited warranty
Output Protocols Supported	2x DMX 512 universes (1024 channels)

Physical

Finish	Black
Weight	0.54 lbs
Mounting	Single or double gang wall socket, Universal mounting plate compatible with most electrical backboxes

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Certifications

Electrical and Control

Power Input	6-7V DC 0.6A
Battery	LIR2032 (rechargeable)
Connections	USB, Ethernet, RS232 serial and I/O ports, clock, 8 dry contact ports, Universal infrared input port
Standards	EC, EMC, ROHS, ETL

Environmental

Operating Temperature	14 °F to 113 °F

Installation

Step 1. Install Electrical Box And Mounting Plate

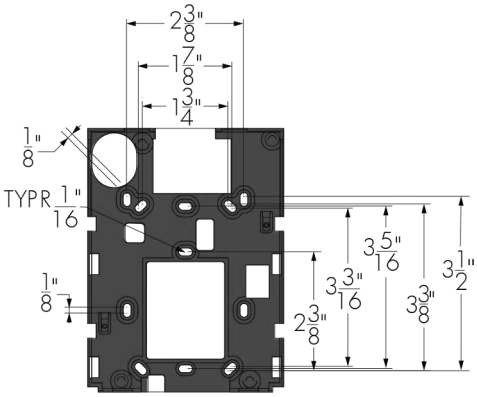
Electrical Box

- Lumentouch 2.0 controller can be installed on any and standard electrical box (double electrical box recommended)

Electrical Box With Power Supply

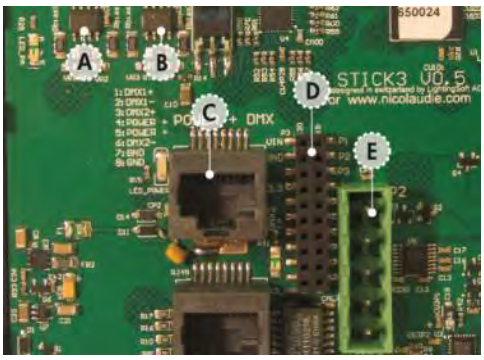
- The power supply can be inserted in a double size electrical box

Mounting Hole Pattern



- Install mounting plate on electrical box with 2 or more screws

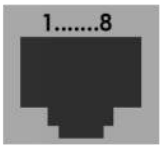
Step 2. Connect Cables
(Power+DMX with Connector Block or RJ45 Cable)



A- DMX chip replacement DMX universe #1
B- DMX chip replacement DMX universe #2

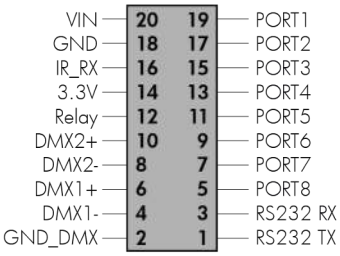
Ref: SP485ECN-L MAX485 CSA

C- Power+DMX Socket (RJ45 cable)



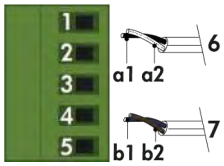
1- DMX +
2- DMX -
3- DMX2 +
4/5- Power/DC +
6- DMX2 -
7/8- Power/Ground

D- Extension Socket Rear Connectors (2x10 pins)



Compatible header connectors:
WURTH ELEKTRONIK Ref: 61301021121
MOLEX Ref: 10-89-7202
TE Connectivity Ref: 1-87227-0
FCI Ref: 77313-101-20LF
HARWIN Ref: M20-9981046
SAMTEC Ref: TSW-110-xx-T-D
FARNELL Ref: 1841232
RS Ref: 54 673-7534 251-8165
MOUSER Ref: 538-10-89-7202
DIGIKEY Ref: WM26820-ND

E- Connector Block (5 pins)

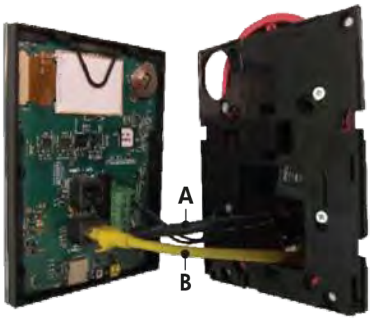


1- Power&DC +[1]
2- Power&Ground [1]
3- DMX&Ground [2]
4- DMX - [2]
5- DMX +[2]
6- From power supply to connector block
  a1: Power DC + (white trace cable)
  a2: Power Ground (black cable)
7- From power supply to wall plug
  b1: VDC + (blue cable)
  b2: VDC - (brown cable)

(1) Power: Connect a 6V to 7V DC 0.6A ACDC supply. Be sure to not invert the + and the ground.
(2) DMX: Connect the DMX cable to the lighting receivers (LEDs, dimmers, fixtures)

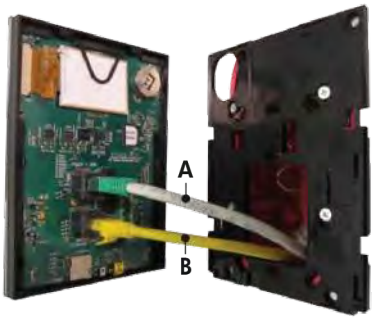
Step 3. Install Lumentouch 2.0 Interface On Mounting Plate

Plug Connector Block and Ethernet cable



A- Block connector (5 pins)
B- Ethernet socket (RJ45 cable)

Plug Power+DMX and Ethernet cable



A- Power+DMX socket (RJ45 cable)
B- Ethernet socket (RJ45 cable)

- Press front panel controller against mounting plate and slide down to install (2x screws needed underneath to hold the controller in place).
- Check pin configurations. Applying power to the DMX input will damage the controller.
- Make sure the controller is mounted without too much force behind as this can push apart the glass.
- Lumenpulse recommends using a gang box extension if possible to increase the volume of the wiring compartment for ease of installation.

Connections and Triggering

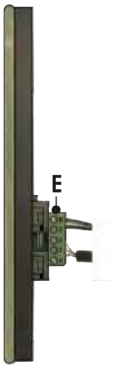
Touch-Sensitive User Interface*

Front view

A - Previous scene
B - Power On/Off and settings menu
C - Next scene
D - Previous area/page
E - Next area/page
F - Dimmer
G - Scene playback
H - Color wheel
I - Enter/confirm selection
J - Speed
K - Color selection wheel
**Please remove protective film before use to ensure proper operation of the controller.*

Connections

Back view



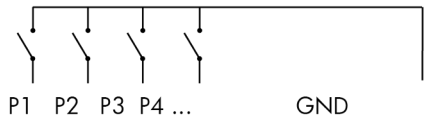
Side view

Bottom view

A- Rechargeable battery LIR2032
B- Extension socket rear connectors (2x10 pins)
C- Power+DMX socket (RJ45 cable)
D- Ethernet socket (RJ45 cable).
E- Connector block (5 pins)
F- DMX Activity Light
G- MicroSD card slot
H- Reset button
I- Mini USB slot
J- Data Activity Light

Connections and Triggering (continued)

Dry Contact Port Triggering



It is possible to start scenes using the input ports (contact closure).

To activate a port, a brief contact of at least 1/25 second must be established between the ports (1...8) and the ground (GND).

Note: the scene will not be switched off when the switch is released.

RS232 Triggering

Make a cable using the 3 pins : TX, RX and G (GND).

Set the RS232 parameters to : 9600bds 8 bits, no Parity, 2 Stop bits.

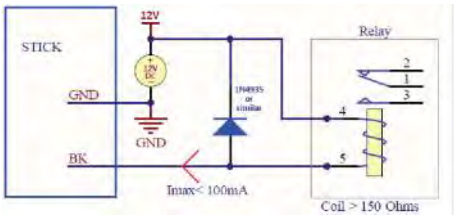
Messages should be hexadecimal not decimal (ie. 1 = 01, 255 = ff etc.)

- To play a scene, send 4 bytes: **1 x y 255**
- To stop a scene, send 4 bytes: **2 x y 255**
- To pause a scene, send 4 bytes: **3 x y 255**
- To release a pause, send 4 bytes: **4 x y 255**
- To reset a scene, send 4 bytes: **5 x y 255**

When (y)=0, (x) can be set between 0 and 255
- To play scene 300, send the command: 1 44 1 255

When (y)=1, (x) can be set between 0 and 243 to trigger scenes 256-499
- To play scene 300, send the command: 1 44 1 255

Blackout Relay (Energy Saving)



A relay can be connected between the RELAY and GND sockets of the 20 pin extension socket.

This can be used to turn off other equipment such as lighting drivers. The signal is connected when the controller is in standby.

Example of relay :
FINDER Ref.
22.23.9.012.4000

Network Control

The controller can be connected to a local network, allowing it to be controlled from a smartphone or tablet over WiFi.

Connect the controller to a router or switch with an RJ45 cable.

The controller is set by default to get an IP address from the router via DHCP. If the network is not working with DHCP, a manual IP address and subnet mask can be set using the Hardware Manager.

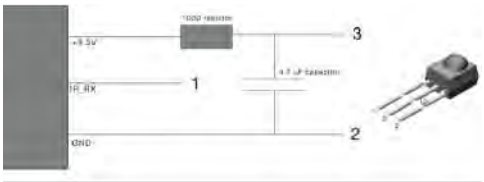
If the network has a firewall enabled, allow ports 2430 and 2431.

TCP Triggering

The controller can be connected to an existing automation system over a network and triggered via TCP packets on port 2431 or UDP packets on 2430.

Consult the remote protocol document for more information.

Infra Red



The controller works with the official IR remote control (no receiver). A 36khz infra red receiver can be connected, such as the TSOP34836 by Vishay Semiconductors. **Farnell ref:** 4913127. This can be attached to the extension connections. A resistor and capacitor can be added to surpress power supply disturbance.

Setting Up the Controller

iPhone/iPad/Android Control

The controller can be used with one of 3 different apps, each available at Google Play and the App Store (not supported through Lumenpulse).

DMX Lightpad 3

Designed to work seamlessly with the controller, DMX Lightpad 3 provides an easy way to control your lights over a local WiFi network.

Use the wheel to change the dimmer, color or speed, and the arrows to select scenes and effects just like the wall panel.

Swipe down to reveal quick access scene selection buttons.

Easy Remote

Create an entirely customized remote controller for your tablet or smartphone.

Easy Remote is a powerful and intuitive app allowing you to easily add buttons, faders, color wheels and more.

Connect to a WiFi network and the app will find all compatible devices.

Arcolis

The Arcolis application is a comprehensive tool allowing you to directly control and re-program the controller from your smartphone or tablet.

This is a simple application which can be used by just about everyone in any situation.

Mobile, easy to use and powerful, Arcolis is the ideal controller for dimming or switching traditional, LED and RGB color mixing DMX lighting fixtures.

Program static and dynamic lighting scenes and effects.

Arcolis is compatible with Android devices only.

How to Order

Housing
LTO2 Lumentouch 2.0™