Lighting Study Report

Skyview BESS – Substation and BESS Facility

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Approved By:	Ronak Patel, P.Eng.

Engineering Stamp

Revision History

Rev.	Date	Author(s)	Reviewed By	Approved By	Comments
0A	2025-09-02	ISP	RP	RP	Issued For Permit

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1 Scope

This report presents illumination study results for a lighting design at the proposed Skyview substation and battery energy storage (BESS) facility. The lighting at the Skyview BESS facility is to provide sufficient and safe illumination levels for nighttime foot and vehicle movement within the substation and BESS yard, and deliberate lighting of specific spaces including access gates, building proximity, and high voltage switchgear.

To minimize light pollution, the lighting design does not attempt to give sufficient task lighting for all apparatus. For specific work to be completed in the Skyview facility, portable lighting will generally be needed. The illumination study was performed by Maskwa High Voltage (MHV) using AGi32 lighting design software from Lighting Analysts Inc., a division of Revalize.

2 Design Criteria

2.1 Codes and Standards

Electrical substation and battery energy storage facility lighting have no codes or standards governing acceptable levels of illumination. The lighting at the facility is to provide sufficient and safe illumination levels for nighttime foot and vehicle movement within the substation and BESS yard, and deliberate lighting of specific areas including access gates, building proximity, and high voltage switchgear. As a result, the illumination requirements for the site have been determined based on common industry practice and industry recommended values.

Skyview substation and BESS facility is a private industrial facility that is not accessible to the public. The lighting requirements at this facility are for general illumination and access. This facility has remote operation capability and nighttime access to this facility by authorized personnel is expected to be very minimal. To minimize light pollution, most of the lights in the facility are operated by on/off switches in the main control building with only access gate lights and lights at building entrances operated by photocells, illuminated at night. This design ensures minimal light pollution from the facility.

2.2 Study Criteria

The primary design criteria for illumination of the substation, BESS site, and switching substation were drawn from Illuminating Engineering Society (IES) [1], with additional guidance from Canadian Centre for Occupational Health and Safety [2], and DarkSky International [3].

The following parameters were used in the lighting evaluation for the Skyview substation and BESS facility. The basis was parking lot illumination according to IES RP-8-22 Table 17-2, which was judged to provide the best fit among the lighting categories addressed in IES, although the application for lighting is in this case primarily snow clearing.

Of important note, the intent is to have most Skyview substation, BESS yard, and switching substation lights on locally and remotely operated switches that are normally off every night. An exception is lighting for the gate areas and exterior building entrances; these would be on photocell sensor for site security / access safety reasons.

Other design criteria are as follows:

- Calculation points placed at 5 x 5m spacings
- LLF coefficient 0.8
- Vertical illuminance levels for parking areas are NOT part of the design criteria, only horizontal. This is due to the isolated, limited access nature of the site (no pedestrians) and the purpose of lighting in the BESS yard and substation, which is largely for snow clearing and equipment operation. Designing to vertical illuminance targets would likely result in an excessively lit site.

Table 1: Design illuminance levels for Skyview substation and BESS yard lighting per IES.

Uses	Horizontal Illumination	
	Minimum (see Note 1)	Max/Min Ratio (see Note 2)
BESS & Sub Yards (IES "Parking Area")	2.0 lux	20

Notes:

1. "Minimum" in this case is to be interpreted as "must exceed" for every calculation point.
2. Max/Min ratio is to be interpreted as "must not exceed". In practice, the combination of the two forces a significantly higher average level of illumination than the 2.0 lux minimum might suggest.

For reference, illuminance for familiar natural conditions are as follows.

Table 2: Natural lighting conditions for reference [4]**.**

Condition	Value (lux)
Full Daylight	10,800
Overcast Day	1,080
Twilight	10.8
Deep Twilight	1.08
Full Moon	0.108
Overcast Night	0.0001

2.3 Light Fixtures

For the Skyview substation and BESS site lighting design, two types of luminaires are selected – Nemalux XR-20 LED luminaires will be installed for all outdoor yard lights and wall pack lights WP-LED40 will be installed on the exterior of building entrances and at the staging area.

Details of the luminaries are as follows.

Nemalux XR20-40H-T3-GY-GN-AC (Refer to **Appendix B** for datasheet)

- IESNA Type 3 wide distribution
- Full cut-off
- 18,036 nominal lumens
- Color temperature 4000K
- CRI 90
- 120-277 VAC supply
- 156 W consumption
- Grey enclosure

WP-LED40-B-VK-BRZ-DIM-PC (Refer to **Appendix C** for datasheet)

- 5,712 nominal lumens
- Color temperature 4000K
- CRI >80
- 120-277 VAC supply
- 41 W consumption
- Bronze enclosure

If required, lights can be provided with hoods/shields, however we do not believe this is required since the lights are intended to be off normally every night. Additionally, the site is located well below grade in a gravel pit, with minimal light pollution beyond the pit anticipated.

3 Analysis and Results

The lighting layout was designed based on the Skyview substation and BESS yard layouts and elevation drawings to provide the best possible illuminations levels for the required areas that meets the criteria outlined in Section 2.2. Lights are installed on standalone light poles or on other structures such as lightning masts, equipment supports, and similar. Refer to drawing **SKY_BESS-E-DWG-05401-1-A in Appendix D** showing the lighting layout.

The fixtures in the facility are either pole or equipment mounted, and their heights are set at 9m or below. Wall pack lights are to be mounted on buildings above or near entrances.

The following Table displays the minimum and maximum lighting levels calculated by AGi32 for the location; additional information can be found in **Appendix A** of this report.

Table 3: Skyview calculated illuminance values for site lighting.

Location	Min Horizontal Illuminance (lux)	Max/Min Ratio
Design criteria for yards	*2.0*	*20*
BESS	2.9	19.4
SUB	5.8	11.6

Note: the study was completed with all luminaires in the facility (substations and BESS yard) turned on, which may not be the case in most instances as majority of the lights in the BESS yard and the substation yard are on locally and remotely operated switches that are normally off every night. When required, personnel would likely access one or the other yard at nighttime but rarely have the need to access both and illuminate the entire facility.

4 Conclusion

A lighting design was completed by Maskwa High Voltage using AGi32 software with IES guidelines as design criteria.

Lighting within the substations and BESS yards provides for parking lot illumination levels with calculated minimums and max/min ratios within IES guidelines. Vertical illuminance is not evaluated.

Equipment maintenance and/or construction activities at the facility will require additional portable lighting and this is understood and acknowledged by the facility owner.

5 References

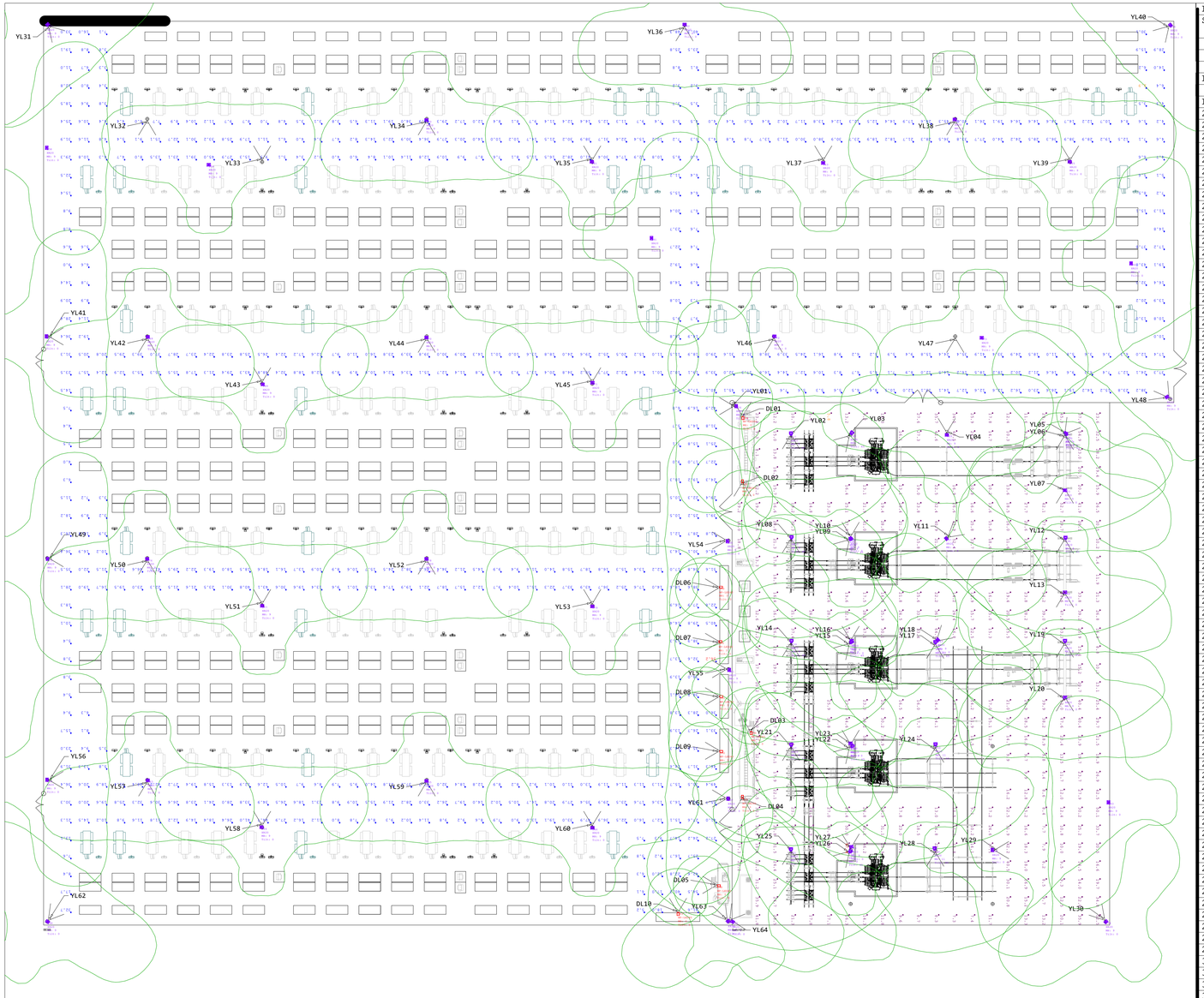
[1] Illuminating Engineering Society, "ANSI/IES RP-8-22 Recommended Practice: Lighting Roadway and Parking Facilities," Illuminating Engineering Society, New York, NY, 2023.

[2] Canadian Centre for Occupational Health and Safety, "Lighting Ergonomics - Survey and Solutions," Government of Canada, 10 February 2024. [Online]. Available: https://www.ccohs.ca/oshanswers/ergonomics/lighting/lighting_survey.html. [Accessed 28 May 2024].

[3] DarkSky International, "Advancing responsible outdoor lighting," DarkSky International, 2024. [Online]. Available: https://darksky.org/what-we-do/advancing-responsible-outdoor-lighting/. [Accessed 28 May 2024].

[4] T&M World, "Lux Illuminance Chart | Light Levels In Indoor,Outdoor," T&M World, 2016. [Online]. Available: https://www.test-and-measurement-world.com/Terminology/Lux-or-Illuminance-light-levels-Indoor-and-Outdoor-Chart.html. [Accessed 29 May 2024].

Appendix A: AGi32 Study Outputs



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Luminaire Schedule

Symbol	Qty	Label	Tag	LLF	Luminaire Lumens	Luminaire Watts
	10	WP-LED40-B-VK-BRZ-DIM-PC	WP-LED40	0.800	5584	39.3
X	67	XR20-40H-T3-GY-GN-AC	XR20	0.800	19206	157.8

Luminaire Location Summary

		Insertion Point				
LumNo	Label	X	Y	Z	Orient	Tilt
226	XR20-40H-T3-GY-GN-AC	193.2	-107.4	9	180	0
227	XR20-40H-T3-GY-GN-AC	208.5	-115.6	9	270	45
228	XR20-40H-T3-GY-GN-AC	225.1	-115.3	9	232.252	45
229	XR20-40H-T3-GY-GN-AC	252	-115.4	9	90	0
230	XR20-40H-T3-GY-GN-AC	285.1	-115	9	48.675	0
231	XR20-40H-T3-GY-GN-AC	285.2	-115.7	8	269.228	45
232	XR20-40H-T3-GY-GN-AC	208.7	-144.5	9	270	45
233	XR20-40H-T3-GY-GN-AC	284.9	-130.8	9	268.961	0
234	XR20-40H-T3-GY-GN-AC	225.1	-144.3	9	90.872	0
235	XR20-40H-T3-GY-GN-AC	224.8	-144.8	9	226.443	45
236	XR20-40H-T3-GY-GN-AC	285.1	-144.6	8	270	45
237	XR20-40H-T3-GY-GN-AC	251.8	-144.3	9	37.823	0
238	XR20-40H-T3-GY-GN-AC	284.9	-159.3	9	270	0
239	XR20-40H-T3-GY-GN-AC	208.7	-173.4	9	270	45
240	XR20-40H-T3-GY-GN-AC	225	-173.6	9	225	45
241	XR20-40H-T3-GY-GN-AC	225.4	-172.8	9	92.13	0
242	XR20-40H-T3-GY-GN-AC	248.8	-173.8	11	270.646	45
243	XR20-40H-T3-GY-GN-AC	249.5	-172.6	9	42.265	0
244	XR20-40H-T3-GY-GN-AC	284.9	-173.4	8	269.54	45
245	XR20-40H-T3-GY-GN-AC	284.9	-188.6	9	270	0
247	XR20-40H-T3-GY-GN-AC	208.6	-202.4	9	271.105	45
248	XR20-40H-T3-GY-GN-AC	225.2	-202.5	9	218.417	45
249	XR20-40H-T3-GY-GN-AC	225.1	-201.5	9	89.155	0
250	XR20-40H-T3-GY-GN-AC	248.8	-202.3	11	269.29	45
251	XR20-40H-T3-GY-GN-AC	208.5	-231.6	9	270.973	45
252	XR20-40H-T3-GY-GN-AC	224.7	-232	9	225.746	45
253	XR20-40H-T3-GY-GN-AC	225.3	-230.3	9	90.857	0
254	XR20-40H-T3-GY-GN-AC	248.6	-231.3	11	270	45
255	XR20-40H-T3-GY-GN-AC	264.7	-231.2	9	0	0
256	XR20-40H-T3-GY-GN-AC	296.4	-251.3	9	130.867	0
257	XR20-40H-T3-GY-GN-AC	1.1	-0.9	9	311.393	0
258	XR20-40H-T3-GY-GN-AC	0.9	-35.3	9	358.831	0
259	XR20-40H-T3-GY-GN-AC	46.1	-40	9	90.821	0
260	XR20-40H-T3-GY-GN-AC	106.8	-27.6	9	270.604	0
261	XR20-40H-T3-GY-GN-AC	152.9	-39.2	9	90	0
262	XR20-40H-T3-GY-GN-AC	178.8	-0.9	9	270	0
263	XR20-40H-T3-GY-GN-AC	217.4	-39.5	9	90	0
264	XR20-40H-T3-GY-GN-AC	254.2	-27.4	9	270.671	0
265	XR20-40H-T3-GY-GN-AC	286.3	-39.2	9	90.727	0
266	XR20-40H-T3-GY-GN-AC	314.4	-1.1	9	222.467	0
267	XR20-40H-T3-GY-GN-AC	0.8	-87.9	9	0	0
268	XR20-40H-T3-GY-GN-AC	29.1	-88.1	9	270	0
269	XR20-40H-T3-GY-GN-AC	61.1	-101.3	9	90.746	0
270	XR20-40H-T3-GY-GN-AC	106.8	-88.2	9	270.761	0
271	XR20-40H-T3-GY-GN-AC	153.1	-100.8	9	90.782	0
272	XR20-40H-T3-GY-GN-AC	203.9	-87.9	9	270	0
273	XR20-40H-T3-GY-GN-AC	261.7	-88.3	9	270	0
274	XR20-40H-T3-GY-GN-AC	313.4	-104.8	9	122.708	0
275	XR20-40H-T3-GY-GN-AC	1.1	-150	9	0	0
276	XR20-40H-T3-GY-GN-AC	28.9	-150	9	270	0
277	XR20-40H-T3-GY-GN-AC	61	-163.1	9	91.057	0
278	XR20-40H-T3-GY-GN-AC	106.8	-150	9	270.87	0
279	XR20-40H-T3-GY-GN-AC	153.1	-163.3	9	90	0
280	XR20-40H-T3-GY-GN-AC	190.8	-145.1	9	180	0
281	XR20-40H-T3-GY-GN-AC	191.3	-181	9	179.492	0
282	XR20-40H-T3-GY-GN-AC	1	-211.6	9	0	0
283	XR20-40H-T3-GY-GN-AC	29.1	-211.8	9	270	0
284	XR20-40H-T3-GY-GN-AC	60.8	-224.9	9	90	0
285	XR20-40H-T3-GY-GN-AC	106.8	-212	9	270	0
286	XR20-40H-T3-GY-GN-AC	153.1	-225.1	9	90	0
287	XR20-40H-T3-GY-GN-AC	190.9	-216.9	9	178.509	0
288	XR20-40H-T3-GY-GN-AC	1.1	-251.2	9	52.507	0
289	XR20-40H-T3-GY-GN-AC	190.9	-251.1	9	132.881	0
290	XR20-40H-T3-GY-GN-AC	192.2	-251.2	9	60.801	0
291	XR20-40H-T3-GY-GN-AC	169.6	-60.5	9	358.859	0
292	XR20-40H-T3-GY-GN-AC	303.4	-67.5	9	0	0
293	XR20-40H-T3-GY-GN-AC	297.1	-217.9	9	180	0
294	WP-LED40-B-VK-BRZ-DIM-PC	195.1	-110.3	3	268.976	0
295	WP-LED40-B-VK-BRZ-DIM-PC	195	-128.8	3	90	0
296	WP-LED40-B-VK-BRZ-DIM-PC	197.4	-198.2	3	269.087	0
297	WP-LED40-B-VK-BRZ-DIM-PC	195	-216.8	3	91.15	0
298	WP-LED40-B-VK-BRZ-DIM-PC	187.9	-241.2	3	359.528	0
299	WP-LED40-B-VK-BRZ-DIM-PC	188.5	-157.9	3	0	0
300	WP-LED40-B-VK-BRZ-DIM-PC	188.4	-173.1	3	359.415	0
301	WP-LED40-B-VK-BRZ-DIM-PC	188.7	-188.4	3	0.246	0
302	WP-LED40-B-VK-BRZ-DIM-PC	188.7	-203.8	3	0.449	0
303	WP-LED40-B-VK-BRZ-DIM-PC	177	-248.7	3	270	0

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
BESS	Illuminance	Lux	18.2	56.2	2.9	N.A.	19.4
SwitchSub	Illuminance	Lux	23.0	67.4	5.8	N.A.	11.6

Appendix B: Nemalux XR Luminaire Details

Nemalux™

XR-HZ

rev. B-03

KEY FEATURES

- Designed for marine, harsh, and hazardous location use
- Thermal separation of LED and power supply allows max ambient temperatures of up to +75°C
- Field serviceable light engines, power supply, and components to extend system life
- Wide range of optical distribution patterns for superior lighting quality
- Approved for through-wiring of several units on a single circuit
- Built-in junction area for simplified termination

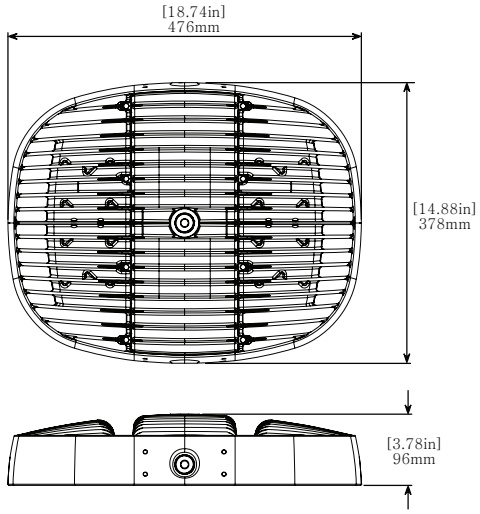
  8 mounting options for installation flexibility

TECHNICAL SPECIFICATIONS / MAXIMUM RATINGS

HOUSING	Copper Free Aluminium and Polycarbonate Lens
MOUNTING	See Pages 2 and 3 for MOUNTING OPTIONS
INPUT VOLTAGE	**AC**: 120-277 VAC | **HV**: 347-480VAC (50/60Hz)
POWER (TYP)	**XR8:** WC Flood 47W, Optic 60W **XR10:** WC Flood 55W, Optic 75W **XR15:** WC Flood 84W, Optic 103W **XR20:** WC Flood 141W, Optic 156W
CONNECTIONS	3x 3/4" NPT Entries
TEMPERATURE RANGE	**Class I Division 2 | Class 1 Zone 2** **XR8:** -50°C to +75°C T3C **XR10:** -50°C to +74°C T3C **XR15:** -50°C to +74°C T3C **XR20:** -50°C to +67°C T3 (Case ~30°C above ambient) **Class II Division 2 | Zone 22** All models -50°C to +50°C T3C **Orientation restricted to straight down only.*
CERTIFICATIONS	Certified to UL 1598 / CSA C22.2 No. 250.0-08, UL 1598A, UL 8750 / CSA C22.2 No. 250.13-17 Certified to UL 844 and CSA C22.2 No. 137-18: Class I, Division 2 Groups ABCD Class II Division 2 Groups FG Class III Class I, Zone 2, Groups IIC; Zone 22, Groups IIIB;
INGRESS PROTECTION	IP66 Suitable for wet locations. Marine Outside Type (Salt Water).
COLOUR TEMP RANGE	**50**: 5000K | Special Order: 2700-6500K
CRI VALUE (MIN)	**50**: 70
TOTAL LUMENS	See CHART on Page 2
LUMEN MAINTENANCE	LM-80 > 100,000 hrs (Based on CREE long term testing)
WEIGHT	8.1 kg | 17.8 lbs

**The ambient temperature during lifetime, lumen and chromaticity determination is 25°C ± 1°C.*

DIMENSIONS

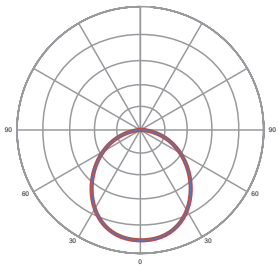


WARRANTY

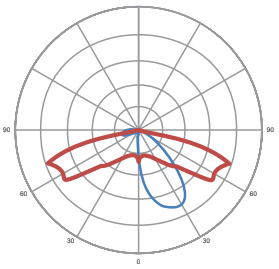
Five (5) year limited warranty to the original purchaser. The warranty covers defects in materials and workmanship under normal use and service.

For additional information see:
https://nemalux.com/legal

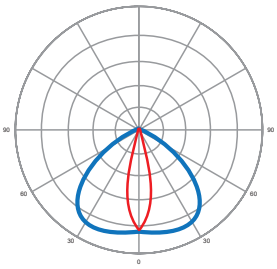
OPTIC OPTIONS



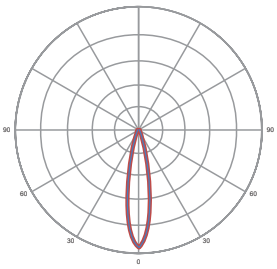
WC - Wide Beam (No Optics)



T3 - IESNA Type 3



OC - Oval 30° x 115°



SC- Spot 20°

AC MODELS (5000K CCT, minimum)

MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7093	47	151
XR10	8267	55	150
XR15	12866	84	153
XR20	20550	143	144

MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7790	60	130
XR10	9540	75	127
XR15	12839	103	125
XR20	18036	156	116

MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7098	60	118
XR10	8692	75	116
XR15	11697	103	114
XR20	16433	156	105

MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7098	60	128
XR10	8692	75	126
XR15	11697	103	123
XR20	16433	156	114

HV MODELS (5000K CCT, minimum)

MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7093	49	145
XR10	8267	58	143
XR15	12866	91	141
XR20	20550	148	139

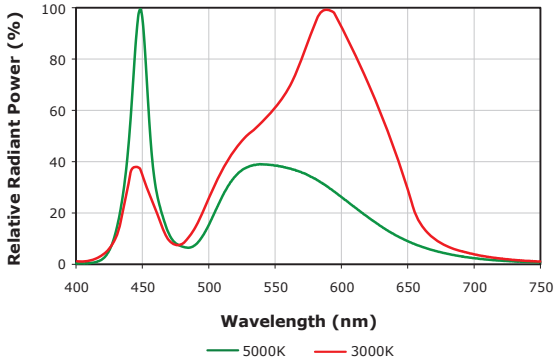
MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7790	64	122
XR10	9540	77	124
XR15	12839	107	120
XR20	18036	160	113

MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7098	64	111
XR10	8692	77	113
XR15	11697	107	109
XR20	16433	160	103

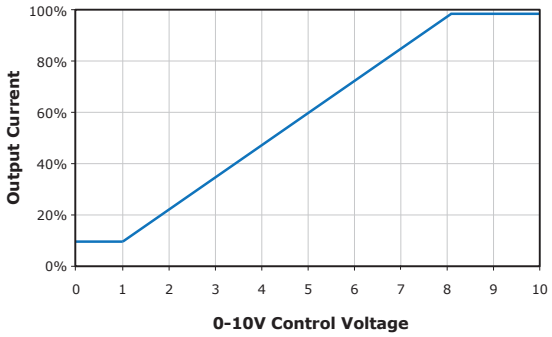
MODEL	LUMENS	WATTS	LUMENS/WATT
XR8	7098	64	120
XR10	8692	77	123
XR15	11697	107	119
XR20	16433	160	111

Note: Standard offering above, 11 alternate optical profiles available upon request.
Contact Nemalux Sales representative for further details. Minimum order quantities, additional costs and lead times may apply.

PHOTOMETRICS



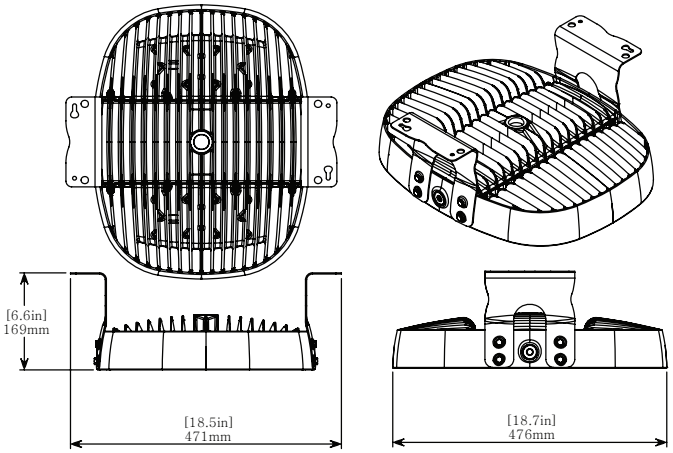
DIMMING



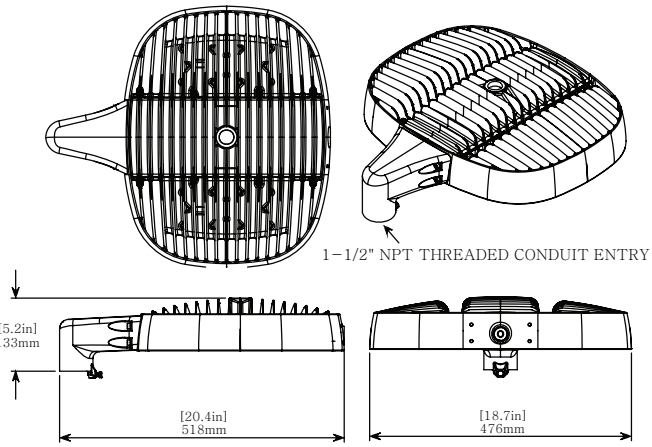
- *Driver will source a maximum of 200uA for control needs*
- *Controller must sink current from the 0-10V control leads*

MOUNTING OPTIONS (Ordered Separately)

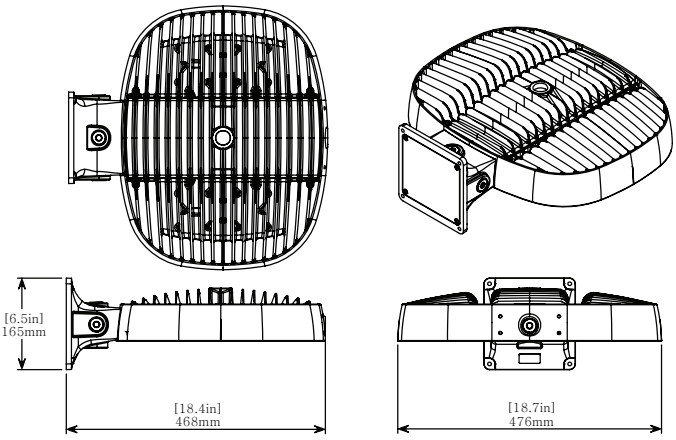
SURFACE/SUSPENDED MOUNT (XR-SM) : 8.5 kg | 18.7 lbs



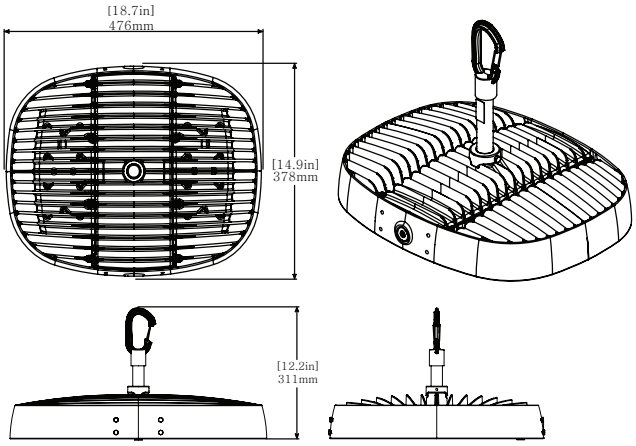
POLE MOUNT (XR-PM) : 8.6 kg | 18.9 lbs | EPA: 0.05 m² / 0.49 ft²



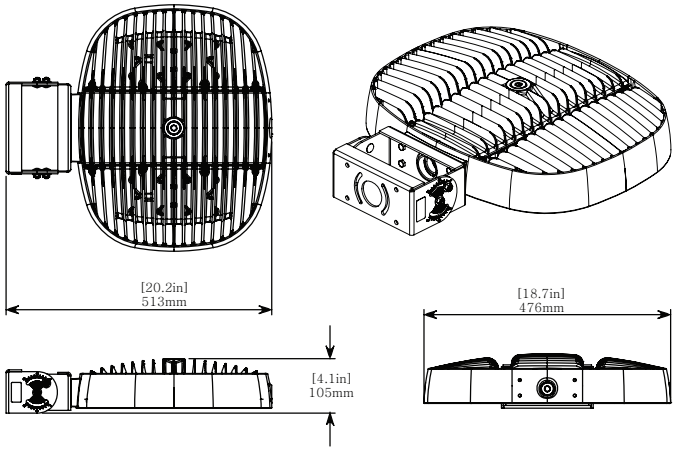
WALL MOUNT (XR-WM) : 9.4 kg | 20.7 lbs



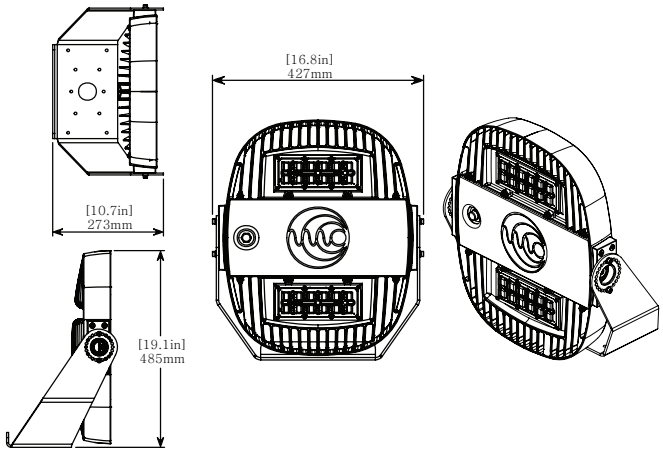
HANGING PENDANT (XR-HK) : 8.1 kg | 17.8 lbs



YOKE MOUNT (XR-YM) : 8.5 kg | 18.7 lbs | EPA: 0.17 m² / 1.80 ft²

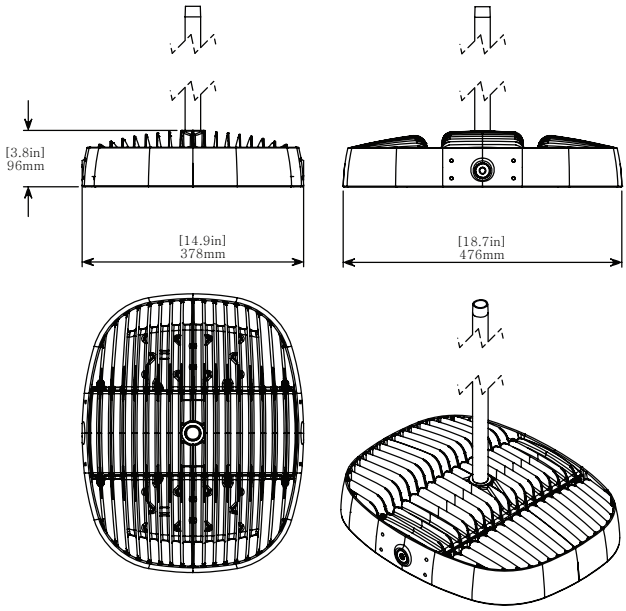


HIGH VIBRATION YOKE (XR-YK) : 12.9 kg | 28.3 lbs | EPA: 0.23 m² / 2.43 ft²

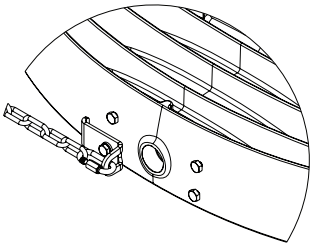


MOUNTING OPTIONS (Ordered Separately)

CONDUIT ROTATION LOCK (XR-CC) : 8.2 kg | 18.0 lbs

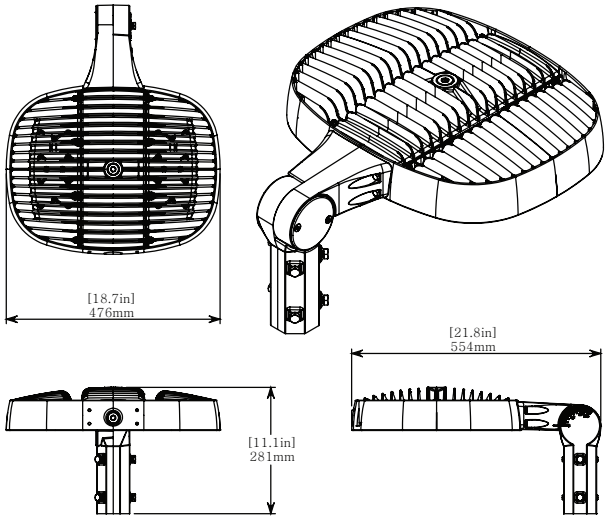


SECONDARY SAFETY KIT (XR-SK-##) : 8.2 kg | 18.0 lbs



represents the safety chain length in feet (i.e. 05=5', 10=10').
Secondary Safety Kit contains bracket, stainless steel chain (1/8 trade size), and two stainless steel oval threaded connecting links.

SLIP FITTER YOKE MOUNT (XR-SFY) : 10.05 kg | 22.1 lbs | EPA: 0.18 m^2 / 1.99 ft^2



Stepped to accept either 1.5" Trade size (1-13/16" [46mm] to 2" [50mm] OD) & 2" Trade size (2-1/8" [53mm] to 2-7/16" [63mm])

***Per NEC 314.23H2 pendant/conduit installation below 8ft (2.4m) requires the use of an anti-rotation mechanism. XR-CC accessory required. Order seperately.*

ORDERING INFORMATION

PROJECT NAME		TYPE	
PROJECT LOCATION			
COMMENT		DATE	
PREPARED BY			

MODEL SELECTOR

Sample Number: XR20-50-WC-GY-HZ-AC

MODEL	COLOUR	OPTIC	FINISH	LOCATION	POWER
-	-	-	GY -	HZ -	
XR8[6] **XR10**[6] **XR15**[6] **XR20**[6]	**50** - 5000K, 70CRI Special Order: **27** - 2700K, 70CRI[1,3] **27H** - 2700K, 90CRI[1,3] **30** - 3000K, 70CRI[1,3] **30H** - 3000K, 90CRI[1,3] **35** - 3500K, 80CRI[1] **35H** - 3500K, 90CRI[1] **40** - 4000K, 70CRI[1] **40H** - 4000K, 90CRI[1] **50H** - 5000K, 90CRI[1] **57** - 5700K, 70CRI[1] **57H** - 5700K, 90CRI[1] **65** - 6500K, 70CRI[1] **65H** - 6500K, 90CRI[1]	**WC** - Wide Beam (No optics) **MC** - Medium 60° **OC** - Oval 30° x 115° **T3** - IESNA Type 3 Special Order: **VSM** - IESNA Type 5 Short (Square beam for wide area lighting)[1] **ME** - Asymmetric 70° x 150°[1] **T29** - Type 2 90 degree rotated where long side of beam must be parallel to luminaire[1] **WW** - 90° Spot[1] **T2** - IESNA Type 2[1] **SC** - 20° Spot[1] **NC** - 25° Spot[1]	**GY** - Grey Custom finishes available. Please contact for details.[1]	**HZ** - Hazardous Locations	**AC** - 120-277VAC **HV** - 347-480VAC

ACCESSORIES (Ordered Separately)

Sample Number: XR-PM-GY

ACCESSORY	FINISH	LOCATION
-	GY -	
XR-SM - Surface/Suspended Mount[2,3] **XR-PM** - Pole Mount[3] **XR-WM** - Wall Mount[3] **XR-HK** - Hanging Pendant Mount[3] **XR-YM** - Yoke Mount[2] **XR-YK** - High Vibration Yoke Mount[2] **XR-CC** - Conduit Rotation Lock Mount **XR-SFY** - Slip Fitter Yoke Mount[5] **XR-SK-##** - Secondary Safety Kit[4] **XR-SP-AC** - Surge Suppressor[7] **XR-SP-HV** - Surge Suppressor[7]	**GY** - Grey Custom finishes available. Please contact for details.[1]	**HZ** - Hazardous Location[5]

NOTES:

1. *Minimum order quantities, additional costs and lead times may apply.*
2. *Only available in stainless steel finish.*
3. *IDA Fixture Seal of Approval only applies to fixtures with a CCT of 3000K or less, and have fixed mounts aiming the fixture perpendicular to the ground.*
4. *## represents the safety chain length in feet (i.e. 05=5', 10=10'). Secondary Safety Kit contains bracket, stainless steel chain (1/8 trade size), and two stainless steel oval threaded connecting links.*
5. *XR-SFY-GY-**HZ** > only applied to slip fitter yoke mount for hazardous locations.*

6. DLC Listed models:

DesignLights Consortium (DLC) v5.1 Qualified LED Luminaire Listings			
Model No.	*Category*	*General Application*	*Classification*
XR8-50-WC-xx-GN-AC	*Outdoor Luminaires*	*Mid Output*	*DLC Premium*
XR8-50-WC-xx-HZ-AC	*Outdoor Luminaires*	*Mid Output*	*DLC Standard*
XR10-50-WC-xx-GN-AC	*Outdoor Luminaires*	*Mid Output*	*DLC Premium*
XR10-50-WC-xx-HZ-AC	*Outdoor Luminaires*	*Mid Output*	*DLC Standard*
XR15-50-WC-xx-GN-AC	*Outdoor Luminaires*	*High Output*	*DLC Premium*
XR15-50-WC-xx-GN-AC	*Indoor Luminaires*	*High-Bay*	*DLC Standard*
XR15-50-WC-xx-HZ-AC	*Outdoor Luminaires*	*High Output*	*DLC Premium*
XR15-50-WC-xx-HZ-AC	*Indoor Luminaires*	*High-Bay*	*DLC Standard*
XR20-50-WC-xx-GN-[AC,HV]	*Outdoor Luminaires*	*High Output*	*DLC Premium*
XR20-50-WC-xx-GN-[AC,HV]	*Indoor Luminaires*	*High-Bay*	*DLC Standard*
XR20-50-WC-xx-HZ-[AC,HV]	*Outdoor Luminaires*	*High Output*	*DLC Premium*
XR20-50-WC-xx-HZ-[AC,HV]	*Indoor Luminaires*	*High-Bay*	*DLC Standard*

7. Surge Suppressor Options:

XR-SP-AC – 277V FOR USE WITH -AC XR MODELS

-Protects against surges and transients per ANSI C62.41-2002 category C high (10KV, 1.2/50µS & 10KA, 8/20µS) standard Combo waves and (6KV, 100KHz) Ring wave

-Protects against surges and transients per new ANSI C82.77-5 2015 category C high (20KV, 1.2/50µS & 10KA, 8/20µS) standard Combo waves and (6KV, 100KHz) Ring wave

XR-SP-HV – 480V FOR USE WITH -HV XR MODELS

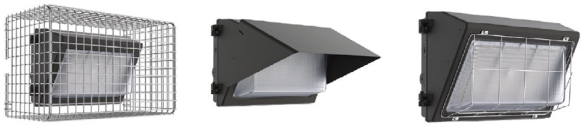
-Protects against surges and transients per ANSI C62.41-2002 category C high (10KV, 1.2/50µS & 10KA, 8/20µS) standard Combo waves and (6KV, 100KHz) Ring wave

-Protects against surges and transients per new ANSI C82.77-5 2015 category C high (20KV, 1.2/50µS & 10KA, 8/20µS) standard Combo waves and (6KV, 100KHz) Ring wave

Appendix C: Wall Pack WP-LED40 Details

Project: | Type: | Date: | Notes:

WP-LED Series
LED Wall Pack



Applications:
Entrances, schools, loading docks, perimeter lighting and more.

DESCRIPTION:

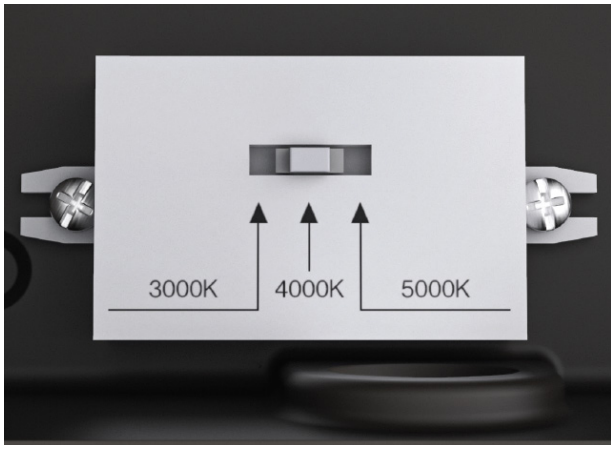
A Traditional Wall Pack with the newest lighting technology. Die cast aluminum housing with side hinge and borosilicate glass.

FEATURES:

- LED Wallpack that serves as an ideal replacement for HID wallpacks from 150W - 400W.
- Colour selectable switch inside fixture allows installer to choose between 3000K/4000K/5000K CCT on the field.
- Die cast aluminum housing with borosilicate glass lens.
- Side hinged design allows Installer to use two hands for wiring.
- Photocell, motion sensor, and 10Kv surge protector options available.

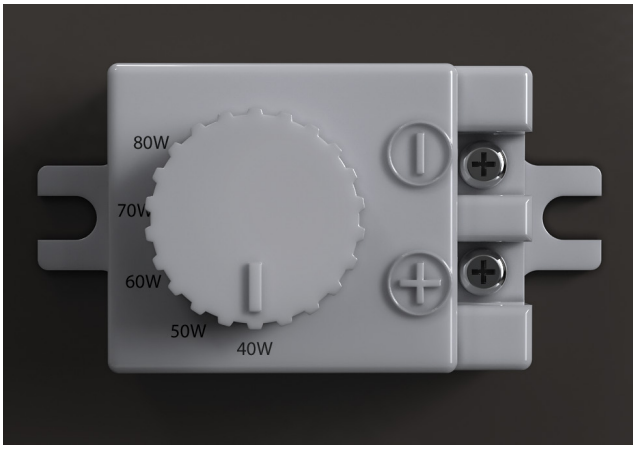
Colour Temperature Selecting Switch Inside:

Choose between 3000K, 4000K or 5000K at the time of installation.



Adjustable Wattage Version Available:

The *WP-LED80A40* can be set to 40W, 50W, 60W, 70W or 80W at the time of installation.



SPECIFICATIONS:

	WP-LED40	WP-LED80	WP-LED80A40[1]	WP-LED120
Watts	41W	78W	Max 80W adjustable to minimum 40W	124W
Voltage	120-277V, 120-347V	120-277V	120-347V	120-347V
Lumens	5,712 (120-277V) 5,623 (120-347V)	10,827	11,072 (at 80W setting)	16,493
Efficacy	141	139.7	137.5 (at 80W setting)	136.7
Replaces Up To	175W MH	250W MH	175W MH and 250W MH	400W MH
B	1	1	1	2
U	3	4	4	5
G	4	5	5	5
Colour Temperature	VK - 3000K, 4000K, 5000K Colour Selectable (4000K default setting)			
Colour Rendering Index (CRI)	>80			
Distribution	Type IV Short			
Operating Temperature	-40° C to +50° C			
Housing Material	Die Cast Aluminum			
Lens Material	Borosilicate Glass			
Finish	Bronze*, Custom Colours			
Factory Installed Options	Photocell, 10kV Surge Protector, Dimming Motion Sensor, On/Off Motion Sensor			
Accessories Sold Separately	Visor, Wire Guard, Wire Cage			
THD (%)	15.0			
PF	0.900			

[1]Wattage adjustable units with 5 wattage settings.

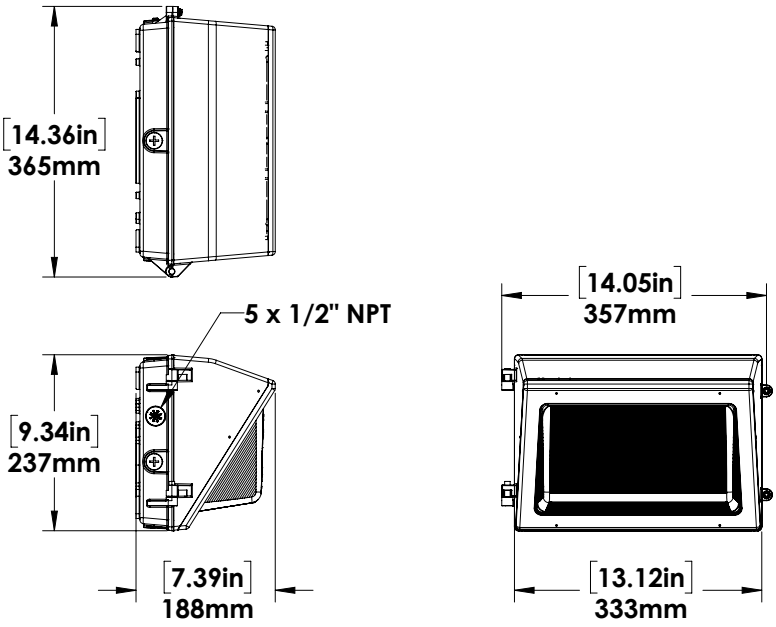
Standard Fixtures	Weight (lbs)
WP-LED40	7.8
WP-LED80	8.4
WP-LED80A40	8.4
WP-LED120	9.2

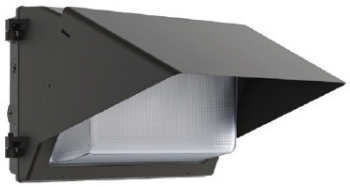
AMPERAGE DRAW & SURGE PROTECTION							
	Current (A)					Surge Protection (kV)	
	120V	208V	240V	277V	347V	120-277V	120-347V
WP-LED40	0.35A	0.21A	0.18A	0.16A	0.14A	2kV	2kV
WP-LED80	0.7A	0.41A	0.35A	0.31A		4kV	
WP-LED80A40	0.7A	0.41A	0.35A	0.31A	0.25A		4kV
WP-LED120	1.05A	0.61A	0.53A	0.46A	0.37A		6kV

LUMEN MAINTENANCE			
	50,000 Hours	75,000 Hours	100,000 Hours
WP-LED40	90%	86%	81%
WP-LED80	90%	86%	81%
WP-LED80A40	90%	86%	81%
WP-LED120	90%	86%	81%

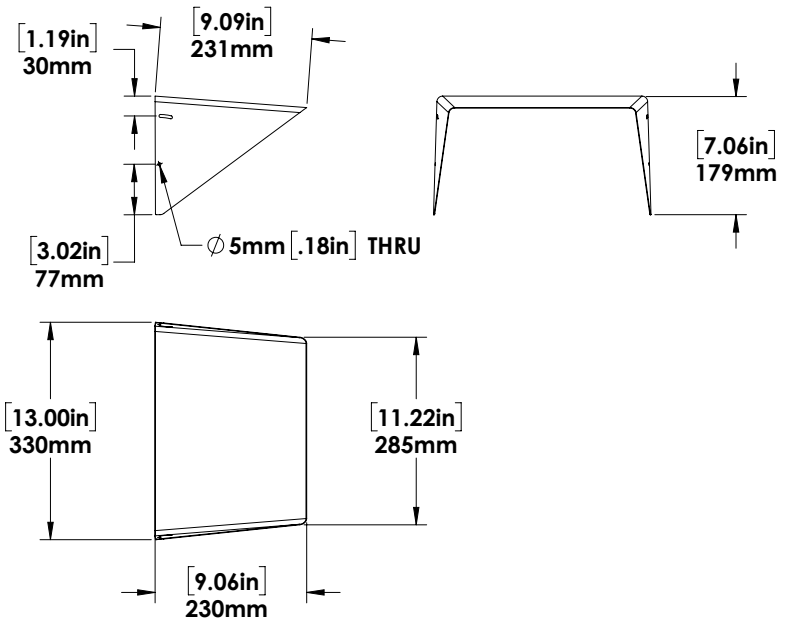
DIMENSIONS:

WP-LED



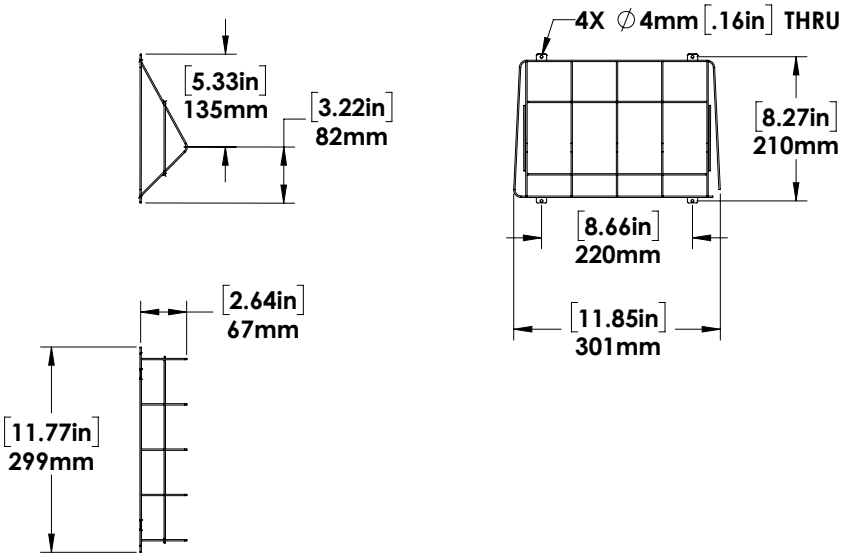


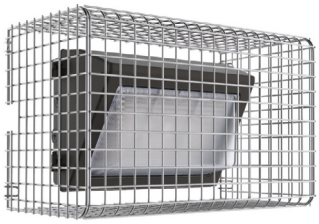
VISOR



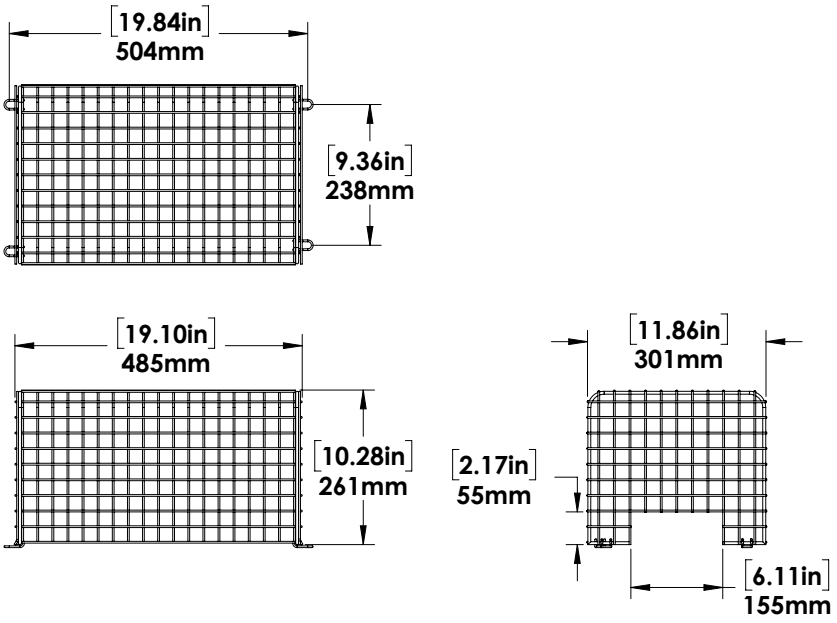
DIMENSIONS:

WIRE GUARD





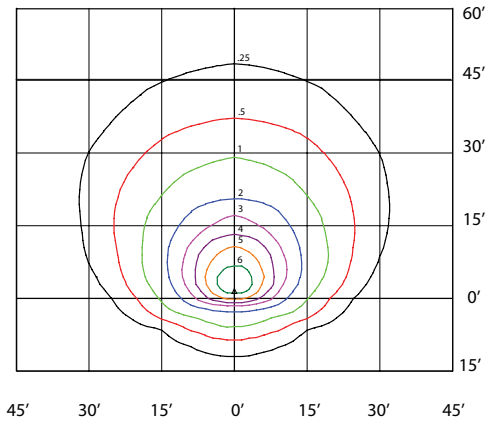
WIRE CAGE



PHOTOMETRICS:

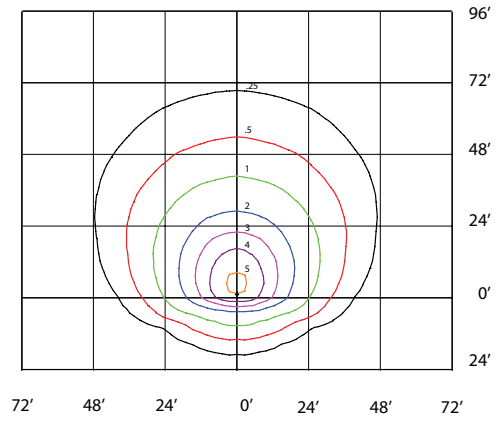
WP-LED40-B-4K-DIM
MOUNTED AT 15 FEET

Total Lumens = 5712 Mounting Height = 15.00 Ft Maximum Calculated Value = 6.80 Fc



WP-LED80-B-4K-DIM
MOUNTED AT 24 FEET

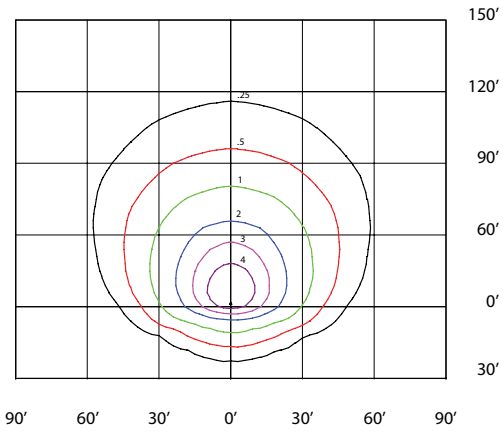
Total Lumens = 11751 Mounting Height = 24.00 Ft Maximum Calculated Value = 5.19 Fc



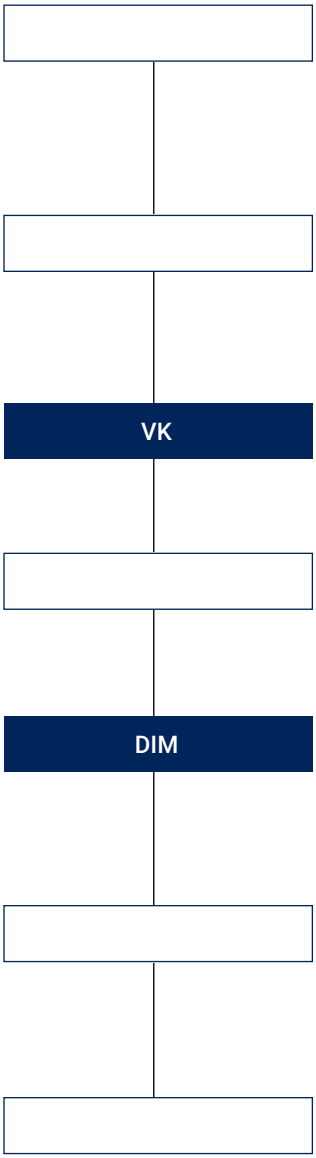
PHOTOMETRICS:

WP-LED120-B-4K-DIM
MOUNTED AT 30 FEET

Total Lumens = 17344 Mounting Height = 30.00 Ft Maximum Calculated Value = 4.96 Fc



ORDERING GUIDE:



Wattage:
WP-LED40 - 40 Watts
WP-LED80 - 80 Watts
WP-LED80A40 - 5 adjustable power settings of 80W, 70W, 60W, 50W, 40W
WP-LED120 - 120 Watts

If you require 347V in 80W, select the WP-LED80A40 unit.

Voltage:
B-120-277V (for WP-LED40, WP-LED80, or see **Note**)
H - 120-347V (for WP-LED40, WP-LED80A40, WP-LED120)
C - 347V (See **Note**)

Note: When ordering WP-LED40, WP-LED80A40 or WP-LED120 with photocell, sensor or surge protector, fill "B" in the voltage field if input voltage is 120-277V or "C" **instead of H** when input voltage is 347V.

Colour Temperature:
VK- Selectable CCT 3K, 4K, 5K

Paint Finish:
BRZ - Bronze
CC - Custom Colours

Dimming:
DIM - 0-10V

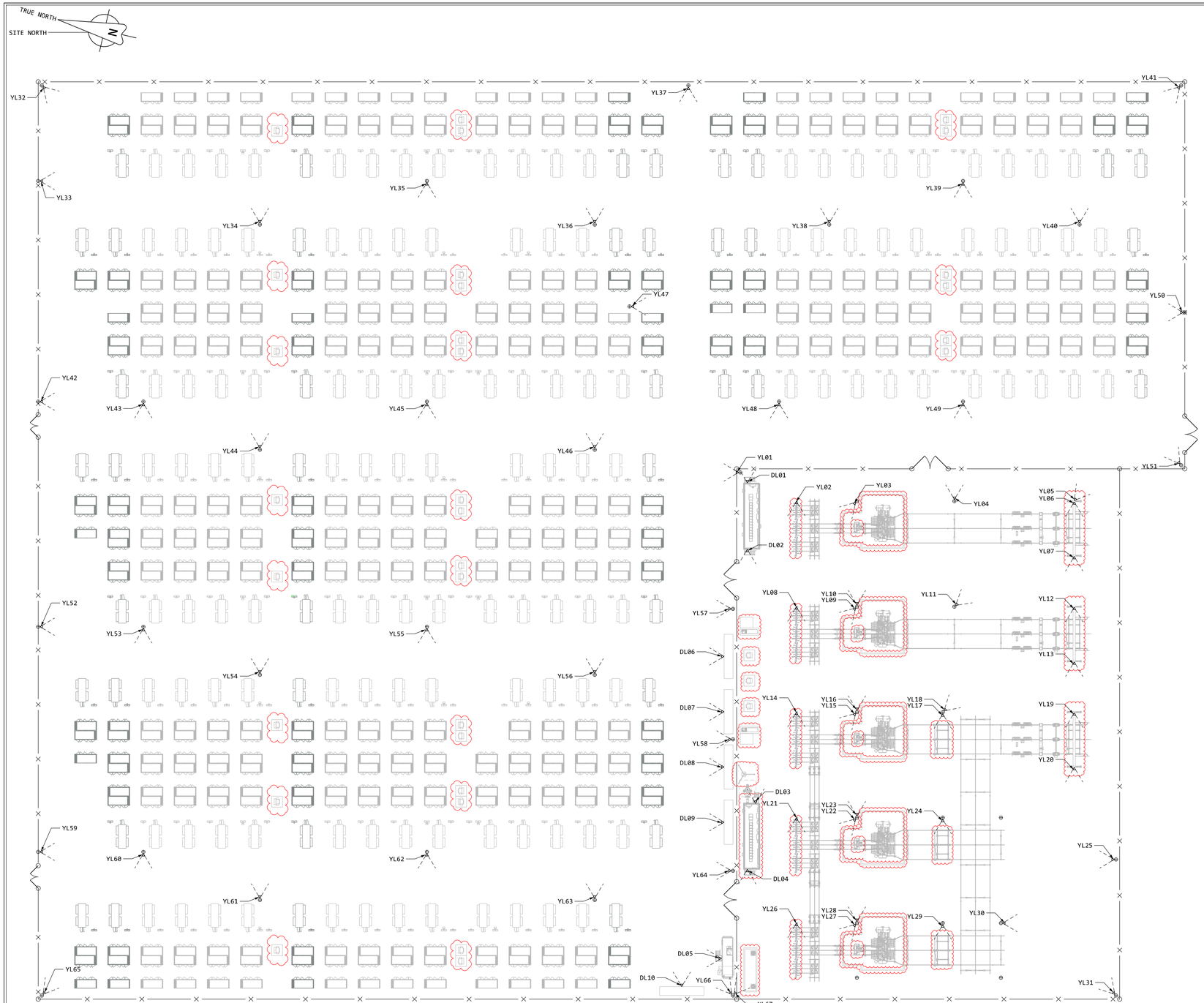
Controls:
(Compatible with 120-277V or 347V)
PC - Photocontrol
DMS - Dimming Motion Sensor
SMS - On/Off Motion Sensor

Add Ons:
(Compatible with 120-277V or 347V)
SP10 - 10Kv Surge Protector

Ordering Guide For Accessories
Check the items that you wish to order:

- ☐ 080731 - WP-LED CUTOFF VISOR BRZ
- ☐ 080732 - WP-LED WIRE GUARD
- ☐ 098710 - WP WIRE CAGE CHROME PLATED STEEL

Appendix D: Lighting Layout Drawing SKY_BESS-E-DWG-05401-1-A



LEGEND

- YARD LIGHT DIRECTION
- LIGHT POLE
- LIGHTNING SPIRE
- BACKGROUND DETAILS
- FUTURE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. REFER TO DRAWINGS [05419] & [05420] FOR YARD LIGHT DETAILS.
3. REFER TO THE SKYVIEW BESS LIGHTING STUDY FOR ILLUMINATION LEVELS.

LIGHTING SCHEDULE

LIGHT #	ITEM #	DESCRIPTION	MANUFACTURER	PART NUMBER	MOUNTING HEIGHT(m)	ORIENTATION (deg)	TILT (deg)
YL01	122	SOLID STATE LED FLOODLIGHT, 120-277 VAC,156W,4000K, CRI 90, MEDIUM BEAM, GREY FINISH	NEMALUX	XR20-40H-T3-GY-GN-AC	9	270	0
YL02					9	180	45
YL03					9	225	45
YL04					9	0	0
YL05					9	45	0
YL06					8	180	45
YL07					9	180	0
YL08					9	180	45
YL09					9	225	45
YL10					9	0	0
YL11					9	45	0
YL12					8	180	45
YL13					9	180	0
YL14					9	180	45
YL15					9	225	45
YL16					9	0	0
YL17					11	180	45
YL18					9	45	0
YL19					8	180	45
YL20					9	180	0
YL21					9	180	45
YL22					9	225	45
YL23					9	0	0
YL24					11	180	45
YL25					9	270	0
YL26					9	180	45
YL27					9	225	45
YL28					9	0	0
YL29					11	180	45
YL30					9	90	0
YL31					9	315	0
YL33					9	90	0
YL34					9	0	0
YL35					9	180	0
YL36					9	0	0
YL37					9	180	0
YL38					9	0	0
YL39					9	180	0
YL40					9	0	0
YL41					9	225	0
YL42					9	90	0
YL43					9	180	0
YL44					9	0	0
YL45					9	180	0
YL46					9	0	0
YL47					9	90	0
YL48					9	180	0
YL49					9	180	0
YL50					9	270	0
YL51					9	315	0
YL52					9	90	0
YL53					9	180	0
YL54					9	0	0
YL55					9	180	0
YL56					9	0	0
YL57					9	270	0
YL58					9	270	0
YL59					9	90	0
YL60					9	180	0
YL61					9	0	0
YL62					9	180	0
YL63					9	0	0
YL64					9	270	0
YL65					9	45	0
YL66					9	315	0
YL67					9	45	0
DL01	VENDOR SUPPLIED	EXTERIOR LED WALL LIGHT, 120 -277 VAC,41W, 4000k, CRI >80, BRONZE FINISH	SUPPLIED BY BUILDING VENDOR	WP-LED40-B-VK-BRZ-DIM-PC	ABOVE DOOR	0	0
DL02						180	0
DL03						0	0
DL04						180	0
DL05						270	0
DL06						270	0
DL07						270	0
DL08						270	0
DL09						270	0
DL10						0	0

STAMP:

PERMIT:

NOT FOR CONSTRUCTION

PRELIMINARY DRAWING

REV	DATE	REVISION DESCRIPTION	DRN	DES	CHK	APP
A	2025-07-16	ISSUED FOR 60% REVIEW - MHV #2518731.00	KG	KG	RP	RP

DRAWN: K GERDIS
DESIGNED: K GERDIS
CHECKED: R PATEL
APPROVED: R PATEL
DATE: 2025-07-16

Potentia

Barton Malow CANADA

PREPARED BY: MASKWA HIGH VOLTAGE — An ENTRUST Solutions Group Company

LOCATION: SKYVIEW BATTERY ENERGY STORAGE SYSTEM

TITLE: LIGHTING SCHEDULE
230/34.5kV SUBSTATION AND 411MW BESS FACILITY

SCALE: 1:600

SHEET: 1 OF 1

REVISION #: A

DRAWING #: SKY_BESS-E-DWG-05401-1-A