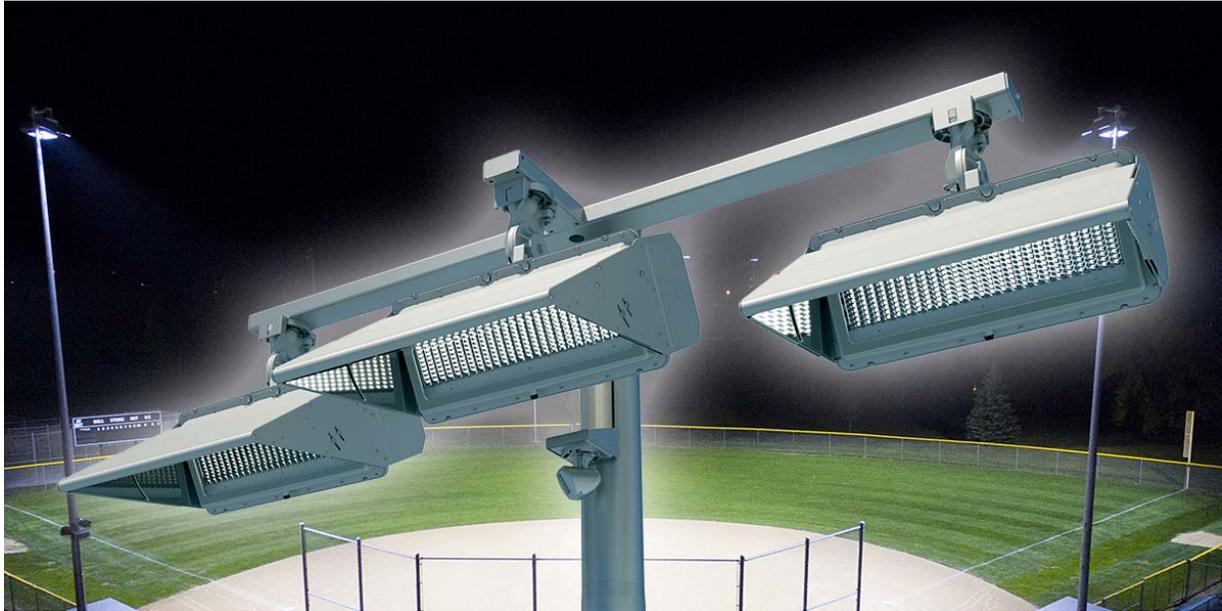


TLC for LED® - Total Light Control



For nearly a decade, Musco has been testing the Light Emitting Diode (LED) light source and applying it in projects in which it was the best option. While LED saved energy, for a typical recreational facility the hours of operation weren't great enough to offset the higher cost.

With our Total Light Control—TLC for LED® technology, we've paired our expertise in light control with the advancing output of LED to the point where it's a cost-effective option for recreational facilities.

The result is a system that makes Musco's great lighting even better.

Better for Players... who want to perform their best and be able to track the entire flight of the ball.

Better for Neighbors... who don't want glare in or around their homes or lights left on when not in use.

Better for the Night Sky... with bright, uniform light directed onto the field and not spilling above it.



Trojan Park - 2016 NRPA Parks Build Community



LoConte Family Field - Clemson University

Burr Jones Park

Madison, WI

Lighting System

| Pole / Fixture Summary | | | | | | |
|------------------------|-------------|------------|-------------|----------------|-----------------|---------|
| Pole ID | Pole Height | Mtg Height | Fixture Qty | Luminaire Type | Load | Circuit |
| S1, S3-S4, S6 | 70' | 70' | 4 | TLC-LED-1150 | 4.60 kW | A |
| S2, S5 | 70' | 70' | 6 | TLC-LED-1150 | 6.90 kW | A |
| 6 | | | 28 | | 32.20 kW | |

| Circuit Summary | | | |
|-----------------|-------------|---------|-------------|
| Circuit | Description | Load | Fixture Qty |
| A | Soccer | 32.2 kW | 28 |

| Fixture Type Summary | | | | | | | |
|----------------------|--------------------|---------|---------|---------|---------|---------|----------|
| Type | Source | Wattage | Lumens | L90 | L80 | L70 | Quantity |
| TLC-LED-1150 | LED 5700K - 75 CRI | 1150W | 121,000 | >81,000 | >81,000 | >81,000 | 28 |

Light Level Summary

| Calculation Grid Summary | | | | | | | | |
|--------------------------|------------------------|--------------|-----|------|-------------|---------|----------|-------------|
| Grid Name | Calculation Metric | Illumination | | | | | Circuits | Fixture Qty |
| | | Ave | Min | Max | Max/Min | Ave/Min | | |
| Blanket Grid | Horizontal | 8.80 | 0 | 46 | 19023500.00 | | A | 28 |
| Property Line | Horizontal | 0.15 | 0 | 0.44 | 9447.37 | | A | 28 |
| Soccer | Horizontal Illuminance | 33.5 | 24 | 42 | 1.77 | 1.40 | A | 28 |
| Ultimate Field 1 | Horizontal Illuminance | 33.5 | 25 | 42 | 1.70 | 1.34 | A | 28 |
| Ultimate Field 2 | Horizontal Illuminance | 33.4 | 22 | 41 | 1.85 | 1.52 | A | 28 |

From Hometown to Professional



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EQUIPMENT LIST FOR AREAS SHOWN

| Pole | | | | Luminaires | | | | |
|------|-----------------|------|-----------------|-----------------|----------------|------------|-----------|-------------|
| QTY | LOCATION | SIZE | GRADE ELEVATION | MOUNTING HEIGHT | LUMINAIRE TYPE | QTY / POLE | THIS GRID | OTHER GRIDS |
| 4 | S1, S3-S4 S6 | 70' | - | 70' | TLC-LED-1150 | 4 | 4 | 0 |
| 2 | S2, S5 | 70' | - | 70' | TLC-LED-1150 | 6 | 6 | 0 |
| 6 | TOTALS | | | | | 28 | 28 | 0 |

Burr Jones Park

Madison, WI

GRID SUMMARY

Name: Soccer
Size: 330' x 210'
Spacing: 30.0' x 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

| Entire Grid | |
|------------------------------|------------|
| Guaranteed Average: | 30 |
| Scan Average: | 33.54 |
| Maximum: | 42 |
| Minimum: | 24 |
| Avg / Min: | 1.40 |
| Guaranteed Max / Min: | 2.5 |
| Max / Min: | 1.77 |
| UG (adjacent pts): | 1.44 |
| CU: | 0.69 |
| No. of Points: | 77 |

LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI
Luminaire Output: 121,000 lumens
No. of Luminaires: 28
Total Load: 32.2 kW

| Luminaire Type | Lumen Maintenance | | |
|----------------|-------------------|---------|---------|
| | L90 hrs | L80 hrs | L70 hrs |
| TLC-LED-1150 | >81,000 | >81,000 | >81,000 |

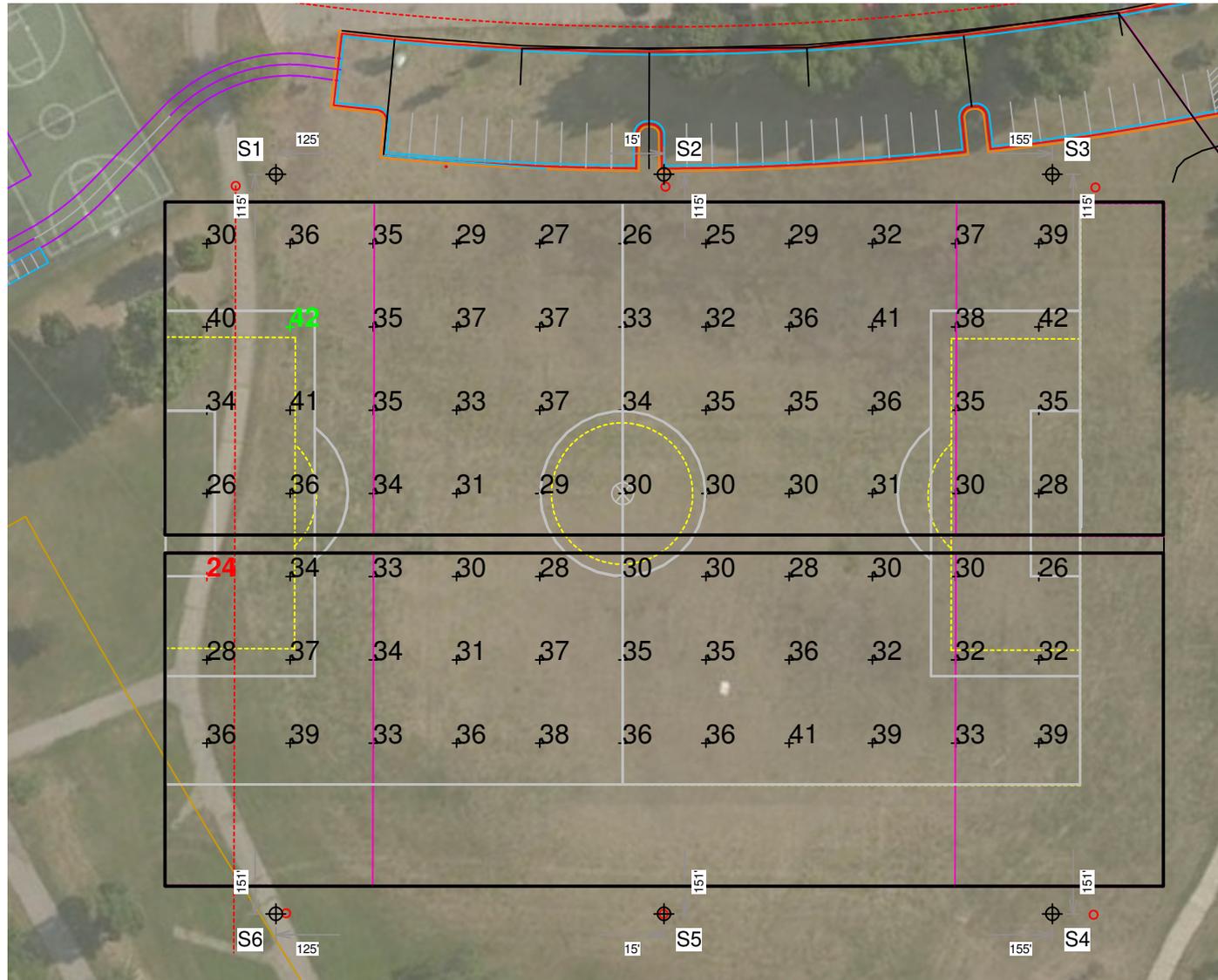
Reported per TM-21-11. See luminaire datasheet for details.

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



SCALE IN FEET 1 : 60



Pole location(s) Ⓧ dimensions are relative to 0,0 reference point(s) ⊗



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EQUIPMENT LIST FOR AREAS SHOWN

| Pole | | | | Luminaires | | | | |
|------|-----------------|------|-----------------|-----------------|----------------|------------|-----------|-------------|
| QTY | LOCATION | SIZE | GRADE ELEVATION | MOUNTING HEIGHT | LUMINAIRE TYPE | QTY / POLE | THIS GRID | OTHER GRIDS |
| 4 | S1, S3-S4 S6 | 70' | - | 70' | TLC-LED-1150 | 4 | 4 | 0 |
| 2 | S2, S5 | 70' | - | 70' | TLC-LED-1150 | 6 | 6 | 0 |
| 6 | TOTALS | | | | | 28 | 28 | 0 |

Burr Jones Park

Madison, WI

GRID SUMMARY

Name: Ultimate Field 1
Size: 360' x 120'
Spacing: 30.0' x 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

| Entire Grid | |
|------------------------------|------------|
| Guaranteed Average: | 30 |
| Scan Average: | 33.54 |
| Maximum: | 42 |
| Minimum: | 25 |
| Avg / Min: | 1.34 |
| Guaranteed Max / Min: | 2.5 |
| Max / Min: | 1.70 |
| UG (adjacent pts): | 1.38 |
| CU: | 0.43 |
| No. of Points: | 48 |

LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI
Luminaire Output: 121,000 lumens
No. of Luminaires: 28
Total Load: 32.2 kW

| Luminaire Type | Lumen Maintenance | | |
|----------------|-------------------|---------|---------|
| | L90 hrs | L80 hrs | L70 hrs |
| TLC-LED-1150 | >81,000 | >81,000 | >81,000 |

Reported per TM-21-11. See luminaire datasheet for details.

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



Pole location(s) Ⓢ dimensions are relative to 0,0 reference point(s) ⊗



We Make It Happen.

EQUIPMENT LIST FOR AREAS SHOWN

| Pole | | | | Luminaires | | | | |
|------|-----------------|------|-----------------|-----------------|----------------|------------|-----------|-------------|
| QTY | LOCATION | SIZE | GRADE ELEVATION | MOUNTING HEIGHT | LUMINAIRE TYPE | QTY / POLE | THIS GRID | OTHER GRIDS |
| 4 | S1, S3-S4 S6 | 70' | - | 70' | TLC-LED-1150 | 4 | 4 | 0 |
| 2 | S2, S5 | 70' | - | 70' | TLC-LED-1150 | 6 | 6 | 0 |
| 6 | TOTALS | | | | | 28 | 28 | 0 |

Burr Jones Park

Madison, WI

GRID SUMMARY

Name: Ultimate Field 2
Size: 360' x 120'
Spacing: 30.0' x 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

| Entire Grid | |
|------------------------------|------------|
| Guaranteed Average: | 30 |
| Scan Average: | 33.38 |
| Maximum: | 41 |
| Minimum: | 22 |
| Avg / Min: | 1.51 |
| Guaranteed Max / Min: | 2.5 |
| Max / Min: | 1.85 |
| UG (adjacent pts): | 1.43 |
| CU: | 0.43 |
| No. of Points: | 48 |

LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI
Luminaire Output: 121,000 lumens
No. of Luminaires: 28
Total Load: 32.2 kW

| Luminaire Type | Lumen Maintenance | | |
|----------------|-------------------|---------|---------|
| | L90 hrs | L80 hrs | L70 hrs |
| TLC-LED-1150 | >81,000 | >81,000 | >81,000 |

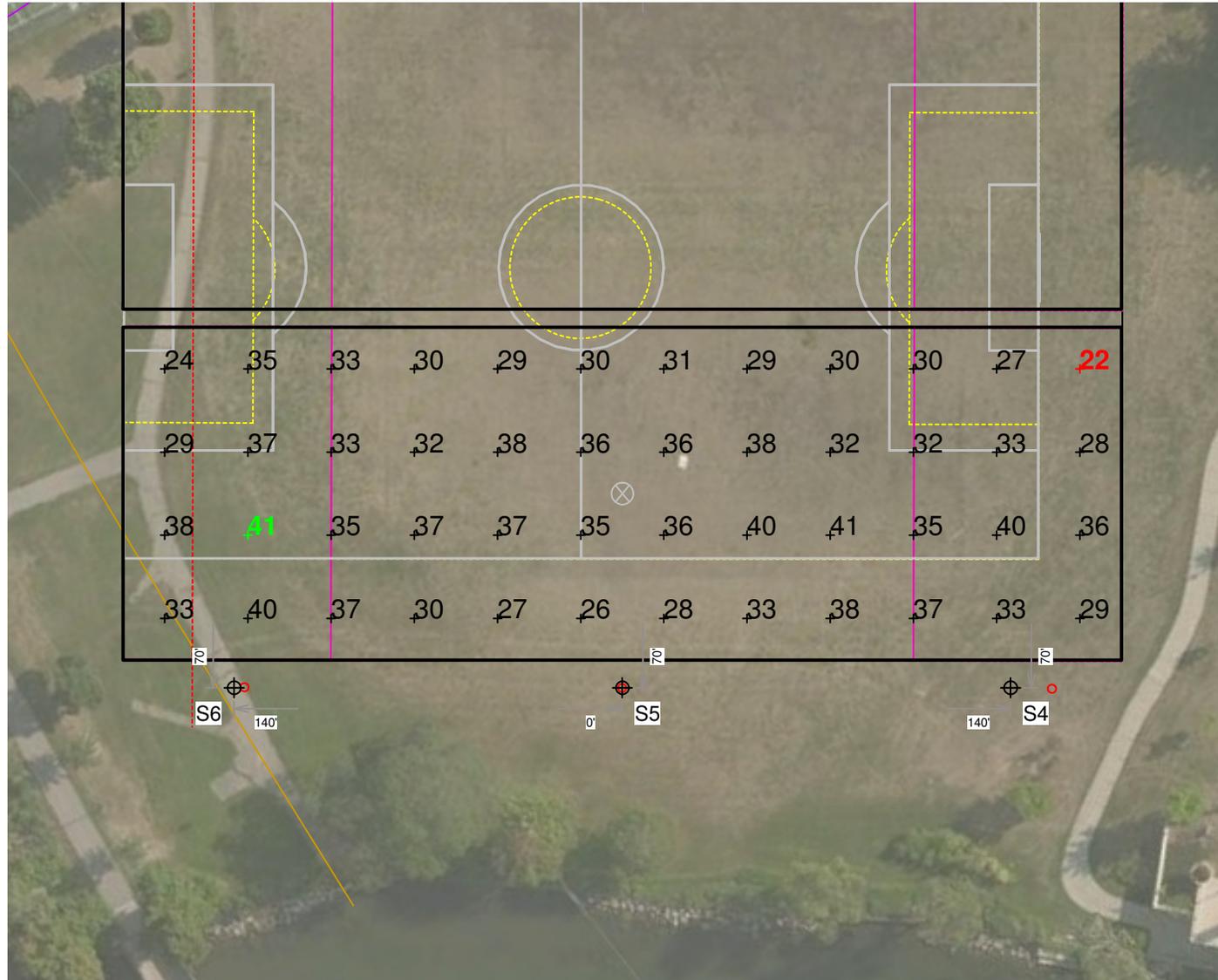
Reported per TM-21-11. See luminaire datasheet for details.

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN

| Pole | | | | Luminaires | | | | |
|--------|-----------------|------|-----------------|-----------------|----------------|------------|-----------|-------------|
| QTY | LOCATION | SIZE | GRADE ELEVATION | MOUNTING HEIGHT | LUMINAIRE TYPE | QTY / POLE | THIS GRID | OTHER GRIDS |
| 4 | S1, S3-S4 S6 | 70' | - | 70' | TLC-LED-1150 | 4 | 4 | 0 |
| 2 | S2, S5 | 70' | - | 70' | TLC-LED-1150 | 6 | 6 | 0 |
| TOTALS | | | | | | 28 | 28 | 0 |

Burr Jones Park

Madison, WI

GRID SUMMARY

Name: Blanket Grid
Spacing: 30.0' x 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

Entire Grid
Scan Average: 8.80
 Maximum: 46
 Minimum: 0
 No. of Points: 425

LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI
 Luminaire Output: 121,000 lumens
No. of Luminaires: 28
 Total Load: 32.2 kW

Lumen Maintenance

| Luminaire Type | L90 hrs | L80 hrs | L70 hrs |
|----------------|---------|---------|---------|
| TLC-LED-1150 | >81,000 | >81,000 | >81,000 |

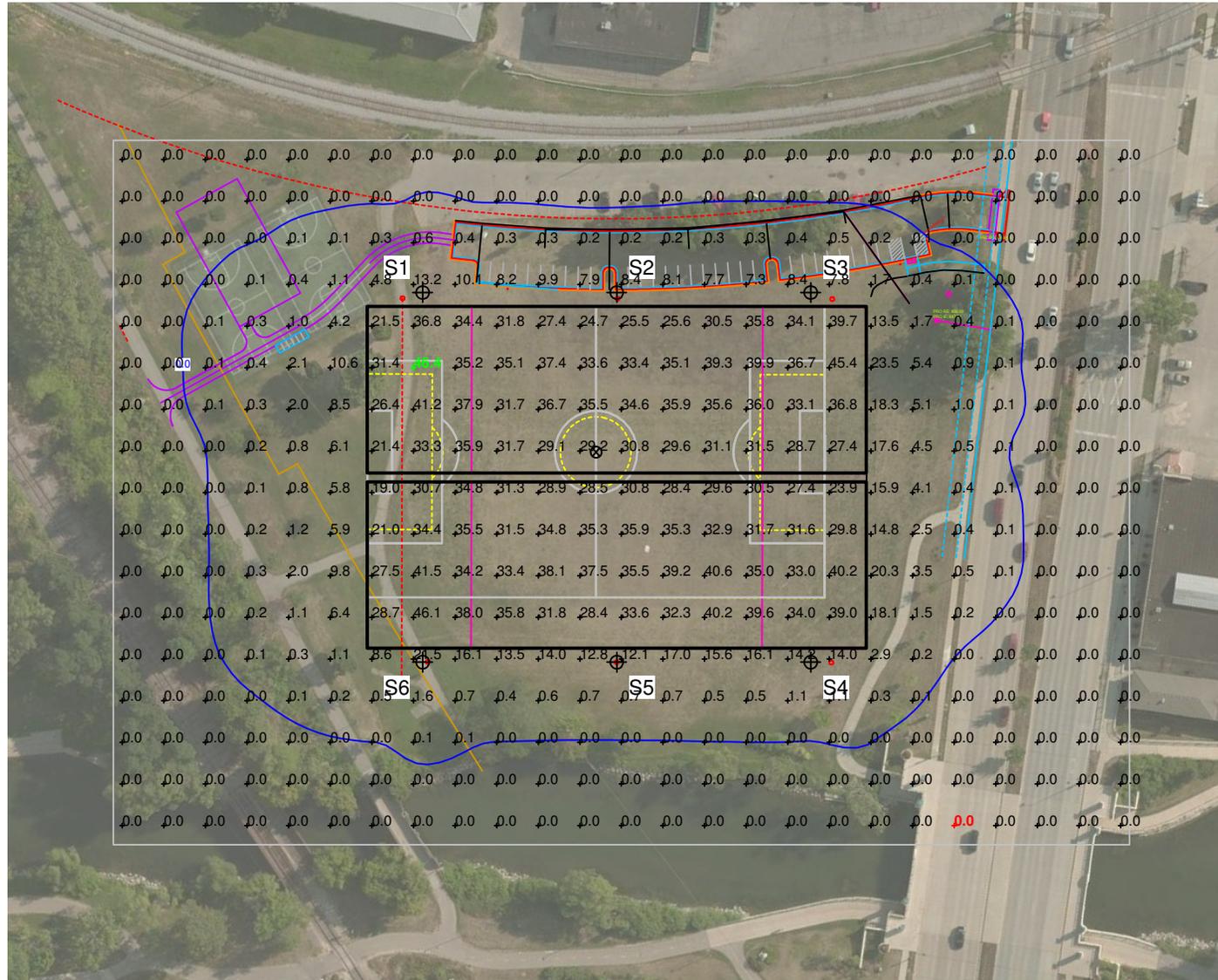
Reported per TM-21-11. See luminaire datasheet for details.

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



SCALE IN FEET 1 : 120



Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

ENGINEERED DESIGN By: Connor Ramstead • File #191142CR1 • 07-Jan-19



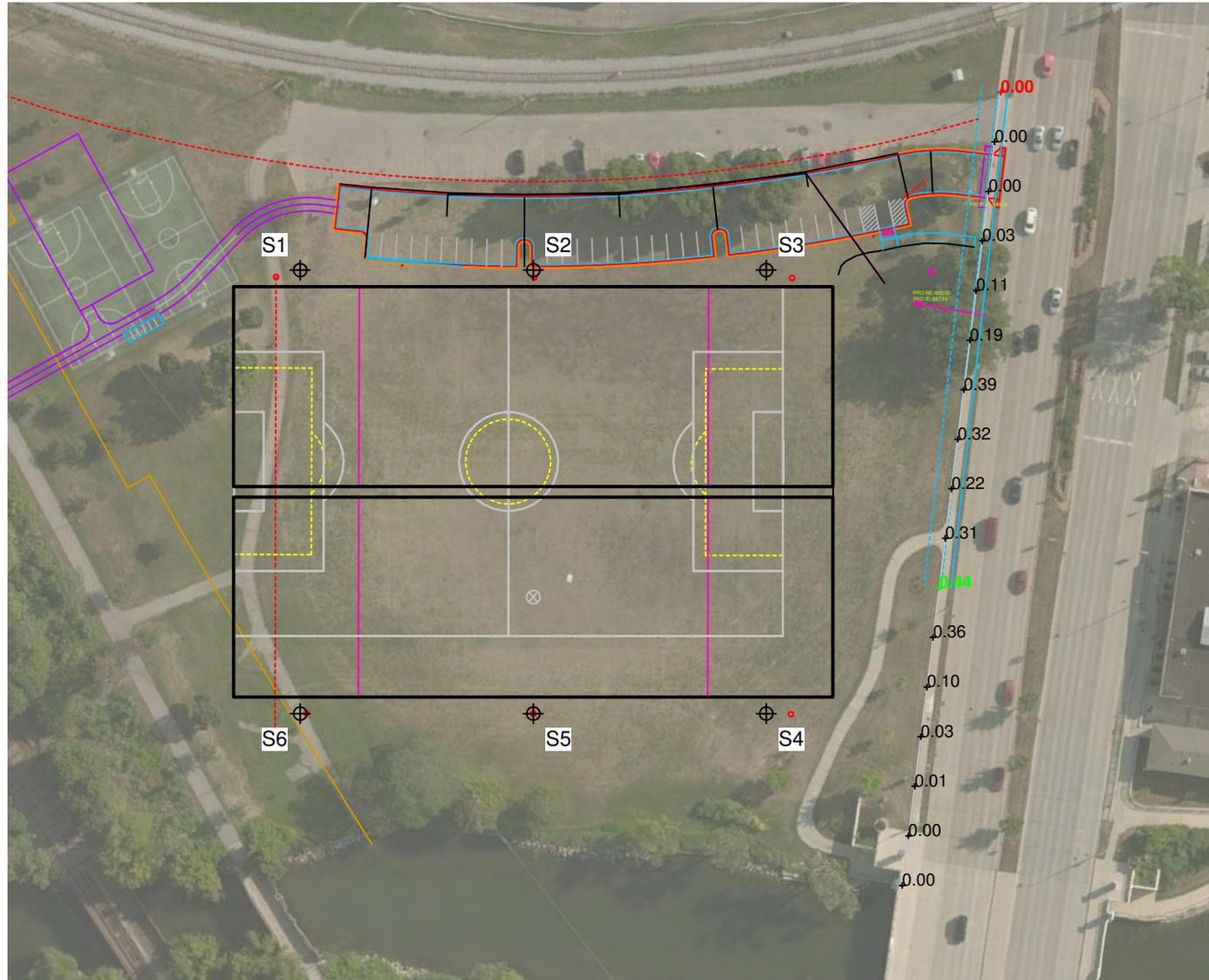
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ILLUMINATION SUMMARY

EQUIPMENT LIST FOR AREAS SHOWN

| Pole | | | | Luminaires | | | | |
|------|-----------------|------|-----------------|-----------------|----------------|------------|-----------|-------------|
| QTY | LOCATION | SIZE | GRADE ELEVATION | MOUNTING HEIGHT | LUMINAIRE TYPE | QTY / POLE | THIS GRID | OTHER GRIDS |
| 4 | S1, S3-S4 S6 | 70' | - | 70' | TLC-LED-1150 | 4 | 4 | 0 |
| 2 | S2, S5 | 70' | - | 70' | TLC-LED-1150 | 6 | 6 | 0 |
| 6 | TOTALS | | | | | 28 | 28 | 0 |



Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

Burr Jones Park

Madison, WI

GRID SUMMARY

Name: Property Line
Spacing: 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

Scan Average: 0.1476
Maximum: 0.44
Minimum: 0.00
No. of Points: 17

LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI
Luminaire Output: 121,000 lumens
No. of Luminaires: 28
Total Load: 32.2 kW

| Luminaire Type | Lumen Maintenance | | |
|----------------|-------------------|---------|---------|
| | L90 hrs | L80 hrs | L70 hrs |
| TLC-LED-1150 | >81,000 | >81,000 | >81,000 |

Reported per TM-21-11. See luminaire datasheet for details.

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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Burr Jones Park

Madison, WI

EQUIPMENT LAYOUT

INCLUDES:

- Soccer
- Ultimate Field 1
- Ultimate Field 2

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

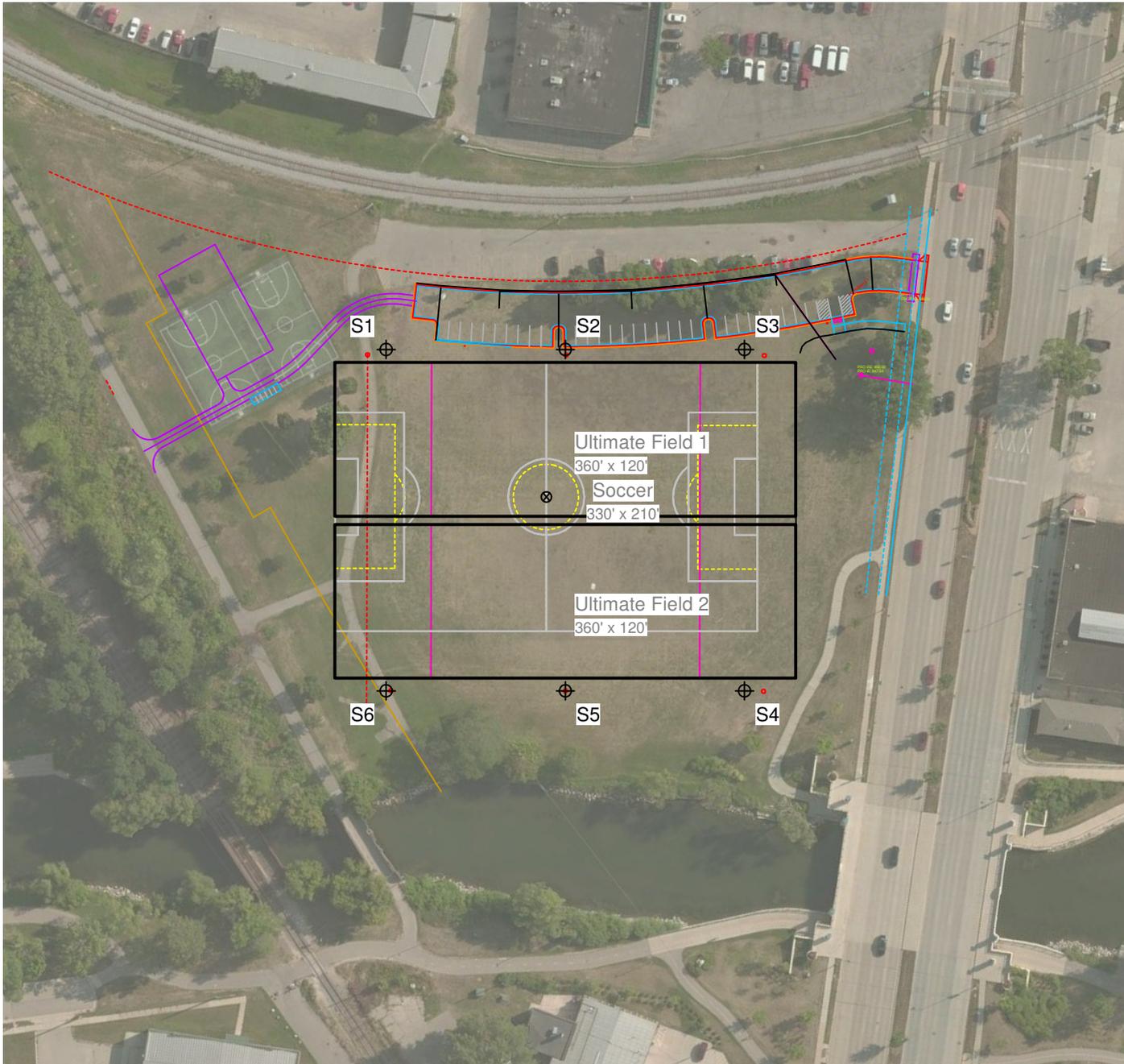
Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

| QTY | LOCATION | Pole | | Luminaires | | |
|-----|-----------------|------|-----------------|-----------------|----------------|------------|
| | | SIZE | GRADE ELEVATION | MOUNTING HEIGHT | LUMINAIRE TYPE | QTY / POLE |
| 4 | S1, S3-S4 S6 | 70' | - | 70' | TLC-LED-1150 | 4 |
| 2 | S2, S5 | 70' | - | 70' | TLC-LED-1150 | 6 |
| 6 | TOTALS | | | | | 28 |

SINGLE LUMINAIRE AMPERAGE DRAW CHART

| Ballast Specifications (.90 min power factor) | Line Amperage Per Luminaire (max draw) | | | | | | |
|--|---|-------------|-------------|-------------|-------------|-------------|-------------|
| | 208 (60) | 220 (60) | 240 (60) | 277 (60) | 347 (60) | 380 (60) | 480 (60) |
| Single Phase Voltage | 208 (60) | 220 (60) | 240 (60) | 277 (60) | 347 (60) | 380 (60) | 480 (60) |
| TLC-LED-1150 | 6.8 | 6.5 | 5.9 | 5.1 | 4.1 | 3.7 | 3.0 |



SCALE IN FEET 1 : 120



Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗



We Make It Happen.

Burr Jones Park

Madison, WI

GLARE IMPACT

Summary

Map indicates the maximum candela an observer would see when facing the brightest light source from any direction.

A well-designed lighting system controls light to provide maximum useful on-field illumination with minimal destructive off-site glare.

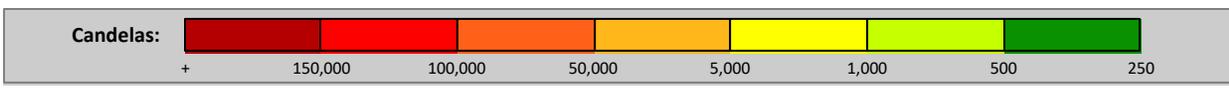
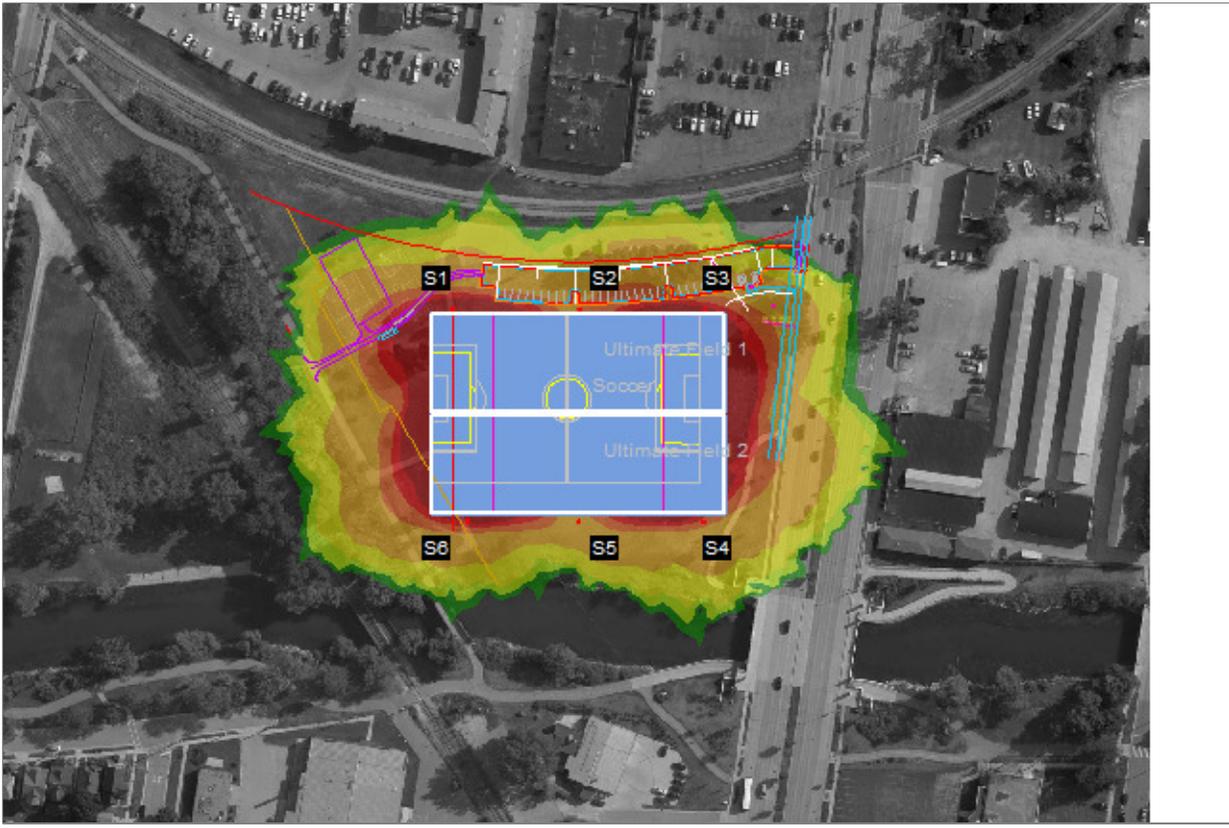
GLARE

Candela Levels

High Glare: 150,000 or more candela
Should only occur on or very near the lit area where the light source is in direct view. Care must be taken to minimize high glare zones.

Significant Glare: 25,000 to 75,000 candela
Equivalent to high beam headlights of a car.

Minimal to No Glare: 500 or less candela
Equivalent to 100W incandescent light bulb.



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