

**MINUTES
SPECIAL MEETING
JENKS CITY COUNCIL
TUESDAY, JUNE 27, 6:00 P.M.
JENKS CITY HALL, 211 NORTH ELM**

The Agenda for the Jenks City Council was posted on the City's website at 4:56 p.m. on June 23, 2023. The meeting was called to order at 6:00 p.m. on the above date with Mayor Cory Box presiding at Jenks City Hall.

A roll call vote of members was taken as follows:

Craig Murray	Present
Rodney Cline	Present
Kevin Short	Present
Donna Ogez	Present
Jere Schelling	Present
Gary Isbell	Present
Mayor Cory Box	Present

Invocation was given by Pastor Josh Krebs

Pledge of Allegiance was given

Animal Welfare Spotlight None

Citizen Comments Steve Eaton (307 E 111th St)

Business

Official action can only be taken on items which appear on the agenda. The City Council may adopt, approve, ratify, deny, defer, recommend, amend, strike, or continue any agenda item (except for Item 1).

1. Consideration and appropriate action relating to a request for approval of the Consent Agenda. (All matters listed under "Consent" are considered by the City Council to be routine and will be enacted by one motion. Any Councilor may, however, remove an item from the Consent Agenda by request. A motion to adopt the Consent Agenda is non-debatable.)
 - A. Approve minutes of the regular meeting held on June 06, 2023
 - B. Approve Encumbrances and Expenditures
 - C. Monthly Reports
 - D. Reappoint Phil Frasier as Presiding Municipal Court through June 30, 2025 and approve judicial services agreement.
 - E. Reappoint Sharon Phillips as Alternate Municipal Court through June 30, 2025 and approve judicial services agreement.
 - F. JZ 23 PUD 128.m1 – minor amendment to Estates at Ritz Hollow for a lot line adjustment

- G. Approve Final Plat Amended for Estates at Ritz Hollow
- H. Approve Plat Amendment for South County Crossing. General Location: N of 121st St, between Elwood and Elm
- I. Approve request by the Jenks Public Schools Foundation to use Jenks streets for the Hometown Huddle from 3:00 p.m. until 8:30 p.m. on September 29, 2023. [Luttrell]
- J. Approve request by the Jenks Chamber of Commerce to use Jenks streets for the Party in the Park from 4:00 p.m. until 11:00 p.m. on September 22, 2023.
- K. Approve request by the Jenks Athletic Department to use Jenks streets for Varsity home football games from 6:00 p.m. until 11:30 p.m. on the following dates: 8/18/23, 8/25/23, 9/8/23, 10/13/23, 11/3/23, 11/10/23.
- L. Approve request by Erin Dory to use Jenks streets for the Battle for the Republic event from 2:00 p.m. on July 07, 2023, until 1:00 a.m. on July 08, 2023.

Kevin Short made a motion to approve Item 1. Donna Ogez seconded the motion. A roll call vote of members was taken as follow:

Craig Murray	Yes
Rodney Cline	Yes
Kevin Short	Yes
Donna Ogez	Yes
Jere Schelling	Yes
Gary Isbell	Yes
Mayor Cory Box	Yes

Motion Carried.

- 2. Consideration and appropriate action relating to items removed from the Consent Agenda.
Withdrawn

- 3. Ordinance No. 1617, related to PUD 23 142: a request by Lou Reynolds for a Planned Unit Development to allow for outdoor entertainment, General, on AG (Agriculture) zoned land [Hilton] Planning Director Marcaé Hilton introduced Item 3. Lou Reynolds (2727 E 21st St, Tulsa, OK), presented the application to the Council. Rico Velazquez (Musco Lighting) and Gene Philips were brought by the applicant as lighting and floodplain experts. *Rico Velazquez provided a packet for Council. This Packet is attached to the end of the minutes.* All three answered questions from the Council. The following individuals gave public comments on this Item:

- Jennifer Wiseman (10610 S Gum St)
- Sam Mather (11902 S Juniper St)
- Allen Robinson (10614 S Forest)
- Stephen Murphy (10615 S Fir St)
- Linda Eaton (307 E 111th St)
- Justin Little (10531 S Koa St)

City Council took recess at 8:11 p.m. and returned at 8:24 p.m.

- Kelly Dunkerley (11310 S 4th St)
- Shannon Wilburn (2224 W 111th St)
- Brad Lenhart (777 W 106th St)

- Tim Batson (12305 S Ash)
- Burns Getchell (10503 S Koa St)
- Roddy Roberts (702 W 108th St)
- Catrena Thomas (115 W “A” St)
- Catherine Lenhart (777 W 106th St)
- Helen Clark (721 W 108th Pl)
- John Dorman (9400 S Broadway Ext, Suite 600, Oklahoma City, OK)
- Hilary Green (3738 S Xanthus Ave, Tulsa, OK)

City Attorney Teresa Nowlin and City Manager Christopher Shrout answered questions. Lou Reynolds spoke again to address some of the questions raised by the commentors. Gary Isbell made a motion to approve Item 3 adding the 80’ limit for light poles. Donna Ogez seconded the motion. A roll call vote of members was taken as follow:

Craig Murray	Yes
Rodney Cline	Yes
Kevin Short	Yes
Donna Ogez	Yes
Jere Schelling	Yes
Gary Isbell	Yes
Mayor Cory Box	Yes

Motion Carried.

4. Emergency Clause for Ordinance No. 1617, making it effective immediately upon passage since the immediate operation of the provisions of the Ordinance is necessary for the preservation of public health, welfare and safety. Gary Isbell made a motion to approve Item 4. Rodney Cline seconded to the motion. A roll call vote of members was taken as follow:

Craig Murray	No
Rodney Cline	No
Kevin Short	No
Donna Ogez	No
Jere Schelling	No
Gary Isbell	No
Mayor Cory Box	No

Motion failed

5. PA 23-27: Request for a Comprehensive Land Use Map amendment to amend the map from Parks and Open Space to Regional Commercial. General Location: N of 106th and E of Elm. Planning Director Marcaé Hilton introduced Item 5 and gave a recommendation to change the Comprehensive Plan Land Use Map to Local Commercial. The following individuals gave public comments on this Item:

- Catherine Lenhart (777 W 106th St)
- Justin Little (10531 S Koa St)
- Stephen Murphy (10615 S Fir St)
- Steve Eaton (307 E 111th St)

Donna Ogez made a motion to approve Item 5 per staff recommendation. Kevin Short seconded the motion. A roll call vote of members was taken as follow:

Craig Murray	Yes
Rodney Cline	Yes
Kevin Short	Yes
Donna Ogez	Yes
Jere Schelling	Yes
Gary Isbell	Yes
Mayor Cory Box	Yes

Motion Carried.

6. Potential Executive Session for the purpose of discussing the possible purchase and appraisal of real property. 25 O.S. §307(B)(3) (Waco Ave. and 120th St between Union and Yukon). Craig Murray made a motion to enter Executive Session, Kevin Short seconded the motion. A roll call vote of members was taken as follow:

Craig Murray	Yes
Rodney Cline	Yes
Kevin Short	Yes
Donna Ogez	Yes
Jere Schelling	Yes
Gary Isbell	Yes
Mayor Cory Box	Yes

Motion Carried. *Council entered Executive Session at 11:05 p.m. and returned at 11:24 p.m. No other business was discussed.*

7. Resolution 804 authorizing the acquisition of property for the construction of Waco Avenue extending north to 120th Street South and the construction of 120th Street South from Union Avenue to Yukon Avenue. Kevin Short made a motion to approve Item 7. Rodney Cline seconded the motion. A roll call vote of members was taken as follow:

Craig Murray	Yes
Rodney Cline	Yes
Kevin Short	Yes
Donna Ogez	Yes
Jere Schelling	Yes
Gary Isbell	Yes
Mayor Cory Box	Yes

Motion Carried.

8. Discuss potential Chamber relocation to ranch property (10596 S Peoria Ave) and potential demolition of the Hive (115 S 1st St), and potentially take action directing City Manager to obtain estimates and plans for demolition and potential new parking lot. City Manager Christopher Shrout introduced Item 8. Craig Murray made a motion to approve Item 8. Kevin Short seconded the motion. A roll call vote of members was taken as follow:

Craig Murray	Yes
Rodney Cline	Yes
Kevin Short	Yes

Donna Ogez	Yes
Jere Schelling	Yes
Gary Isbell	Yes
Mayor Cory Box	Yes

Motion Carried.

Other Business

1. City Manager's Report City Manager Christopher Shrout gave his report and answered questions.
2. Committee Reports Gary Isbell presented the INCOG report
3. Mayor's Report None given

Gary Isbell announced that he will be resigning from his seat, with his last day being 06/30/2023.

Adjournment. The Jenks City Council adjourned at 11:43 p.m.


Cory Box, MAYOR


CITY CLERK



To Whom It May Concern:

We want to thank you for considering Musco for your future sports-lighting needs.

Musco's Total Light Control (TLC) for LED lighting system is the result of over 45 years of technology research and it offers you these key values:

Better On-Field Lighting

The whiter and more uniform light distribution of the TLC for LED improves visibility for players & fans

Total Light Control

Our patented glare control technology preserves darkness around fields like never seen before

Improved Efficiency

We've helped customers reduce energy consumption by as much as 80 percent in some cases

Long-Term Parts & Labor Warranty

Musco provides a parts & labor warranty eliminating all maintenance costs for a period of 25 years

Our team of experts is eager to help you plan and design a lighting system that best fits your needs. Please feel free to reach out to us if you have any questions or would like additional information on any of your lighting needs.

Sincerely,

Denise Etzel
Project Coordinator
563-999-4104
denise.etzel@musco.com

Rico Velazquez
Field Sales Representative
405-479-5693
rico.velazquez@musco.com

Football

Atoka High School
Atoka, Oklahoma

Bixby High School  
Bixby, Oklahoma

Broken Arrow Football Stadium 
Broken Arrow, Oklahoma

Chelsea High School
Chelsea, Oklahoma

Chouteau High School
Chouteau, Oklahoma

Conger Football Field 
Purcell, Oklahoma

Covington Douglas Football Field
Covington, Oklahoma

Deer Creek High School
Edmond, Oklahoma

Edmond North Football
Edmond, Oklahoma

Elk City High School 
Elk City, Oklahoma

Guymon Tiger Football Stadium 
Guymon, Oklahoma

Jones High School 
Jones, Oklahoma

Muskogee High School 
Muskogee, Oklahoma

Porter Football Fields
Porter, Oklahoma

Southeastern Oklahoma State University Football
Durant, Oklahoma

Taft Stadium
Oklahoma City, Oklahoma

Tulsa Union Football 
Tulsa, Oklahoma

Vian Football Field 
Vian, Oklahoma

Wagoner High School 
Wagoner, Oklahoma

Professional

Chesapeake Energy Arena 
NBA – Oklahoma City Thunder
Oklahoma City, Oklahoma

Chickasaw Bricktown Ballpark
MiLB – Oklahoma City Dodgers
Oklahoma City, Oklahoma

ONEOK Field  
MiLB – Tulsa Drillers
Tulsa, Oklahoma

Baseball

Amber POCASSET High School Baseball / Softball
Amber, Oklahoma

Chelsea High School Baseball / Softball
Chelsea, Oklahoma

Chouteau High School Baseball / Softball
Chouteau, Oklahoma

Covington Douglas High School Baseball
Covington, Oklahoma

Deer Creek High School
Edmond, Oklahoma

Dover Public High School Baseball / Softball
Dover, Oklahoma

Hilldale High School Baseball / Softball
Muskogee, Oklahoma

Newkirk Baseball / Softball
Newkirk, Oklahoma

Northeastern State University
Tahlequah, Oklahoma

Oklahoma State University
Stillwater, Oklahoma

Plainview Public Schools Baseball / Softball
Ardmore, Oklahoma

Reaves Park Baseball / Softball
Norman, Oklahoma

Seminole State College
Seminole, Oklahoma

Skiatook Sports Complex
Skiatook, Oklahoma

University of Central Oklahoma Baseball / Softball
Edmond, Oklahoma

240 Sports Complex
Oklahoma City, Oklahoma

Softball

ASA Hall of Fame Field – Women's CWS
Oklahoma City, Oklahoma

Events Park Adult Softball Complex
Broken Arrow, Oklahoma

Ninnekah High School
Ninnekah, Oklahoma

Otoe Missouriia Softball Complex
Red Rock, Oklahoma

Seiling Public Schools
Seiling, Oklahoma

Tuttle High School
Tuttle, Oklahoma

Multi-Purpose / Other Fields

Andrews Skate Park
Norman, Oklahoma

Bentley Park Sports Complex
Bixby, Oklahoma

Kickingbird Golf Clubhouse
Edmond, Oklahoma

Jenks Veterans Skate Park
Jenks, Oklahoma

McMahon Park
Skate Park
Lawton, Oklahoma

OKC MAPS 3 Scissortail Park
Oklahoma City, Oklahoma

Oklahoma State University
North Multipurpose Fields
Stillwater, Oklahoma

Owasso Skate Park
Owasso, Oklahoma

Tonkawa Pow Wow Arena 
Tonkawa, Oklahoma

University of Oklahoma Intramural Fields
Norman, Oklahoma

Will Rogers Stampede Arena
Claremore, Oklahoma

Tennis

Bartlesville High School
Bartlesville, Oklahoma

Greer Park 
Lawton, Oklahoma

Jenks Public Schools Tennis Courts
Jenks, Oklahoma

Southern Hills Country Club Outdoor Tennis
Tulsa, Oklahoma

Soccer

Bentley Park Soccer Field
Bixby, Oklahoma

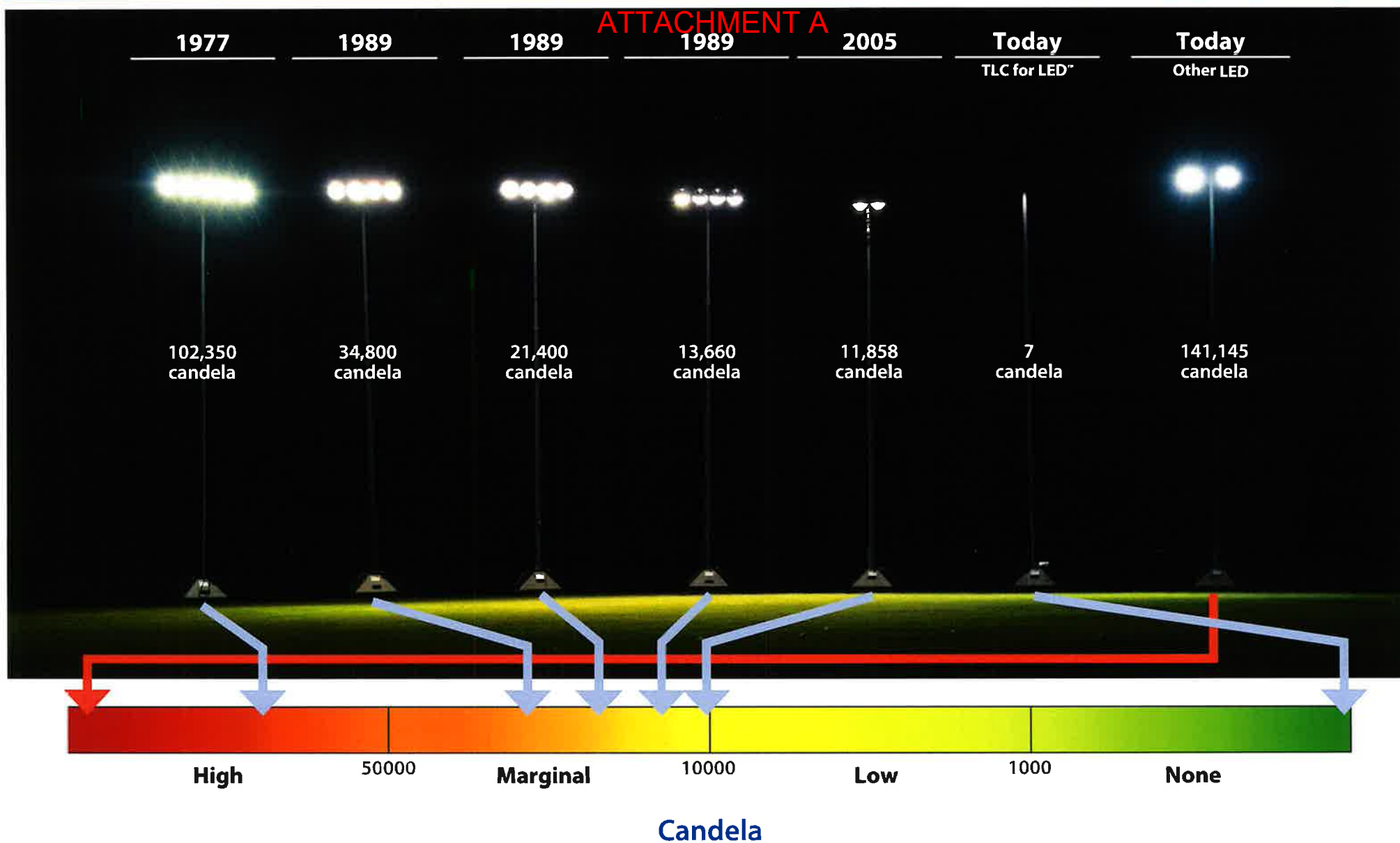
Mid-American Christian University
Oklahoma City, Oklahoma

Nash Soccer Field
Guymon, Oklahoma

South Lakes Soccer
Oklahoma City, Oklahoma

University of Central Oklahoma
Tom Thompson Soccer Field
Edmond, Oklahoma

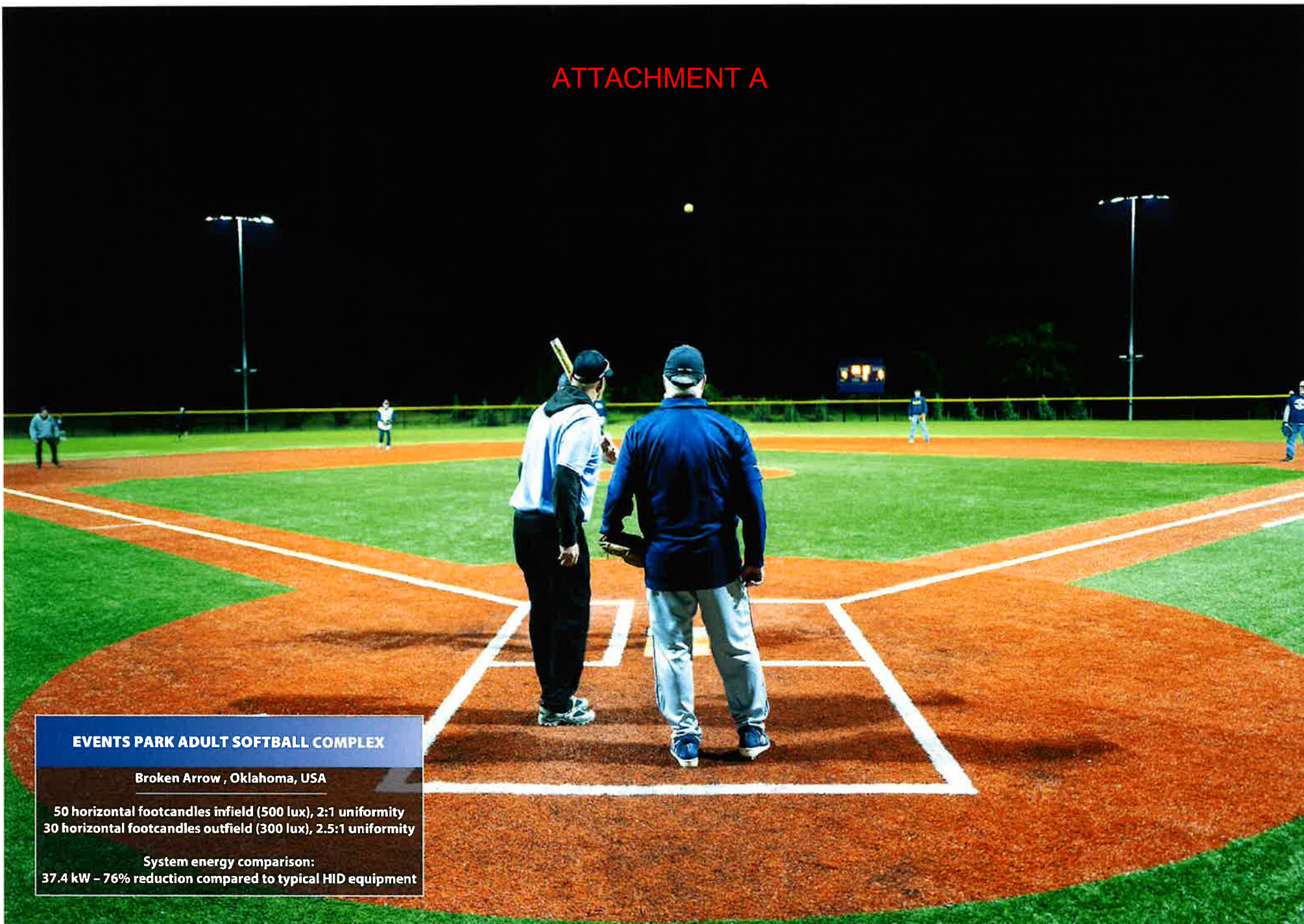
Wendel Whisenhunt Soccer Complex at Woodson Park
Oklahoma City, Oklahoma



Candela values (single fixture) reported from photometric reports at 15° above the beam center.

Photographed at 100 ft (30 m) from field edge. Used equal parameters for: on-field light level per pole, mounting height, luminaire aiming angles, and pole distance from aiming point.

ATTACHMENT A



EVENTS PARK ADULT SOFTBALL COMPLEX

Broken Arrow, Oklahoma, USA

50 horizontal footcandles infield (500 lux), 2:1 uniformity
30 horizontal footcandles outfield (300 lux), 2.5:1 uniformity

System energy comparison:
37.4 kW – 76% reduction compared to typical HID equipment

ATTACHMENT A



TUTTLE HIGH SCHOOL SOFTBALL

Tuttle, Oklahoma, USA

50 horizontal footcandles infield (500 lux), 2:1 uniformity
30 horizontal footcandles outfield (300 lux), 2.5:1 uniformity

System energy comparison:
20.8 kW – 76% reduction compared to typical HID equipment

SPORTS LIGHTING

ATTACHMENT A

Answers to **9 common QUESTIONS**



With bonus LED Retrofit Information



MUSCO
Lighting
We Make It Happen.

Contents

Decisions . . .

When it comes to sports lighting, there are a lot of them. It's a big investment, and the decisions you make now can affect your community for the next 20 or 30 years.

The priorities are clear and consistent—it must be cost effective, trouble free, energy efficient, avoid maintenance headaches, and minimize the impact of spill and glare on neighbors.

Above all, you want the most value possible from the dollars you spend and field lighting that will be a source of pride for years to come.

The following are answers to the most common questions about sports lighting, so you can make the most informed decisions possible.

Common Questions

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RETROFITS

Thinking of retrofitting your old lighting?
Watch for the green text blocks for information specific to upgrading your lights while using existing structures and underground electrical supply.

1. Should I retrofit with LED?

ATTACHMENT A

For many years, metal halide was the typical light source used for sports lighting. Replacing existing metal halide with light-emitting diode (LED) technology can deliver many benefits, provided it's supported by a well-designed system of light control, structures, electrical and application.

Light Levels

As metal halide lighting ages, it's likely that on-field light levels decrease which can eventually affect safety and playability. Relamping and cleaning fixtures may recover some lost light. Retrofitting with LED can also improve light levels, but just swapping out your old lights with LED fixtures will not guarantee the light levels you need. The best way to ensure adequate light levels is by having photometric designs done prior to installation so there are no surprises.

Spill & Glare

Sports lighting is unique in that it requires high quantity of light projected over long distances in a way that avoids impacting the neighborhood and meets the differing viewing needs of players, fans, and often video broadcasts. The LED light source has the potential for extreme cut-off. However, if not properly controlled, the intensity of the multiple tiny light sources also has a greater risk of creating uncomfortable glare and spill light.

Energy Efficiency

LED can reduce energy consumption by as much as 80 percent compared to older light sources. And the instant on/off capabilities of LED also ensures a more energy efficient operation, as does the ability to dim LED lights and operate them at less than full power so you can tailor usage for multiple uses such as events, practices, and clean up.

Return On Investment

Most indoor sports facilities are used almost daily, so the energy savings with LED generally pay back the cost of retrofitting in just a few years. Outdoor recreational facilities are often used less than 500 hours per year. At 10 cents per kilowatt hour, the energy cost to light a youth soccer field with metal halide is less than \$2 per hour. In this case, return on investment through energy savings for an LED retrofit would take several years.

Warranty

Evaluate how retrofitting your existing lighting will impact the current warranty and services being provided by the original manufacturer. In some cases, you might still have several years of coverage that could become void if the equipment is modified. Automated on/off control service systems may also be impacted. If your warranty is expired, retrofitting may be a great way to extend your light level guarantee and coverage for parts and labor.

Add Entertainment Features

The instant on/off capabilities of LED enables well-designed system controls and special effects packages to present exciting light shows for team and game celebrations. These may include features such as light-to-music synchronization and color-changing Red-Green-Blue-White (RGBW) technology.

“Two aspects of energy efficiency are important to consider: the efficiency of the LED device itself (source efficacy) and how well the device and fixture work together in providing the necessary lighting (luminaire efficacy).”

— Source: U.S. Department of Energy, <http://energy.gov/eere/ssl/led-basics>

Light control matters



2017 · Retrofit with Musco TLC for LED® technology
Notre Dame Preparatory High School, Scottsdale, Arizona, USA



2016 · Other manufacturer's fixture with LED light source after an attempt to resolve glare complaints
Notre Dame Preparatory High School, Scottsdale, Arizona, USA

RETROFITS

Musco can help you evaluate the benefits and considerations for retrofitting your existing lighting.

2. How much will it cost to install my lights?

Every field is unique, and there are many things that impact the cost. The fixtures are only a small part of overall project cost, which can be broken into two categories: initial, and operating (or life-cycle) costs.

The initial cost of installing your project includes three components:

- Lighting
- Structural
- Electrical

For each of these three components, you will need to select someone to:

- Design
- Supply
- Install

Decisions you make in one area will affect the others. For example, variances in fixture efficiency will affect the number of fixtures needed and, as a result, could require larger poles to operate the system. Your choices in these areas will also impact operating and maintenance costs.

The following chart can be used to ensure all nine of these important decisions are covered.

9 Important Sports-Lighting Decisions

	LIGHTING	STRUCTURAL	ELECTRICAL
DESIGN	?	?	?
SUPPLY	?	?	?
INSTALL	?	?	?
OPERATE			

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RETROFITS

On retrofit projects, using your facility's existing poles and electrical system can be a great way to reduce cost. Just be sure these components are evaluated for integrity, and you'll want to make sure the new lights work as an integrated part of the overall system design to achieve the best possible results.

ATTACHMENT A

As you work through these decisions, it's important to keep in mind a number of variables will affect the design and costs of your project. Here's a checklist of things to discuss with your sports lighting representative:

Quantity and Quality of Light	Geographical Issues	Environmental Light Control Issues	Lighting Usage
☐ Facility type and size	☐ Location — structural and local/state building codes	☐ Proximity of neighbors	☐ Anticipated hours of operation
☐ Players' skill level	☐ Soil conditions	☐ Community light ordinances	☐ Local initiatives for reducing energy usage
☐ Seating capacity	☐ Existing structures	☐ Nearby airports or observatories	☐ Desire for dimming or special effects
☐ Television/video broadcast requirements	☐ Pole setback requirements	☐ Multi-field complexes	
☐ Lighting standards (for organizations such as Little League Baseball®)			



Musco provides FREE project planning assistance to help you navigate the decisions that impact project cost. Our foundation-to-poletop systems and retrofit systems incorporate lighting, structural, and electrical components.

3. How many lights do I need?

ATTACHMENT A

When it comes to how much light you need, don't think about it in terms of number of fixtures. What you're really buying is quantity and quality of light on your field. With LED sports lighting, the quantity and quality of light is determined largely by the efficiency of reflector systems, light sources, and application expertise — all of which vary greatly based on the experience of your manufacturer.

Quantity of light

On-field lighting is measured in footcandles or lux. The amount of footcandles/lux required for your field is determined by:

- 1. Sport Type** — more light is needed for sports that use smaller, faster-moving objects (balls, pucks, skeet, etc.)
- 2. Skill Level** — higher light levels are needed for sports being played at higher skill levels to account for increased speed and gameplay accuracy.
- 3. Field Size** — the size of the playing area defines the number of square feet/meters that need to be lighted.
- 4. Seating Capacity** — the more seating your field has, the farther away some of the spectators will likely be, requiring more lighting to see the action on the field.
- 5. Video Broadcast Requirements** — a camera interprets images slower than the human eye and requires more light to be able to follow the action. Broadcasts include closeups of players during critical portions of an event and broadcasters often want the greatest depth of view possible.



Achieving and maintaining the right quantity and quality of light impacts tournament site selection.

RETROFITS

Simply swapping LED fixtures in for your existing lights on a 1:1 basis may not achieve necessary light levels or uniformity, and could lead to serious problems with glare and spill light.

Quality of light

Quality of light is referred to as uniformity or evenness on the playing surface. It's often stated as a ratio, such as 3:1, the minimum standard for most sports. This means the brightest point on the field should be no more than three times as bright as the darkest point. This ratio is important because a ball can appear to change speed as it passes from dark to light areas, making it difficult for players to safely track the ball's flight.

Initial vs. Target Light Levels

Light levels depreciate over time as the light source ages and dirt builds up on the fixture. How fast it depreciates depends on the fixture design, light source type and how it's operated. Initial light levels refer to how much light is on your field immediately upon installation, while target (or maintained) light levels refer to what you can expect over the life of your system. Each manufacturer bidding on your project should provide specific information on target light levels, as well as a uniformity ratio. This will ensure they're all designing to the same criteria when you're comparing proposals. You should also get written guarantees for the quantity and quality of light your system will provide.

Generally Accepted Lighting Standards

Sport	Sport Level	Seating Capacity	Footcandles	Lux
Baseball / Softball	Recreational	Limited or none	30/20	300/200
	Schools / Leagues	Up to 2000	50/30	500/300
	Schools / Leagues / Semi-Pro	Up to 5000	100/70	1000/700
Basketball (indoor)	Recreational	Limited or none	30	300
	Schools / Leagues	Up to 2000	50	500
	Schools / Leagues / Semi-Pro	Up to 5000	75	750
Football	Recreational	Limited or none	20	200
	Schools / Leagues	Up to 2000	30	300
	Schools / Leagues / Semi-Pro	Up to 5000	50	500
	Schools / Leagues / Semi-Pro	Over 5000	100	1000
Soccer	Recreational	Limited or none	20	200
	Schools / Leagues	Up to 2000	30	300
	Schools / Leagues / Semi-Pro	Up to 5000	50	500
Tennis – 2 court (side by side)	Recreational	Limited or none	30	300
	Schools / Leagues	Up to 2000	50	500
	Schools / Leagues / Semi-Pro	Up to 5000	75	750

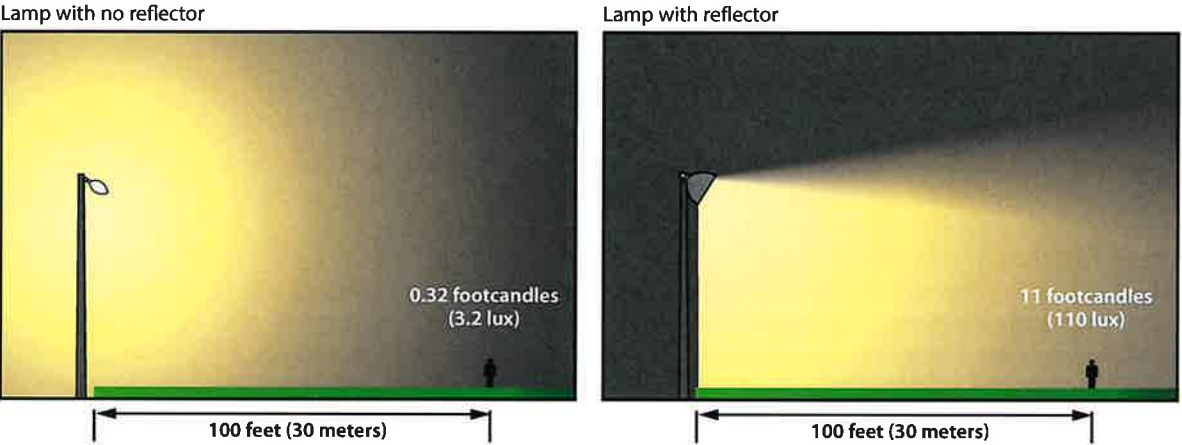
Based on IES Recommended Practice: Lighting Sports and Recreational Areas RP-6-20. For larger facilities, please contact Musco.



Musco provides FREE photometric design and computer modeling services to you or your consultant to help you achieve guaranteed light quantity and quality on your field.

4. If they use the same wattage, aren't all LED fixtures the same?

No. The manufacturer's reflector design and application expertise determine how effectively the light energy is projected onto the playing surface. Technology allows wasted spill light to be redirected back onto the playing surface, increasing light on the field.



Same Light Source, Different Results

It's a common mistake to specify a number of fixtures rather than the quantity of light delivered to the field. Specifying a set number of fixtures simply spells out the amount of light that will be generated by the fixture at the top of the pole, not the amount of light on the field.

In the illustration above, the fixture produces the same amount of light at the poletop. Without a reflector, it projects less than one footcandle (10 lux) onto an area 100 feet (30 meters) away. With a basic reflector it projects 30 times that amount, redirecting what would otherwise be wasted spill light onto the field.

RETROFITS

There are big differences in efficiency of LED luminaires used for sports lighting. Make sure to evaluate the on-field performance to ensure you get the light levels you need.

ATTACHMENT A

System vs Parts

Sports lighting may be purchased as a complete system, or as a single fixture that must then be matched up with parts and pieces from a variety of sources. Here's an analysis:

The diagram shows a vertical pole with various components highlighted in blue. A legend indicates: "Shaded areas indicate engineered components".

Engineered as a complete system • Parts selected by trained engineers for compatibility • Critical components assembled in controlled environment • Tested prior to shipping • Single source accountability with light level guarantee and warranty on entire system	Parts and pieces of unknown strength and quality put together by the installer • Inconsistent warranties from several sources • Exposed wiring creates maintenance problems
Factory aimed • Reduced installation time and expense • Known results	Individual fixture-by-fixture aiming from the top of the pole • Adds installation time and cost • Unknown results
Electrical components mounted at pole base • Easier maintenance • Weight reduction at poletop assures better fixture alignment	Electrical components on fixture • Troubleshooting must be done from the top of the pole • Increases chance of misalignment
Built-in lightning and surge protection • Assures it's installed and operating	Unknown protection

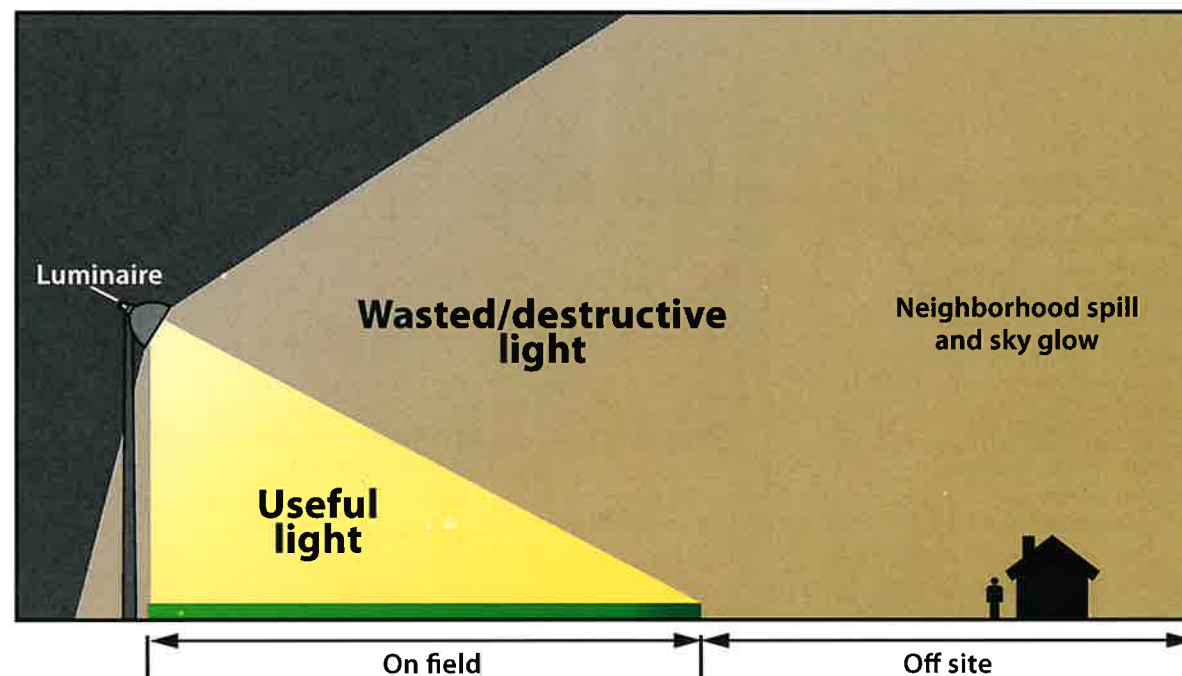
Musco's complete system is engineered from foundation to poletop in 5 Easy Pieces™ for optimal light control, easy installation, and trouble-free operation.

5. Why should I be concerned with spill light and glare?

The ability to effectively control spill light and glare is critical for a number of reasons.

Spill Light is Wasted Energy

Fixtures with poor light control waste light by allowing it to go off the field into neighborhood spill and sky glow. Proper light control redirects wasted spill light back onto the playing surface. Efficient fixture and system design, along with application expertise, will reduce the number of fixtures needed to get useful light onto the field. This can also significantly cut the energy consumption and carbon footprint at your facility.



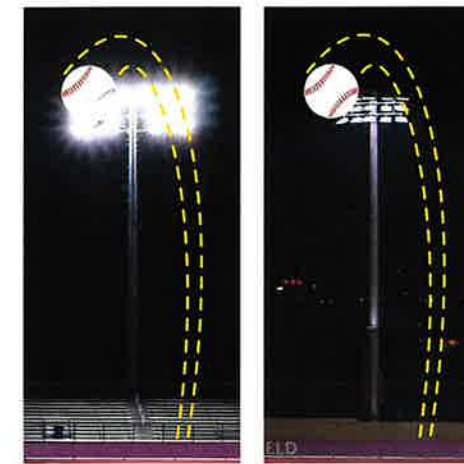
RETROFITS

Planning a retrofit in which new LEDs are swapped in for old fixtures on a 1:1 basis can lead to serious problems with glare and spill if the fixture is not properly designed. Since LED involves hundreds of tiny light sources instead of one large one, effectively controlling the light being emitted is more challenging.

ATTACHMENT A

Impact on Players and Fans

Due to the intensity of the LED light source, increased measures should be taken to provide optic controls that minimize glare. Poorly designed fixtures create excessive glare, making it difficult for fans to follow the action and for players to follow the ball, creating the possibility for injury. Players competing on multi-field complexes can also be affected by glare from adjacent fields.



Glare impacts players

Musco gets the glare out of the players' eyes

Impact on Neighbors

Neighboring homes and businesses can be significantly impacted if your lights create glare and/or spill that disrupt their evening hours. Some schools and organizations have even been forced to leave their lights off by homeowners associations and municipalities until they resolve problems with glare and spill.

There's a growing concern for wasting energy and for limiting the impact of light pollution. Many communities are enacting environmental light pollution ordinances to keep wasted light from impacting roadways, astronomical research facilities, and nearby wildlife habitats.

Community Growth

Even if there aren't currently homes in the immediate area around your facility, that could change. Communities often grow around sports facilities, and your lighting system should last 20 years or more. By minimizing spill light and glare now, you'll ensure happy neighbors when they do arrive and receive fewer complaints in the future.



Musco has been evolving its advanced glare and spill control technology for over four decades, and has nearly two dozen patents focused on better light control.

6. Why does pole type and height matter?

Poles are an integral part of a lighting system. The right poles help ensure proper aiming, long-term reliability, and reduced maintenance expense.

Pole Types

Pole Type	Benefits	Drawbacks
Wood	• Low cost of material	• Poles not tall enough to allow proper mounting height • Fixture misalignment because wood twists and leans over time • Safety hazards: rotting wood, exposed electrical conduit, toxic preservatives
Concrete	• Can be direct buried, eliminating the cost of footings • Corrosion and moisture resistant • Pleasing appearance	• Poles are heavier and more expensive to set • High freight costs often limit their use to areas near concrete pole manufacturing plants
Base-plate Galvanized Steel	• Pleasing appearance • Lighter weight than concrete, easy to handle	• Higher initial cost • Require construction of concrete foundation with anchor bolts to mount poles and sufficient curing time for concrete • Curing time of concrete base • Corrosion at ground level • Difficulty with pole orientation
Direct Burial Galvanized Steel	• Pleasing appearance • Lightweight	• Underground corrosion accelerated due to moisture and soil chemicals (often undetectable prior to pole failure) • Unpredictable life expectancy • Increase installation time and cost depending on structural engineer's criteria



Combination Concrete and Steel Pole

There are also combination concrete and steel poles, which offer the advantages of steel and concrete without many of the drawbacks. Well-designed steel and concrete poles can help simplify installation, save costs, and reduce concerns about corrosion at and below ground level.

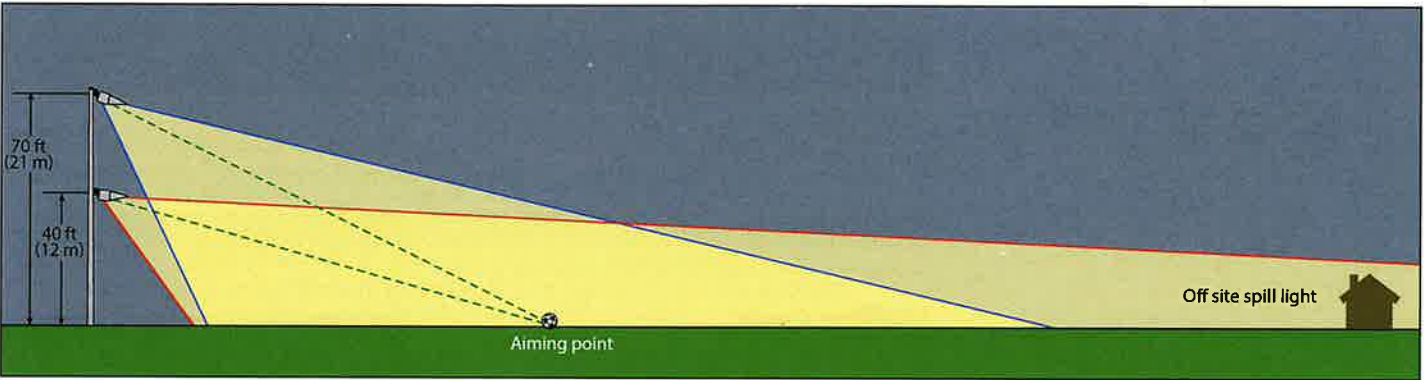
Musco's Light-Structure System™ combines the benefits of both concrete and steel poles.

RETROFITS

Among the first steps of any LED retrofit project is to examine your existing poles to ensure structural reliability. Even if your poles are structurally sound, you should check your poletop mounting structures as well to determine if new crossarms are needed.

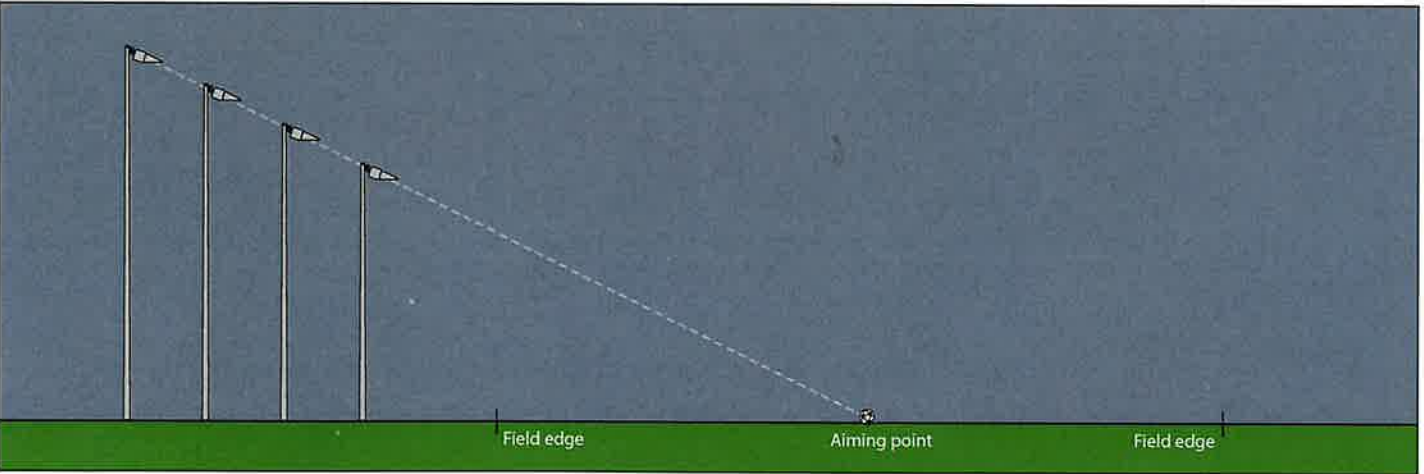
Pole Height

Pole height impacts aiming angles, which directly affect the evenness of light distribution across the field and the potential for spill light pollution. Normally, taller poles allow fixtures to be aimed more directly down onto the playing surface, reducing the amount of light spilling into unwanted areas. In some cases, city ordinances or other factors require the use of shorter poles, a challenge that experienced manufacturers can typically resolve with customizations like additional poles or creative aiming strategies to achieve your lighting goals on and off the field.



Pole Distance

The optimal height of the poles needed for your lighting system and resulting project cost is also affected by their distance from the playing surface. Structures such as bleachers and buildings will impact pole location and resulting distance from the field. Future expansions or other facility plans should be discussed with your lighting manufacturer.



Musco's expert project managers and engineers will work with you to design the ideal lighting system for your specific needs.

7. How much will it cost to operate my lights?

The cost to operate your lights can be broken out into four categories:

Electrical Costs

Electrical cost to operate lights is less than many think. Light sources vary in how efficiently they convert electrical energy into light energy. LED can cut energy consumption by as much as 80 percent. However, your hours of usage will determine how much you could save on annual energy cost. Here's an example:

Standard soccer field — 360 x 225 ft (110 x 69 m), 30 footcandles (300 lux)

	Musco		Other Manufacturer
	TLC for LED® Technology	1500 W Metal Halide	1500 W Metal Halide
Fixtures required	24	32	52
Hourly energy cost	\$3.02	\$5.00	\$8.42
Annual energy cost	\$1,510	\$2,502	\$4,212
25-year energy cost	\$37,750	\$62,560	\$105,300

Assumes 10¢ per kWh electrical rate, 500 hours per year operation

Staffing Costs

As public concern for energy conservation grows and budget constraints impact staffing, automated control systems can help keep those costs in check. Automated systems are more reliable than timers, better accommodate last-minute changes, save energy, and eliminate staff travel to fields to turn lights on and off.

Some systems provide reports that track hours by user, helping you set user fees to offset operating costs. Monitoring services are also available to ensure on/off schedules are completed and provide alerts to you or your warranty provider for fixture outages that may affect playability.

Routine Maintenance Costs

Older metal halide light sources required group relamping prior to end of lamp life to maintain target light levels on the field. LEDs used for sports lighting should not burn out before the end of system life, provided there is adequate design for the supporting structural and electrical components.

Regardless of light source technology, the basics of lighting maintenance remain the same: cleaning, monitoring, aiming alignment, and troubleshooting. Fuses will need to be replaced as needed. You may need to rent equipment if the electrical components such as fuses and drivers are not accessible at ground level.

Costs include:

- Equipment rental to get to top of pole (\$75 to \$150 per hour)
- Labor (approximately \$60 - \$100/hour average)

RETROFITS

LED is not maintenance free. Find out if your manufacturer includes parts, shipping, onsite labor and lift equipment. Electrical components located remotely near the base of the pole, so routine servicing can be done from a step ladder, eliminate the expense of a crane or lift to reach drivers or fuses located in the fixtures.

Unexpected Repair Costs

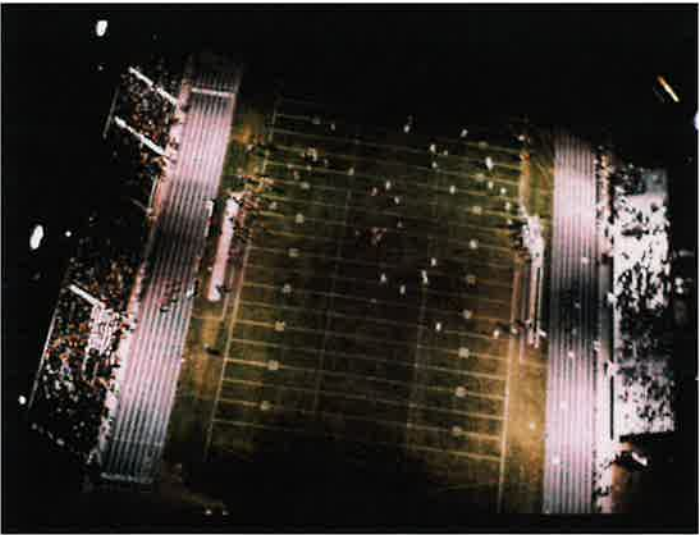
Unexpected repairs can take significant time and money to fix. A well-designed system will be durable enough to withstand the elements and have features designed to reduced unexpected costs.

Re-aiming — make sure your manufacturer guarantees fixture alignment. Over time, factors like weather can cause misalignment resulting in less light on the field. Labor and equipment cost to correct this can be significant.

Fixture outages — Each driver or fixture should be individually fused. This minimizes multiple or "gang" failures. If your manufacturer does not include labor for fixture repairs, you will be responsible for lift and labor to remove and ship a fixture in for repair or replacement. Upon return, you will need to reinstall the new fixture.

Troubleshooting — Easy-to-access systems have electrical components such as ballasts/drivers, capacitors, and fuses located close to the ground to save time and money.

Lightning and surge protection — Built-in lightning grounding and surge protection helps avoid equipment damage. This is especially critical with the electronics involved in LED lighting.



Misalignment of as little as 10 degrees shifts light off the playing field into the stands.



Having major electrical components accessible at ground level avoids hiring a \$100/hour crane to replace a \$10 fuse.



Musco's systems are efficient, include automated controls, can be turned on/off instantly with the touch of a phone, are proactively monitored with 24/7 call-center support, and are backed by a no-touch warranty covering all parts, labor, and routine maintenance.

8. How can I make sure I get the results I want?

Sports lighting is a big investment that can bring a wide range of benefits to your community for years to come. There are some important steps you can take to ensure you get the results you want.

Define Standards

Make sure to get written specifications that establish the performance you expect. Remember to incorporate the lighting, structural, and electrical components and the costs involved for design, supply, installation, and operation (see page 6) into your planning. Specify the values you want for playability, environmental light control, life-cycle cost savings, and warranty.

Clearly defined standards will help you avoid two problems on bid date:

- Insufficient, cheap equipment substitutions to lower bid price
- High bids to cover the uncertain costs of an underdefined project

Seek Accountability

Having a manufacturer that stands behind its product and provides good service will make a huge difference in long-term satisfaction with your lighting system.

Require Written Guarantees — Manufacturers can provide written performance guarantees for light levels and your entire system from the foundation to the fixtures. This will ensure the specifications you establish are met. Getting this guarantee from a single-source system provider will save you the headache of sorting out responsibility among multiple manufacturers should a problem arise.

Compare Warranties and Services — It's essential to understand and compare different manufacturer warranties. The warranty reflects a manufacturer's confidence in how its lighting will perform. Some manufacturers provide single-source accountability, offering a long-term warranty covering all parts and onsite labor. Other manufacturers' lighting includes several warranties from a variety of suppliers whose parts and pieces are included, which can lead to confusion as to what's covered, for how long, and by whom. Some manufacturers include services such as on/off controls and proactive system monitoring.

RETROFITS

All LED sports lighting is not created equal, so if you're considering an LED retrofit it's important to visit other facilities similar to yours that have recently completed retrofit installations to see how different manufacturers' lighting performs.

ATTACHMENT A

Get References — Ask for references and review each manufacturer's reputation and track record for service. A good question to ask is if there will be an on-site field performance evaluation after the installation, as well as how far away the manufacturer's service technicians are. This will impact how long it takes to address problems that may arise.

See For Yourself — There's no better way to compare and contrast the performance of different manufacturers' lighting than by getting out onto fields and seeing it firsthand. Ask to visit nearby facilities that are similar to yours, and talk with the owners about their overall experience and how well the manufacturer did at helping them achieve their lighting goals.

"The bitterness of poor quality remains long after the sweetness of low price is forgotten."

— Benjamin Franklin



Musco's long-term warranty and performance guarantee covers every part and all labor, and is backed by a service Team of more than 170 professionals including regionally-based technicians, 24/7 proactive monitoring, instant on/off controls, and the support of a fully-staffed call center.



9. Is there funding help available?

ATTACHMENT A

Funding is often the most critical and challenging aspect of a sports lighting project. It's important to know there are options available that can bring your project within financial reach.

Utility Grants & Rebates

Many utility companies offer incentives to promote the use of energy-efficient products, including sports lighting. Incentives vary and come in the form of rebates, grants, low-interest loans, and/or reduced kilowatt rates. Once the utility company completes an energy-savings audit, it can help fund new lights or upgrade your existing equipment with an energy-efficient system. Make sure that the replacement system meets the light level, light control, warranty, and other specifications.

Manufacturer Financing

Well-established manufacturers may offer financing programs for municipalities, public schools, and other organizations to provide a "budget stretcher" to help with facility improvements. The added revenue from expanded use of your facility can help make the annual payments and allow you to enjoy the benefits of your lighted facility sooner. Plus, a set payment can be built into your annual budget, freeing you from budget uncertainties and cash flow implications of a large purchase.

Unique Fundraising

Look for fundraising campaigns and programs that may be out there in conjunction with manufacturers and organizations, such as Little League® and Babe Ruth®. Check with local businesses to gauge their interest in purchasing advertising at your field as a way to raise funds for lighting.

Volunteer Installation

Well-designed sports lighting systems can offer a simplified and streamlined installation, in which case you can recruit volunteers to assist with the process. This is a good way to save money and reduce your overall costs.



RETROFITS

If you are working with an Energy Service Company, or ESCO, be sure to take into account important aspects such as on-field light levels, spill and glare control, and warranty to ensure your retrofit project doesn't sacrifice quality.

Musco offers financing options and a resource database to identify grants and incentives available to make your project happen. Musco also partners with organizations such as Little League®, Babe Ruth®, and U.S. Soccer Foundation to award field lighting systems at a discount. Musco's unique Pennant Program™ fundraising provides advertising opportunities using pennants displayed on light poles to help with both initial and annual operating costs.

Lighting terms you'll hear

Creating Light Energy

Light-emitting diode (LED): Small semiconductor device that creates light when electricity passes through it.

High intensity discharge (HID) lamp: Metal halide, high-pressure sodium, and mercury vapor — a group of light sources that create light when electricity ignites gases inside an arc tube.

Incandescent: A light source that creates light when electricity passes through a filament.

Measuring Light Energy

Lumen (1 lm): Measure of light, much like a liter is a measure of volume.

Footcandle (fc): One lumen of light spread over 1 square-foot of surface. A light level of 30 footcandles means that 30 lumens of light are being projected onto each square foot of playing surface.

Lux (lx): Lux is the metric equivalent to a footcandle. A lux is 1 lumen spread over 1 square meter.

Candela (cd): Measure of the intensity of a light source. Relates to predicting on-field and off-field glare. You can relate this to car headlights: high beam = approximately 30,000 cd, low beam = approximately 12,000 cd.

Coloring rendering index (CRI): A scale from 0–100 used to measure a light source's ability to show colors realistically as compared to natural light (daylight). Higher CRI values mean a light source is more true to color.

Color temperature: A unit of measure in degrees Kelvin that indicates the color of a light source. Temperatures below 3500K appear yellow or warmer. Above 4500K appear bluish white or cooler. Absolute white is 5000K.

Controlling Light — Lighting Performance

Photometrics: Control of light energy through redirection.

Constant light level: The amount of light you can expect on the field at any given time over the extended life of the fixture or system.

Initial footcandles or lux: The amount of light on the field when the lighting system is first put into use.

Target (maintained) footcandles or lux: The lowest average amount of light you should always have on your field to meet minimum performance requirements.

Light loss: Amount of brightness from a fixture lost over time due to aging of the light source, dirt accumulation, temperature and voltage variations, and maintenance.

Lumen maintenance (Lp): The number of operating hours an LED light source will maintain the percentage (p) of its initial light output, noted as Lp.

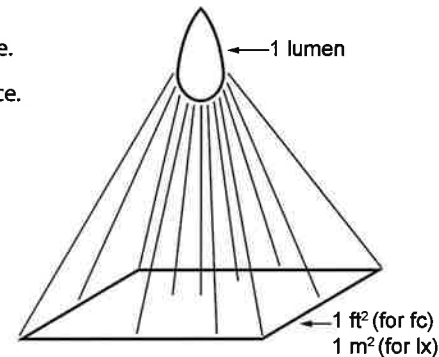
Uniformity: The smoothness of light on the field.

Point by point scan: Computer-generated model of your proposed lighting system showing footcandle/lux readings at given points on your field.

Spill light: Wasted light that falls off the field into undesired areas, such as a neighbor's back yard.

Glare: Destructive light from a light source that shines in players, spectators, or neighbors' eyes, making it difficult to see.

Sky glow: Destructive light in the night sky which results from light that is reflected upwards.



Point by point scan

ATTACHMENT A

We will help get you started

From our expert project managers to our team of certified engineers, we will work with you to design a custom foundation-to-poletop or retrofit lighting solution that:

- Reduces your facility's energy and life-cycle costs
- Delivers superior controlled light guaranteed to meet specified light levels
- Controls spill light, glare, and sky glow
- Eliminates maintenance costs
- Simplifies operation and reduces cost with our Control-Link® system monitoring, management tools, and on/off control.

Lighting solutions for your large area applications



San Francisco-Oakland Bay Bridge
Oakland, California, USA



Mount Rushmore National Memorial
Keystone, South Dakota, USA



Smokey Row Coffee Company Parking Lot
Des Moines, Iowa, USA

Need to light a non-sports project?

Musco's team of expert engineers create innovative lighting solutions for a variety of applications from small parking lots to large ports and national monuments. Since 1976, Musco has established itself as the global leader in sports and large area lighting solutions. For innovative lighting systems that enhance light quality, improve effectiveness, reduce spill light and glare, cut costs, and minimize the impact on our environment, contact Musco.

- Parking lots
- Buildings and architecture
- Monuments
- Ports, airports, and rail yards
- Construction sites
- Bridges and roadways
- Security
- And much more

ATTACHMENT A



For **FREE** planning assistance for your sports-lighting project contact:



We Make It Happen.

www.musco.com

lighting@musco.com

Phone: 641.673.0411

Toll-free: 800.825.6030

Connect with us:



ATTACHMENT A

TLC[®] for LED[®]

Total Light Control[™]



We Make It Happen.

Keeping Good Lighting Affordable

With the emergence of LED sports lighting, facility owners are discovering that different manufacturers produce vastly different results.

The LED light source has distinctive challenges and advantages. To realize the full potential of LED lighting, it takes experience and a proven system for controlling and applying the unique characteristics of the diode in a sports setting.

With Musco's more than 45 years of experience—and over a decade of researching LED—our Team has looked at the combination of issues to achieve the best solution to meet your needs from structures, to quality of on-field light, to off-site impact, to energy and costs.

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 fans...

who want to see the game better and enjoy world-class light shows watching preps or the pros.

Better for neighbors...

who won't have light spill or glare in their homes or lights left on when not in use.

Better for the night sky...

with more light directed onto the field and less spilling above it.

Better for your budget...

an affordable system that's built to last and control operating costs.

And you won't have to worry about maintenance costs for up to 25 years.



A Unique System Design

5 Easy Pieces™ complete from foundation to poletop.

While other manufacturers produce single light fixtures, our system approach delivers better long-term reliability and trouble-free operation.

Whether it's Light-Structure System™ complete from foundation to poletop, or SportsCluster® System retrofitted to existing structures, we include lighting, structural, and electrical components designed to work together.

Our system provides a more protective environment for the LED's sensitive electronics, integrated grounding, surge protection, and remote drivers so servicing can be done from a step ladder, not a lift.

And we guarantee its performance for up to 25 years.

Control
from the foundation to the poletop.

ATTACHMENT A



ATTACHMENT A

A Better Night Game Experience

The key issues in sports lighting haven't changed—how do you put more light onto the field, spill less around it, protect the night sky, reduce glare, and ensure it performs when needed and withstands the elements.

Our TLC for LED® system delivers highly-controlled downward light from the poletop, along with precisely-targeted upward light from our BallTracker® luminaires. Together, this patented system illuminates the underside of a ball in flight, creates better contrast against the dark night sky, and creates unparalleled cut-off, preventing spill and glare from affecting the surrounding area.

And for an enhanced entertainment experience, Musco's strategically located color-changing luminaires and innovative light-to-sound synchronization capabilities create Big League light shows for players and fans at fields of all sizes.

This is why, when you walk onto a field lighted by Musco, it just looks better.

"Now you can actually see the seams of the baseball coming in at you, and you can pick up spin easier. BallTracker is really important because when the ball gets up into the air it keeps the ball white against the dark sky. So it helps a lot."

— Nate Esposito, Wilmington Blue Rocks (MiLB)

Control
from the light source to the field.



Sahlen Field - Buffalo, New York, USA

With patented BallTracker® technology, players enjoy quality lighting, no glare, and better ability to track the entire flight of the ball.



Mount Rushmore - Keystone, South Dakota, USA

Pinpoint control from 1,100 feet away highlights the target area while preserving surrounding darkness.



University of Notre Dame - Notre Dame, Indiana, USA

Event lighting with dimming saves energy for high-usage, multi-use venues.



Estadio Tigres - Nuevo Leon, Mexico

Show-Light® theatrics and special effects enhance fan and TV experience.

A Solution Neighbors Will Love

Emitting light is easy, controlling it isn't. At Musco, we care as much about preserving darkness around your field as we do putting high-quality lighting onto it.

Our system's custom optics, designed around the LEDs, control and apply the light precisely where it's needed. And our patented fixture visoring greatly reduces glare at the light source.

This means no spill light or disruptive glare affecting neighboring homes, and the preservation of dark skies above. It's why our system could be installed at a large, multi-field sports complex located in close proximity to an international airport.

Our light control capabilities have made lighting possible at fields where, previously, it wasn't allowed due to community concerns.

Control
preserving the night sky.

"Glyndon Park is in a naturally wooded residential area. We didn't want to illuminate the homes of neighbors in the area. I initially wasn't supportive of putting in traditional lights. The product Musco has developed allows us to light this field, yet light nothing else around it."

— Parks and Recreation Director, Vienna, VA



Glyndon Park Little League, Vienna, Virginia, USA

ATTACHMENT A

1977

Musco Metal Halide System

40 years of research, increasing efficiency and minimizing environmental impact.

Today

Musco LED System

Today

Other Luminaire Manufacturer LED

Equal parameters used for each pole including on-field light produced, wattage, height, and aiming angle.



A Field That's Always Ready for Play

With the remote facility management of Musco's Control-Link® service, your field will always have light when it's needed.

You'll be able to instantly turn your lights on or off from anywhere, with the touch of a smart phone. Our Team at Control-Link Central™ will be there for you 24/7 to provide scheduling and monitoring support.

In fact, if a problem arises we'll likely know about it before you do, right down to the fixture. Here's a look at the service we provided customers in just the past year:

- *Turned lights on/off remotely for more than 7.6 million events.*
- *Conducted routine inspections and maintenance at over 11,000 fields.*
- *Helped with scheduling and answered questions on over 297,000 calls, over 981,000 app sessions, and 1.3 million web site log-ins.*
- *Traveled enough miles servicing fields to circle the equator 24 times.*

And with our 25-year parts and labor warranty, you'll have peace of mind for the next 9,125 days knowing that you'll pay zero maintenance costs, won't have headaches over staffing and managing your lights, and will be free from neighbors complaining about lights being left on.

Control
assuring the results you expect.

ATTACHMENT A



Our R&D, customization, and application capabilities deliver solutions specific to each customer's needs.

"Musco called to let us know there was an issue before we knew we had a problem."

— Stephen Cooke, CPRP, CYSA
Greenville County Recreation Athletics Manager, Taylors, SC



Our Control-Link service provides 24/7 proactive monitoring and the support of a fully staffed call center.

Musco's Light-Structure System™ performs
in real world conditions **for 25 years, guaranteed.**
We Make It Happen®



Our regionally-based technicians provide prompt service for 25 years.



ATTACHMENT A



Control

from foundation to poletop...

from the light source to the field,
preserving the night sky...

assuring the results you expect,
day 1...year 1...and for 25 years.



We Make It Happen.

www.musco.com

e-mail: lighting@musco.com

Phone: 800.825.6030

ATTACHMENT A Control Solutions



The image shows a control room with multiple computer monitors and people working at desks. A screen in the foreground displays a table titled "FIELDS AREAS CONTROLLED".

Field Type	%
Baseball Softball	21.4%
Other	16.7%
Soccer	17.9%
Football	12.8%
Tennis	6.8%

Making Facility Management Easy Since 1999

The most innovative solutions are developed in response to real-world problems. In 1999 Musco introduced Control-Link® as a first-of-its-kind light management system to help customers who were getting calls from neighbors at 2 a.m. about lights left on, to help cut energy costs, and save staff time.

Since that first introduction, Musco has installed thousands of control systems from fully automated unmanned recreational sites to complex theatrical solutions for many of the largest stadiums in the world.

Anytime, Anywhere ... Control-Link management tools allow you to access and manage your lights instantly, from anywhere via a cellular internet connection.

A Real, Live Voice ... Control-Link Central™ Team will monitor, schedule, and help manage your lights 24/7/365, and a real live voice will be on the other end of the phone when you call.

Factory Wired, Programmed, and Tested ... our unique system approach streamlines installation and assures that your controls, from basic on/off to professional level light shows, will be ready to work on day one.



8.1 million

schedules managed and monitored by our Control-Link Central™ Team last year



270,000

calls fielded to assist customers last year

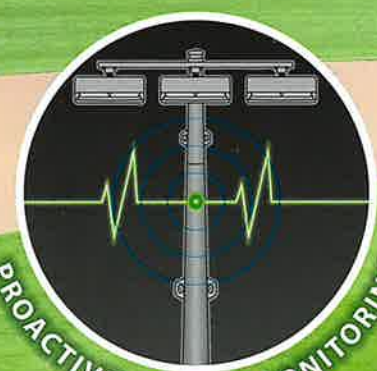
ATTACHMENT A



EASY, INSTANT LIGHT MANAGEMENT



REDUCED ENERGY CONSUMPTION



PROACTIVE SYSTEM MONITORING



LIGHT SHOWS



COLOR-CHANGING TECHNOLOGY



ADVANCED INTEGRATION

Control-Link

- ☐ **Easy, Instant Light Management**
Turn your lights on and schedule them from anywhere with your smartphone
- ☐ **Reduced Energy Consumption**
Three levels of dimming for different activities help save energy and costs
- ☐ **Proactive System Monitoring**
24/7 system monitoring means you'll be immediately alerted when any issues arise

Show-Light

- ☐ **Light Shows**
Pre-designed and custom special effects, including lights synchronized to music, add excitement for players and spectators
- ☐ **Easy to Upgrade**
You can expand and customize your system as the needs at your facility change

Options

- ☐ **Color-Changing Technology**
Add colored pole accent lights or color washing capabilities with over 100 color options
- ☐ **Advanced Integration**
Add scoreboards, ribbon boards, other light sources, and video displays into light shows with custom integration

Flexible Control, Solid Management

ATTACHMENT A

Your Control-Link® control and monitoring system offers efficient, cost-effective tools that are both cutting-edge and simple to use.

Musco will have your back 24/7/365 to ensure your lights are only on when needed, keeping neighbors and taxpayers happy. Because more than anything, it's about your peace of mind.

The Control-Link system provides comprehensive scheduling assistance, system monitoring, secure password-protected access, automated equipment controls, and valuable usage data.

Flexible and Reliable . . . remote scheduling and controls mean no more staffing headaches, tracking multiple sets of keys, or late-night hours being on-site to turn your lights off.

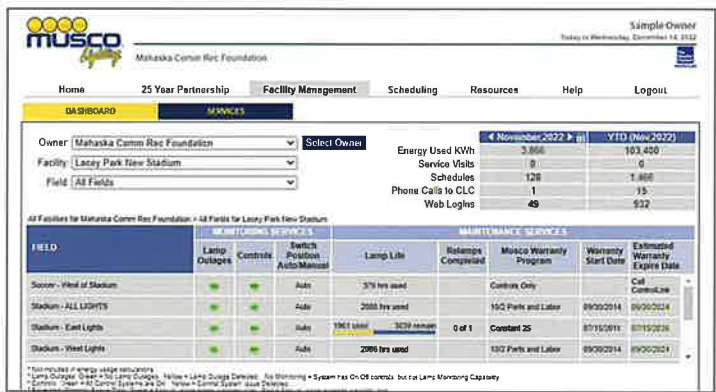
24/7/365 Monitoring . . . our Team will monitor your system's performance at the luminaire level, so if an issue arises we'll likely know about it before you do.

Better for Your Budget . . . automated operation of your lights, as well as three levels of dimming that come standard, will reduce energy consumption and cut staffing costs.

Data You Can Use . . . we'll help create usage reports and analytics for your facilities from the extensive data we store, which will help improve operational efficiencies and future planning.



Enter schedules up to 10 years in advance.



Dashboard tracking allows you to see the operation and service status of your fields.

Musco Control-Link Usage Report (Auto Only)			
By Facility, Field			
Usage Type of Light Usage			
June, 2022			
Summary by Facility			
Facility	Total Auto Hours Usage	Total Hours Saved from Early Offs	
Cowley	112:50	17:08	
Dunbar	64:53	29:46	
Garland Parklet	49:48	0:00	
Herschel Field	256:47	26:05	
Total:	484:18	72:59	
Summary by Facility, Field			
Facility	Field	Total Auto Hours Usage	Total Hours Saved from Early Offs
Cowley	Baseball	63:04	17:08
Cowley	Basketball	49:46	0:00

Control-Link Central database stores usage data by field and user group.

Control-Link® Control and Monitoring System

- ✓ **Easy, Instant Light Management**
Turn your lights on and schedule them from anywhere with your smartphone
- ✓ **Reduced Energy Consumption**
Three levels of dimming for different activities help save energy and costs
- ✓ **Proactive System Monitoring**
24/7 system monitoring means you'll be immediately alerted when any issues arise



"In the past, a light could've gone out and our guys wouldn't see it for two to three weeks or until a whole pole went dark. Now if one light goes out we get an e-mail notice immediately from Musco's Control-Link Central."

– Chuck Vones, Parks and Recreation Director
Pembroke Pines, Florida

Big Time Light Shows at Hometown Fields

Show-Light® special effects provide a cost-effective way for you to bring professional light shows to your facility. From pre-game introductions, to halftime shows, to celebrating big plays and big wins, this special effects lighting will energize players and fans and take your game atmosphere to a new level.

The technology behind Show-Light special effects, and the exciting atmosphere it creates, are the same as what we provide our NFL, MLB, NBA, and NHL customers. The system is easy to use and will provide an even more memorable game night experience.

Set the Scene . . . you'll get preprogrammed lighting effects that will excite players and fans through the entire game night experience. In addition, you'll get custom programming to synchronize lights to four minutes of licensed music you provide.

Simple-to-Use Touchscreen . . . you'll be provided an industrial grade 15-inch smart device with touchscreen to start and stop effects, select dimming levels, and adjust optional features.

Reliable and Versatile . . . your programming will be stored on site and backed up at Control-Link Central™ data center.

Plenty of Options . . . the system is flexible and upgradable so you can add additional features as your needs change.

Responsible Programming . . . we follow industry best practices to minimize the potential impact for those with photosensitivity and encourage facilities to post notifications about the use of flashing lights during events.



Use the provided touchscreen device to start and stop effects, adjust dimming levels, or control optional features.



The number of songs used in your audio programming is flexible to meet your needs. You can choose one four-minute song, eight songs that last 30 seconds each, or any combination up to four minutes.

"I've had people come to the games because they saw the energy and excitement associated with the lights. When the lights first started flashing our baseball players poured out of the dugout and were making a big deal about it. I looked over at the coach and said, 'That is why we got the lights.' Musco had the same kind of excitement that we had. That tells me they believe in the product and know how important it is to our student-athletes, to our fans, and to people like me."

– Dr. Tom Huebner, President
Meridian Community College

Show-Light® Special Effects Package

- ☒ **Easy, Instant Light Management**
Turn your lights on and schedule them from anywhere with your smartphone
- ☒ **Reduced Energy Consumption**
Three levels of dimming for different activities help save energy and costs
- ☒ **Proactive System Monitoring**
24/7 system monitoring means you'll be immediately alerted when any issues arise
- ☒ **Light Shows**
Pre-designed and custom special effects, including lights synchronized to music, add excitement for players and spectators
- ☒ **Easy to Upgrade**
You can expand and customize your Show-Light system as the needs at your facility change



**See Meridian Community College's
light shows in action.**



Take Your Light Shows to the Next Level ATTACHMENT A

With our optional features, you can tap into advanced customization capabilities.

Custom integration provides programming and technical support required to include ribbon boards, scoreboards, video displays, or other third-party DMX or network capable equipment in your light shows.

Our color package includes custom programming and the color luminaires needed to create the effect you want for your facility — from accenting poles with color, to washing seating areas or the field of play in color changing effects.

Tie It All Together . . . from simple programming to more complex solutions, we can help connect and control existing equipment or incorporate new equipment as your needs change.

Add Color . . . by adding optional color changing luminaires you can enhance shows with pops of color, color wash, or accent lighting.

Streamlined Solution . . . if you already have a DMX system, Show-Light® equipment will act as a fully integrated extension of that system.



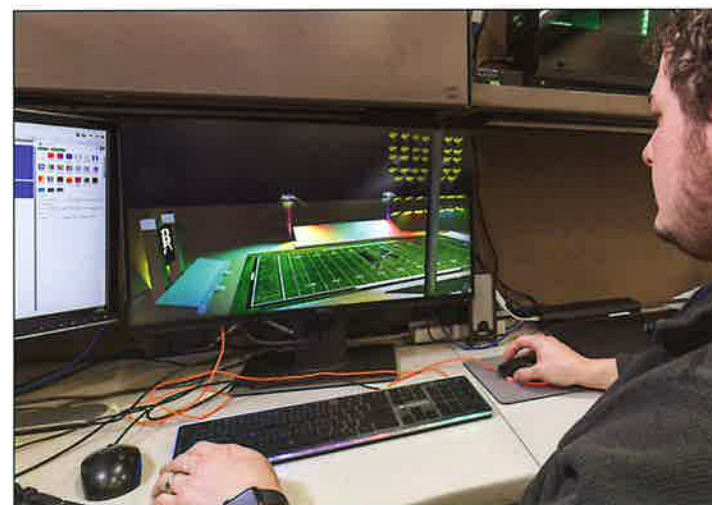
Optional color accent lighting highlights poles or other structures.



With optional color changing luminaires you can choose from over 100 color options to show your team color, highlight special events, or enhance light shows.

"The fan reaction has been great. I look for the lights to be as much of an entertainment vehicle as I do fireworks — seventh inning stretch, when we hit a home run, when we win the game. Everybody loves it, particularly when we make the lights flash and dance to the music."

— Sam Bernabe, President & General Manager
Iowa Cubs



Musco's programming specialists will customize a solution for your facility.

Show-Light® Options

- ✓ **Easy, Instant Light Management**
Turn your lights on and schedule them from anywhere with your smartphone
- ✓ **Reduced Energy Consumption**
Three levels of dimming for different activities help save energy and costs
- ✓ **Proactive System Monitoring**
24/7 system monitoring means you'll be immediately alerted when any issues arise
- ✓ **Light Shows**
Pre-designed and custom special effects, including lights synchronized to music, add excitement for players and spectators
- ✓ **Easy to Upgrade**
You can expand and customize your Show-Light® system as the needs at your facility change
- ✓ **Color-Changing Technology**
Add colored pole accent lights or color washing capabilities with over 100 color options
- ✓ **Advanced Integration**
Add scoreboards, ribbon boards, other light sources, and video displays into light shows with custom integration



See Estadio Universitario's
light shows in action.

Innovative, Streamlined Communications

Managed by Our Team 24/7/365

Each component of your control system is designed, factory-built and tested for seamless operation and integration with your lighting system.

Proven Technology, Innovated . . . Musco's advanced powerline communication technology provides robust control and monitoring for the system.

Reliable Installation and Operation . . . communication cables to the lights are eliminated, saving installation costs. Lights may be scheduled remotely or operated manually on site with a key switch.

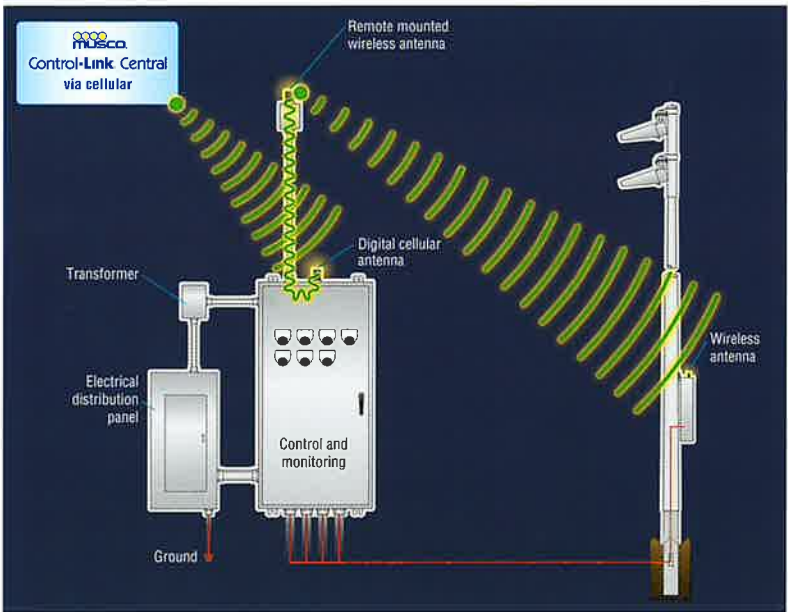
Safety Features . . . electricity is only on when the system is in use, with built-in fusing and surge protection.

Monitoring and Support . . . our Control-Link Central™ Team monitors your system 24/7/365 to ensure schedules execute and to provide assistance.

ATTACHMENT A

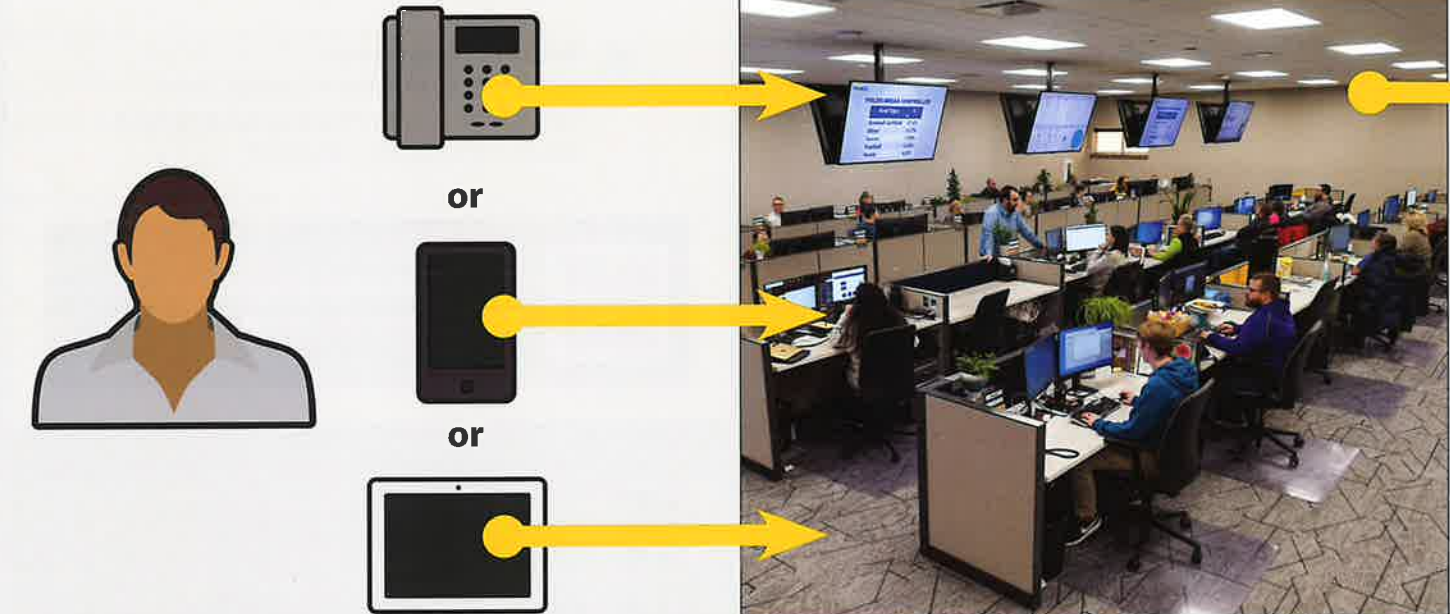
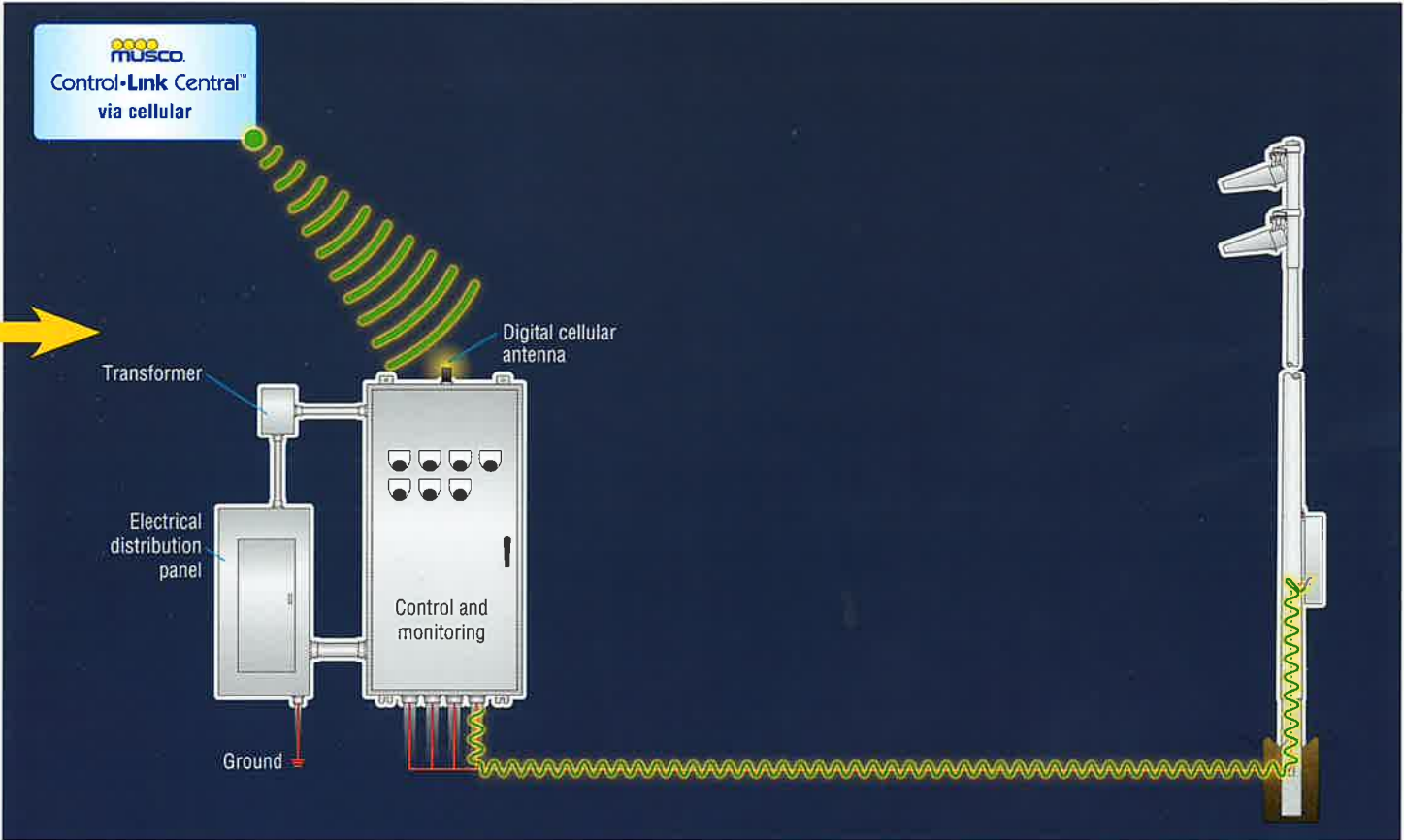
Wireless Communication

An optional wireless mesh network is available depending on your project requirements



Powerline Communication System™

Uses supply wiring for control commands and monitoring feedback



1) Enter schedules at your convenience

Based on security levels, users schedule field lighting and other equipment such as door locks, concession stands, and security lights from any location via website, smartphone app, or phone call.

2) Control-Link Central™ data center routes schedules, with 24/7/365 team member support

Schedules are received, routed to your site, and backed up at the Control-Link Central data center, where our staff provides scheduling support and verification, and monitors your lighting system operation.

3) Schedules are stored on-site

Schedules are transmitted to your facility via cellular technology and stored in the on-site equipment controller.

4) Equipment is controlled automatically with on-site show controls

Lights are operated per your schedules via Musco's Powerline Communication System technology. You can control optional Show-Light® features with the on-site tablet.

5) Continuous monitoring

Entire system is monitored during operation and the Control-Link Central Team is notified of any issues.



Unequaled performance . . .
for your budget, for the environment.



We Make It Happen.

www.musco.com

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Phone: 800.825.6030

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