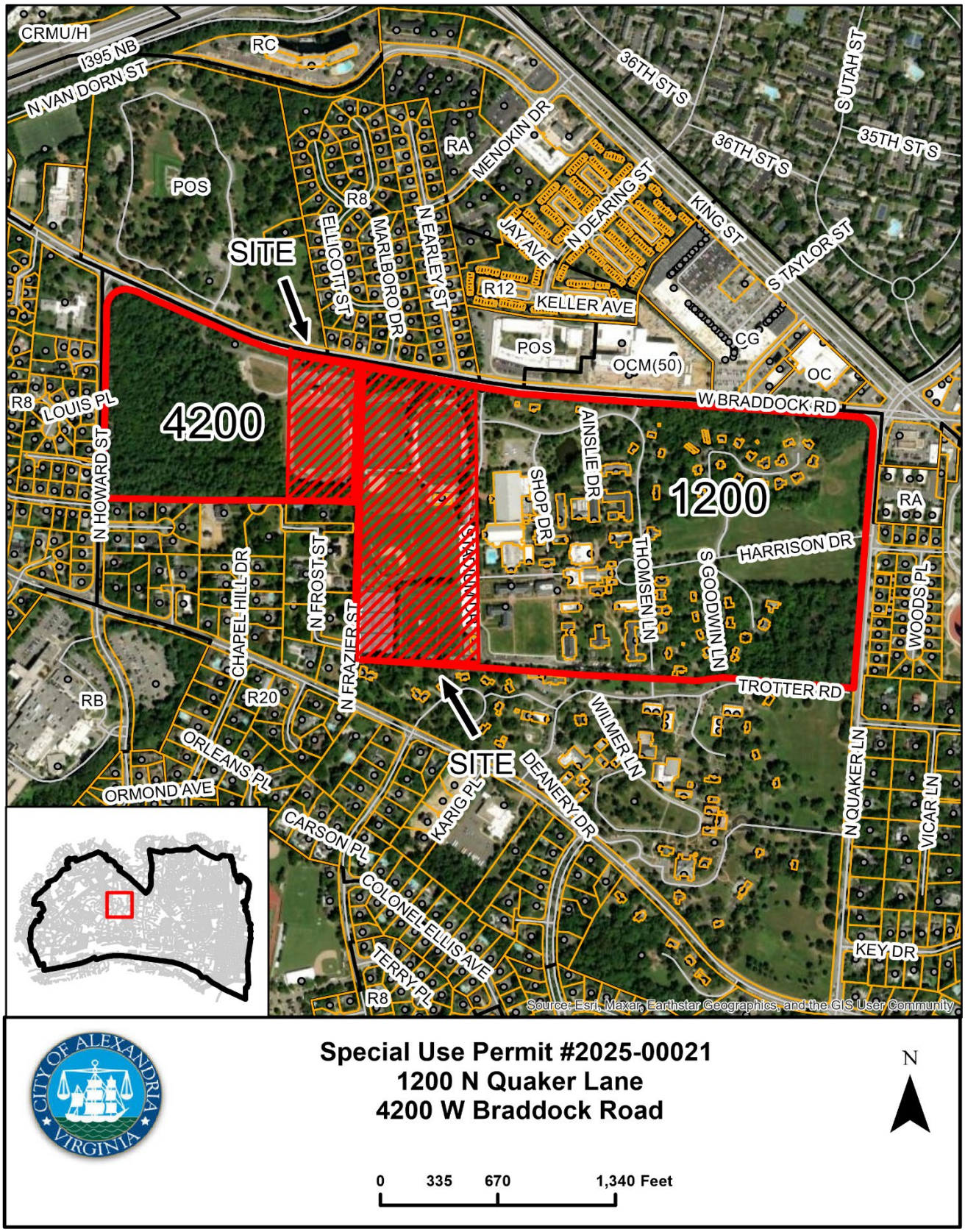
Docket Item #13
Special Use Permit #2025-00021
1200 North Quaker Lane & 4200 West Braddock Road
Episcopal High School Athletic Field Lighting

Application	General Data	
Request: Public hearing and consideration of a request to add lighting to athletic fields and courts on the Episcopal High School campus.	**Planning Commission Hearing:**	May 6, 2025
	City Council Hearing:	May 17, 2025
Address: 1200 North Quaker Lane & 4200 West Braddock Road	**Zone:**	R-20/Residential Zone
Applicant: The Protestant Episcopal High School in Virginia, represented by Duncan Blair, Esq.	**Small Area Plan:**	Seminary Hill/Strawberry Hill

Staff Recommendation: APPROVAL subject to compliance with all applicable codes and ordinances and the recommended Special Use Permit conditions found in Section IV of this report.

Staff Reviewers: Bill Cook, Urban Planner, P&Z
Tony LaColla, Division Chief, Land Use Services, P&Z



Special Use Permit #2025-00021
1200 N Quaker Lane
4200 W Braddock Road

N

0 335 670 1,340 Feet

I. DISCUSSION

REQUEST

The applicant, the Protestant Episcopal High of Virginia, requests Special Use Permit (SUP) approval to allow athletic field lighting for courts and athletic fields located on the academic campus at 1200 North Quaker Lane.

SITE DESCRIPTION

Episcopal High School sits on 130-acres and occupies one of the largest contiguously owned parcels in the City. The property is bounded by West Braddock Road to the north, North Quaker Lane to the east, Seminary Road to the south and North Howard Street to the west. All four streets are anchored by DASH bus service. The property provides several access points controlled by security staff. The size, layout and functional aspects of the property more resemble a university campus than a conventional high school. Students and dedicated faculty live on campus year-round, and staff also live within and supervise the gender-separated student residences. The 130-acre campus is contiguous to the Virginia Theological Seminary to the south and single-unit residences to the southwest. The School itself is located centrally within the Seminary Hill neighborhood.

Recent development and land use approvals include a campus expansion to construct two dormitories, a health and wellness center and site improvements (DSUP#2019-0026), a new athletic field (DSUP#2018-0019), a set of faculty town homes (SUP#2017-0022, et al.), and the Centennial Gym Expansion in 2008 (DSUP#2007-0033). The campus itself is governed under DSUP#2011-0017, Townsend Hall Addition.

BACKGROUND

According to the applicant, Episcopal High School has been considering the addition of athletic field lighting for over a year as part of campus-wide capital improvements. Plans have accelerated since the School was approved to serve as a private training site for football (soccer) teams participating in FIFA Club World Cup 2025 being hosted at Audi Field in Washington, D.C. this summer. The School has also been approved to serve as a team training site for next summer's FIFA World Cup 2026 tournament to be held in various cities throughout North America.

The initial installation of the lighting project will be on the School's Track Field and Hummel Bowl stadium. The poles for these two areas will also light an adjacent practice field. These areas have all been identified on the campus plan submitted with this application. The lights to be installed on the Track Field are required to meet the FIFA training site standards. It is anticipated that the Track Field and adjacent fields and facilities will also be utilized as an official private training site for a team. In addition to lights being installed on the Track Field and Hummel Bowl, lights will be installed on the School's soccer, baseball, softball, field hockey/lacrosse fields as well as the tennis courts as part of a multi-year capital improvement program for EHS.

PROPOSAL

Episcopal High School proposes to install lighting on campus outdoor athletic fields and courts as an accessory congregate recreational facility use to the principal use of the property as a private academic school. A total of 47 light poles are proposed ranging in heights from 40 feet to 100 feet. A schedule of the poles and site diagram is shown in *Image 1*. Due to the layout of the facilities several poles can provide lighting for multiple fields by having luminaires (fixtures) in different directions, and many poles have luminaires installed at different heights along the length of the pole. Typical light pole constructions are shown in *Image 2*.

The lighting contractor is Musco Lighting, which specializes in lighting for sports facilities and has completed other projects in the city for the Department of Recreation Parks and Cultural Activities (RPCA) and Alexandria City Public Schools (ACPS). The plan uses LED luminaires on galvanized steel light poles set on precast concrete bases. The system is designed to comply with the International Dark-Sky Associations (IDA) Community Friendly Outdoor Sports Lighting Program and provide full cutoff lighting that minimizes glare and light spillage onto adjacent properties. The athletic field lights will be connected to a remote facility management system to provide school staff control of the light schedules. Additionally, the applicant has utilized temporary field lighting and requests continued use as part of this SUP until full implementation of permanent improvements.

MASTER PLAN & ZONING DESIGNATION

Seminary Hill/Strawberry Hill
The project site is located in the Seminary Hill/Strawberry Hill Small Area Plan (the "SAP"). The SAP identifies the specific neighborhood of the project site as Seminary Hill. A major goal of the SAP is to preserve and protect the character of residential uses in the Seminary Hill/ Strawberry Hill area from incompatible and intensive redevelopment and to ensure preservation of open space. Episcopal High School has operated a private boarding school on the site for almost 200 years.

R-20 Zone
Private schools are a special use within the R-20 zone. The Applicant has operated a private boarding school on the site since 1839, and the 130-acre campus is restricted from the public. The campus itself is notable for its orderly master planning and unique architectural portfolio. It is home to 450 students (both male and female) as well as a number of faculty who live on site.

Lighting for Congregate Recreational Facilities and Dog Parks
With an SUP, the height of athletic field lighting can be increased beyond what would be permitted in the R-20 zone, subject to limitations, when demonstrated that additional height would mitigate lighting impacts to surrounding property. The maximum height permitted for non-residential structures in the R-20 zone is 40 feet.

II. COMMUNITY

According to the applicant, discussions with the surrounding community and the Seminary Hill Association have been held over the past year. Additional meetings are to be held in the near-term as the School prepares the priority fields associated with FIFA team usage this summer. The applicant has stated that representatives of the School serve on the Seminary Hill Board, and that the School has regular and open communication with the surrounding community. As longer-term field lighting plans are refined and funded, the School will continue to keep the neighboring properties and larger community informed.

III. STAFF ANALYSIS

Staff supports the request to install athletic field lighting on the Episcopal High School campus, which requires SUP approval to exceed the height limits of the R-20 zone. The proposed lighting would largely comply with Zoning Ordinance Section 6-403(F), as proposed to be amended. The athletic fields identified for high-priority improvements (Track Field, Hummel Bowl and practice field), to support upcoming use by a FIFA team additionally comply with the 35-foot setback requirement per Section 6-403(F)(2)(d).

Staff has included a condition that the applicant continue to work with staff on adjustments to the lighting plans serving the baseball and softball fields and tennis courts. Some poles serving these facilities do not meet the 35-foot setback requirement. These areas are identified for improvements in the longer term, and approval of this SUP would allow the School to move forward with lighting plans for the high-priority facilities. An additional condition extending SUP approval for 10-years allows time for the School to continue to refine and design compliant lighting for the other athletic facilities on campus and coordinate this work with fundraising.

Section 6-403(F)(2) states that the following limitations apply when approving an SUP:

(a) Poles include luminaire assemblies.

The maximum height of all poles for athletic field lighting includes all luminaires, power, and control apparatus.

(b) Poles may be up to 80 feet in height.

As proposed to be amended, the height maximum under this section would be eliminated. Staff supports this amendment, finding that the requirement for an SUP and the other limitations within this section sufficiently provide for public comment and staff evaluation of any community impacts associated with lighting for congregate recreational facilities and dog parks in the city.

(c) The applicant shall demonstrate that the increased pole height will mitigate the impact of lighting in terms of spillage and glare.

The applicant has submitted plans for lighting on all fields, which includes equipment specifications and models of light levels on the fields. Additional models are required to be submitted for review by multiple City departments with an application for a building permit. Ongoing experience in the City has shown that the current LED technology allows for precise control of light direction and intensity that mitigates glare and light spillage, and additional pole height improves such control. All plans are additionally required to comply with other City ordinances and standards pertaining to lighting, so there are multiple regulatory safeguards to address any issues.

(d) Poles shall be setback a minimum of 35 feet from any right-of-way or residential property line.

The light poles proposed for the high-priority fields (Track Field, Hummel Bowl and practice field) are located furthest from adjacent properties and exceed the 35-foot setback requirement. Some of the poles proposed to light the softball field and tennis courts do not yet meet the minimum setback. Staff has included a condition that the applicant continue to refine the lighting design of these areas to achieve zoning compliance. Any lighting must be fully compliant with all city codes and ordinances for a Building Permit to be issued.

(e) Poles may be located in any zone.

The property is in the R-20/Residential zone.

Subject to the conditions stated in Section IV of this report, staff recommends approval of the Special Use Permit request.

IV. RECOMMENDED CONDITIONS

Staff recommends **approval** subject to compliance with all applicable codes and ordinances and the following conditions:

1. This approval is for ten (10) years and must be consistent with the approved lighting plan and light fixtures.

2. Continue to work with staff on the lighting plan for the tennis courts, softball and baseball fields, which abut off-campus residential areas.

3. Use of temporary lighting may continue until permanent lighting is installed pursuant to this SUP.

V. GRAPHICS

Image 1: Site Layout, Pole Summary

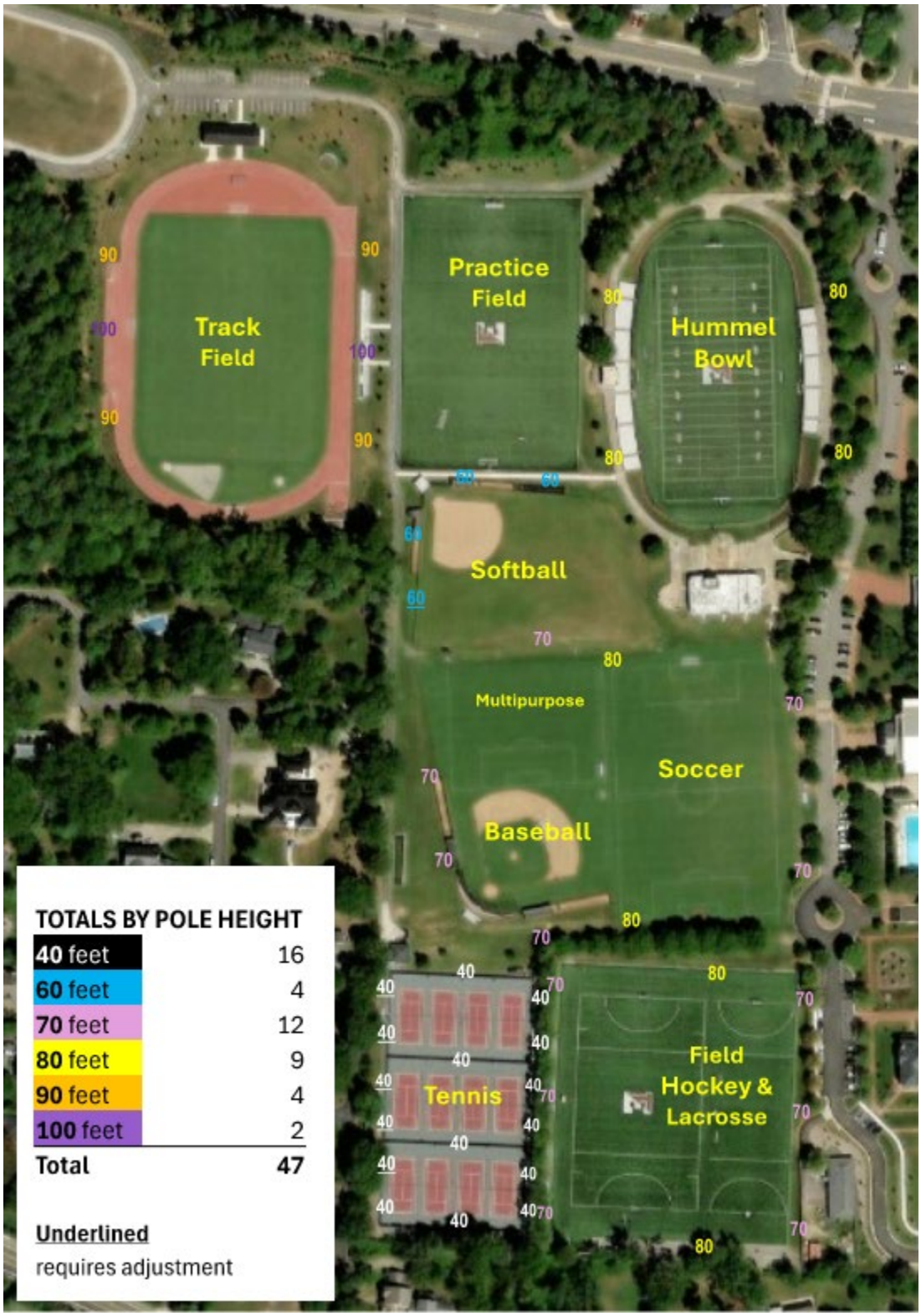
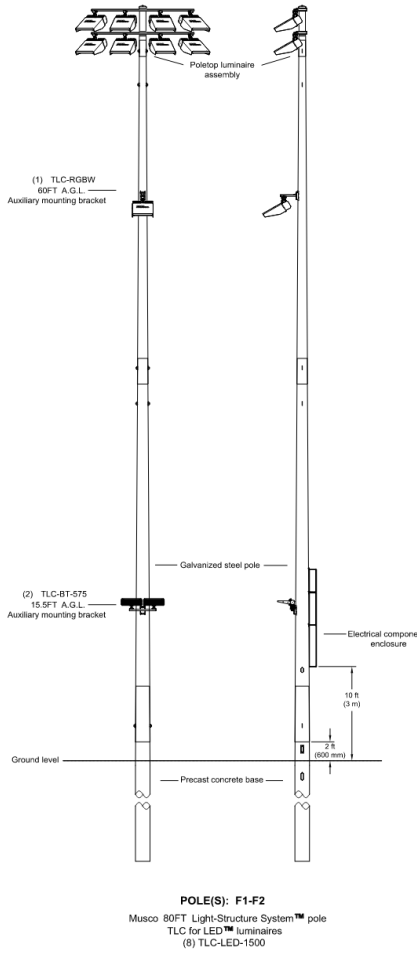
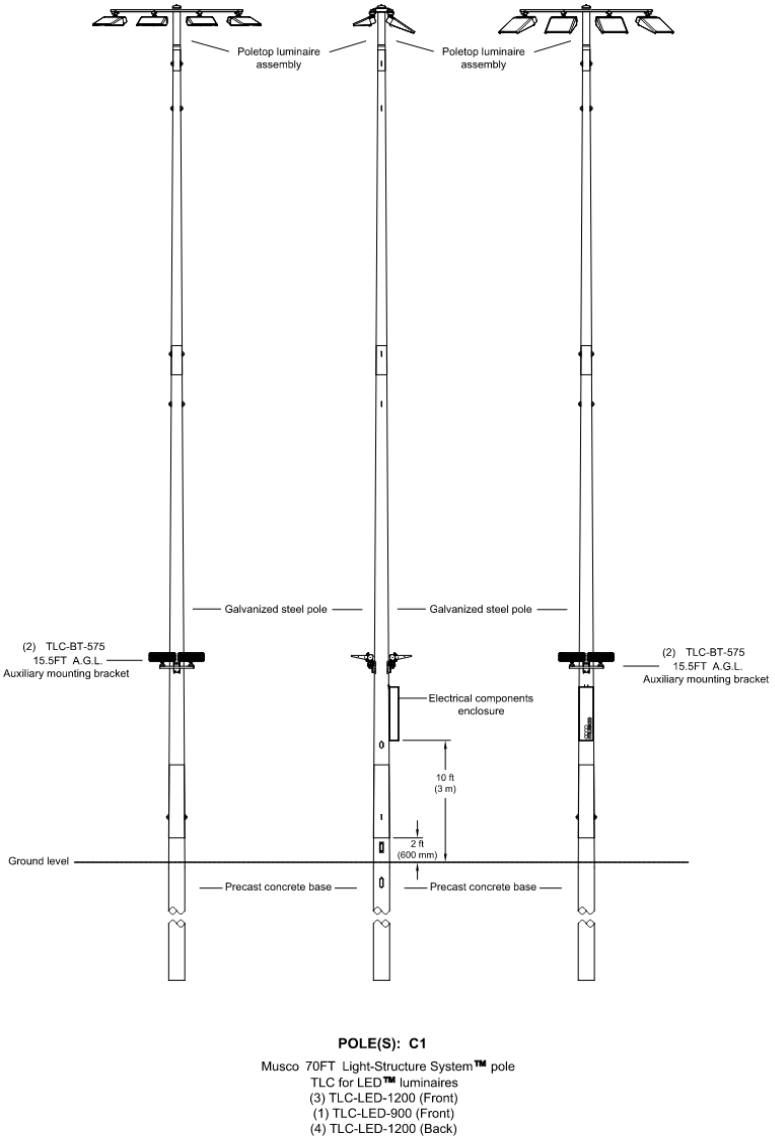


Image 2: Light Pole Elevations with Luminaires and Controls (typical)





Example: Hummel Bowl, 80’ with 8 main luminaires and additional luminaires at 60’ and 15’. (Not to Scale)

Example: Softball & Baseball, 70’ with 8 main luminaires facing opposite sides of pole, and additional luminaires at 15’. (Not to Scale)

APPLICATION
SPECIAL USE PERMIT

SPECIAL USE PERMIT # _____

PROPERTY LOCATION: 1200 N. Quaker Lane & 4200 West Braddock Road, Alexandria, Virginia

TAX MAP REFERENCE: 31.02 02 06 & 31.01 01 01 **ZONE:** R-20 Residential Zone

APPLICANT:
Name: The Protestant Episcopal High School in Virginia

Address: 1200 North Quaker Lane, Alexandria, Virginia 22302

PROPOSED USE: Special Use Permit to expand the existing private school governed by DSUP#2019-00026 to add accessory lighting on the school's athletic fields on light poles in excess of 35 feet tall.

☑ THE UNDERSIGNED, hereby applies for a Special Use Permit in accordance with the provisions of Article XI, Section 4-11-500 of the 1992 Zoning Ordinance of the City of Alexandria, Virginia.

☑ THE UNDERSIGNED, having obtained permission from the property owner, hereby grants permission to the City of Alexandria staff and Commission Members to visit, inspect, and photograph the building premises, land etc., connected with the application.

☑ THE UNDERSIGNED, having obtained permission from the property owner, hereby grants permission to the City of Alexandria to post placard notice on the property for which this application is requested, pursuant to Article IV, Section 4-1404(D)(7) of the 1992 Zoning Ordinance of the City of Alexandria, Virginia.

☑ THE UNDERSIGNED, hereby attests that all of the information herein provided and specifically including all surveys, drawings, etc., required to be furnished by the applicant are true, correct and accurate to the best of their knowledge and belief. The applicant is hereby notified that any written materials, drawings or illustrations submitted in support of this application and any specific oral representations made to the Director of Planning and Zoning on this application will be binding on the applicant unless those materials or representations are clearly stated to be non-binding or illustrative of general plans and intentions, subject to substantial revision, pursuant to Article XI, Section 11-207(A)(10), of the 1992 Zoning Ordinance of the City of Alexandria, Virginia.

Duncan W. Blair, Attorney-Agent		3/21/25
Print Name of Applicant or Agent	Signature	Date
700 N. Fairfax Street	703 778-1444	None
Mailing/Street Address	Telephone #	Fax #
Alexandria, Virginia 22314	dblair@wiregill.com	
City and State Zip Code	Email address	

PROPERTY OWNER'S AUTHORIZATION

As the property owner of 1200 N. Quaker Lane & 4200 West Braddock Road, Alexandria, Virginia (Property Address), I hereby grant the applicant authorization to apply for the Accessory lights on the School's athletic fields. (use) use as described in this application.

Name: The Protestant Episcopal High School in Virginia Phone 703 778 1444

Please Print

Address: 1200 North Quaker Lane, Alexandria, Virginia 22302 Email: dblair@wiregill.com

Signature: BY: [signature] **Date:** 3 21 2025

Duncan W. Blair, Attorney Agent

1. Floor Plan and Plot Plan. As a part of this application, the applicant is required to submit a floor plan and plot or site plan with the parking layout of the proposed use. The SUP application checklist lists the requirements of the floor and site plans. The Planning Director may waive requirements for plan submission upon receipt of a written request which adequately justifies a waiver.

[✓] **Required floor plan and plot/site plan attached.**

[ ] **Requesting a waiver. See attached written request.**

2. The applicant is the *(check one)*:

[✓] Owner

[ ] Contract Purchaser

[ ] Lessee or

[ ] Other: _____ of the subject property.

State the name, address and percent of ownership of any person or entity owning an interest in the applicant or owner, unless the entity is a corporation or partnership, in which case identify each owner of more than three percent.

The Protestant Episcopal High School in Virginia is a Virginia nonstock corporation governed by a twenty-six member Board of Trustees. The corporation has no members.

OWNERSHIP AND DISCLOSURE STATEMENT

Use additional sheets if necessary

1. Applicant. State the name, address and percent of ownership of any person or entity owning an interest in the applicant, unless the entity is a corporation or partnership, in which case identify each owner of more than three percent. The term ownership interest shall include any legal or equitable interest held at the time of the application in the real property which is the subject of the application.

Name	Address	Percent of Ownership
1. The Protestant Episcopal High School in Virginia "EHS"	1200 North Quaker Lane, Alex. Va.	100%
2.		
3.		

2. Property. State the name, address and percent of ownership of any person or entity owning an interest in the property located at 1200 N. Quaker Lane and 4200 and 4200 W. Braddock Road. (address), unless the entity is a corporation or partnership, in which case identify each owner of more than three percent. The term ownership interest shall include any legal or equitable interest held at the time of the application in the real property which is the subject of the application.

Name	Address	Percent of Ownership
1. EHS	1200 North Quaker Lane, Alex. Va.	100%
2.		
3.		

3. Business or Financial Relationships. Each person or entity indicated above in sections 1 and 2, with an ownership interest in the applicant or in the subject property are require to disclose **any** business or financial relationship, as defined by Section 11-350 of the Zoning Ordinance, existing at the time of this application, or within the12-month period prior to the submission of this application with any member of the Alexandria City Council, Planning Commission, Board of Zoning Appeals or either Boards of Architectural Review. **All fields must be filled out completely. Do not leave blank. (If there are no relationships please indicated each person or entity and "None" in the corresponding fields).**

For a list of current council, commission and board members, as well as the definition of business and financial relationship, click here.

Name of person or entity	Relationship as defined by Section 11-350 of the Zoning Ordinance	Member of the Approving Body (i.e. City Council, Planning Commission, etc.)
1. EHS	NONE	
2.		
3.		

NOTE: Business or financial relationships of the type described in Sec. 11-350 that arise after the filing of this application and before each public hearing must be disclosed prior to the public hearings.

As the applicant or the applicant's authorized agent, I hereby attest to the best of my ability that the information provided above is true and correct.

3 22 2025	Duncan W. Blair, Attorney-Agent	
Date	Printed Name	Signature

If property owner or applicant is being represented by an authorized agent such as an attorney, realtor, or other person for which there is some form of compensation, does this agent or the business in which the agent is employed have a business license to operate in the City of Alexandria, Virginia?

[✓] **Yes.** Provide proof of current City business license

[ ] **No.** The agent shall obtain a business license prior to filing application, if required by the City Code.

NARRATIVE DESCRIPTION

3. The applicant shall describe below the nature of the request **in detail** so that the Planning Commission and City Council can understand the nature of the operation and the use. The description should fully discuss the nature of the activity. (Attach additional sheets if necessary.)

See attached Narrative Description.

Special Use Permit Application
1200 North Quaker Lane & 4200 West Braddock Road
Alexandria, Virginia 22302

Project Narrative.

The applicant, The Protestant Episcopal High School in Virginia ("**EHS**" or the "**School**"), is requesting a special use permit to amend Development Special Use Permit (DSUP#2019-00026) governing the use of the property as a private school to permit the installation of lights on light poles excess of thirty-five feet (35") on the School's athletic fields and tennis courts as an accessory use to the principal zoning use of the property as a Private School Academic. The installation of the lights is a multi-year capital improvement program. As part of this application, EHS is requesting the approval be valid for ten (10) years from the date of its approval by the City Council.

The initial installation of the lighting capital improvement project will be on The School's Track Field and Hummel Bowl. The poles for these two areas will also light an adjacent practice field. These areas have all been identified on the campus plan submitted with this application. This Track Field and adjacent fields and facilities on the school's campus will be used in June 2025 as an official private training site for a team participating in the FIFA Club World Cup 2025. The School has also been approved to serve as a training site for FIFA World Cup 26. The lights to be installed on the Track Field are required to meet the FIFA Training Site Standards. It is anticipated that the Track Field and adjacent fields and facilities will also be utilized as an official private training site for a team participating in the FIFA World Cup. It is anticipated that in addition to lights being installed on the Track Field and Hummel Bowl, lights will be installed on the School's Soccer, Baseball, Softball, Field Hockey/Lacrosse fields as well as the tennis courts as part of a multi-year capital improvement program for EHS. Lighting plans prepared by MUSCO Lighting, a leader in sports lighting, for each field are attached to this application. These plans are being submitted together to maximize efficiencies for all parties involved, ensure the best financial package for EHS for this type of capital improvement project, and enable the School to plan for any administrative aspects

of the project to provide thoughtful and healthy use of the lighted space. The addition of athletic field lighting will provide EHS with increased capacity on its fixed resources to support current student use and increasing school and community program needs. Furthermore, with the City's increase in temperatures and number of heatwaves, excessive heat warnings, and events, lighted fields will become more of a necessity to support outdoor activities in a safe manner.

The lights to be installed embrace the latest in light technologies. Full cutoff lights are fixtures that are independently certified by the manufacturers, and do not allow light to be emitted above the fixtures and reduce glare by limiting the light output. Light spill is limited to a defined area surrounding the field as demonstrated on the submitted lighting plans. The lights will only be turned on if the field is actively in use and will be turned off when the activity has ended. It is not anticipated that the installation of the lights will adversely impact the adjoining and surrounding residential property based on the technology of the lighting system and the existing landscape buffers. The City of Alexandria Department of Recreation, Parks and Cultural Activities' recent field lighting projects, also completed by MUSCO Lighting, serve as evidence that the installation and use of this lighting technology will not impact adjoining and surrounding residential properties. The positive impact of the lights will be significant. Simply put, the provision of these lights will enhance and expand athletic opportunities for EHS students and expand the School's ability to support and share its facilities with the community.

USE CHARACTERISTICS

4. The proposed special use permit request is for *(check one):*

[ ] a new use requiring a special use permit,
[ ] an expansion or change to an existing use without a special use permit,
[✓] an expansion or change to an existing use with a special use permit,
[ ] other. Please describe:_____

5. Please describe the capacity of the proposed use:

A. How many patrons, clients, pupils and other such users do you expect?
Specify time period (i.e., day, hour, or shift). No Change from DSUP#2019-00026

B. How many employees, staff and other personnel do you expect?
Specify time period (i.e., day, hour, or shift). No Change from DSUP#2019-00026

6. Please describe the proposed hours and days of operation of the proposed use: No Change from DSUP#2019-00026

Day:	Hours:

7. Please describe any potential noise emanating from the proposed use.

A. Describe the noise levels anticipated from all mechanical equipment and patrons.

No Change from DSUP#2019-00026

B. How will the noise be controlled?

No Change from DSUP#2019-00026

8. Describe any potential odors emanating from the proposed use and plans to control them:

No Change from DSUP#2019-00026

9. Please provide information regarding trash and litter generated by the use. No Change from DSUP#2019-00026

A. What type of trash and garbage will be generated by the use? (i.e. office paper, food wrappers)

No Change from DSUP#2019-00026

B. How much trash and garbage will be generated by the use? (i.e. # of bags or pounds per day or per week) No Change from DSUP#2019-00026

C. How often will trash be collected?

No Change from DSUP#2019-00026

D. How will you prevent littering on the property, streets and nearby properties?

No Change from DSUP#2019-00026

10. Will any hazardous materials, as defined by the state or federal government, be handled, stored, or generated on the property?

[ ] Yes. [✓] No.

If yes, provide the name, monthly quantity, and specific disposal method below:

11. Will any organic compounds, for example paint, ink, lacquer thinner, or cleaning or degreasing solvent, be handled, stored, or generated on the property?

[ ] Yes. [✓] No.

If yes, provide the name, monthly quantity, and specific disposal method below:

12. What methods are proposed to ensure the safety of nearby residents, employees and patrons?

No Change from DSUP#2019-00026

ALCOHOL SALES

13.

A. Will the proposed use include the sale of beer, wine, or mixed drinks?

[ ] Yes [✓] No

If yes, describe existing (if applicable) and proposed alcohol sales below, including if the ABC license will include on-premises and/or off-premises sales.

PARKING AND ACCESS REQUIREMENTS

14. A. How many parking spaces of each type are provided for the proposed use:

No Change from DSUP#2019-00026

_____ Standard spaces

_____ Compact spaces

_____ Handicapped accessible spaces.

_____ Other.

Planning and Zoning Staff Only
Required number of spaces for use per Zoning Ordinance Section 8-200A_____
Does the application meet the requirement? [ ] Yes [ ] No

B. Where is required parking located? *(check one)*

No Change from DSUP#2019-00026

[✓] on-site

[ ] off-site

If the required parking will be located off-site, where will it be located?

_____

PLEASE NOTE: Pursuant to Section 8-200 (C) of the Zoning Ordinance, commercial and industrial uses may provide off-site parking within 500 feet of the proposed use, provided that the off-site parking is located on land zoned for commercial or industrial uses. All other uses must provide parking on-site, except that off-street parking may be provided within 300 feet of the use with a special use permit.

C. If a reduction in the required parking is requested, pursuant to Section 8-100 (A) (4) or (5) of the Zoning Ordinance, complete the PARKING REDUCTION SUPPLEMENTAL APPLICATION.

[ ] Parking reduction requested; see attached supplemental form

15. Please provide information regarding loading and unloading facilities for the use:

No Change from DSUP#2019-00026

A. How many loading spaces are available for the use? _____

Planning and Zoning Staff Only
Required number of loading spaces for use per Zoning Ordinance Section 8-200_____
Does the application meet the requirement? [ ] Yes [ ] No

B. Where are off-street loading facilities located? No Change from DSUP#2019-00026

C. During what hours of the day do you expect loading/unloading operations to occur? No Change from DSUP#2019-00026

D. How frequently are loading/unloading operations expected to occur, per day or per week, as appropriate?

No Change from DSUP#2019-00026

16. Is street access to the subject property adequate or are any street improvements, such as a new turning lane, necessary to minimize impacts on traffic flow?

No Change from DSUP#2019-00026

SITE CHARACTERISTICS

17. Will the proposed uses be located in an existing building? [ ] Yes [✓] No

Do you propose to construct an addition to the building? [ ] Yes [✓] No

How large will the addition be? _____ square feet.

18. What will the total area occupied by the proposed use be? Light poles will be added to on the school's athletic fields as shown on the submitted lighting plans.

_____ sq. ft. (existing) + _____ sq. ft. (addition if any) = _____sq. ft. (total)

19. The proposed use is located in: *(check one)*

[ ] a stand alone building
[ ] a house located in a residential zone
[ ] a warehouse
[ ] a shopping center. Please provide name of the center: _____
[ ] an office building. Please provide name of the building: _____
[✓] other. Please describe: On the school's existing athletic fields.

End of Application

Department of Planning & Zoning
Special Use Permit Application Checklist

Supplemental application for the following uses:

- ☐ Automobile Oriented
- ☐ Parking Reduction
- ☐ Signs
- ☐ Substandard Lot
- ☐ Lot modifications requested with SUP use

Interior Floor Plan

- ☐ Include labels to indicate the use of the space (doors, windows, seats, tables, counters, equipment)

If Applicable

- ☑ Plan for outdoor uses

Contextual site image

- ☑ Show subject site, on-site parking area, surrounding buildings, cross streets

CAMPUS PHOTOS

**With lighting projects labeled*


Hummel Bowl
Adjacent
Practice Field
Track Field


Field Hockey and Lacrosse
Tennis Courts
Soccer
Baesball
Softball

TECHNOLOGY COMPARISON

MUSCO Lighting's technology has revolutionized lighting in the outdoor industry. In this exhibit, you will see a comparison of MUSCO lights on the left versus other types of lighting on the right.

TRACK FIELD

Episcopal High School Track Field

Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
F3-F4	80'	80'	5	TLC-LED-1500	7.05 kW	B
S1	90'	90'	4	TLC-LED-1500	5.64 kW	A
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
S2	100'	100'	6	TLC-LED-1500	8.46 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
S3	90'	90'	4	TLC-LED-1500	5.64 kW	A
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
S4	90'	90'	1	TLC-LED-1200	1.17 kW	B
		90'	4	TLC-LED-1500	5.64 kW	A
		90'	5	TLC-LED-1500	7.05 kW	B
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	2	TLC-RGB-U	0.86 kW	A
S5	100'	100'	6	TLC-LED-1500	8.46 kW	A
		19'	2	TLC-RGB-U	0.86 kW	A
S6	90'	90'	1	TLC-LED-1200	1.17 kW	B
		90'	4	TLC-LED-1500	5.64 kW	A
		90'	5	TLC-LED-1500	7.05 kW	B
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	2	TLC-RGB-U	0.86 kW	A
8			**67**		**83.25 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Field	52.71 kW	45
B	Practirce Field	30.54 kW	22

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1200	LED 5700K - 75 CRI	1170W	150,000	>120,000	>120,000	>120,000	10
TLC-LED-1500	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	48
TLC-RGB-U	RED-GREEN (Shown)-BLUE	430W	16,000	21,300	>36,300	>36,300	9

Single Luminaire Amperage Draw Chart

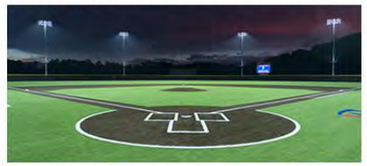
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-RGB-U	3.0	2.9	2.6	2.3	1.8	1.6	1.3

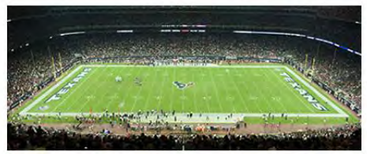
Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Blanket Grid	Horizontal	9.71	0	60	173837.13	27948.06	A	45
Practice Field	Horizontal Illuminance	31.02	20	38	1.93	1.57	B	22
Property Line	Horizontal	0.01	0	0	-	-	A,B	67
Soccer	Ev 270°	41.15	26	56	2.14	1.57	A	45
Soccer	Ev 90°	43.19	26	60	2.33	1.68	A	45
Soccer	Glare Rating	41.49	39	43	1.12	1.07	A	45
Soccer	Horizontal Illuminance	52.52	47	60	1.29	1.13	A	45
Track	Horizontal Illuminance	17.17	1	37	24.91	11.64	A	45

From Hometown to Professional





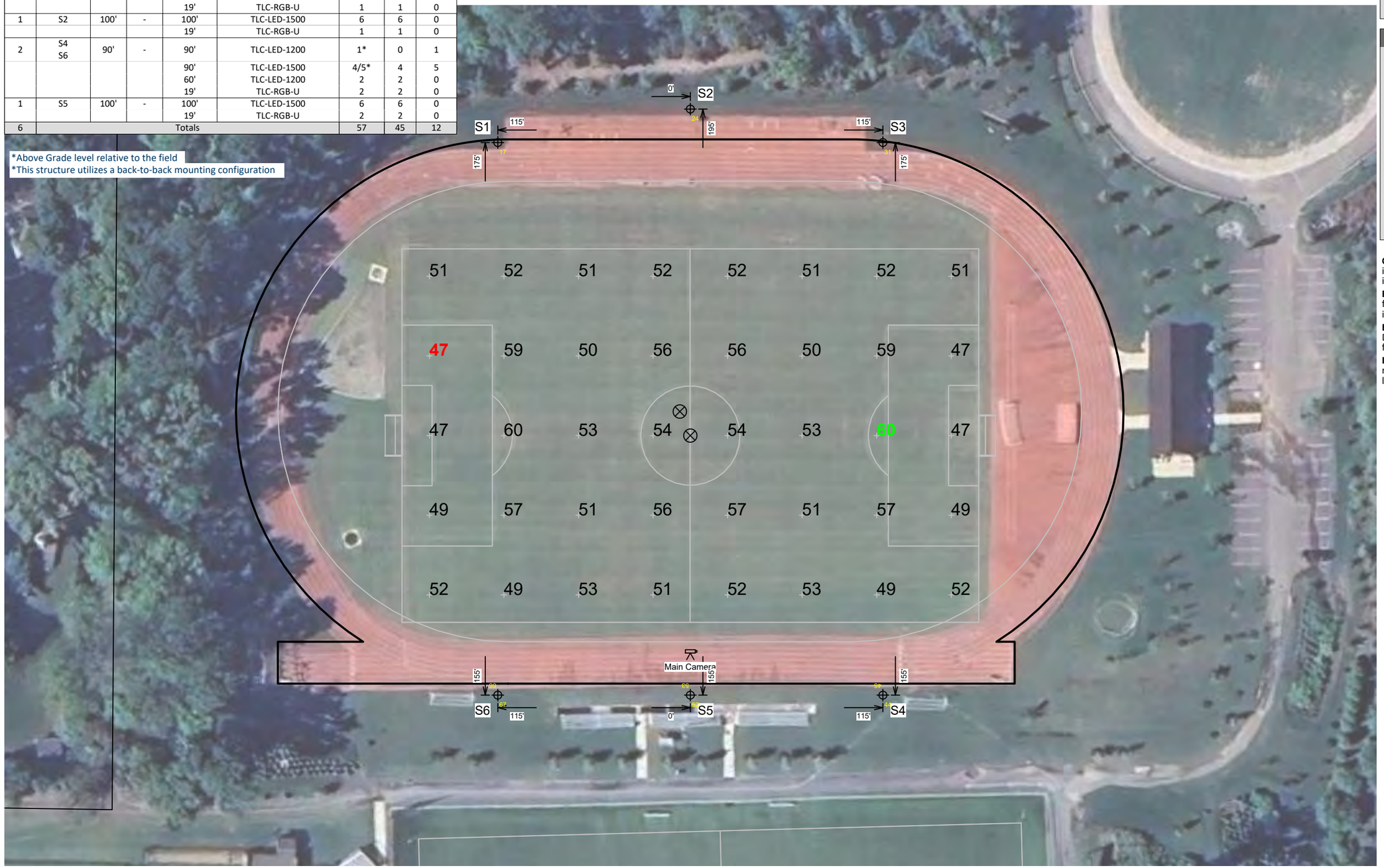
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES	Entire Grid
Guaranteed Average:	**46.45**
Scan Average:	52.52
Maximum:	60
Minimum:	47
Avg/Min:	1.13
Guaranteed Max/Min:	**0.6**
Max/Min:	1.29
UG (adjacent pts):	1.28
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

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

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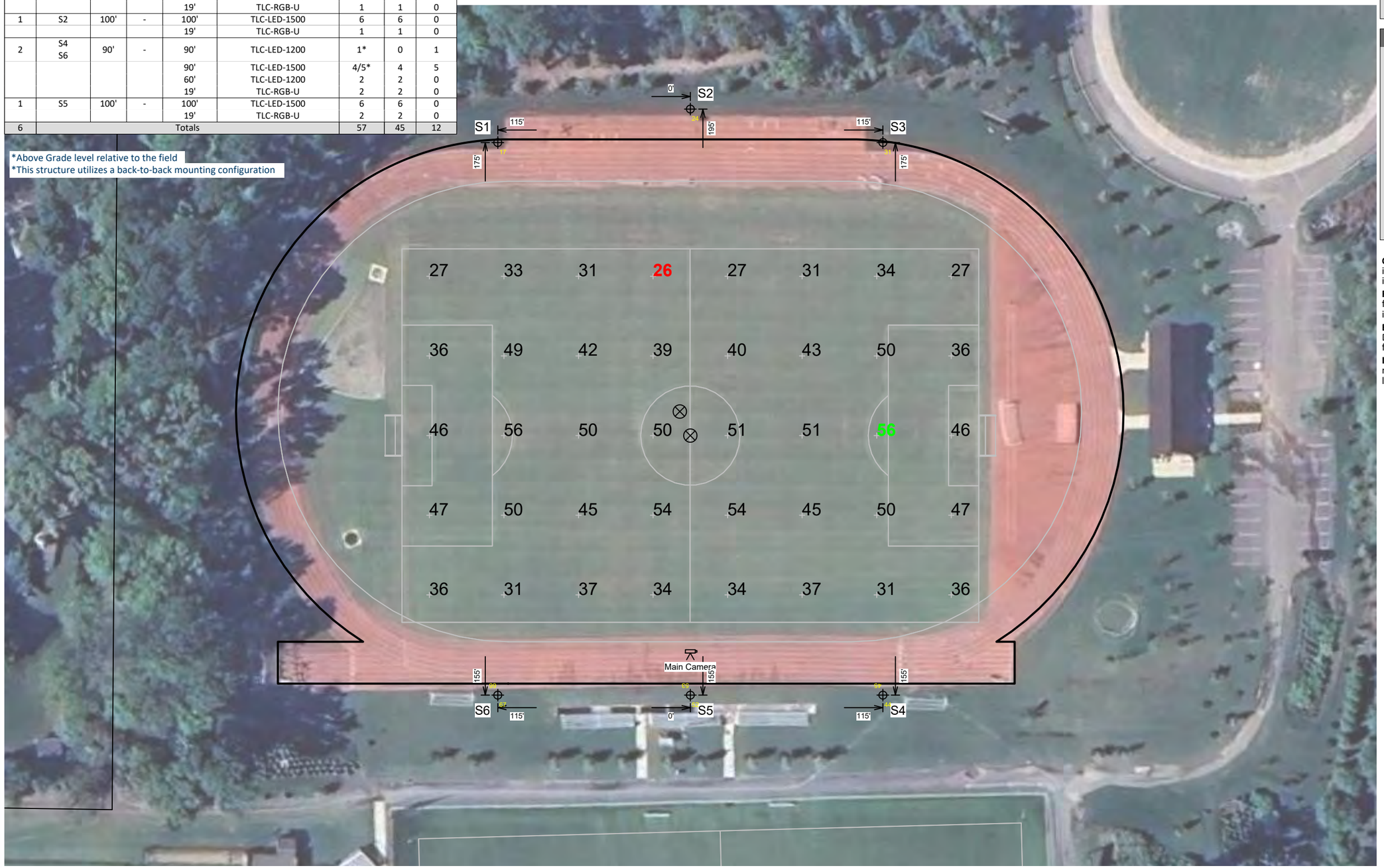
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED FOOTCANDLES FIFA: Ev 270°

	Entire Grid
Guaranteed Average:	**37.16**
Scan Average:	41.15
Maximum:	56
Minimum:	26
Avg/Min:	1.57
Guaranteed Max/Min:	**0.4**
Max/Min:	2.14
UG (adjacent pts):	1.61
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

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90° 0° 180° 270° METER ORIENTATION

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

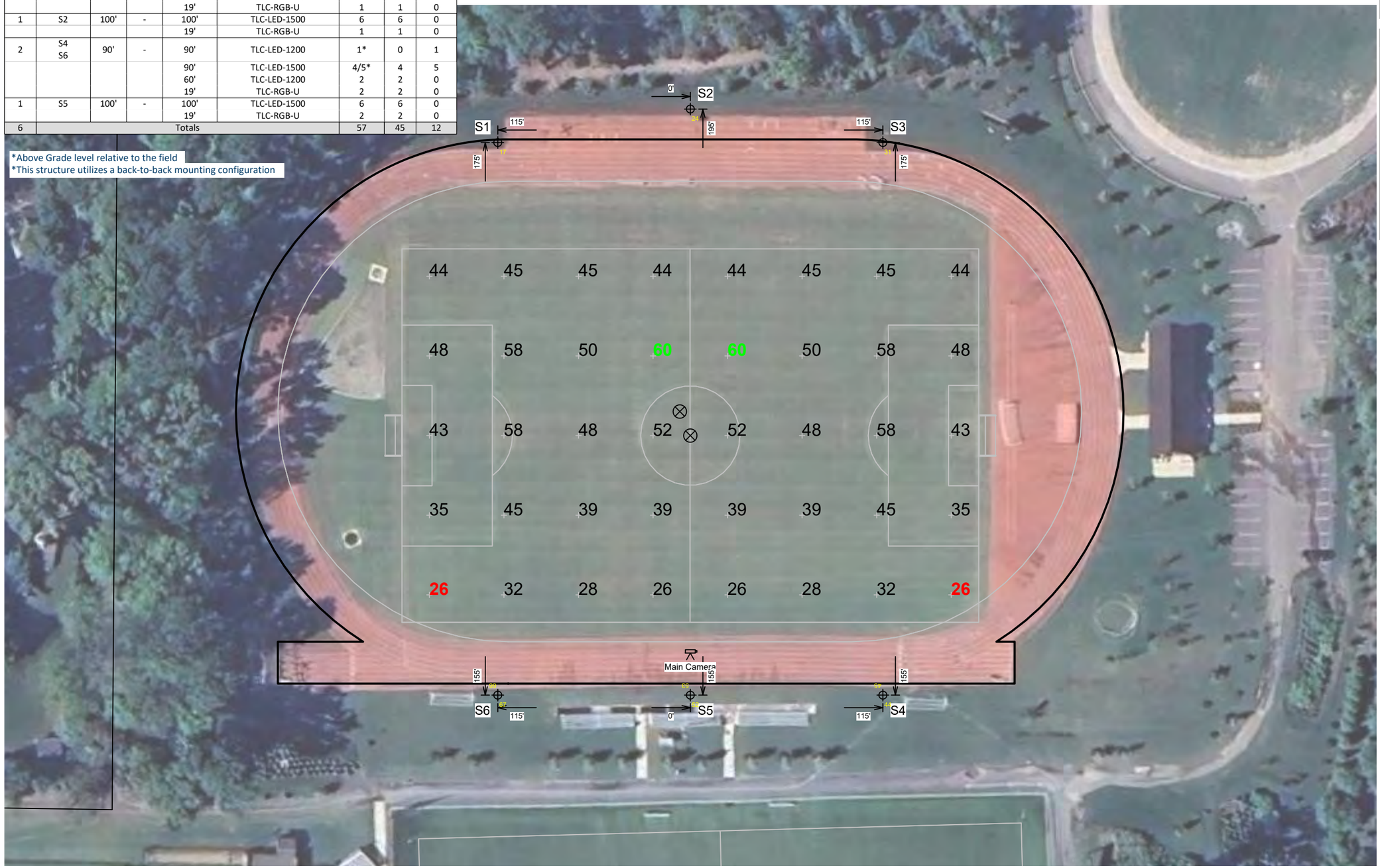
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED FOOTCANDLES FIFA: Ev 90*

	Entire Grid
Guaranteed Average:	**37.16**
Scan Average:	43.19
Maximum:	60
Minimum:	26
Avg/Min:	1.68
Guaranteed Max/Min:	**0.4**
Max/Min:	2.33
UG (adjacent pts):	1.50
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

90° 0° 180° 270°
METER ORIENTATION

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

Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED GLARE RATING: Max Reading	Entire Grid
Scan Average:	**41.49**
Maximum:	43
Minimum:	39
Avg/Min:	1.07
Max/Min:	**1.12**
UG (adjacent pts):	1.05
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

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

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Track**
Size:	Irregular
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Scan Average:	**17.17**
Maximum:	37
Minimum:	1
Avg/Min:	11.64
Max/Min:	**24.91**
UG (adjacent pts):	0.00
CU:	0.11
No. of Points:	48
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

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

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	F3-F4	80'	-	80'	TLC-LED-1500	5*	5	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	1	0
				90'	TLC-LED-1500	4/5*	5	4
				60'	TLC-LED-1200	2	0	2
				19'	TLC-RGB-U	2	0	2
4	Totals					38	22	16

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Practice Field**
Size:	360' x 225'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES	
	Entire Grid
Scan Average:	**31.02**
Maximum:	38
Minimum:	20
Avg/Min:	1.57
Max/Min:	**1.93**
UG (adjacent pts):	1.67
CU:	0.67
No. of Points:	96
LUMINAIRE INFORMATION	
Applied Circuits:	B
No. of Luminaires:	**22**
Total Load:	30.54 kW

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

0' 60' 120'

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

Episcopal High School Track Field

Alexandria,VA

Grid Summary

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

Illumination Summary

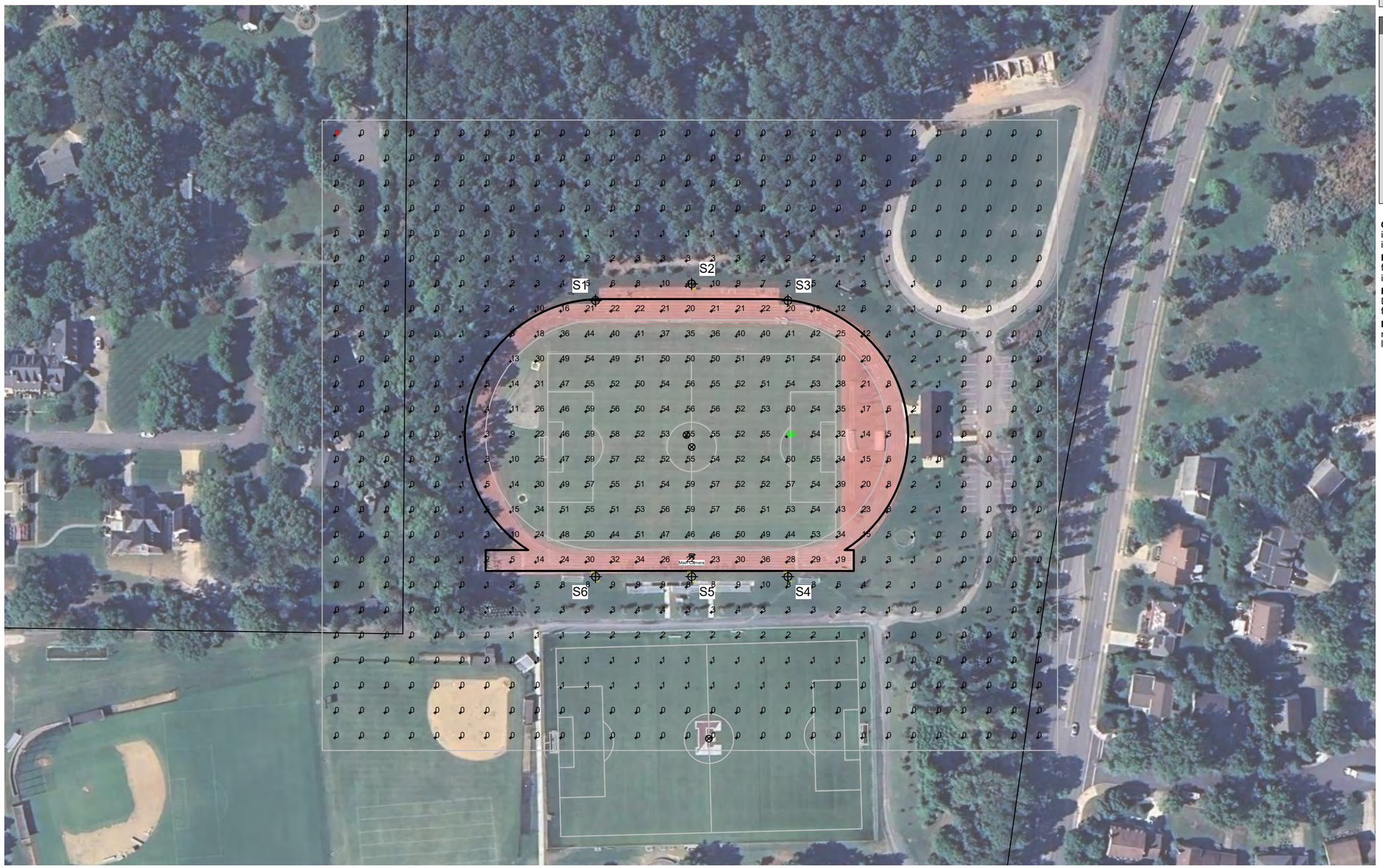
MAINTAINED HORIZONTAL FOOTCANDLES	Entire Grid
Scan Average:	**9.71**
Maximum:	60
Minimum:	0
Avg/Min:	27948.06
Max/Min:	**173837.13**
UG (adjacent pts):	4.33
CU:	0.98
No. of Points:	725
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 120' 240'

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

We Make It Happen.

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES	
	Entire Grid
Scan Average:	**0.01**
Maximum:	0
Minimum:	0
Avg/Min:	-
Max/Min:	**-**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A,B
No. of Luminaires:	**67**
Total Load:	83.25 kW

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

0' 120' 240'

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

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Episcopal High School Track Field

Alexandria,VA

Equipment Layout

INCLUDES:
· Practice Field
· Soccer
· Track

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.

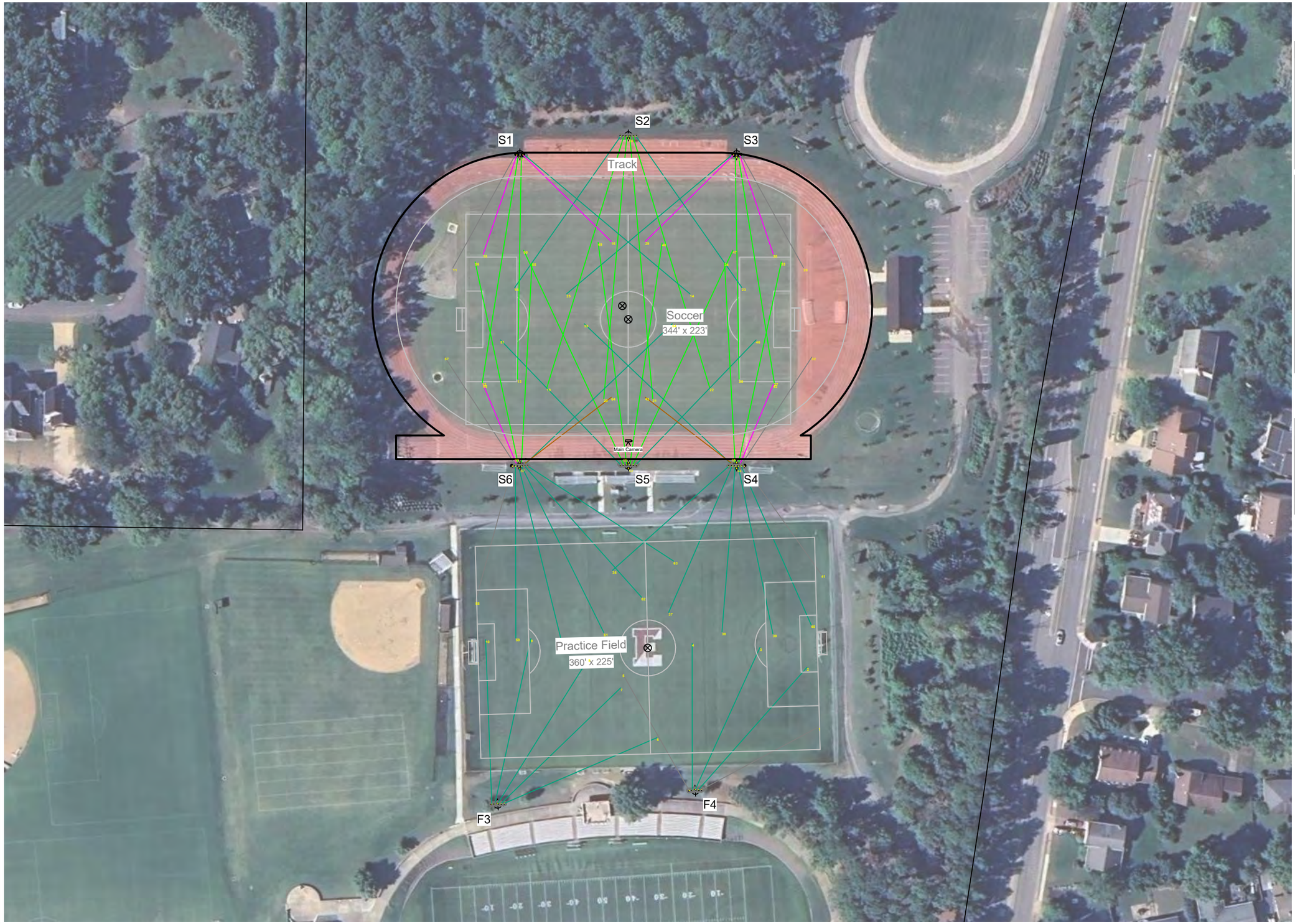
Equipment List For Areas Shown

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	F3-F4	80'	-	80'	TLC-LED-1500	5*
2	S1 S3	90'	-	90' 60' 19'	TLC-LED-1500 TLC-LED-1200 TLC-RGB-U	4 2 1
1	S2	100'	-	100' 19'	TLC-LED-1500 TLC-RGB-U	6 1
2	S4 S6	90'	-	90' 90' 60' 19'	TLC-LED-1200 TLC-LED-1500 TLC-LED-1200 TLC-RGB-U	1* 4/5* 2 2
1	S5	100'	-	100' 19'	TLC-LED-1500 TLC-RGB-U	6 2
8	Totals					67

*This structure utilizes a back-to-back mounting configuration

Single Luminaire Amperage Draw Chart

Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-RGB-U	3.0	2.9	2.6	2.3	1.8	1.6	1.3



SCALE IN FEET 1 : 100

0' 100' 200'

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

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Episcopal High School Track Field

Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
F3-F4	80'	80'	5	TLC-LED-1500	7.05 kW	B
S1	90'	90'	4	TLC-LED-1500	5.64 kW	A
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
S2	100'	100'	6	TLC-LED-1500	8.46 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
S3	90'	90'	4	TLC-LED-1500	5.64 kW	A
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
S4	90'	90'	1	TLC-LED-1200	1.17 kW	B
		90'	4	TLC-LED-1500	5.64 kW	A
		90'	5	TLC-LED-1500	7.05 kW	B
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	2	TLC-RGB-U	0.86 kW	A
S5	100'	100'	6	TLC-LED-1500	8.46 kW	A
		19'	2	TLC-RGB-U	0.86 kW	A
S6	90'	90'	1	TLC-LED-1200	1.17 kW	B
		90'	4	TLC-LED-1500	5.64 kW	A
		90'	5	TLC-LED-1500	7.05 kW	B
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	2	TLC-RGB-U	0.86 kW	A
8			**67**		**83.25 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Field	52.71 kW	45
B	Practirce Field	30.54 kW	22

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1200	LED 5700K - 75 CRI	1170W	150,000	>120,000	>120,000	>120,000	10
TLC-LED-1500	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	48
TLC-RGB-U	RED-GREEN (Shown)-BLUE	430W	16,000	21,300	>36,300	>36,300	9

Single Luminaire Amperage Draw Chart

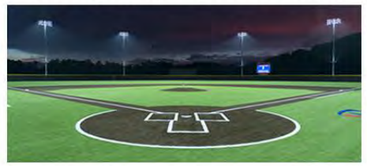
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-RGB-U	3.0	2.9	2.6	2.3	1.8	1.6	1.3

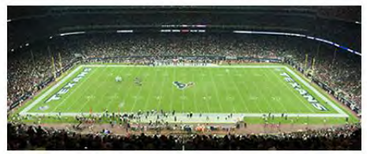
Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Min/Max	Min/Ave		
Blanket Grid	Horizontal	104.51	0	650	0.00	0.00	A	45
Practice Field	Horizontal Illuminance	333.87	213	410	0.52	0.64	B	22
Property Line	Horizontal	0.15	0	1	0.00	0.00	A,B	67
Soccer	Ev 270°	442.99	281	604	0.47	0.64	A	45
Soccer	Ev 90°	464.95	276	645	0.43	0.59	A	45
Soccer	Glare Rating	41.49	39	43	0.90	0.94	A	45
Soccer	Horizontal Illuminance	565.33	502	647	0.78	0.89	A	45
Track	Horizontal Illuminance	184.82	16	395	0.04	0.09	A	45

From Hometown to Professional





We Make It Happen.

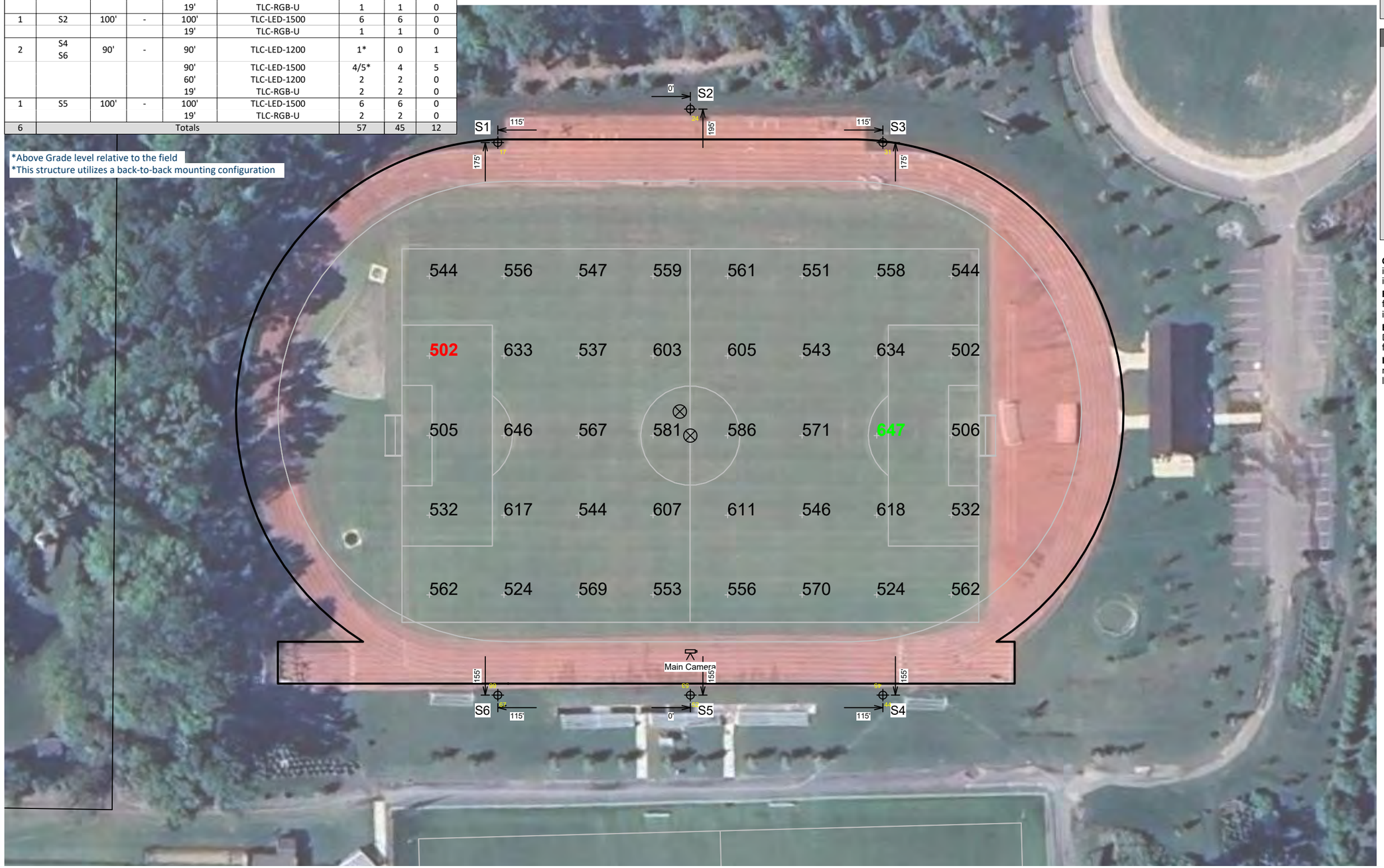
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL LUX
	Entire Grid
Guaranteed Average:	**500**
Scan Average:	565.33
Maximum:	647
Minimum:	502
Min/Avg:	0.89
Guaranteed Min/Max:	**0.6**
Min/Max:	0.78
UG (adjacent pts):	1.28
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

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

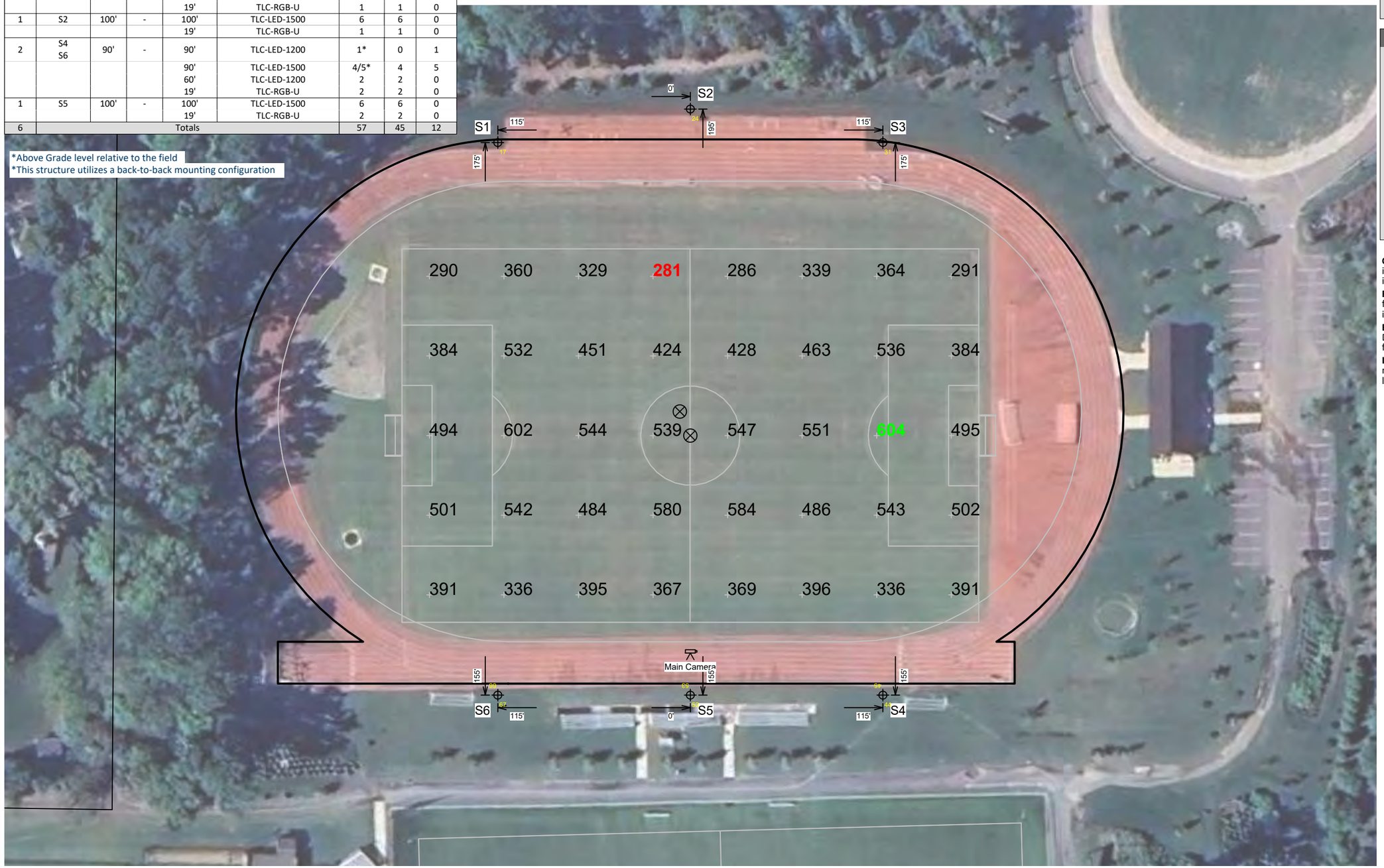
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED LUX FIFA: Ev 270*

	Entire Grid
Guaranteed Average:	**400**
Scan Average:	442.99
Maximum:	604
Minimum:	281
Min/Avg:	0.64
Guaranteed Min/Max:	**0.4**
Min/Max:	0.47
UG (adjacent pts):	1.61
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

90° 0° 180° 270°
METER ORIENTATION

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

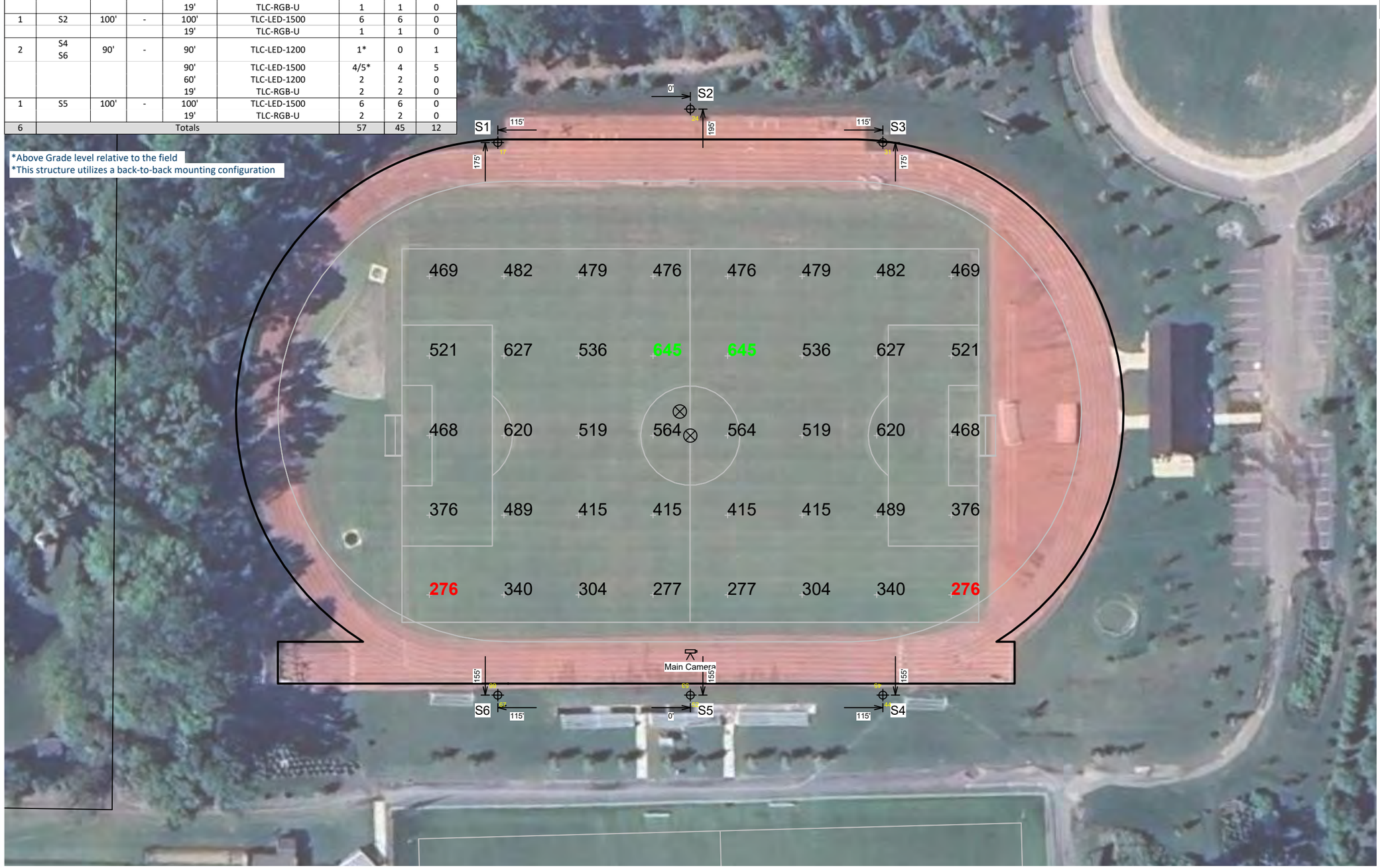
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED LUX FIFA: Ev 90*

	Entire Grid
Guaranteed Average:	**400**
Scan Average:	464.95
Maximum:	645
Minimum:	276
Min/Avg:	0.59
Guaranteed Min/Max:	**0.4**
Min/Max:	0.43
UG (adjacent pts):	1.50
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

90° 0° 180° 270° METER ORIENTATION

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

Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED GLARE RATING: Max Reading	Entire Grid
Scan Average:	**41.49**
Maximum:	43
Minimum:	39
Min/Avg:	0.94
Min/Max:	**0.90**
UG (adjacent pts):	1.05
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

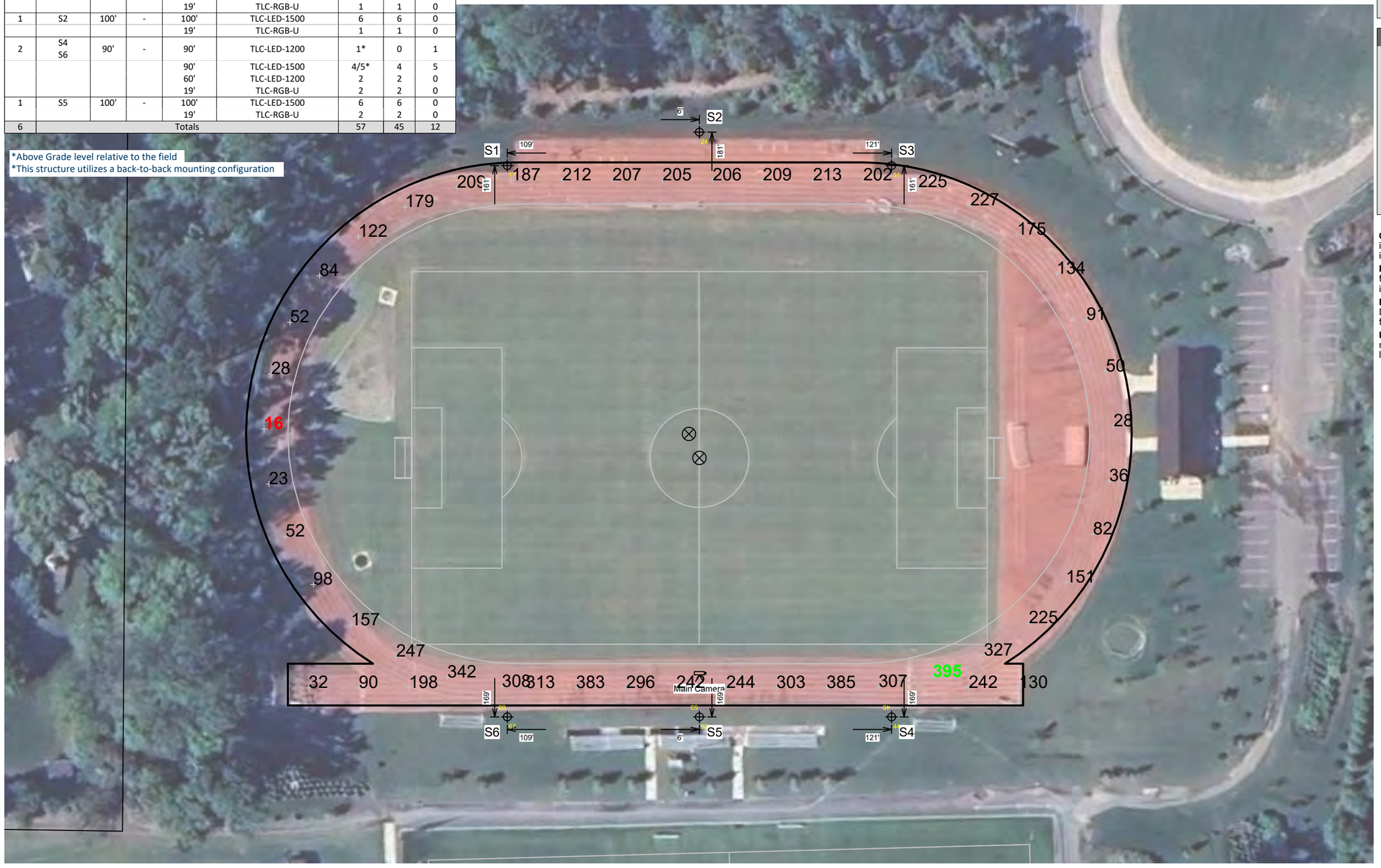
ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

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

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
1	S2	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	1	1	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	2	2	0
1	S5	100'	-	100'	TLC-LED-1500	6	6	0
				19'	TLC-RGB-U	2	2	0
6	Totals					57	45	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Track**
Size:	Irregular
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL LUX
	Entire Grid
Scan Average:	**184.82**
Maximum:	395
Minimum:	16
Min/Avg:	0.09
Min/Max:	**0.04**
UG (adjacent pts):	0.00
CU:	0.11
No. of Points:	48
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

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

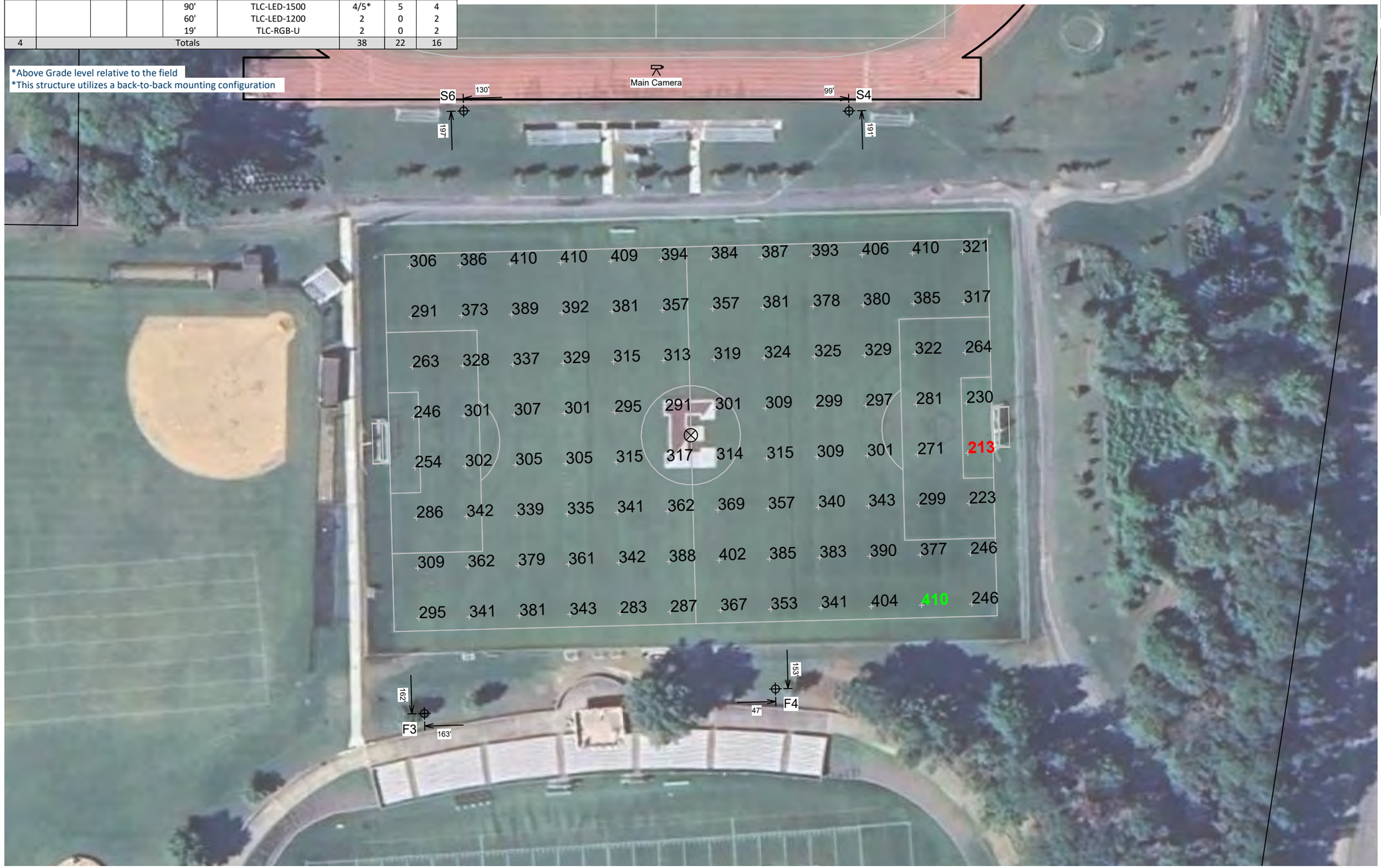
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	F3-F4	80'	-	80'	TLC-LED-1500	5*	5	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	1	0
				90'	TLC-LED-1500	4/5*	5	4
				60'	TLC-LED-1200	2	0	2
				19'	TLC-RGB-U	2	0	2
4	Totals					38	22	16

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Practice Field**
Size:	360' x 225'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL LUX

	Entire Grid
Scan Average:	**333.87**
Maximum:	410
Minimum:	213
Min/Avg:	0.64
Min/Max:	**0.52**
UG (adjacent pts):	1.67
CU:	0.67
No. of Points:	96
LUMINAIRE INFORMATION	
Applied Circuits:	B
No. of Luminaires:	**22**
Total Load:	30.54 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

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

Episcopal High School Track Field

Alexandria,VA

Grid Summary

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

Illumination Summary

MAINTAINED HORIZONTAL LUX

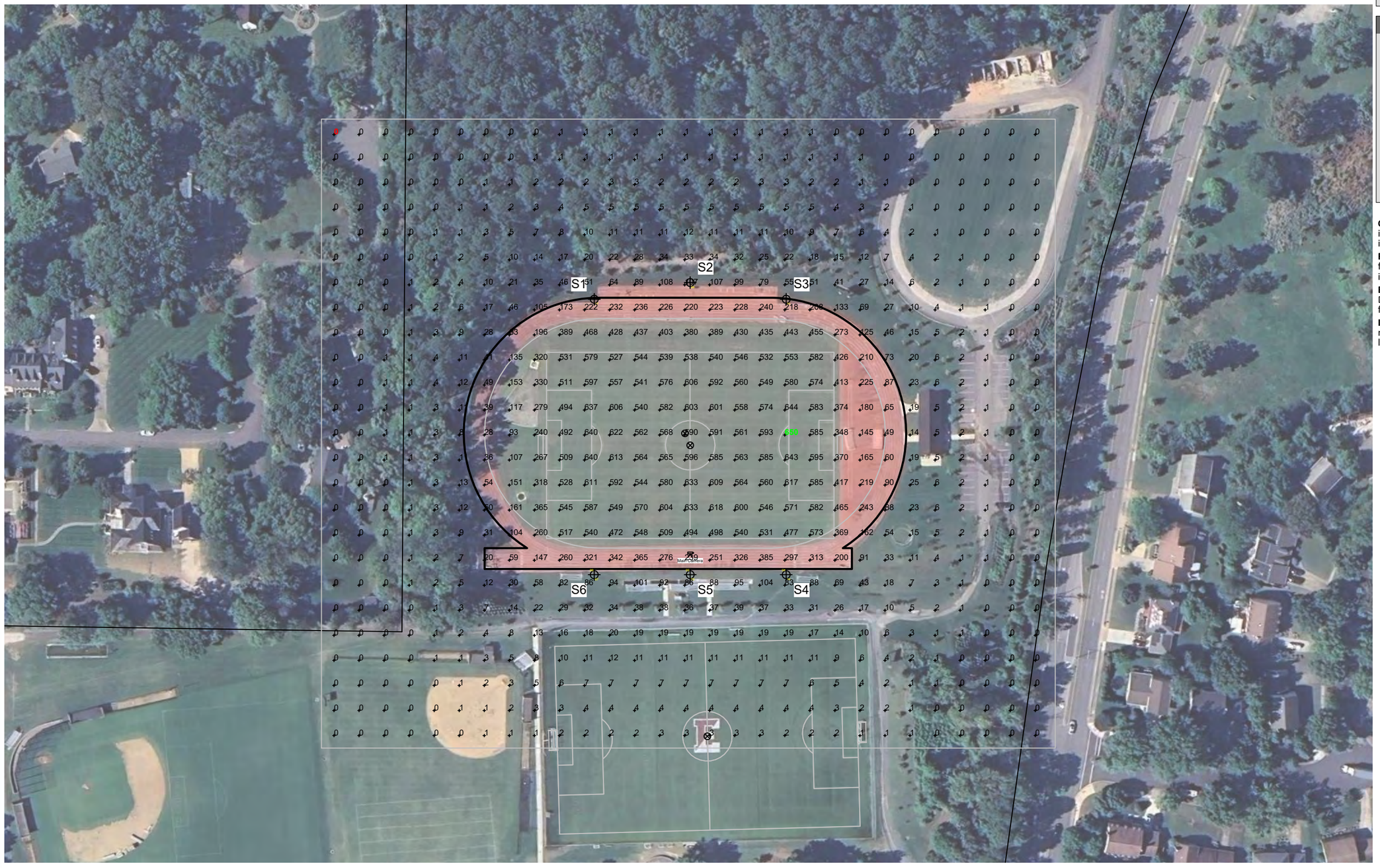
	Entire Grid
Scan Average:	**104.51**
Maximum:	650
Minimum:	0
Min/Avg:	0.00
Min/Max:	**0.00**
UG (adjacent pts):	4.33
CU:	0.98
No. of Points:	725
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**45**
Total Load:	52.71 kW

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

0' 120' 240'

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

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL LUX

	Entire Grid
Scan Average:	**0.15**
Maximum:	1
Minimum:	0
Min/Avg:	0.00
Min/Max:	**0.00**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A,B
No. of Luminaires:	**67**
Total Load:	83.25 kW

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

0' 120' 240'

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

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

Episcopal High School Track Field

Alexandria,VA

Equipment Layout

INCLUDES:
· Practice Field
· Soccer
· Track

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.

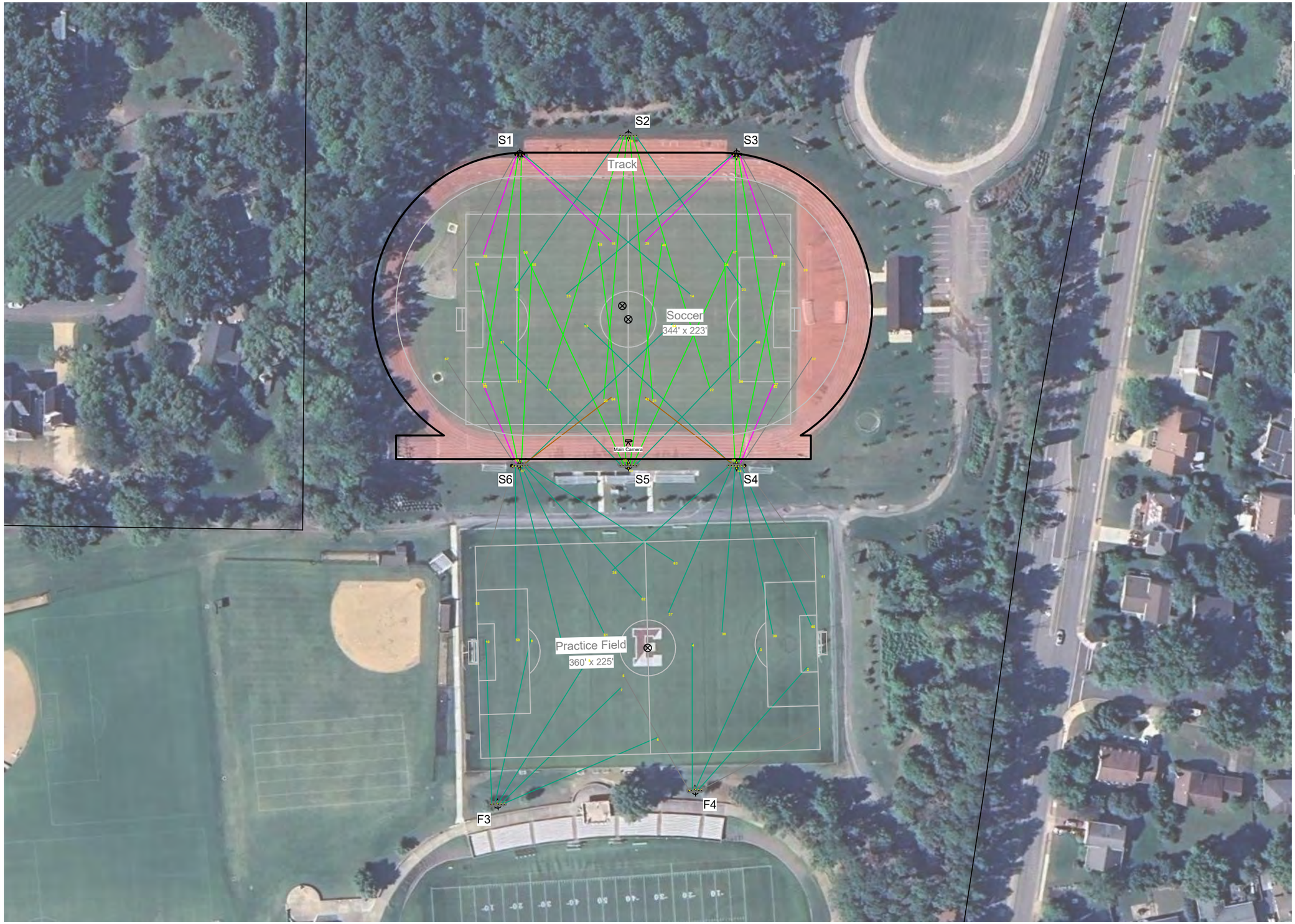
Equipment List For Areas Shown

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	F3-F4	80'	-	80'	TLC-LED-1500	5*
2	S1 S3	90'	-	90' 60' 19'	TLC-LED-1500 TLC-LED-1200 TLC-RGB-U	4 2 1
1	S2	100'	-	100' 19'	TLC-LED-1500 TLC-RGB-U	6 1
2	S4 S6	90'	-	90' 90' 60' 19'	TLC-LED-1200 TLC-LED-1500 TLC-LED-1200 TLC-RGB-U	1* 4/5* 2 2
1	S5	100'	-	100' 19'	TLC-LED-1500 TLC-RGB-U	6 2
8	Totals					67

*This structure utilizes a back-to-back mounting configuration

Single Luminaire Amperage Draw Chart

Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-RGB-U	3.0	2.9	2.6	2.3	1.8	1.6	1.3

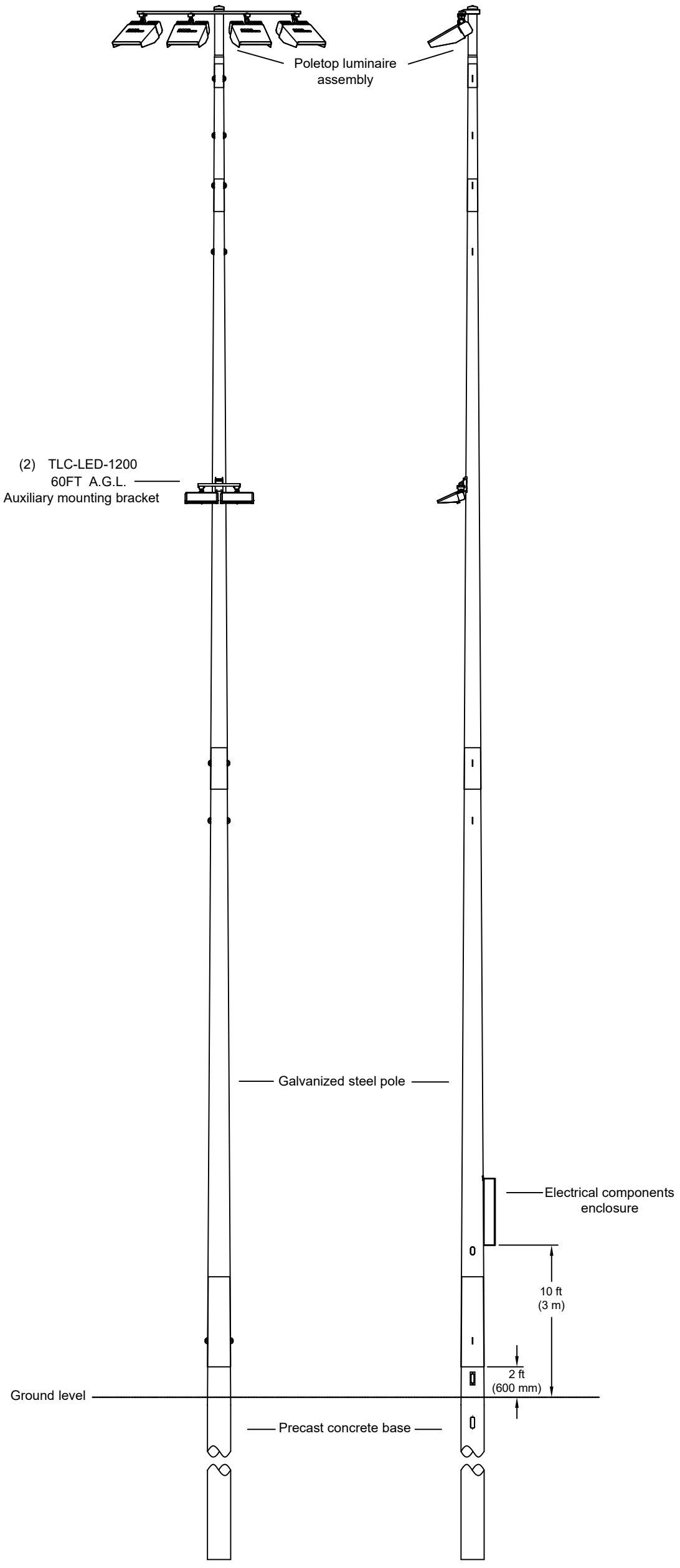


SCALE IN FEET 1 : 100

0' 100' 200'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR3 • 24-Mar-25

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



POLE(S): S1

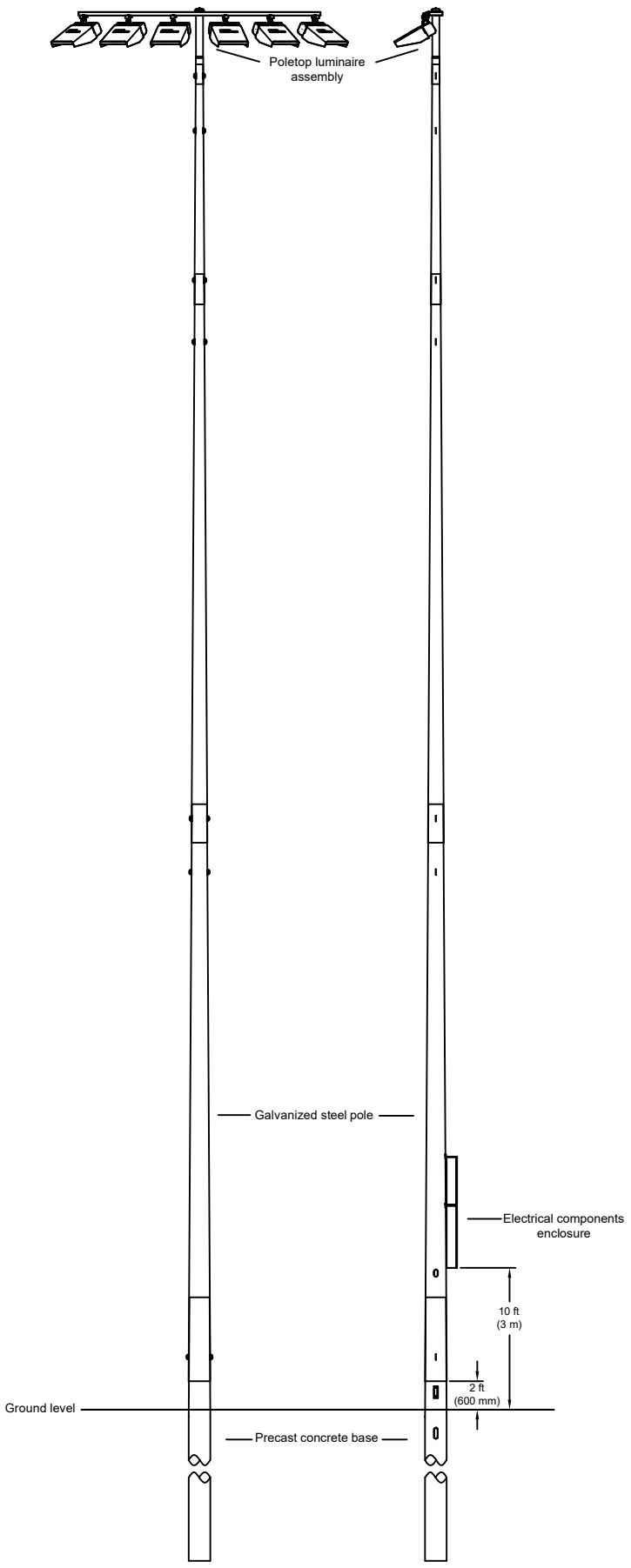
Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER:	243159
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/12/2025
DRAWING NUMBER:	243159P1
	1 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B



POLE(S): S2

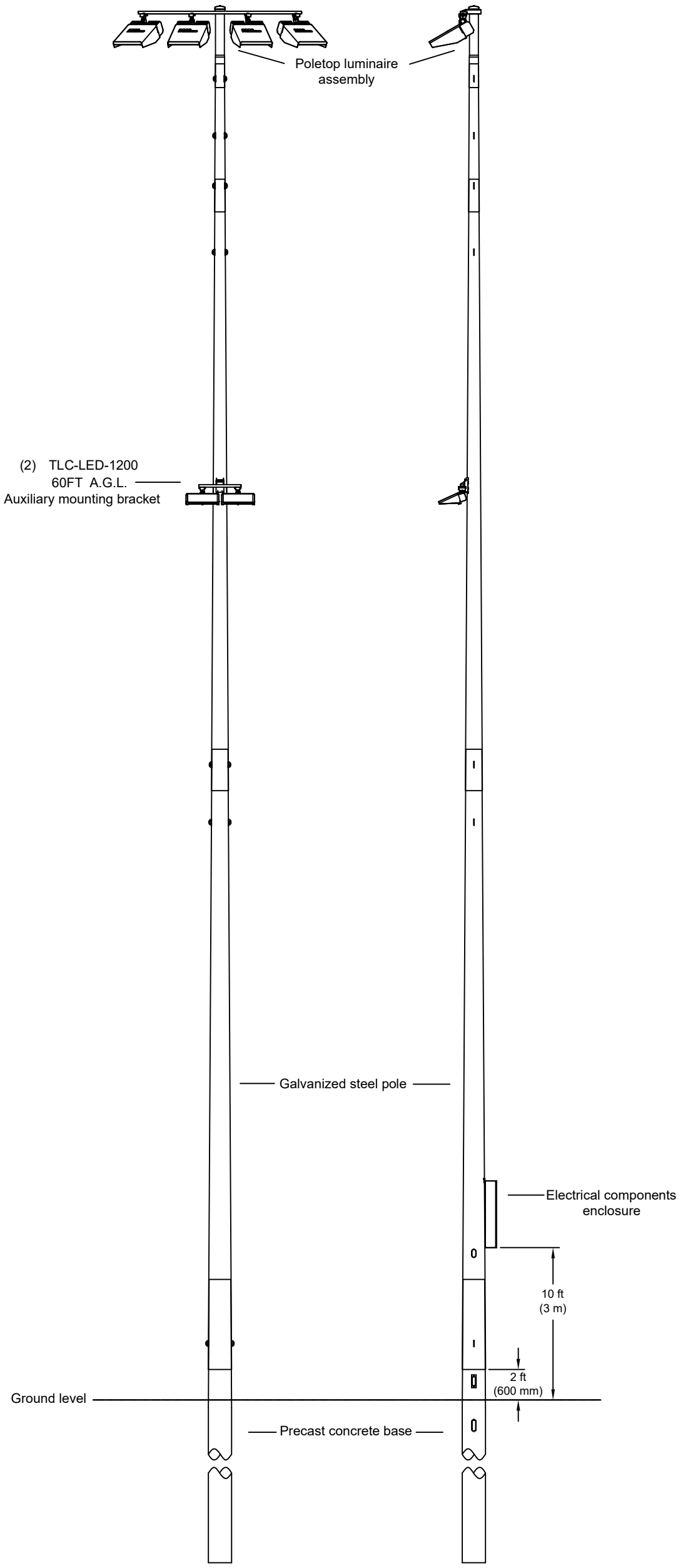
Musco 100FT Light-Structure System™ pole
TLC for LED™ luminaires
(6) TLC-LED-1500

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
243159	B.Carter	NTS	03/12/2025	243159P1
				2 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): S3

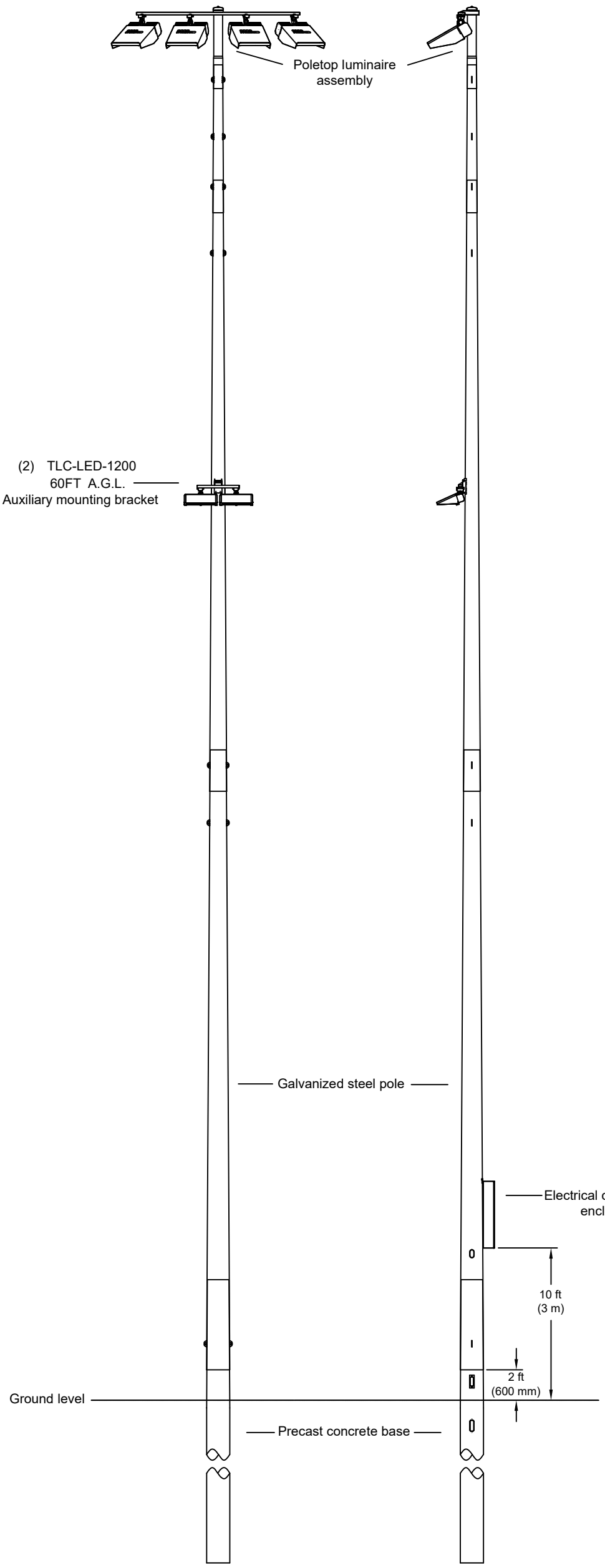
Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
243159	B.Carter	NTS	03/12/2025	243159P1
				3 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B



POLE(S): S4

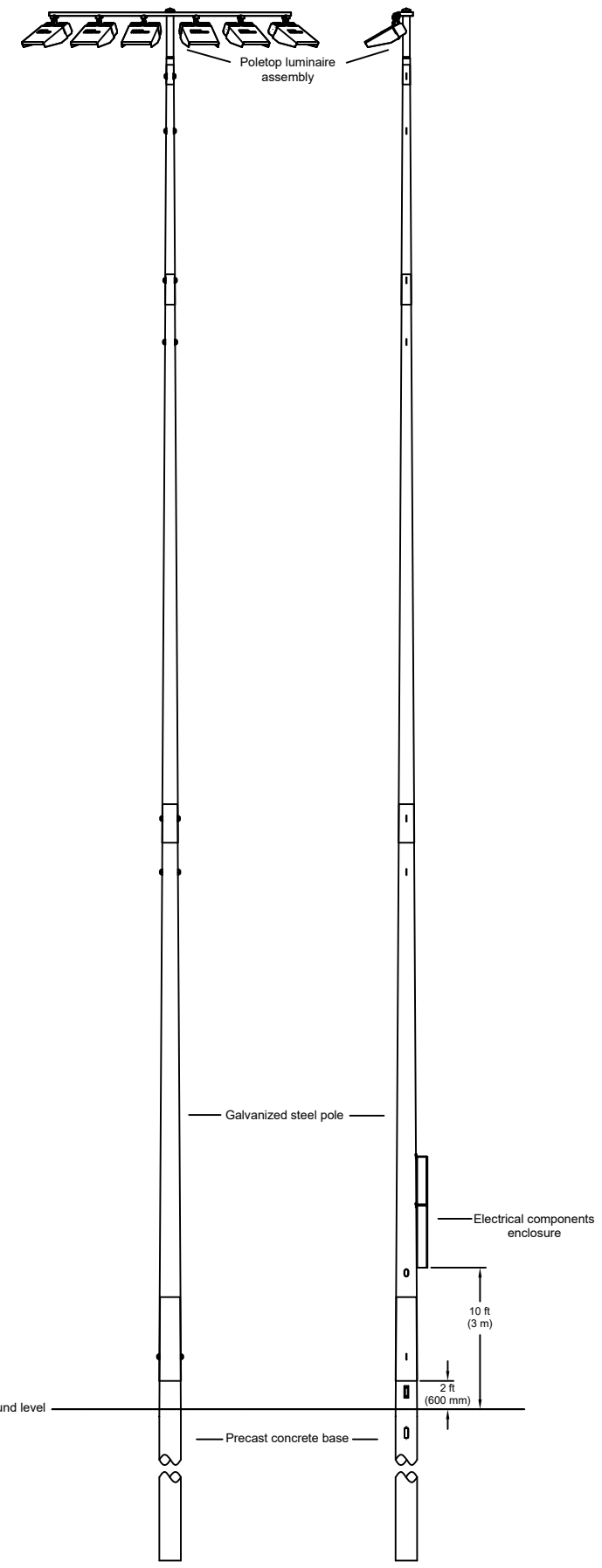
Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER:	243159
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/12/2025
DRAWING NUMBER:	243159P1
4 OF 6 SHEETS	

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B



POLE(S): S5

Musco 100FT Light-Structure System™ pole
TLC for LED™ luminaires
(6) TLC-LED-1500

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
243159	B.Carter	NTS	03/12/2025	243159P1

5 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
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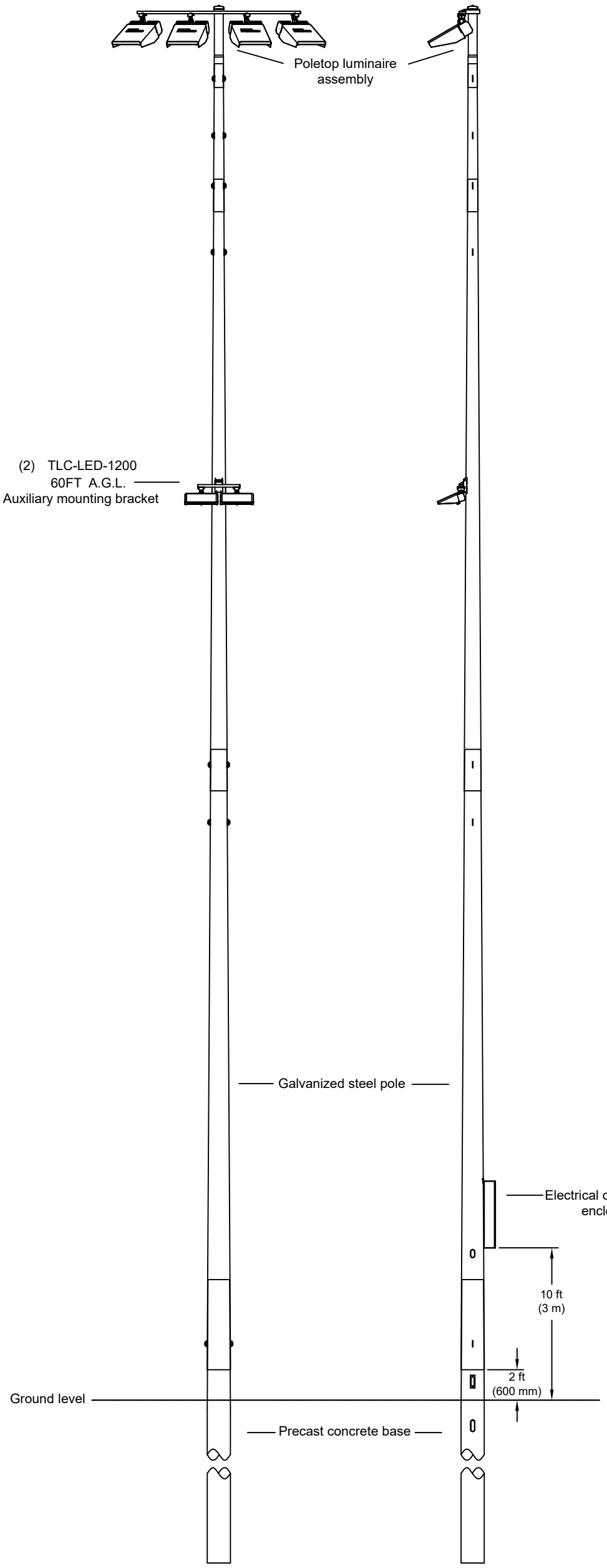
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing

B



POLE(S): S6

Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
243159	B.Carter	NTS	03/12/2025	243159P1

6 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B

System Requirements: Control System Summary

Project Information

Control System

Control System ID:	1 of 1
Control System Type:	Control-Link® Control and Monitoring System
Communication Type:	PowerLine-ST

Power Requirements

Control cabinet(s):	
Control voltage (phase to neutral)	120/60
VA loading - Inrush	2043.0
VA loading - Sealed	232.0
Lighting Circuits:	
Voltage/Hertz/Phase	480/60/3

Project Notes:

Equipment Listing

Description	Qty	Size (in)
Control and monitoring cabinet - primary	1	24 X 48
Contactors, 30 amperes	6	-
Off/On/Auto switches	1	-

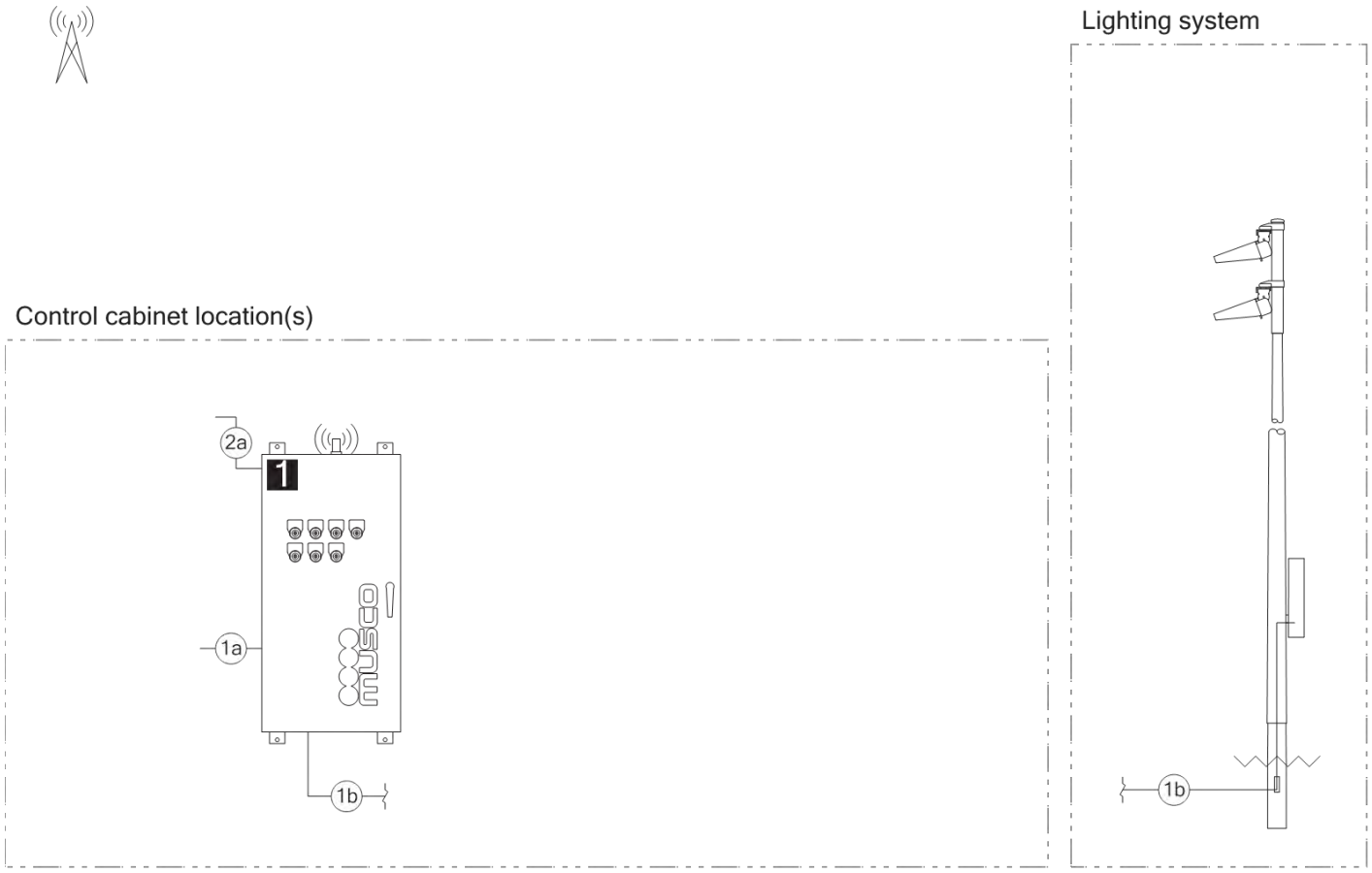
Important Notes:

1. Please confirm that the lighting circuit voltage listed above is accurate for this facility. This is the voltage/phase being connected and utilized at each lighting pole's electrical components enclosure disconnect. Inaccurate voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
2. In a 3 phase design, all 3 phases are to be run to each pole location. Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
3. One contactor is required for each circuit at each pole location. Contactors are 3 pole and 100% rated for the published continuous load.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. Size overcurrent devices using the full load amps column of the Circuit Summary by Switch chart (Minimum power factor is 0.9). Size conduit per code unless otherwise specified as larger to allow for harness connectors.
6. Avoid use of in-ground junction/pull boxes when possible. If used, all wire connectors must be UL listed for Wet Locations to prevent leakage current.
7. Control power wiring must be in separate conduit from line or load power wiring. Communication cables must be in separate conduit from any power wiring.
8. Refer to Installation Instructions for more details on equipment information and the installation requirements.

System Requirements: Control System Summary

Project Name: Episcopal High School Track Field | Project #: 243159
Control System ID: 1 of 1
Distribution Panel Location/ID: Service - Track/Field

Equipment Layout and Connection Details



Connection Details	
ID	**Description**
1a	Line power to contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
1b	Load power from contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
2a	Control power with equipment ground to control cabinet. Requires dedicated 20 A circuit. Provide transformer if control voltage not present.

Equipment	
ID	**Description**
1	Control and monitoring cabinet - primary

Circuit Summary

Switching Schedule	
Field/Switch Description	**Switches**
Field	**1**

Control Module ID: 1

Lighting Circuit Voltage: 480/60/3

Circuit Summary by Switch							
Switch	**Zone Description**	**Pole ID**	**Qty of Fixtures**	**Full load amperes**	**Contactor Size (Amps)**	**Cabinet #**	**Contactor ID**
1	Field	S1	6	12.03	30	1	C1
	Field	S2	6	12.57	30	1	C2
	Field	S3	6	12.03	30	1	C3
	Field	S4	6	12.03	30	1	C4
	Field	S5	6	12.57	30	1	C5
	Field	S6	6	12.03	30	1	C6

Episcopal High School Track Field

Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
S1-S2	80'	80'	8	TLC-LED-1500	11.28 kW	A
S3-S4	80'	80'	9	TLC-LED-1500	12.69 kW	A
4			**34**		**47.94 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Field	47.94 kW	34

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1500	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	34

Single Luminaire Amperage Draw Chart

Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6

Light Level Summary

Calculation Grid Summary

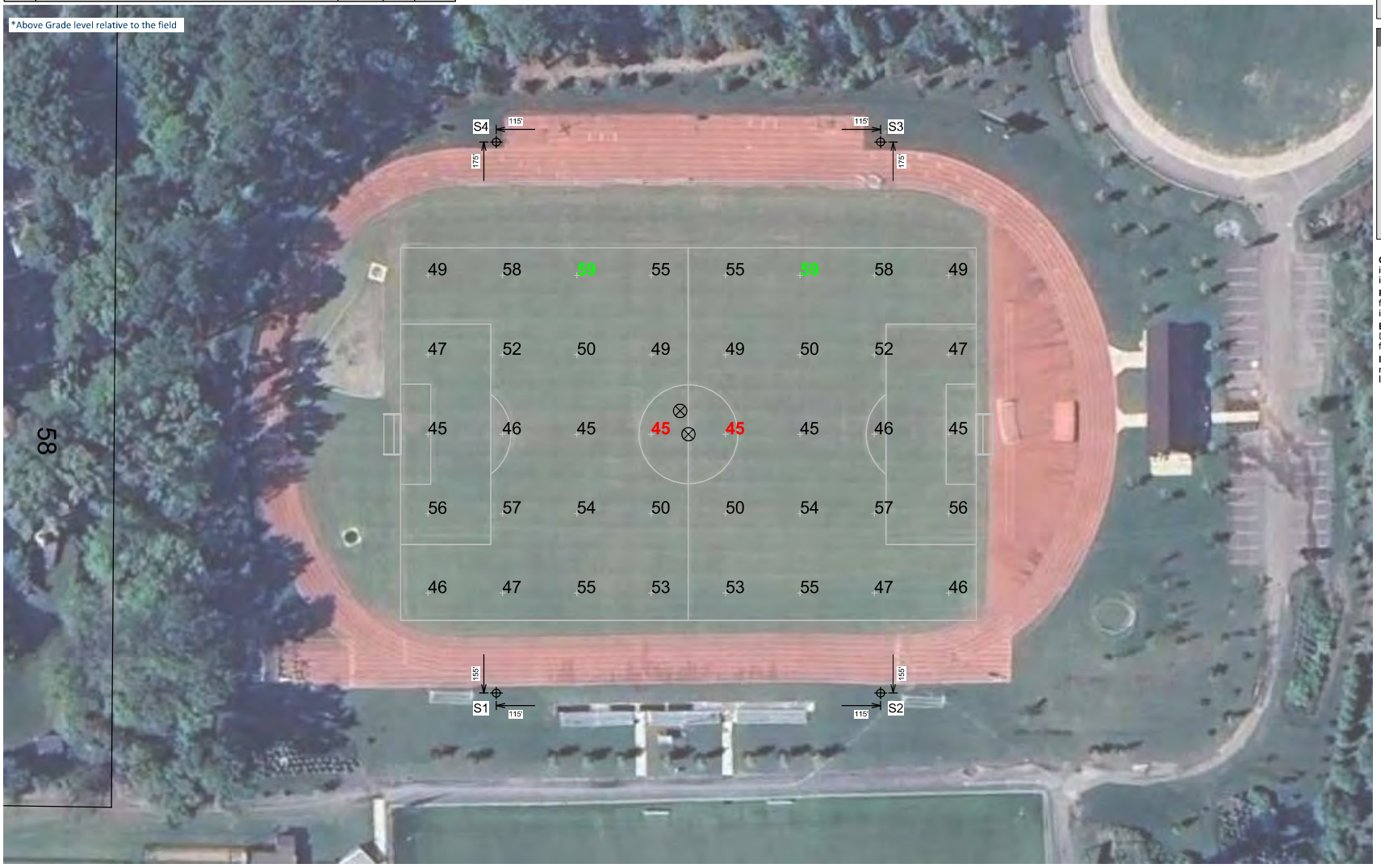
Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Field	Horizontal Illuminance	50.78	45	59	1.32	1.14	A	34
Property Line	Horizontal	0.01	0	0	-	-	A	34
Track	Horizontal Illuminance	14.87	3	27	7.69	4.30	A	34

From Hometown to Professional

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1-S2	80'	-	80'	TLC-LED-1500	8	8	0
2	S3-S4	80'	-	80'	TLC-LED-1500	9	9	0
4	Totals					34	34	0

*Above Grade level relative to the field



Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Field**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Guaranteed Average:	**46.45**
Scan Average:	50.78
Maximum:	59
Minimum:	45
Avg/Min:	1.14
Guaranteed Max/Min:	**0.6**
Max/Min:	1.32
UG (adjacent pts):	1.24
CU:	0.70
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**34**
Total Load:	47.94 kW

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

0' 60' 120'

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

ENGINEERED DESIGN By: Brayton Carter • File #243159B • 14-Mar-25

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Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1-S2	80'	-	80'	TLC-LED-1500	8	8	0
2	S3-S4	80'	-	80'	TLC-LED-1500	9	9	0
4	Totals					34	34	0

*Above Grade level relative to the field

SCALE IN FEET 1 : 60

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159B • 14-Mar-25

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

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Track**
Size:	Irregular
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL FOOTCANDLES
	Entire Grid
Scan Average:	**14.87**
Maximum:	27
Minimum:	3
Avg/Min:	4.30
Max/Min:	**7.69**
UG (adjacent pts):	0.00
CU:	0.10
No. of Points:	48
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**34**
Total Load:	47.94 kW

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.

We Make It Happen.

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1-S2	80'	-	80'	TLC-LED-1500	8	8	0
2	S3-S4	80'	-	80'	TLC-LED-1500	9	9	0
4	Totals					34	34	0

*Above Grade level relative to the field

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Scan Average:	**0.01**
Maximum:	0
Minimum:	0
Avg/Min:	-
Max/Min:	**-**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**34**
Total Load:	47.94 kW

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 : 100

0' 100' 200'

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

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Episcopal High School Track Field

Alexandria,VA

Equipment Layout

INCLUDES:
· Field
· Track

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

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	S1-S2	80'	-	80'	TLC-LED-1500	8
2	S3-S4	80'	-	80'	TLC-LED-1500	9
4	Totals					34

Single Luminaire Amperage Draw Chart

Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6

SCALE IN FEET 1 : 100

0' 100' 200'

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

ENGINEERED DESIGN By: Brayton Carter • File #243159B • 14-Mar-25

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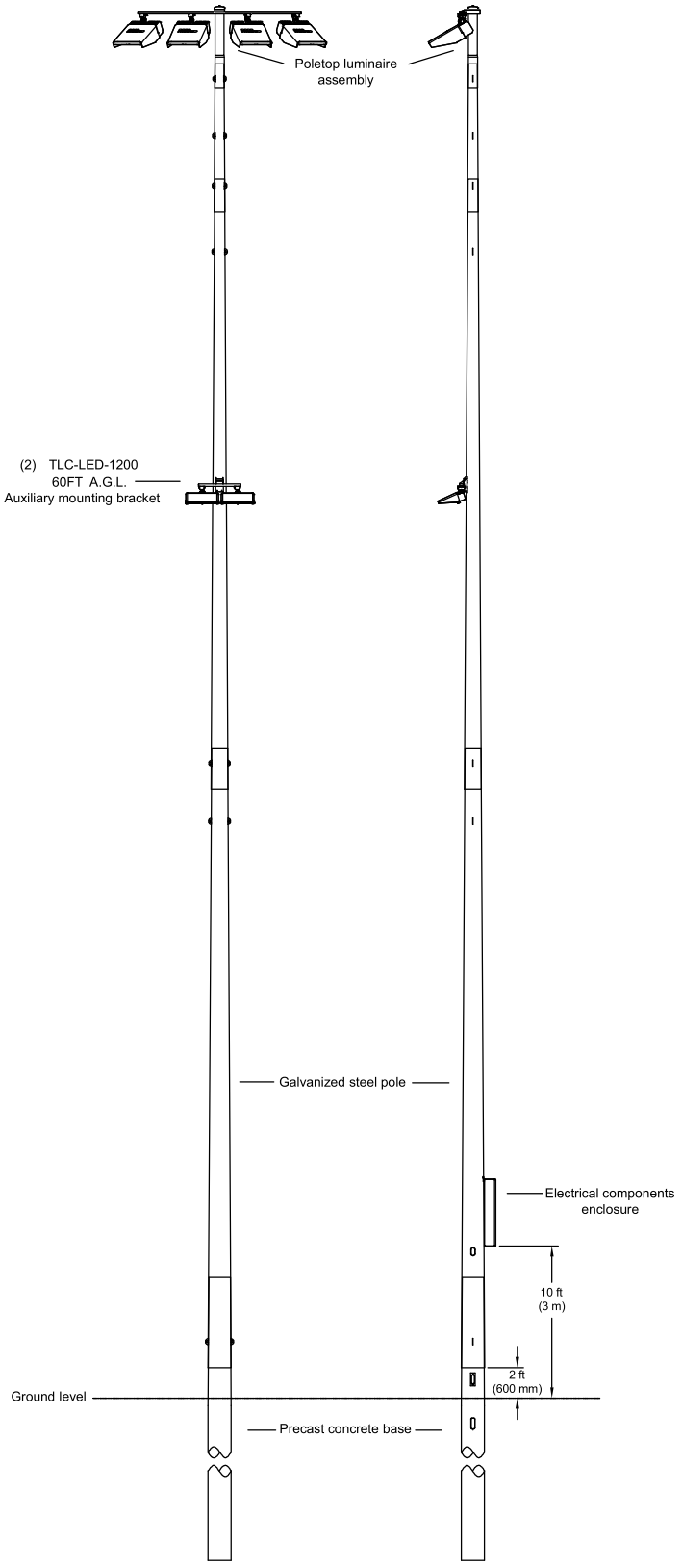


POLE(S): S1

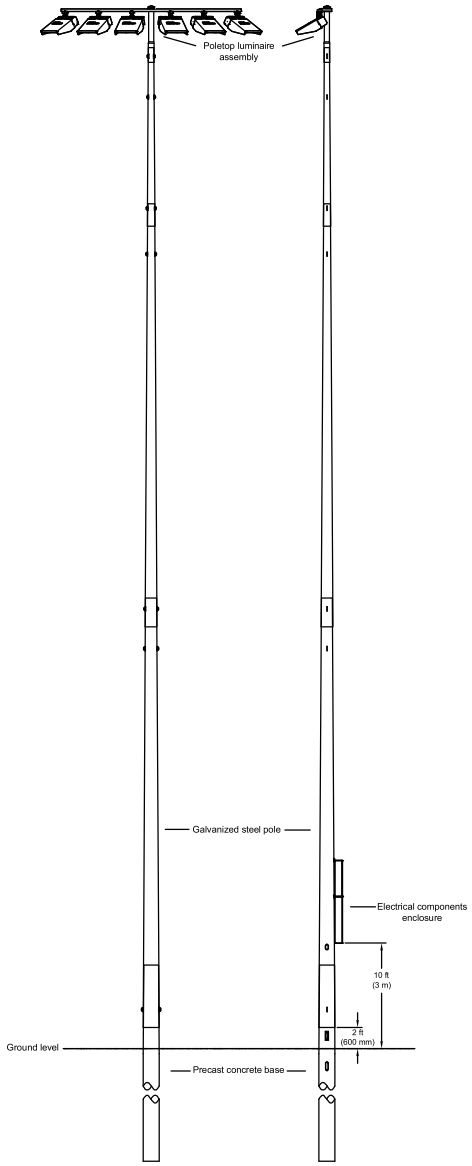
Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER: 243159	DRAWN BY: B.Carter	SCALE: NTS	DATE: 05/12/2025
DRAWING NUMBER: 243159P1			1 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

musco Lighting
CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): S2

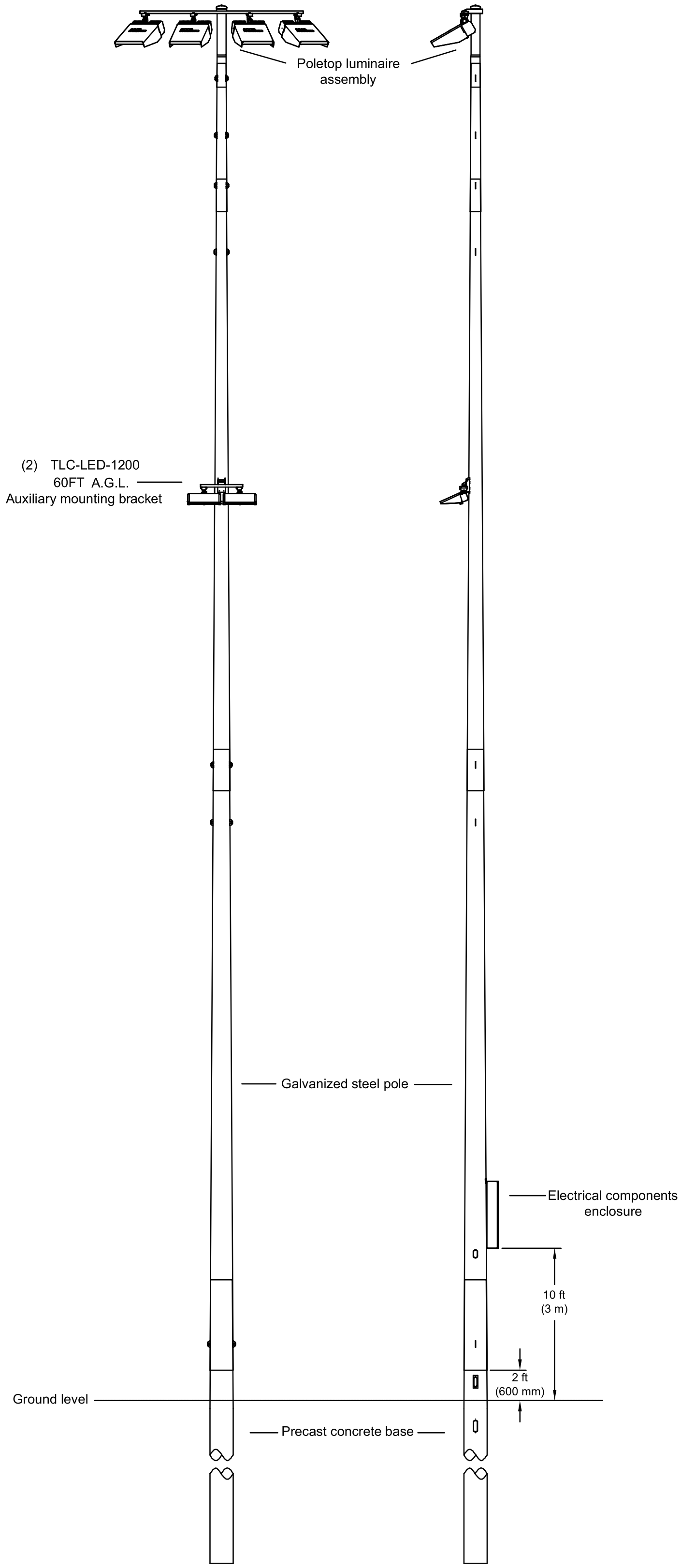
Musco 100FT Light-Structure System™ pole
TLC for LED™ luminaires
(6) TLC-LED-1500

PROJECT NUMBER	DRAWN BY:	SCALE:	DATE	DRAWING NUMBER:
243159	B.Carter	NTS	03/12/2025	243159P1
				2 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B



POLE(S): S3

Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER: 243159
DRAWN BY: B.Carter
SCALE: NTS
DATE: 03/12/2025
DRAWING NUMBER: 243159P1
3 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

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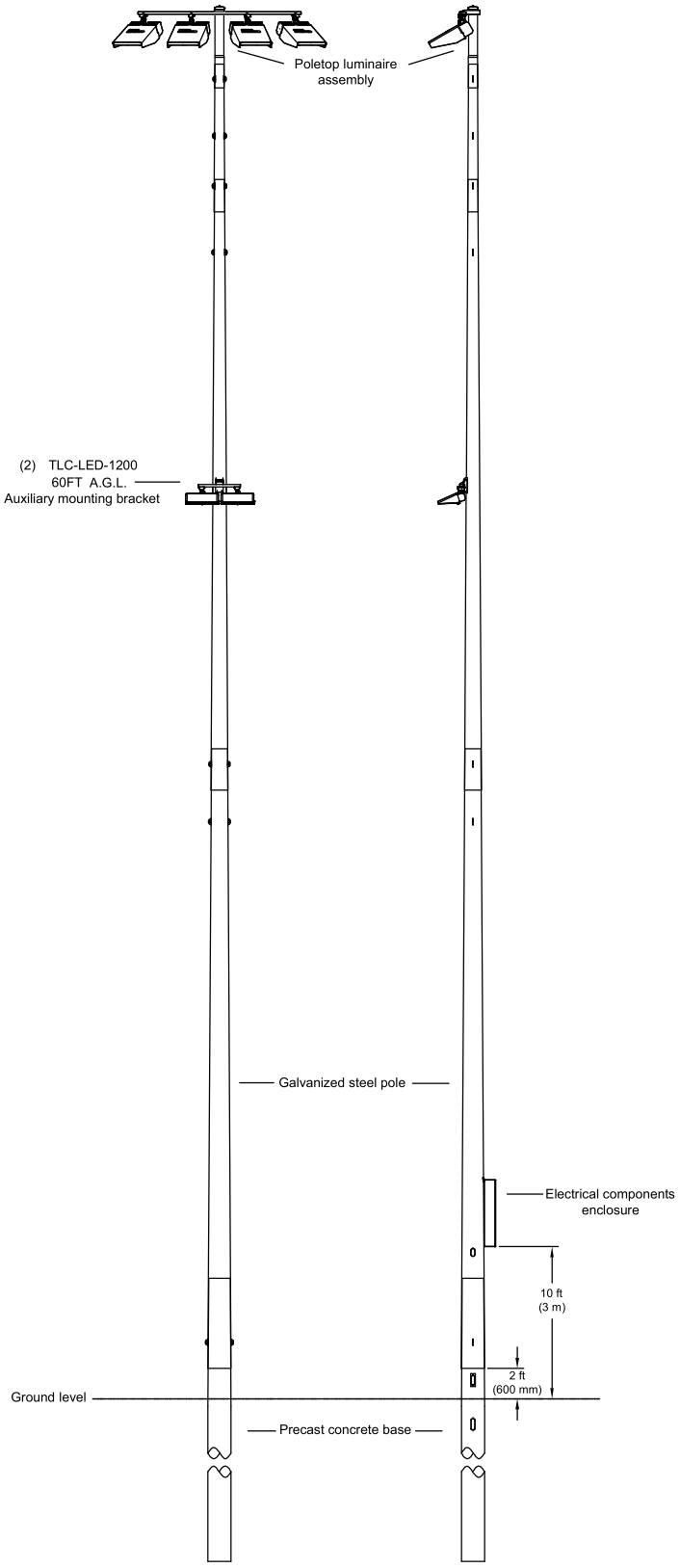
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): S4

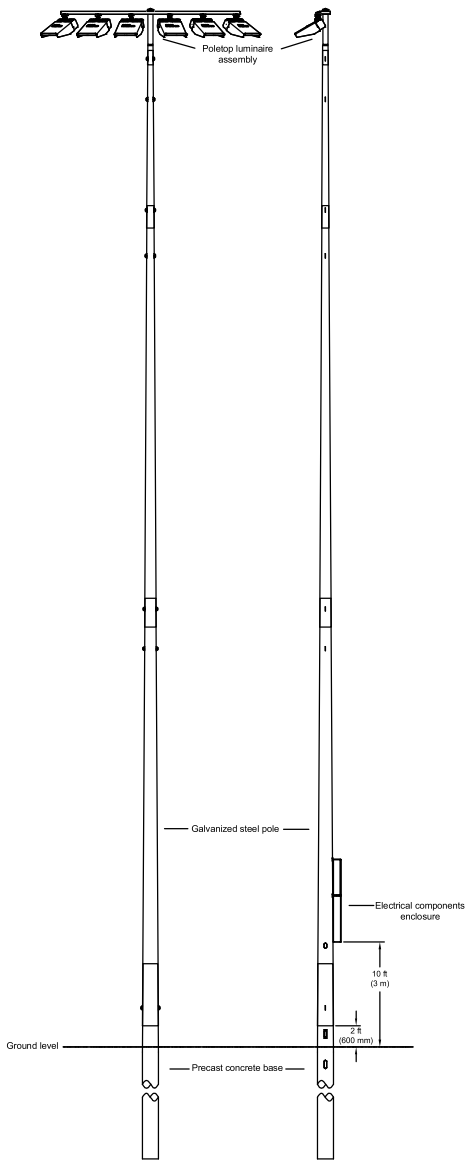
Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER:	243159
DRAWING BY:	B.Carter
SCALE:	NTS
DATE:	03/12/2025
DRAWING NUMBER:	243159P1
4 OF 6 SHEETS	

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B



POLE(S): S5

Musco 100FT Light-Structure System™ pole
TLC for LED™ luminaires
(6) TLC-LED-1500

PROJECT NUMBER:	243159		
DRAWN BY:	B.Carter		
SCALE:	NTS		
DATE:	03/12/2025		
DRAWING NUMBER:	243159P1		
	5 OF 6 SHEETS		

DATE:	BY:	R.L.	REVISIONS:

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CORPORATE OFFICE:
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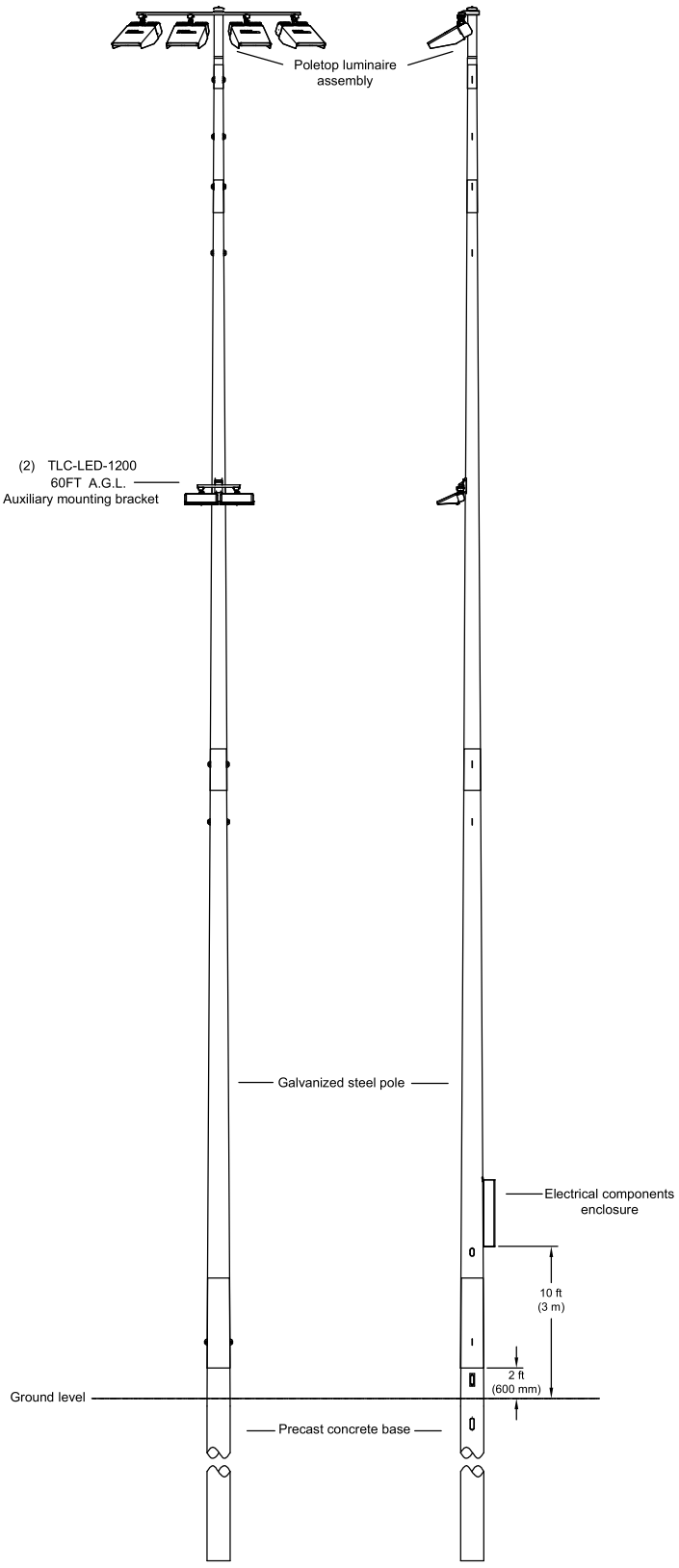
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing B



POLE(S): S6

Musco 90FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500

PROJECT NUMBER:	245159
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	05/12/2025
DRAWING NUMBER:	243159P1
	6 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
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100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Track Field
AlexandriaVA
Pole Configuration Drawing
B

System Requirements: Control System Summary

Project Name: Episcopal High School Track Field | Project #: 243159
Control System ID: 1 of 1
Distribution Panel Location/ID: Service - Track/Field

Project Information

Control System

Control System ID:	1 of 1
Control System Type:	Control-Link ® Control and Monitoring System
Communication Type:	PowerLine-ST

Power Requirements

Control cabinet(s):	
Control voltage (phase to neutral)	120/60
VA loading - Inrush	1553.0
VA loading - Sealed	180.0
Lighting Circuits:	
Voltage/Hertz/Phase	480/60/3

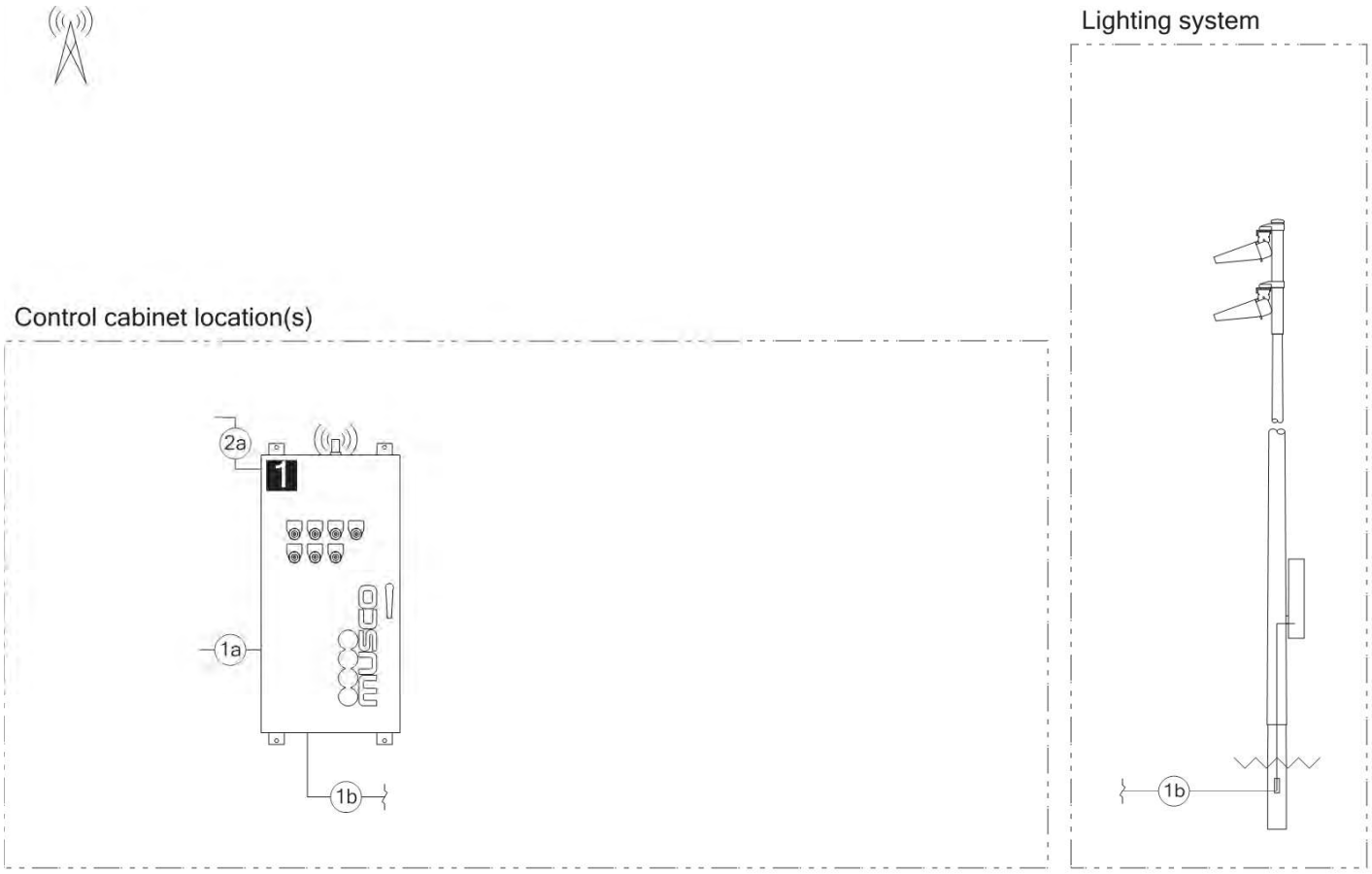
Project Notes:

Equipment Listing		
Description	**Qty**	**Size (in)**
Control and monitoring cabinet - primary	1	24 X 48
Contactors, 30 amperes	4	-
Off/On/Auto switches	1	-

Important Notes:

1. Please confirm that the lighting circuit voltage listed above is accurate for this facility. This is the voltage/phase being connected and utilized at each lighting pole's electrical components enclosure disconnect. Inaccurate voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
2. In a 3 phase design, all 3 phases are to be run to each pole location. Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
3. One contactor is required for each circuit at each pole location. Contactors are 3 pole and 100% rated for the published continuous load.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. Size overcurrent devices using the full load amps column of the Circuit Summary by Switch chart (Minimum power factor is 0.9). Size conduit per code unless otherwise specified as larger to allow for harness connectors.
6. Avoid use of in-ground junction/pull boxes when possible. If used, all wire connectors must be UL listed for Wet Locations to prevent leakage current.
7. Control power wiring must be in separate conduit from line or load power wiring. Communication cables must be in separate conduit from any power wiring.
8. Refer to Installation Instructions for more details on equipment information and the installation requirements.

Equipment Layout and Connection Details



Connection Details	
ID	**Description**
1a	Line power to contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
1b	Load power from contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
2a	Control power with equipment ground to control cabinet. Requires dedicated 20 A circuit. Provide transformer if control voltage not present.

Equipment	
ID	**Description**
1	Control and monitoring cabinet - primary

System Requirements: Control System Summary

Project Name: Episcopal High School Track Field | Project #: 243159
Control System ID: 1 of 1
Distribution Panel Location/ID: Service - Track/Field

Circuit Summary

Switching Schedule	
Field/Switch Description	**Switches**
Field	1

Control Module ID: 1

Lighting Circuit Voltage: 480/60/3

Circuit Summary by Switch							
Switch	**Zone Description**	**Pole ID**	**Qty of Fixtures**	**Full load amperes**	**Contactor Size (Amps)**	**Cabinet #**	**Contactor ID**
1	Field	S1	8	18.86	30	1	C1
	Field	S2	8	18.86	30	1	C2
	Field	S3	9	18.86	30	1	C3
	Field	S4	9	18.86	30	1	C4

HUMMEL BOWL

Episcopal High School Track Field

Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
F3-F4	80'	80'	5	TLC-LED-1500	7.05 kW	B
S1	90'	90'	4	TLC-LED-1500	5.64 kW	A
		60'	2	TLC-LED-1200	2.34 kW	A
		16'	1	TLC-RGB-U	0.43 kW	A
S2	100'	100'	6	TLC-LED-1500	8.46 kW	A
S3	90'	90'	4	TLC-LED-1500	5.64 kW	A
		60'	2	TLC-LED-1200	2.34 kW	A
		16'	1	TLC-RGB-U	0.43 kW	A
S4	90'	90'	1	TLC-LED-1200	1.17 kW	B
		90'	4	TLC-LED-1500	5.64 kW	A
		90'	5	TLC-LED-1500	7.05 kW	B
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
		16'	1	TLC-RGB-U	0.43 kW	A
S5	100'	100'	6	TLC-LED-1500	8.46 kW	A
S6	90'	90'	1	TLC-LED-1200	1.17 kW	B
		90'	4	TLC-LED-1500	5.64 kW	A
		90'	5	TLC-LED-1500	7.05 kW	B
		60'	2	TLC-LED-1200	2.34 kW	A
		19'	1	TLC-RGB-U	0.43 kW	A
		16'	1	TLC-RGB-U	0.43 kW	A
8			**64**		**81.96 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Field	51.42 kW	42
B	Practirce Field	30.54 kW	22

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1200	LED 5700K - 75 CRI	1170W	150,000	>120,000	>120,000	>120,000	10
TLC-LED-1500	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	48
TLC-RGB-U	RED-GREEN (Shown)-BLUE	430W	16,000	21,300	>36,300	>36,300	6

Single Luminaire Amperage Draw Chart

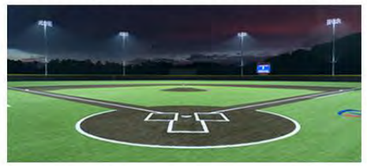
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-RGB-U	3.0	2.9	2.6	2.3	1.8	1.6	1.3

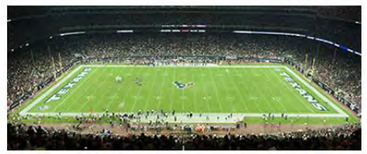
Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Min/Max	Min/Ave		
Blanket Grid	Horizontal	104.51	0	650	0.00	0.00	A	42
Practice Field	Horizontal Illuminance	336.17	217	412	0.53	0.64	B	22
Property Line	Horizontal	0.14	0	1	0.00	0.00	A,B	64
Soccer	Ev 270°	443.66	282	604	0.47	0.64	A	42
Soccer	Ev 90°	464.95	276	645	0.43	0.59	A	42
Soccer	Glare Rating	41.51	39	43	0.90	0.94	A	42
Soccer	Horizontal Illuminance	565.30	502	647	0.78	0.89	A	42
Track	Horizontal Illuminance	184.83	16	395	0.04	0.09	A	42

From Hometown to Professional





We Make It Happen.

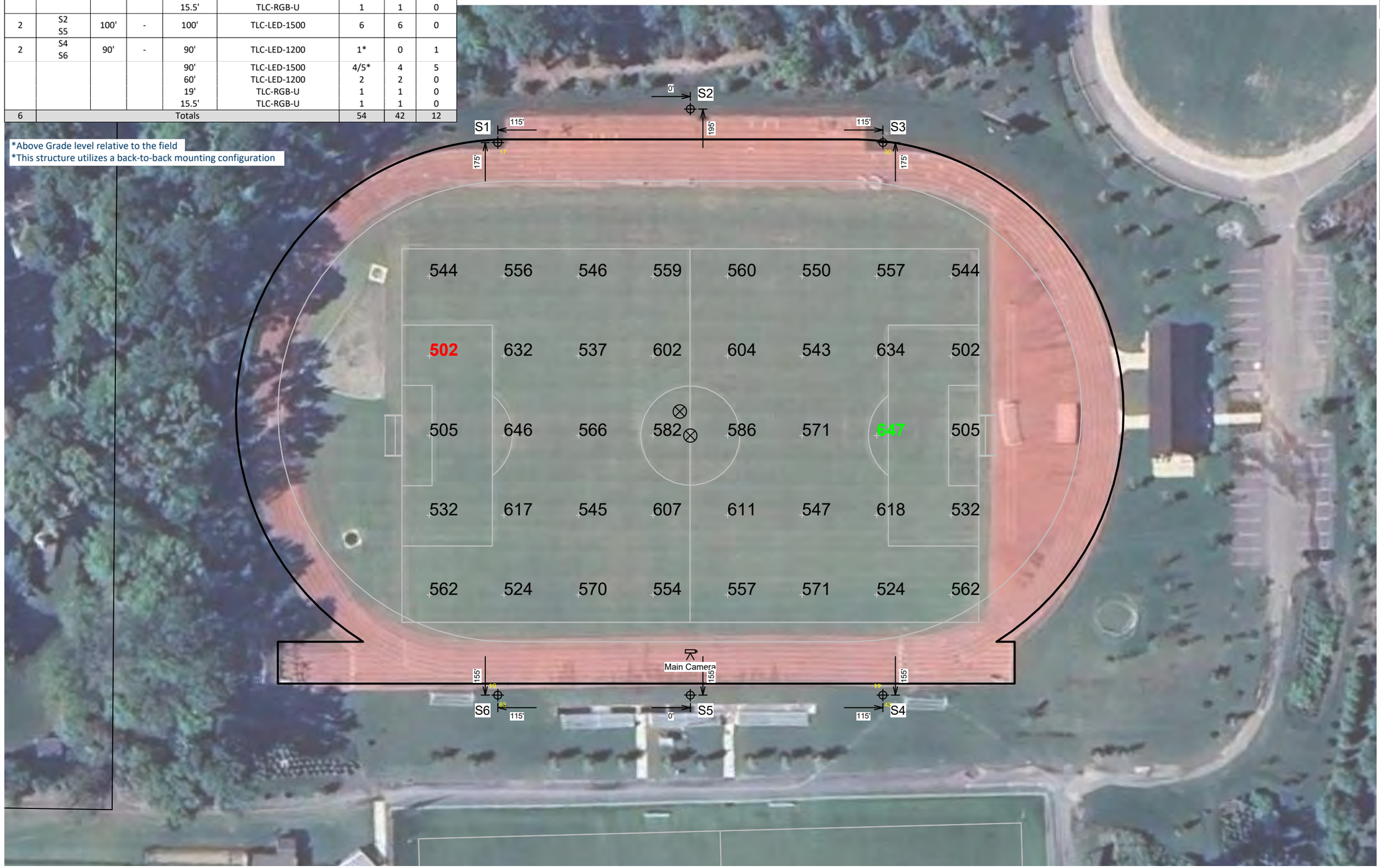
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				15.5'	TLC-RGB-U	1	1	0
2	S2 S5	100'	-	100'	TLC-LED-1500	6	6	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
				15.5'	TLC-RGB-U	1	1	0
6	Totals					54	42	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL LUX

	Entire Grid
Guaranteed Average:	**500**
Scan Average:	565.30
Maximum:	647
Minimum:	502
Min/Avg:	0.89
Guaranteed Min/Max:	**0.6**
Min/Max:	0.78
UG (adjacent pts):	1.28
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**42**
Total Load:	51.42 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR2 • 21-Mar-25

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

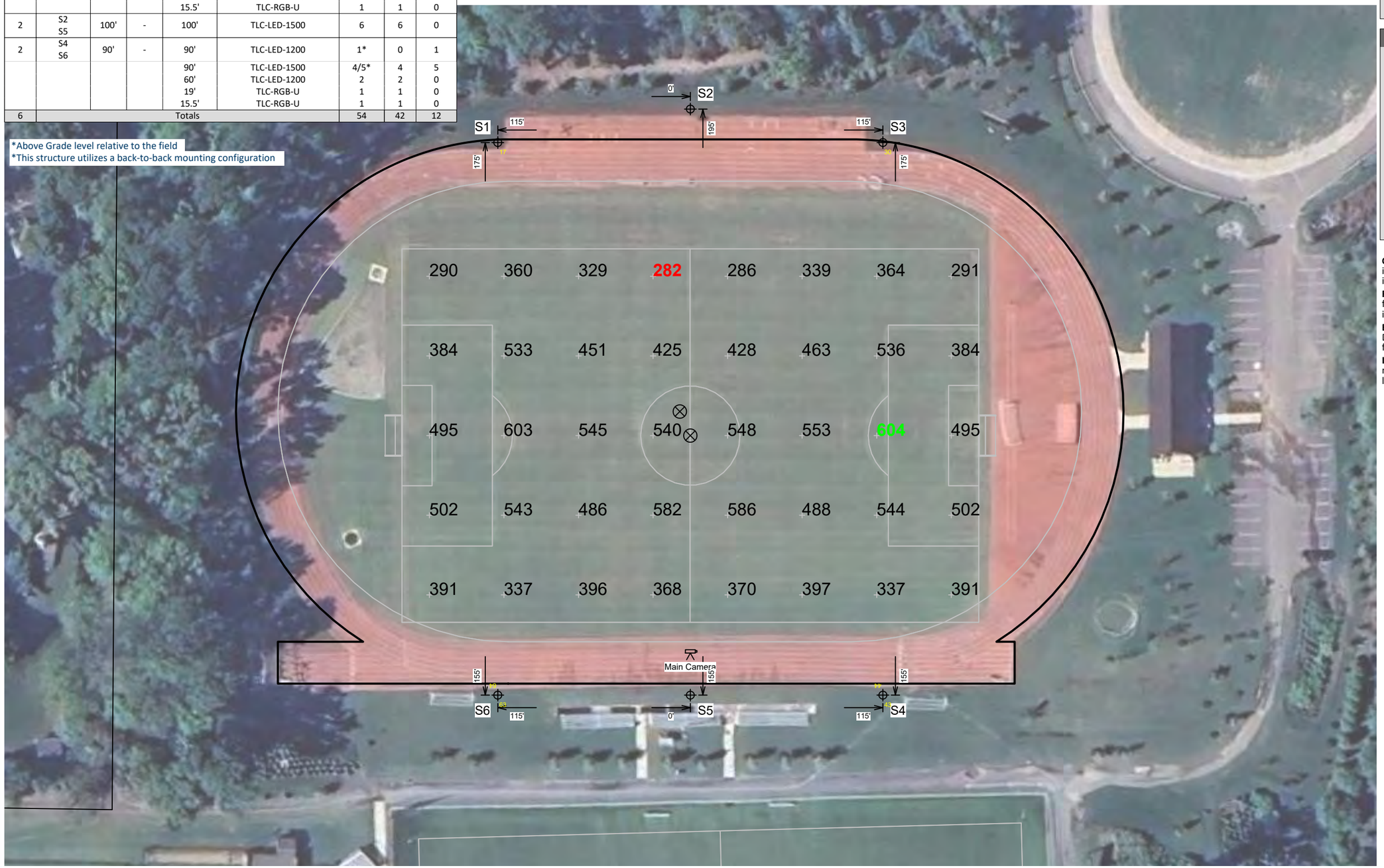
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				15.5'	TLC-RGB-U	1	1	0
2	S2 S5	100'	-	100'	TLC-LED-1500	6	6	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
				15.5'	TLC-RGB-U	1	1	0
6	Totals					54	42	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED LUX FIFA: Ev 270*

	Entire Grid
Guaranteed Average:	**400**
Scan Average:	443.66
Maximum:	604
Minimum:	282
Min/Avg:	0.64
Guaranteed Min/Max:	**0.4**
Min/Max:	0.47
UG (adjacent pts):	1.61
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**42**
Total Load:	51.42 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR2 • 21-Mar-25

90° 0° 180° 270° METER ORIENTATION

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

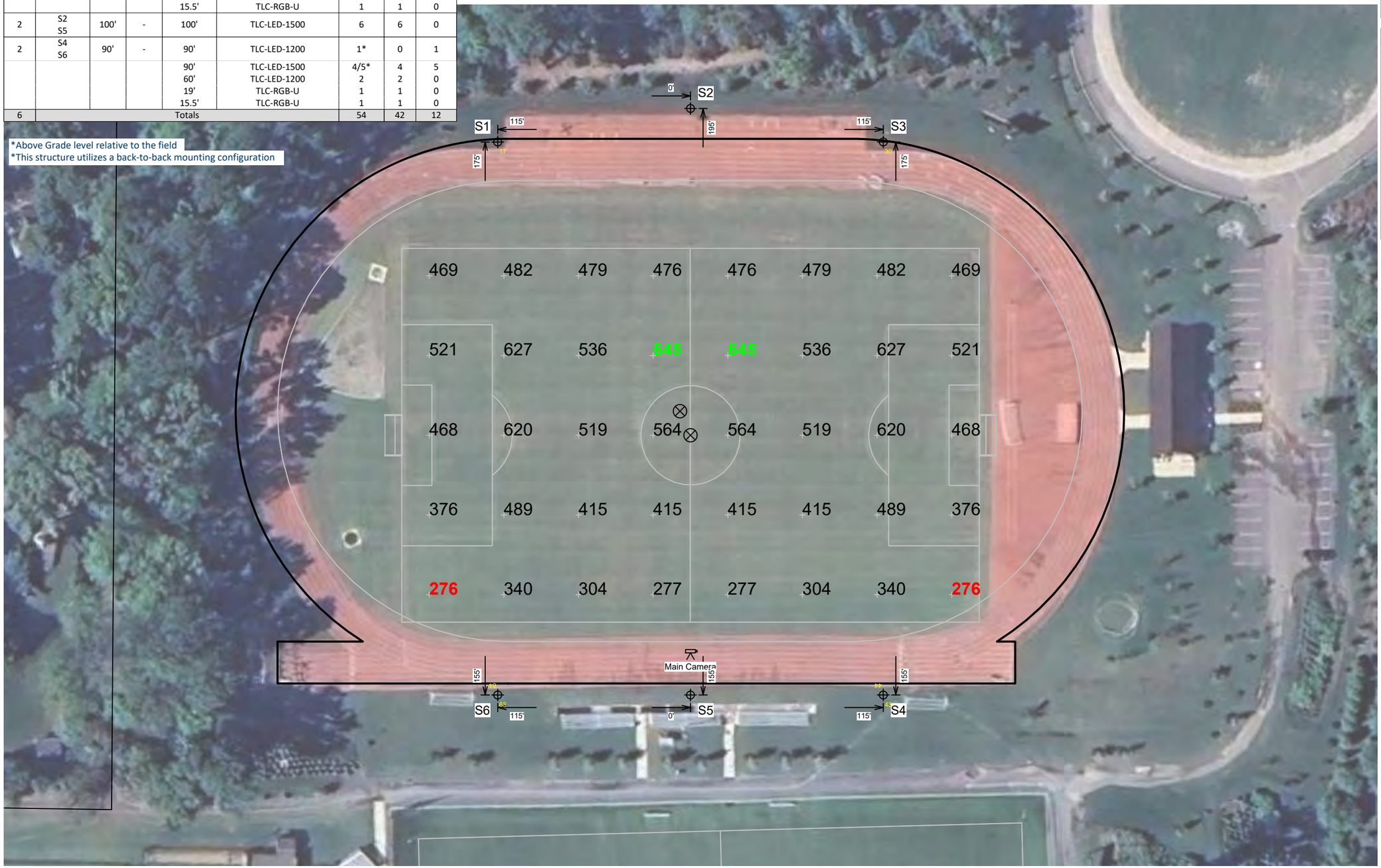
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60' 15.5'	TLC-LED-1200 TLC-RGB-U	2 1	2 1	0 0
2	S2 S5	100'	-	100'	TLC-LED-1500	6	6	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90' 60' 19' 15.5'	TLC-LED-1500 TLC-LED-1200 TLC-RGB-U TLC-RGB-U	4/5* 2 1 1	4 2 1 1	5 0 0 0
6	Totals					54	42	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED LUX FIFA: Ev 90*

	Entire Grid
Guaranteed Average:	**400**
Scan Average:	464.95
Maximum:	645
Minimum:	276
Min/Avg:	0.59
Guaranteed Min/Max:	**0.4**
Min/Max:	0.43
UG (adjacent pts):	1.50
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**42**
Total Load:	51.42 kW

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

0' 60' 120'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR2 • 21-Mar-25

90° 0° 180° 270°
METER ORIENTATION

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

We Make It Happen.

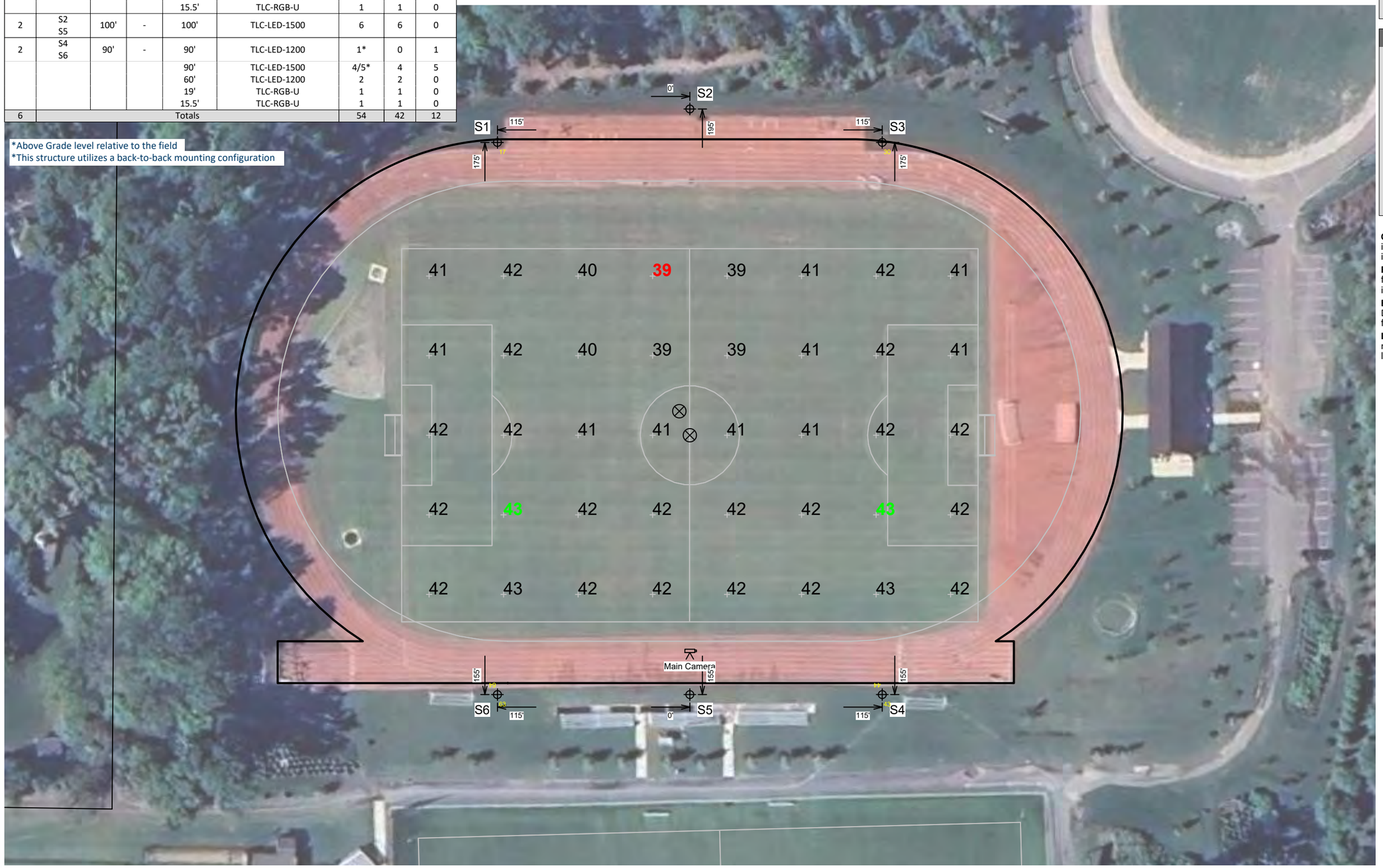
Episcopal High School Track Field

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				15.5'	TLC-RGB-U	1	1	0
2	S2 S5	100'	-	100'	TLC-LED-1500	6	6	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
				15.5'	TLC-RGB-U	1	1	0
6	Totals					54	42	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	344' x 223'
Spacing:	44.5' x 47.6'
Height:	3.0' above grade

Illumination Summary

MAINTAINED GLARE RATING: Max Reading	Entire Grid
Scan Average:	**41.51**
Maximum:	43
Minimum:	39
Min/Avg:	0.94
Min/Max:	**0.90**
UG (adjacent pts):	1.05
CU:	0.69
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**42**
Total Load:	51.42 kW

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

0' 60' 120'

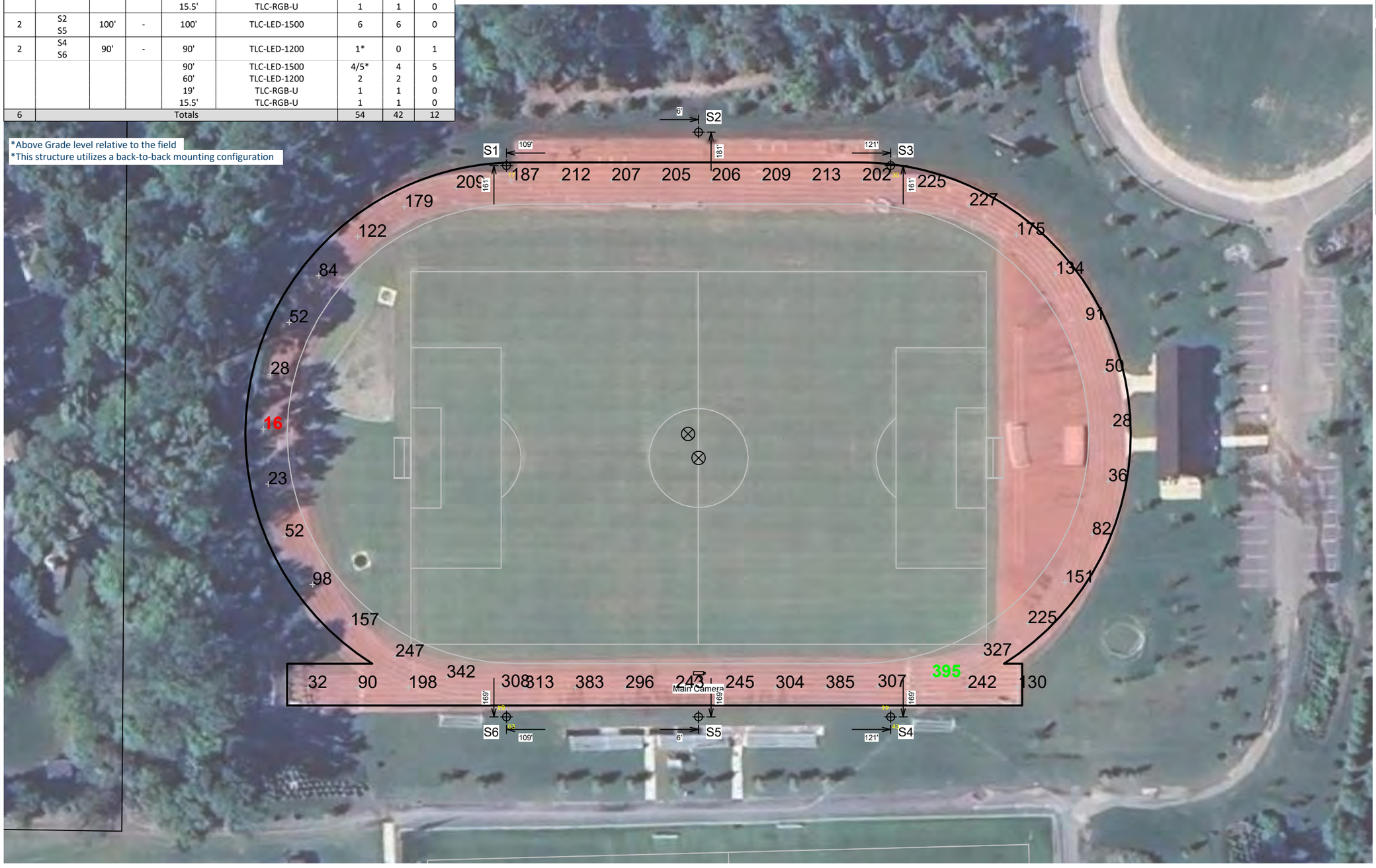
ENGINEERED DESIGN By: Brayton Carter • File #243159AR2 • 21-Mar-25

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

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	S1 S3	90'	-	90'	TLC-LED-1500	4	4	0
				60'	TLC-LED-1200	2	2	0
				15.5'	TLC-RGB-U	1	1	0
2	S2 S5	100'	-	100'	TLC-LED-1500	6	6	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	0	1
				90'	TLC-LED-1500	4/5*	4	5
				60'	TLC-LED-1200	2	2	0
				19'	TLC-RGB-U	1	1	0
				15.5'	TLC-RGB-U	1	1	0
6	Totals					54	42	12

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Track**
Size:	Irregular
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL LUX

	Entire Grid
Scan Average:	**184.83**
Maximum:	395
Minimum:	16
Min/Avg:	0.09
Min/Max:	**0.04**
UG (adjacent pts):	0.00
CU:	0.12
No. of Points:	48
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**42**
Total Load:	51.42 kW

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

0' 60' 120'

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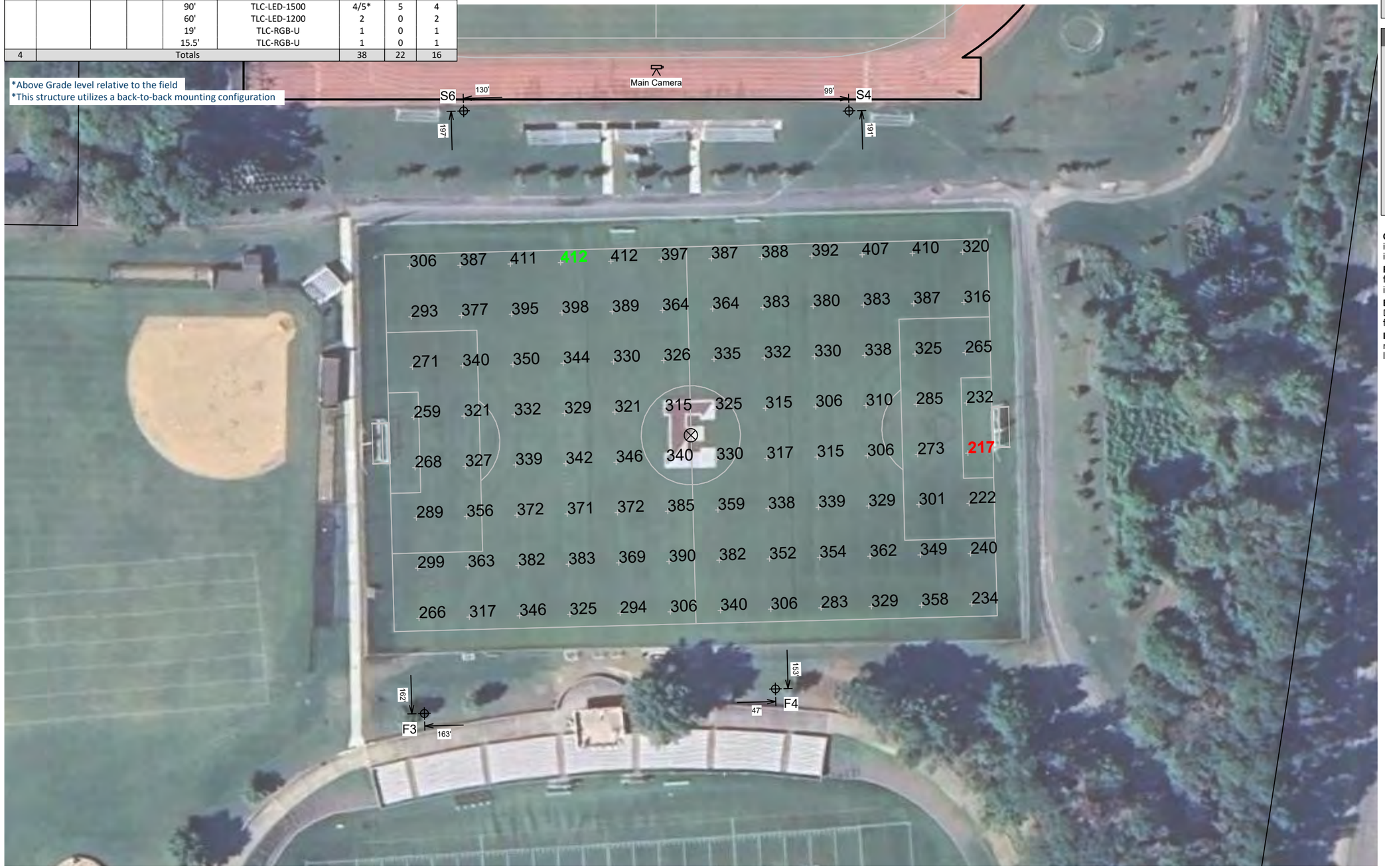
Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊠

We Make It Happen.

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	F3-F4	80'	10'	90'	TLC-LED-1500	5*	5	0
2	S4 S6	90'	-	90'	TLC-LED-1200	1*	1	0
				90'	TLC-LED-1500	4/5*	5	4
				60'	TLC-LED-1200	2	0	2
				19'	TLC-RGB-U	1	0	1
				15.5'	TLC-RGB-U	1	0	1
4	Totals					38	22	16

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Practice Field**
Size:	360' x 225'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL LUX

	Entire Grid
Scan Average:	**336.17**
Maximum:	412
Minimum:	217
Min/Avg:	0.64
Min/Max:	**0.53**
UG (adjacent pts):	1.53
CU:	0.68
No. of Points:	96
LUMINAIRE INFORMATION	
Applied Circuits:	B
No. of Luminaires:	**22**
Total Load:	30.54 kW

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

0' 60' 120'

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

Episcopal High School Track Field

Alexandria,VA

Grid Summary

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

Illumination Summary

MAINTAINED HORIZONTAL LUX

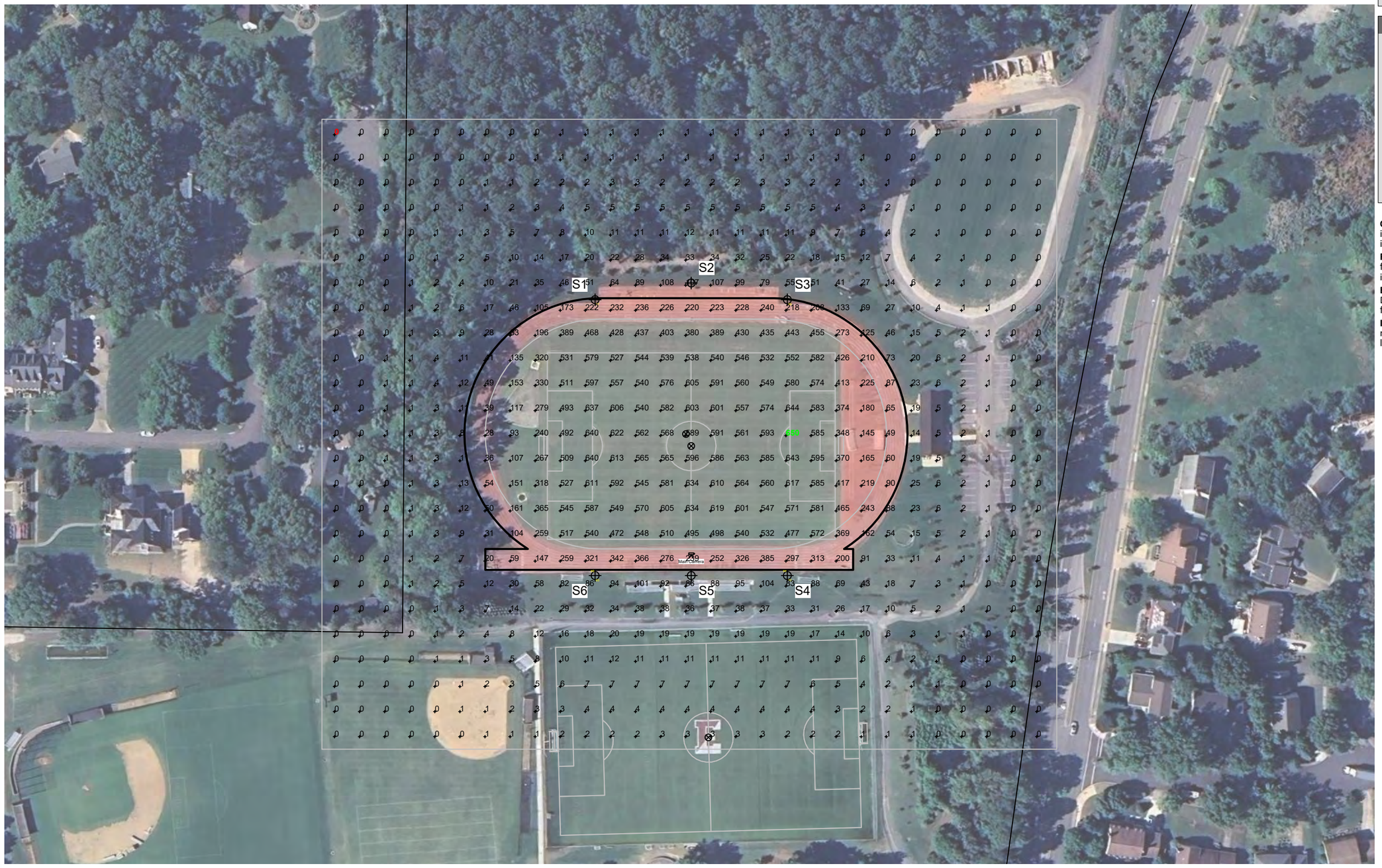
	Entire Grid
Scan Average:	**104.51**
Maximum:	650
Minimum:	0
Min/Avg:	0.00
Min/Max:	**0.00**
UG (adjacent pts):	4.33
CU:	0.98
No. of Points:	725
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**42**
Total Load:	51.42 kW

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

0' 120' 240'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR2 • 21-Mar-25

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

Episcopal High School Track Field

Alexandria,VA

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL LUX

	Entire Grid
Scan Average:	**0.14**
Maximum:	1
Minimum:	0
Min/Avg:	0.00
Min/Max:	**0.00**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A,B
No. of Luminaires:	**64**
Total Load:	81.96 kW

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

0' 120' 240'

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

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Episcopal High School Track Field

Alexandria,VA

Equipment Layout

INCLUDES:
· Practice Field
· Soccer
· Track

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

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	F3-F4	80'	10'	90'	TLC-LED-1500	5*
2	S1 S3	90'	-	90' 60' 15.5'	TLC-LED-1500 TLC-LED-1200 TLC-RGB-U	4 2 1
2	S2 S5	100'	-	100'	TLC-LED-1500	6
2	S4 S6	90'	-	90' 90' 60' 19' 15.5'	TLC-LED-1200 TLC-LED-1500 TLC-LED-1200 TLC-RGB-U TLC-RGB-U	1* 4/5* 2 1 1
8	Totals					64

*This structure utilizes a back-to-back mounting configuration

Single Luminaire Amperage Draw Chart

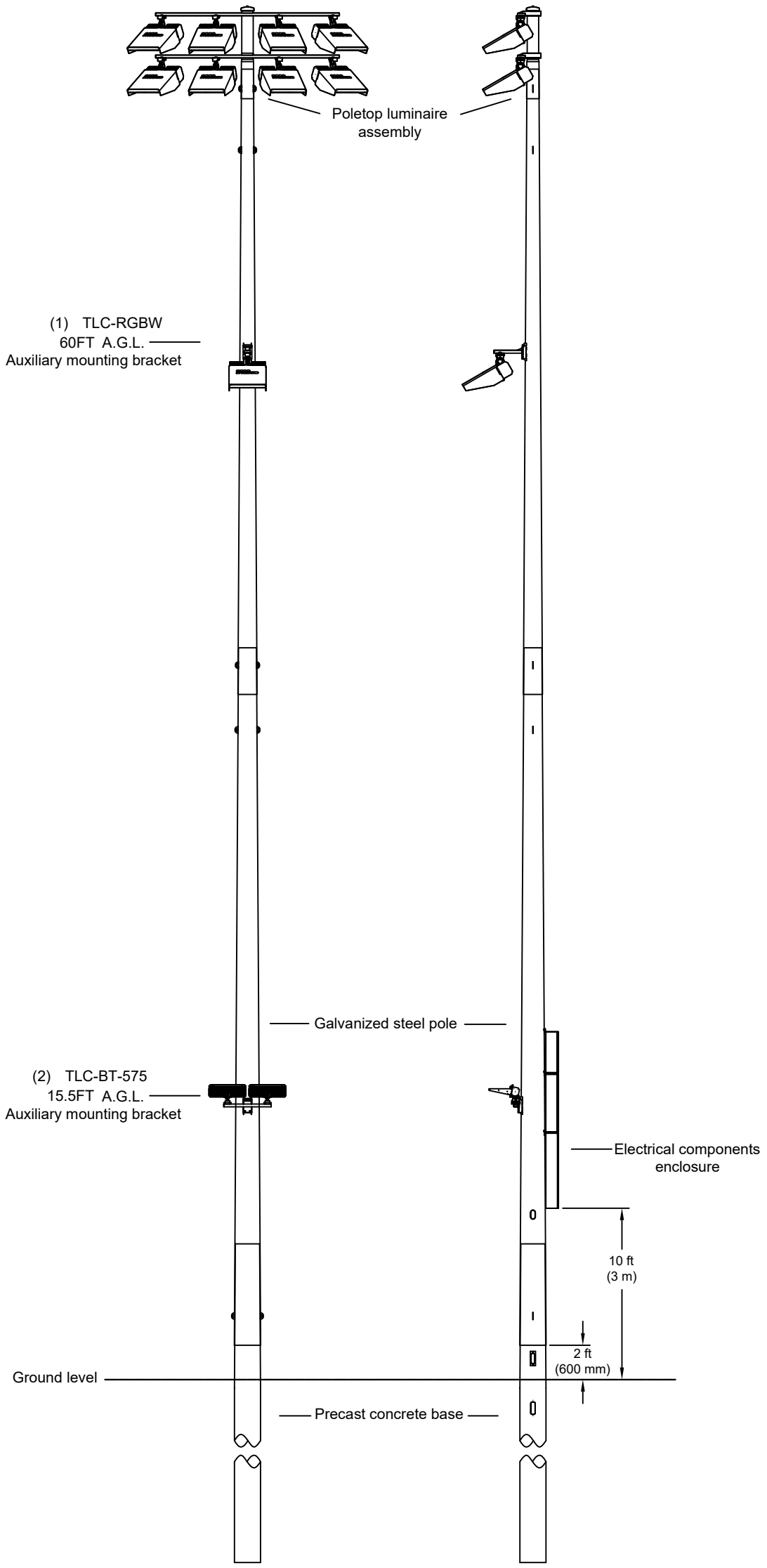
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-RGB-U	3.0	2.9	2.6	2.3	1.8	1.6	1.3

SCALE IN FEET 1 : 100

0' 100' 200'

ENGINEERED DESIGN By: Brayton Carter • File #243159AR2 • 21-Mar-25

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



POLE(S): F1-F2

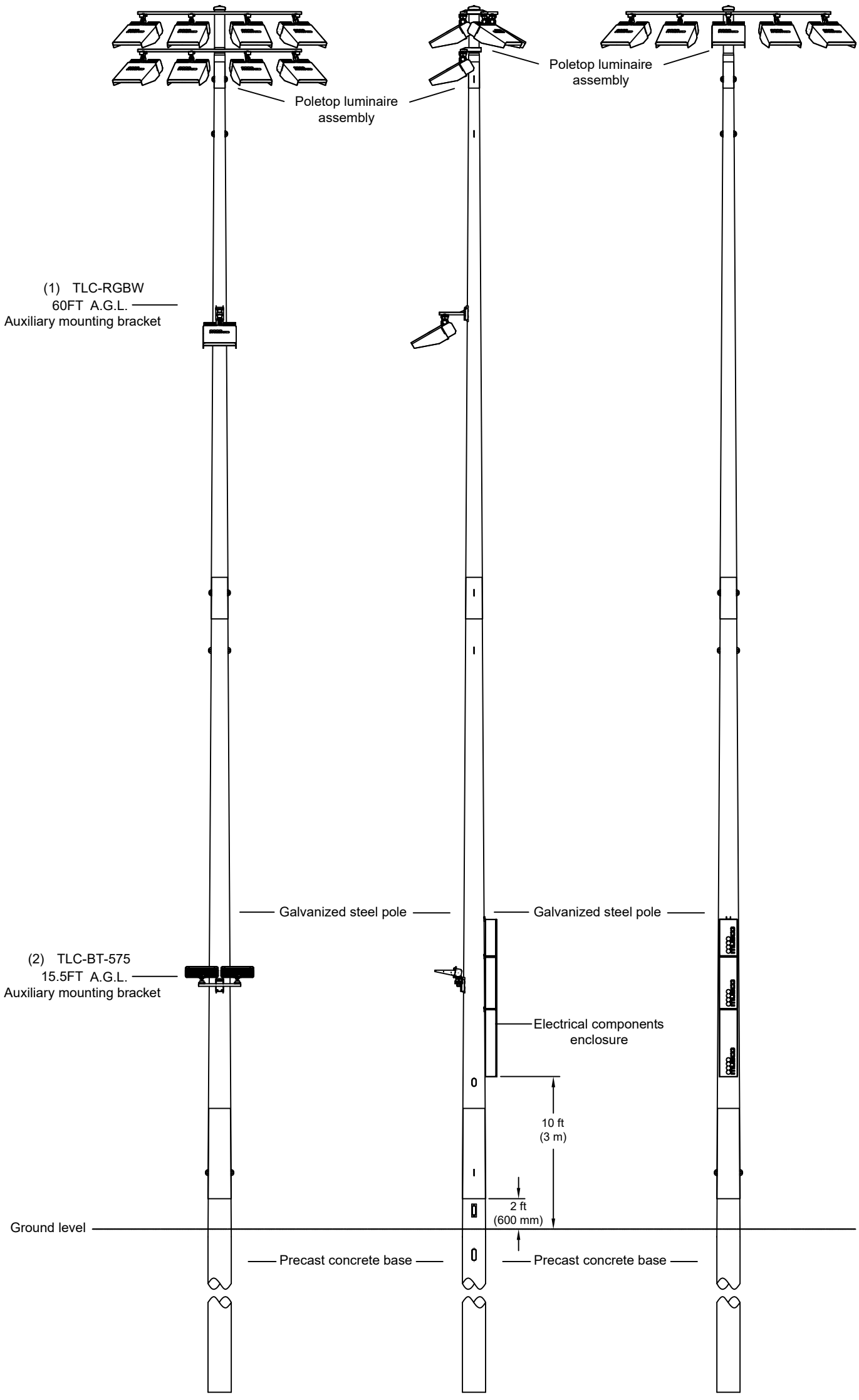
Musco 80FT Light-Structure System™ pole
TLC for LED™ luminaires
(8) TLC-LED-1500

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/06/2025	161492P1
				1 OF 3 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Hummel Bowl
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): F3-F4

Musco 80FT Light-Structure System™ pole
TLC for LED™ luminaires
(8) TLC-LED-1500 (Front)
(5) TLC-LED-1500 (Back)

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/06/2025	161492P1

2 OF 3 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
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Oskaloosa, Iowa 52577
+1-800-825-6020
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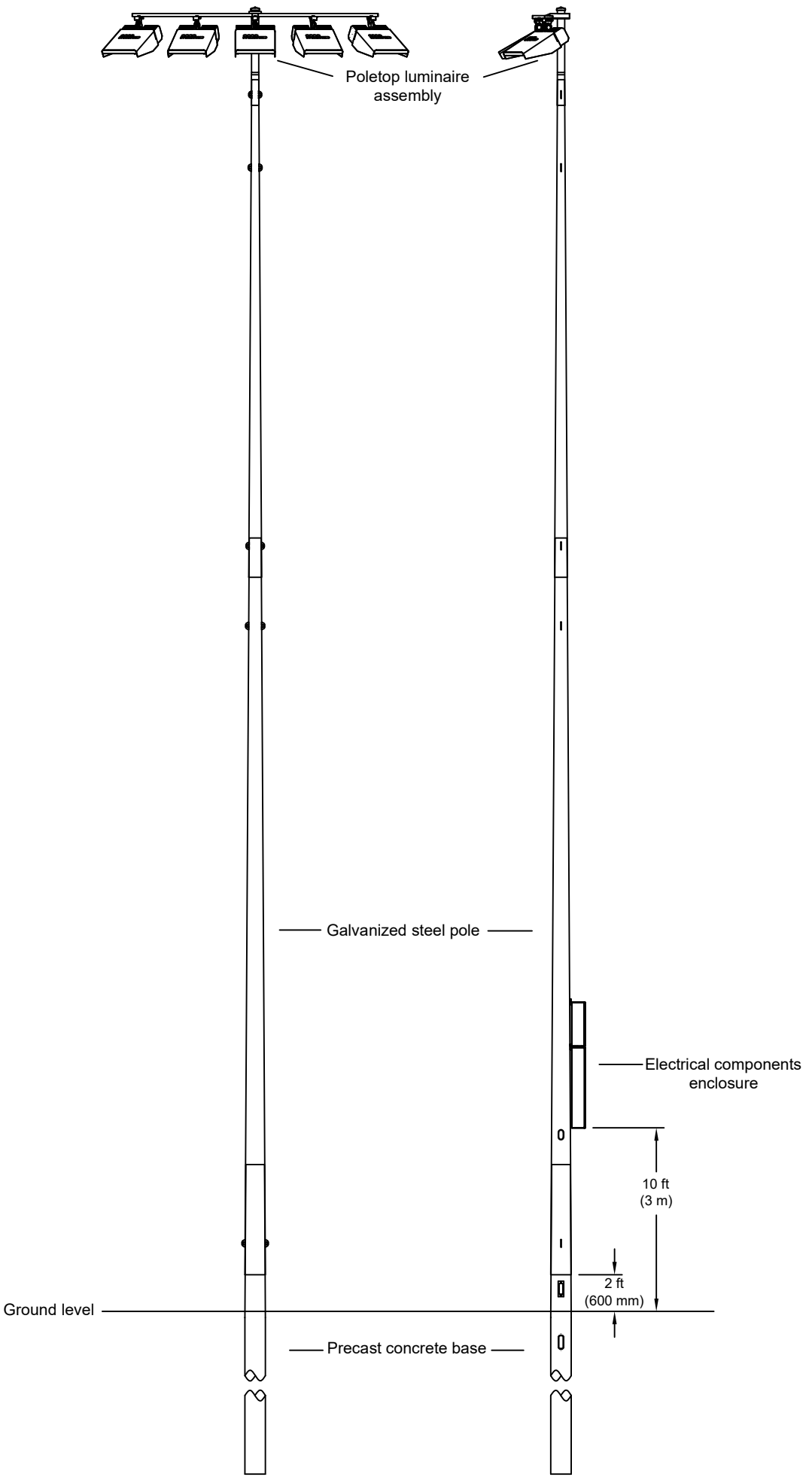
Episcopal High School Hummel Bowl
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): S1-S2

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500
(1) TLC-LED-1200

PROJECT NUMBER:	161492
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	161492P1
	3 OF 3 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
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Episcopal High School Hummel Bowl
AlexandriaVA
Pole Configuration Drawing B

System Requirements: Control System Summary

Project Name: Episcopal High School Hummel Bowl | Project #: 161492
Control System ID: 1 of 1
Distribution Panel Location/ID: BB/SB/SO Service

Project Information

Control System

Control System ID:	1 of 1
Control System Type:	Control-Link® Control and Monitoring System
Communication Type:	PowerLine-ST

Power Requirements

Control cabinet(s):	
Control voltage (phase to neutral)	120/60
VA loading - Inrush	3513.0
VA loading - Sealed	388.0
Lighting Circuits:	
Voltage/Hertz/Phase	480/60/3

Project Notes:

Equipment Listing

Description	Qty	Size (in)
Control and monitoring cabinet - primary	1	24 X 72
Contactors, 30 amperes	12	-
Off/On/Auto switches	4	-

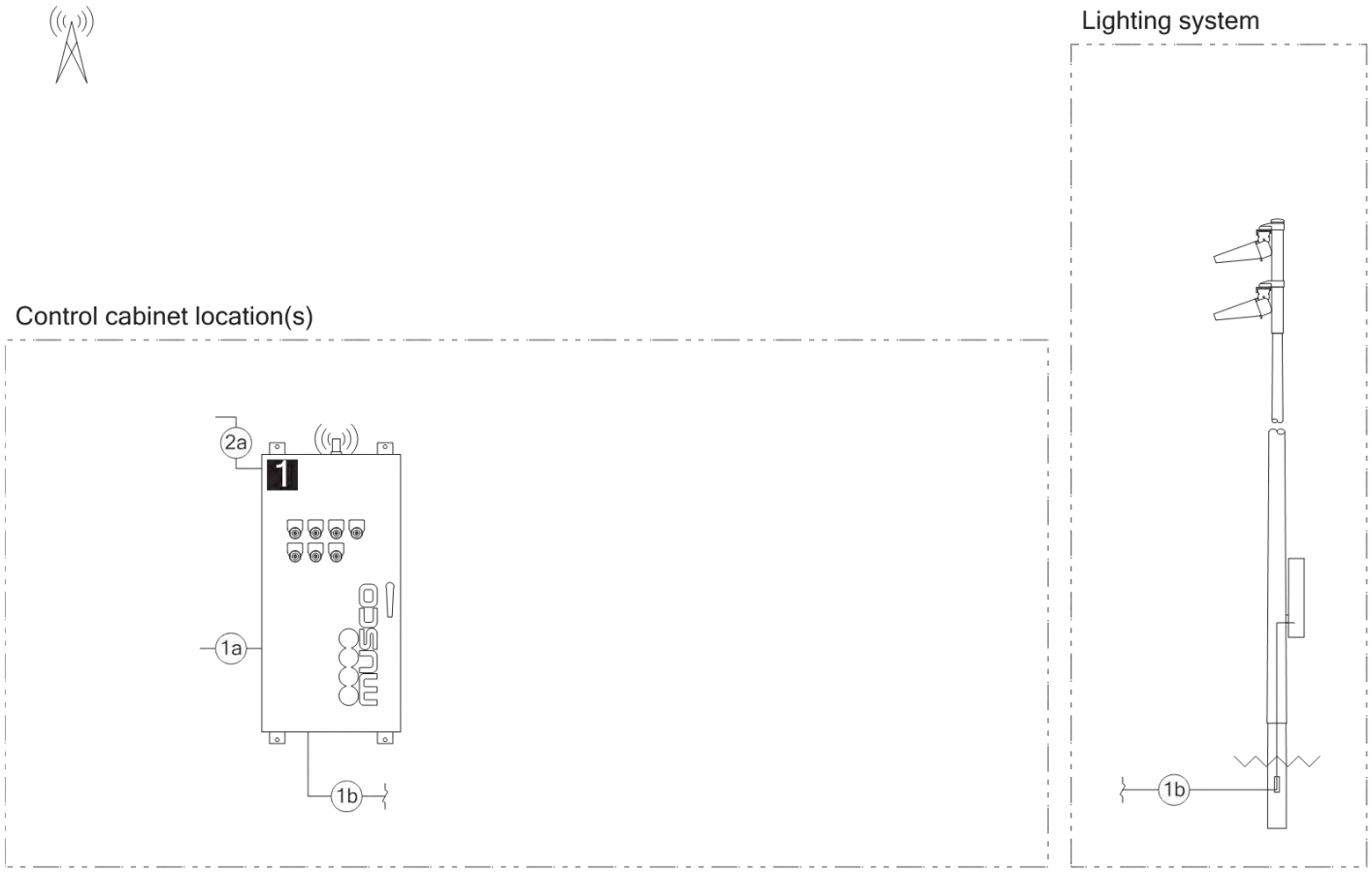
Important Notes:

1. Please confirm that the lighting circuit voltage listed above is accurate for this facility. This is the voltage/phase being connected and utilized at each lighting pole's electrical components enclosure disconnect. Inaccurate voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
2. In a 3 phase design, all 3 phases are to be run to each pole location. Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
3. One contactor is required for each circuit at each pole location. Contactors are 3 pole and 100% rated for the published continuous load.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. Size overcurrent devices using the full load amps column of the Circuit Summary by Switch chart (Minimum power factor is 0.9). Size conduit per code unless otherwise specified as larger to allow for harness connectors.
6. Avoid use of in-ground junction/pull boxes when possible. If used, all wire connectors must be UL listed for Wet Locations to prevent leakage current.
7. Control power wiring must be in separate conduit from line or load power wiring. Communication cables must be in separate conduit from any power wiring.
8. Refer to Installation Instructions for more details on equipment information and the installation requirements.

System Requirements: Control System Summary

Project Name: Episcopal High School Hummel Bowl | Project #: 161492
Control System ID: 1 of 1
Distribution Panel Location/ID: BB/SB/SO Service

Equipment Layout and Connection Details



Connection Details	
ID	**Description**
1a	Line power to contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
1b	Load power from contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
2a	Control power with equipment ground to control cabinet. Requires dedicated 20 A circuit. Provide transformer if control voltage not present.

Equipment	
ID	**Description**
1	Control and monitoring cabinet - primary

Circuit Summary

Switching Schedule	
Field/Switch Description	**Switches**
Baseball	**2,3**
Soccer/Baseball	2
Baseball	3
Softball	**4**
Soccer	**1,2**
Soccer	1
Soccer/Baseball	2

Control Module ID: 1

Lighting Circuit Voltage: 480/60/3

Circuit Summary by Switch							
Switch	**Zone Description**	**Pole ID**	**Qty of Fixtures**	**Full load amperes**	**Contactor Size (Amps)**	**Cabinet #**	**Contactor ID**
1	Soccer	S1	9	18.86	30	1	C1
	Soccer	S2	9	18.86	30	1	C2
	Soccer	S3	9	18.86	30	1	C3
	Soccer	S4	9	18.86	30	1	C4
2	Soccer/Baseball	S1, S2	8	18.86	30	1	C5
	Soccer/Baseball	S3, S4	4	9.43	30	1	C6
3	Baseball	A1, B1	11	18.54	30	1	C7
	Baseball	A2, S1	10	17.21	30	1	C8
	Baseball	C1, S2	11	17.3	30	1	C9
4	Softball	A3, B2	8	11.17	30	1	C10
	Softball	A4, B3	8	11.17	30	1	C11
	Softball	C1, S2	9	13.61	30	1	C12

SOCCER, BASEBALL, AND SOFTBALL

Episcopal High School Soccer, Baseball, Softball

Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
A1-A2	70'	70'	1	TLC-LED-1200	1.17 kW	C
		70'	1	TLC-LED-900	0.88 kW	C
		70'	2	TLC-LED-1500	2.82 kW	C
		16'	1	TLC-BT-575	0.57 kW	C
A3-A4	60'	60'	3	TLC-LED-900	2.67 kW	D
B1	70'	70'	1	TLC-LED-1200	1.17 kW	C
		70'	1	TLC-LED-900	0.88 kW	C
		70'	3	TLC-LED-1500	4.23 kW	C
		16'	1	TLC-BT-575	0.57 kW	C
B2-B3	60'	60'	4	TLC-LED-900	3.56 kW	D
		16'	1	TLC-BT-575	0.57 kW	D
C1	70'	70'	1	TLC-LED-900	0.88 kW	D
		70'	3	TLC-LED-1200	3.51 kW	D
		70'	4	TLC-LED-1200	4.68 kW	C
		16'	2	TLC-BT-575	1.15 kW	C
		16'	2	TLC-BT-575	1.15 kW	D
S1	80'	80'	1	TLC-LED-1200	1.17 kW	A
		80'	4	TLC-LED-1500	5.64 kW	B
		80'	8	TLC-LED-1500	11.28 kW	A
		70'	1	TLC-LED-1500	1.41 kW	C
		70'	2	TLC-LED-1200	2.34 kW	C
		19'	2	TLC-BT-575	1.15 kW	C
S2	80'	80'	1	TLC-LED-1200	1.17 kW	A
		80'	3	TLC-LED-1200	3.51 kW	D
		80'	4	TLC-LED-1500	5.64 kW	B
		80'	8	TLC-LED-1500	11.28 kW	A
		70'	1	TLC-LED-1200	1.17 kW	C
		70'	2	TLC-LED-1500	2.82 kW	C
		19'	2	TLC-BT-575	1.15 kW	C
S3-S4	70'	70'	2	TLC-LED-1500	2.82 kW	B
		70'	9	TLC-LED-1500	12.69 kW	A
12			**105**		**123.47 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Soccer	50.28 kW	36
B	Soccer/Baseball	16.92 kW	12
C	Baseball	33.62 kW	32
D	Softball	22.66 kW	25

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-BT-575	LED 5700K - 75 CRI	575W	52,000	>120,000	>120,000	>120,000	13
TLC-LED-1200	LED 5700K - 75 CRI	1170W	150,000	>120,000	>120,000	>120,000	18
TLC-LED-1500	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	56
TLC-LED-900	LED 5700K - 75 CRI	880W	104,000	>120,000	>120,000	>120,000	4
TLC-LED-900	LED 5700K - 75 CRI	890W	89,600	>120,000	>120,000	>120,000	14

Single Luminaire Amperage Draw Chart

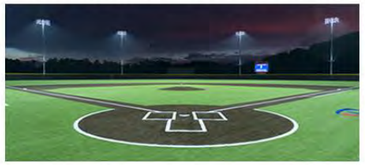
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-900	5.3	5.0	4.6	4.0	3.2	2.9	2.3
TLC-BT-575	3.3	3.2	2.9	2.5	2.0	1.8	1.5

Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Baseball (Infield)	Horizontal Illuminance	51.03	36	59	1.66	1.43	B,C	44
Baseball (Outfield)	Horizontal Illuminance	36.08	28	47	1.71	1.30	B,C	44
Multipurpose Area	Horizontal	28.72	17	44	2.61	1.71	D	25
Property Line	Horizontal	0.01	0	0	-	-	A,B,C,D	105
Soccer	Horizontal Illuminance	75.97	59	89	1.50	1.28	A,B	48
Softball (Infield)	Horizontal Illuminance	50.98	34	58	1.69	1.49	D	25
Softball (Outfield)	Horizontal Illuminance	33.73	23	45	1.91	1.44	D	25

From Hometown to Professional



We Make It Happen.

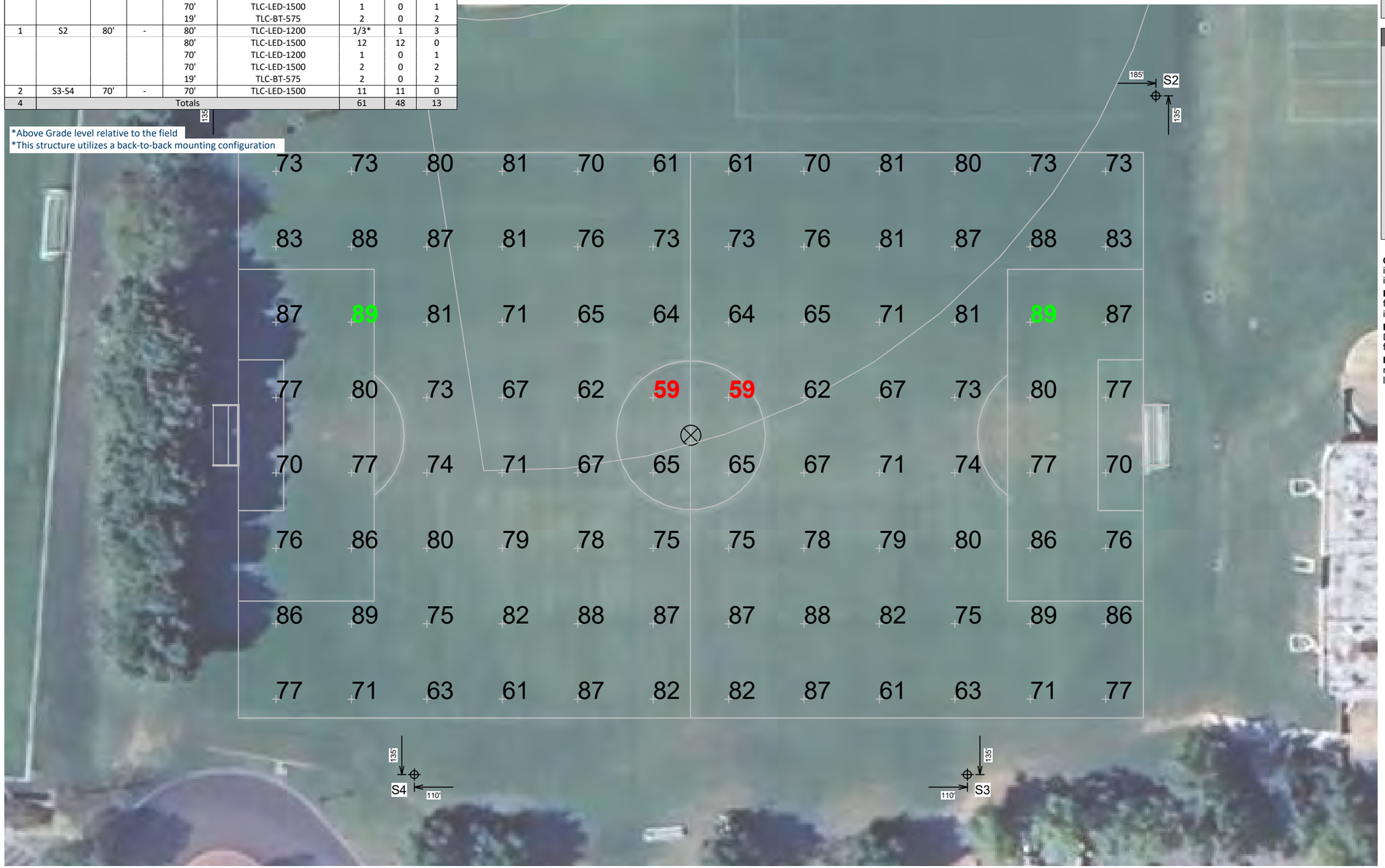
Episcopal High School Soccer, Baseball, Softb

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
1	S1	80'	-	80'	TLC-LED-1200	1	1	0
				80'	TLC-LED-1500	12	12	0
				70'	TLC-LED-1200	2	0	2
				70'	TLC-LED-1500	1	0	1
				19'	TLC-BT-575	2	0	2
1	S2	80'	-	80'	TLC-LED-1200	1/3*	1	3
				80'	TLC-LED-1500	12	12	0
				70'	TLC-LED-1200	1	0	1
				70'	TLC-LED-1500	2	0	2
				19'	TLC-BT-575	2	0	2
2	S3-S4	70'	-	70'	TLC-LED-1500	11	11	0
4	Totals					61	48	13

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Soccer**
Size:	360' x 225'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Guaranteed Average:	**75**
Scan Average:	75.97
Maximum:	89
Minimum:	59
Avg/Min:	1.28
Guaranteed Max/Min:	**2**
Max/Min:	1.50
UG (adjacent pts):	1.43
CU:	0.75
No. of Points:	96
LUMINAIRE INFORMATION	
Applied Circuits:	A,B
No. of Luminaires:	**48**
Total Load:	67.20 kW

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 : 40

0' 40' 80'

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

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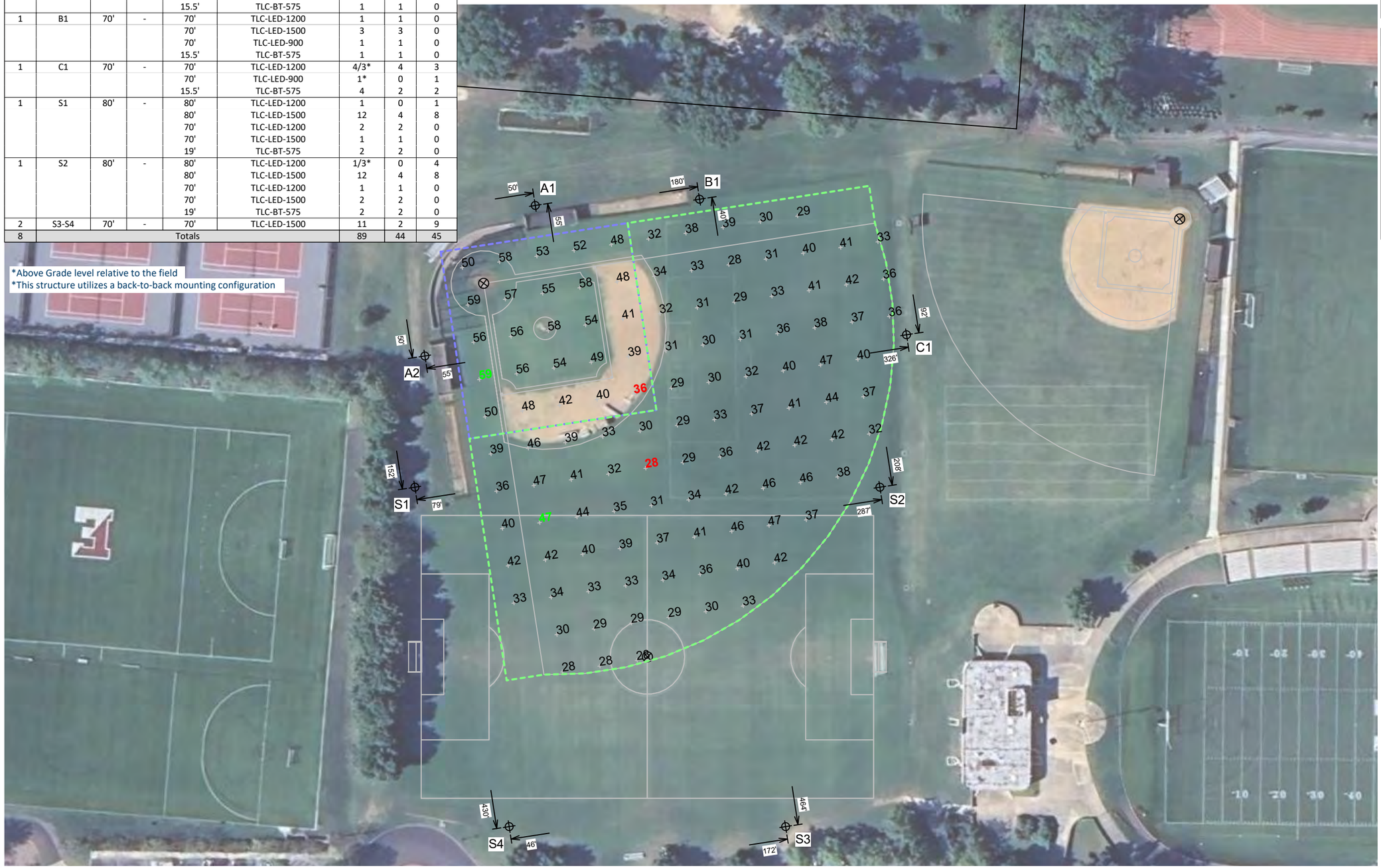
Episcopal High School Soccer, Baseball, Softb

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	A1-A2	70'	-	70'	TLC-LED-1200	1	1	0
				70'	TLC-LED-1500	2	2	0
				70'	TLC-LED-900	1	1	0
				15.5'	TLC-BT-575	1	1	0
1	B1	70'	-	70'	TLC-LED-1200	1	1	0
				70'	TLC-LED-1500	3	3	0
				70'	TLC-LED-900	1	1	0
				15.5'	TLC-BT-575	1	1	0
1	C1	70'	-	70'	TLC-LED-1200	4/3*	4	3
				70'	TLC-LED-900	1*	0	1
				15.5'	TLC-BT-575	4	2	2
1	S1	80'	-	80'	TLC-LED-1200	1	0	1
				80'	TLC-LED-1500	12	4	8
				70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-1500	1	1	0
				19'	TLC-BT-575	2	2	0
1	S2	80'	-	80'	TLC-LED-1200	1/3*	0	4
				80'	TLC-LED-1500	12	4	8
				70'	TLC-LED-1200	1	1	0
				70'	TLC-LED-1500	2	2	0
				19'	TLC-BT-575	2	2	0
2	S3-S4	70'	-	70'	TLC-LED-1500	11	2	9
8	Totals					89	44	45

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Baseball**
Size:	315'/340'/315' - basepath 90'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL FOOTCANDLES	
	Infield	Outfield
Guaranteed Average:	**50**	**30**
Scan Average:	51.03	36.08
Maximum:	59	47
Minimum:	36	28
Avg/Min:	1.43	1.30
Guaranteed Max/Min:	**2**	**2.5**
Max/Min:	1.66	1.71
UG (adjacent pts):	1.34	1.39
CU:	0.64	
No. of Points:	25	90
LUMINAIRE INFORMATION		
Applied Circuits:	B,C	
No. of Luminaires:	**44**	
Total Load:	50.53 kW	

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 : 80

0' 80' 160'

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

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Episcopal High School Soccer, Baseball, Softb

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	A3-A4	60'	-	60'	TLC-LED-900	3	3	0
2	B2-B3	60'	-	60'	TLC-LED-900	4	4	0
				15.5'	TLC-BT-575	1	1	0
1	C1	70'	-	70'	TLC-LED-1200	4/3*	3	4
				70'	TLC-LED-900	1*	1	0
				15.5'	TLC-BT-575	4	2	2
1	S2	80'	-	80'	TLC-LED-1200	1/3*	3	1
				80'	TLC-LED-1500	12	0	12
				70'	TLC-LED-1200	1	0	1
				70'	TLC-LED-1500	2	0	2
				19'	TLC-BT-575	2	0	2
6	Totals					49	25	24

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

SCALE IN FEET 1 : 50

0' 50' 100'

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

Grid Summary

Name:	**Softball**
Size:	205'/205'/205' - basepath 60'
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL FOOTCANDLES	
	Infield	Outfield
Guaranteed Average:	**50**	**30**
Scan Average:	50.98	33.73
Maximum:	58	45
Minimum:	34	23
Avg/Min:	1.49	1.44
Guaranteed Max/Min:	**2**	**2.5**
Max/Min:	1.69	1.91
UG (adjacent pts):	1.27	1.43
CU:	0.61	
No. of Points:	25	77
LUMINAIRE INFORMATION		
Applied Circuits:	D	
No. of Luminaires:	**25**	
Total Load:	22.66 kW	

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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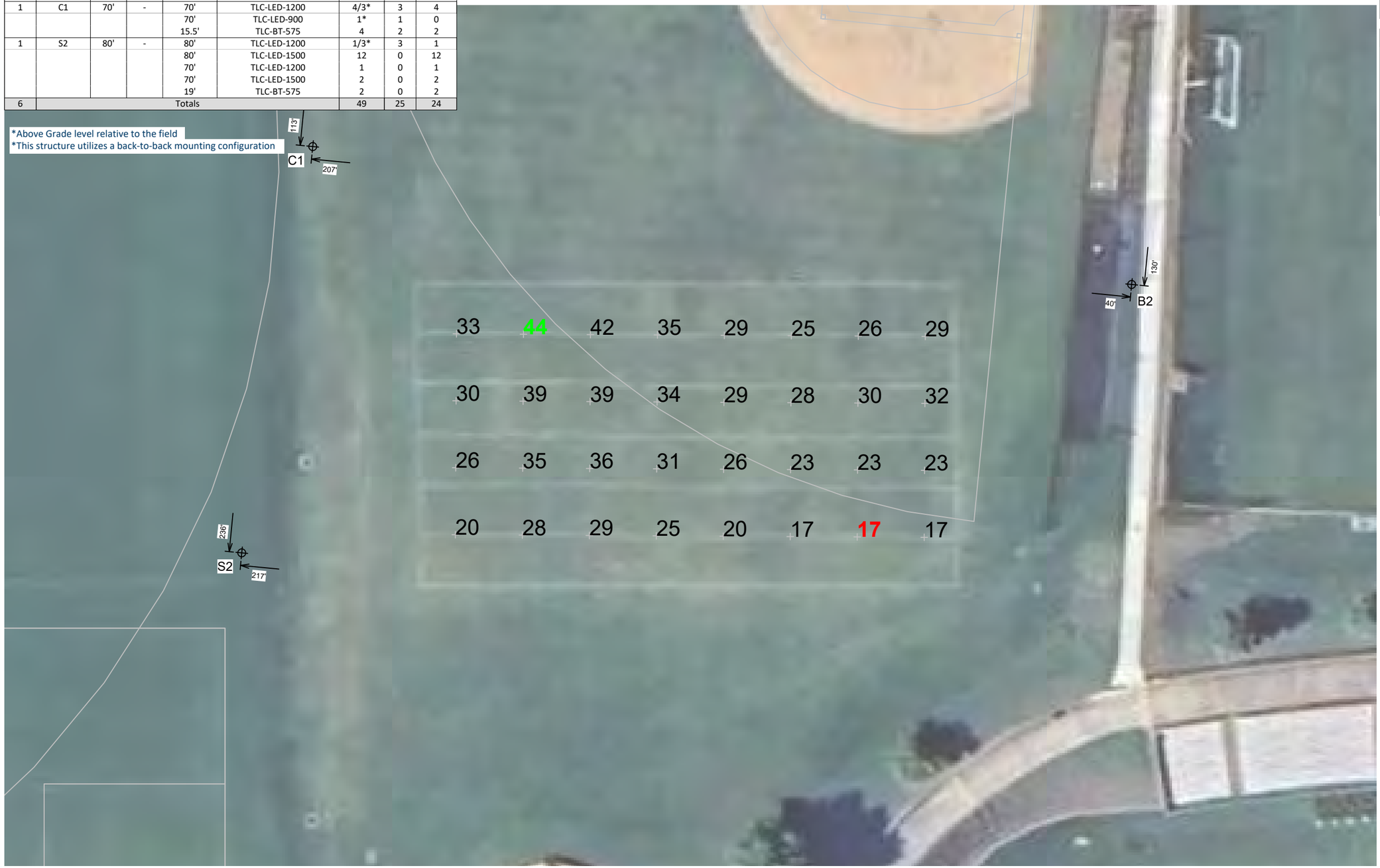
Episcopal High School Soccer, Baseball, Softb

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	A3-A4	60'	-	60'	TLC-LED-900	3	3	0
2	B2-B3	60'	-	60'	TLC-LED-900	4	4	0
				15.5'	TLC-BT-575	1	1	0
1	C1	70'	-	70'	TLC-LED-1200	4/3*	3	4
				70'	TLC-LED-900	1*	1	0
				15.5'	TLC-BT-575	4	2	2
1	S2	80'	-	80'	TLC-LED-1200	1/3*	3	1
				80'	TLC-LED-1500	12	0	12
				70'	TLC-LED-1200	1	0	1
				70'	TLC-LED-1500	2	0	2
				19'	TLC-BT-575	2	0	2
6	Totals					49	25	24

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration



Grid Summary

Name:	**Multipurpose Area**
Size:	205'/205'/205' - basepath 60'
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES	Entire Grid
Scan Average:	**28.72**
Maximum:	44
Minimum:	17
Avg/Min:	1.71
Max/Min:	**2.61**
UG (adjacent pts):	1.41
CU:	0.15
No. of Points:	32
LUMINAIRE INFORMATION	
Applied Circuits:	D
No. of Luminaires:	**25**
Total Load:	22.66 kW

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 : 30

0' 30' 60'

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

Episcopal High School Soccer, Baseball, Softb

Alexandria,VA

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Scan Average:	**0.01**
Maximum:	0
Minimum:	0
Avg/Min:	-
Max/Min:	**-**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A,B,C,D
No. of Luminaires:	**105**
Total Load:	123.47 kW

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 : 100

0' 100' 200'

ENGINEERED DESIGN By: Brayton Carter • File #161492BB.SB.SO-A • 28-Feb-25

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

We Make It Happen.

Episcopal High School Soccer, Baseball, Softb

Alexandria,VA

Equipment Layout

INCLUDES:
· Baseball
· Soccer
· Softball

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

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	A1-A2	70'	-	70'	TLC-LED-1200	1
				70'	TLC-LED-1500	2
				70'	TLC-LED-900	1
				15.5'	TLC-BT-575	1
2	A3-A4	60'	-	60'	TLC-LED-900	3
1	B1	70'	-	70'	TLC-LED-1200	1
				70'	TLC-LED-1500	3
				70'	TLC-LED-900	1
				15.5'	TLC-BT-575	1
2	B2-B3	60'	-	60'	TLC-LED-900	4
				15.5'	TLC-BT-575	1
1	C1	70'	-	70'	TLC-LED-1200	4/3*
				70'	TLC-LED-900	1*
				15.5'	TLC-BT-575	4
1	S1	80'	-	80'	TLC-LED-1200	1
				80'	TLC-LED-1500	12
				70'	TLC-LED-1200	2
				70'	TLC-LED-1500	1
				19'	TLC-BT-575	2
1	S2	80'	-	80'	TLC-LED-1200	1/3*
				80'	TLC-LED-1500	12
				70'	TLC-LED-1200	1
				70'	TLC-LED-1500	2
				19'	TLC-BT-575	2
2	S3-S4	70'	-	70'	TLC-LED-1500	11
12	Totals					105

*This structure utilizes a back-to-back mounting configuration

Single Luminaire Amperage Draw Chart

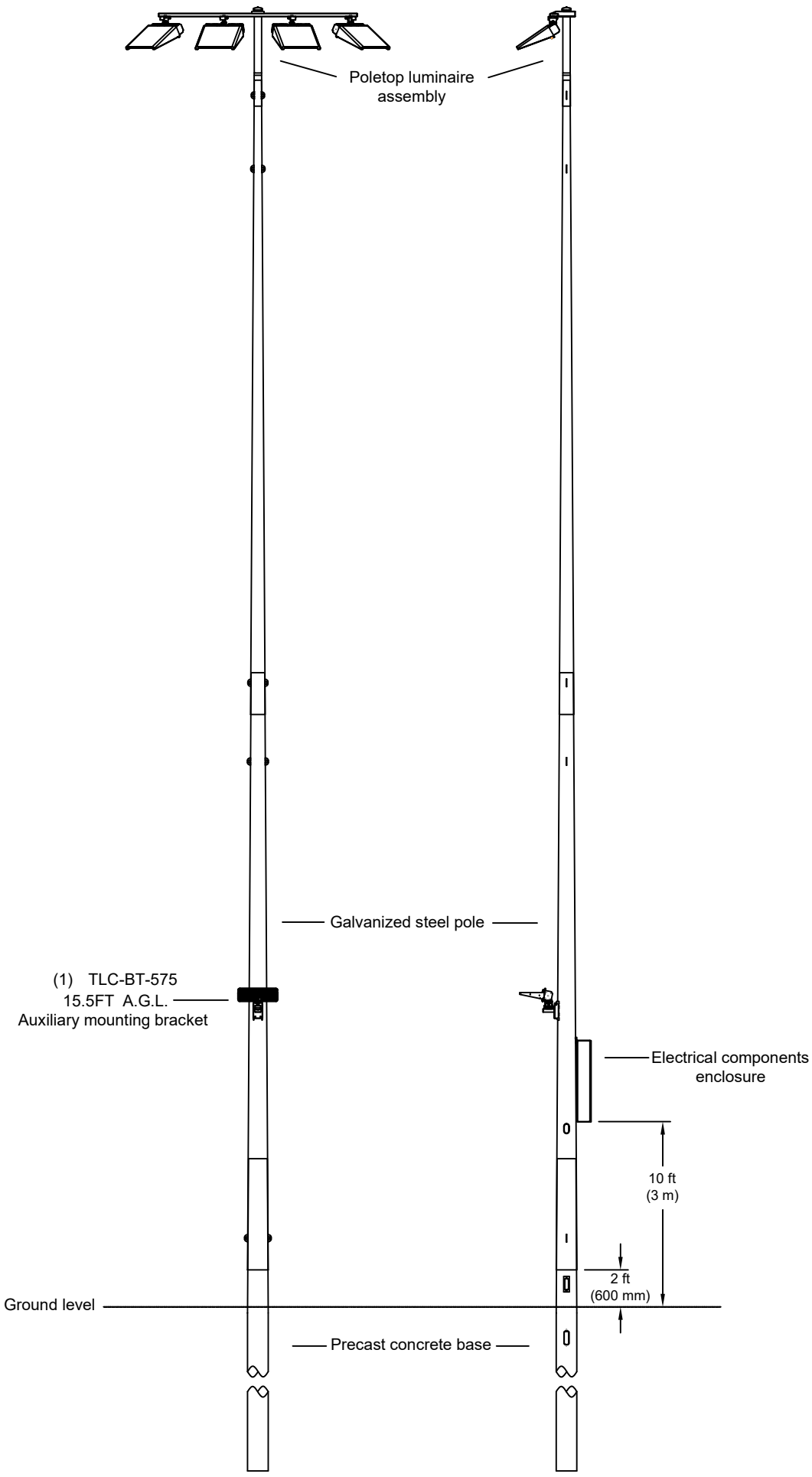
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-900	5.3	5.0	4.6	4.0	3.2	2.9	2.3
TLC-BT-575	3.3	3.2	2.9	2.5	2.0	1.8	1.5

SCALE IN FEET 1 : 100

0' 100' 200'

ENGINEERED DESIGN By: Brayton Carter • File #161492BB.SB.SO-A • 28-Feb-25

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



POLE(S): A1-A2

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(2) TLC-LED-1500
(1) TLC-LED-1200
(1) TLC-LED-900

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/10/2025	161492P2

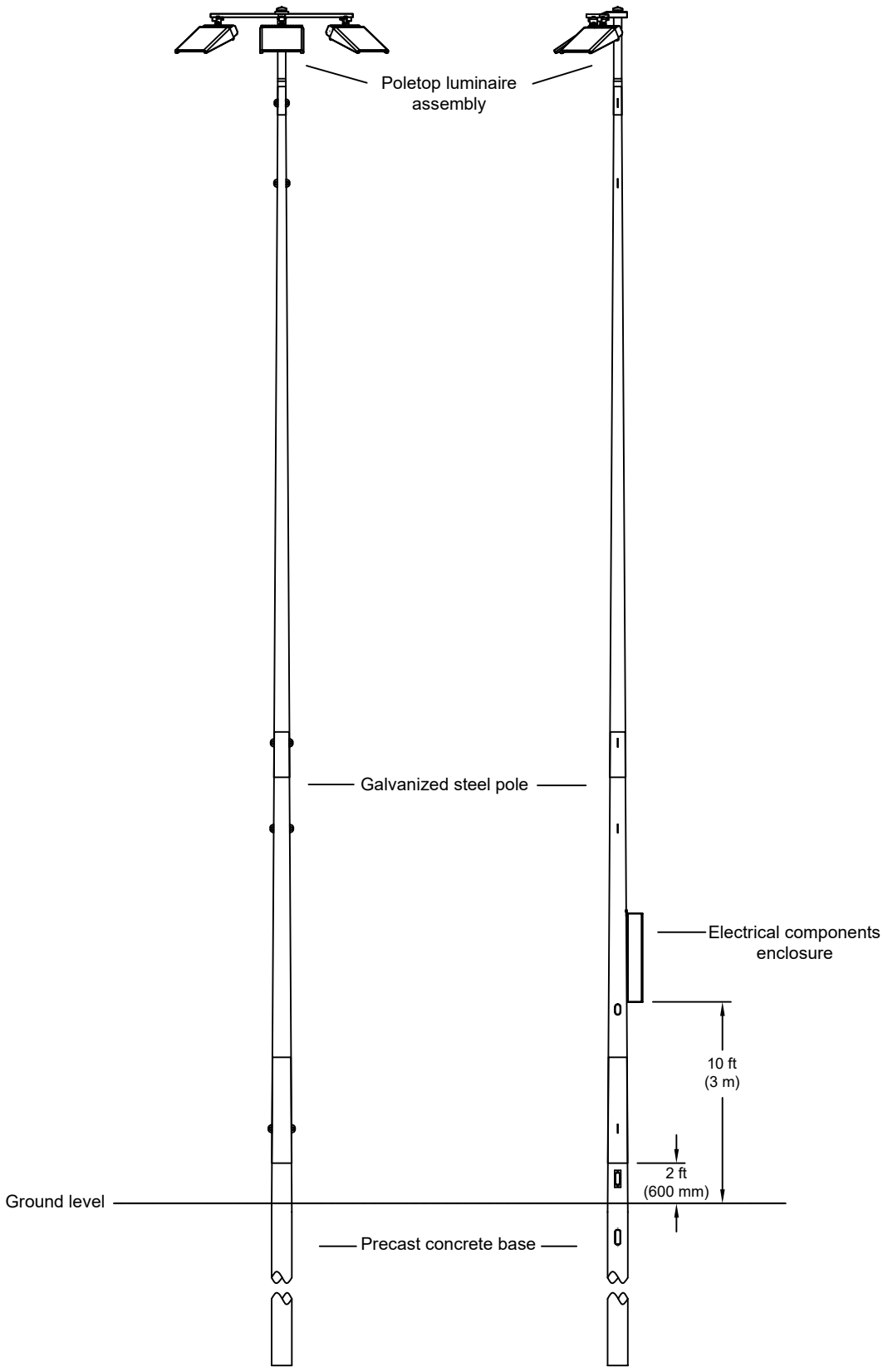
1 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing

B



POLE(S): A3-A4

Musco 60FT Light-Structure System™ pole
TLC for LED™ luminaires
(3) TLC-LED-900

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/10/2025	161492P2

2 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
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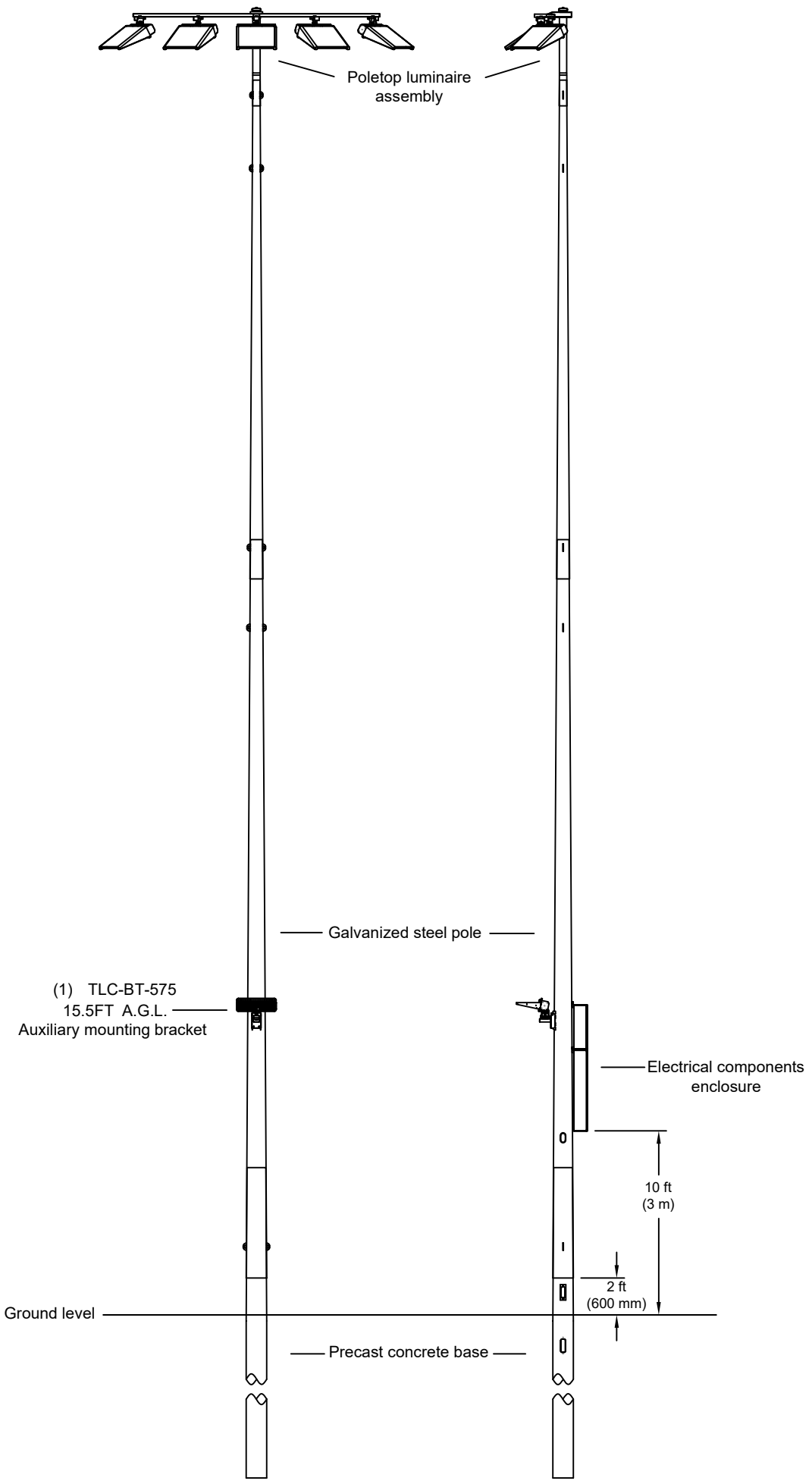
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing

B



POLE(S): B1

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(3) TLC-LED-1500
(1) TLC-LED-1200
(1) TLC-LED-900

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/10/2025	161492P2

3 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

musco Lighting
CORPORATE OFFICE:
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Oskaloosa, Iowa 52577
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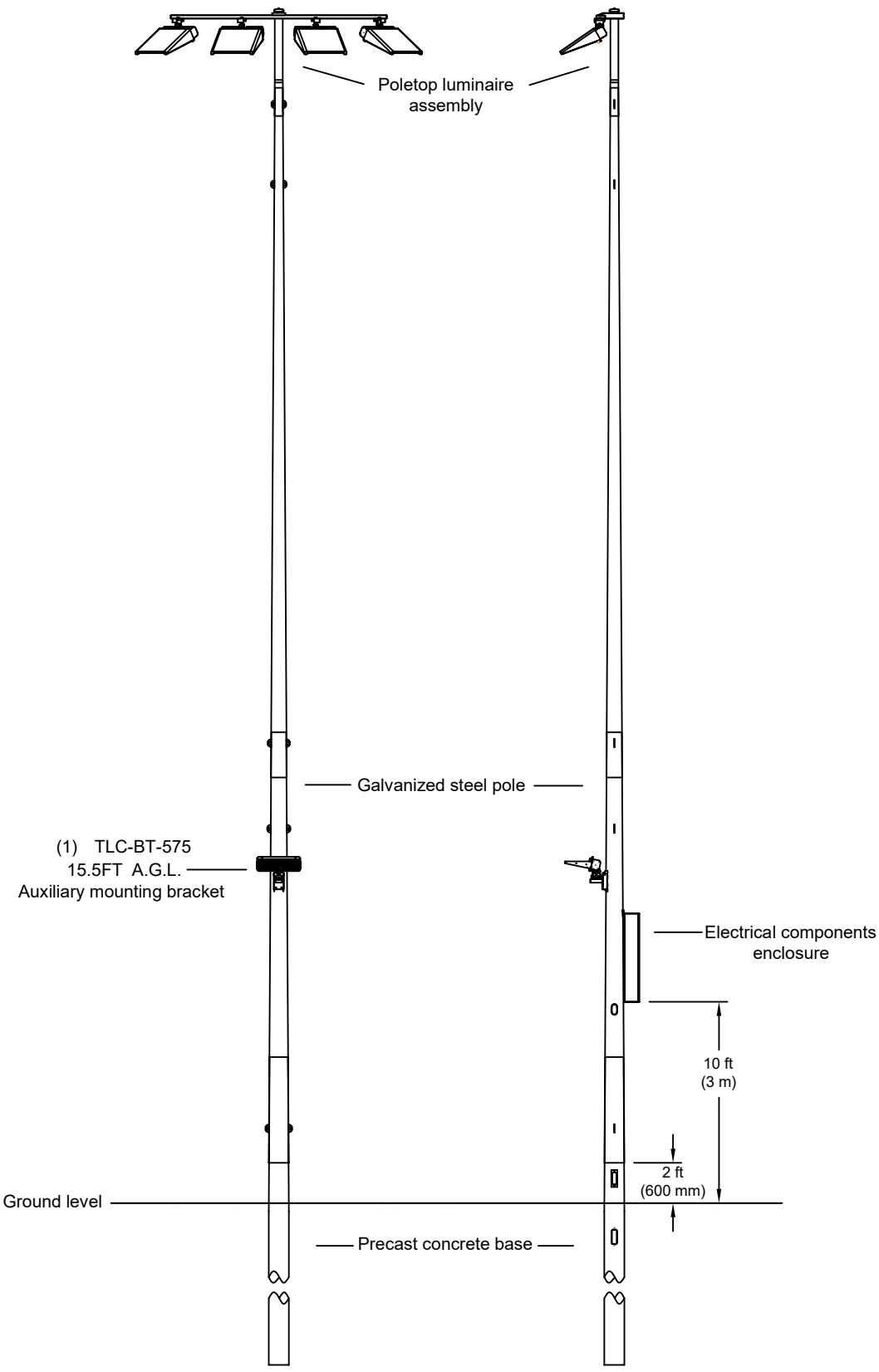
+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing
B



POLE(S): B2-B3

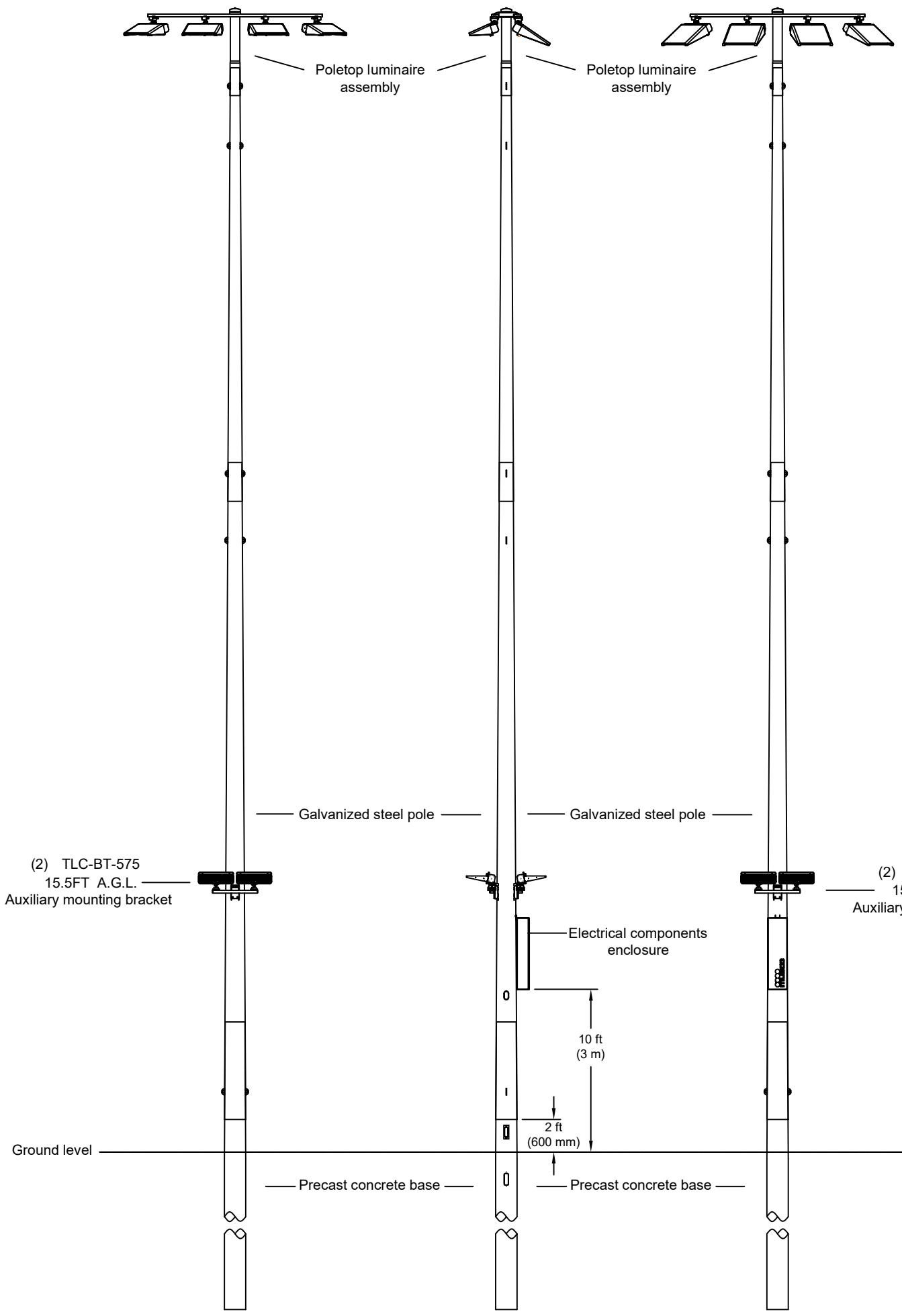
Musco 60FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-900

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/10/2025	161492P2
				4 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing B



POLE(S): C1

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(3) TLC-LED-1200 (Front)
(1) TLC-LED-900 (Front)
(4) TLC-LED-1200 (Back)

PROJECT NUMBER: 161492
DRAWN BY: B.Carter
SCALE: NTS
DATE: 03/10/2025
DRAWING NUMBER: 161492P2
5 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

MUSCO Lighting
00
CORPORATE OFFICE:
P.O. Box 808
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Oskaloosa, Iowa 52577
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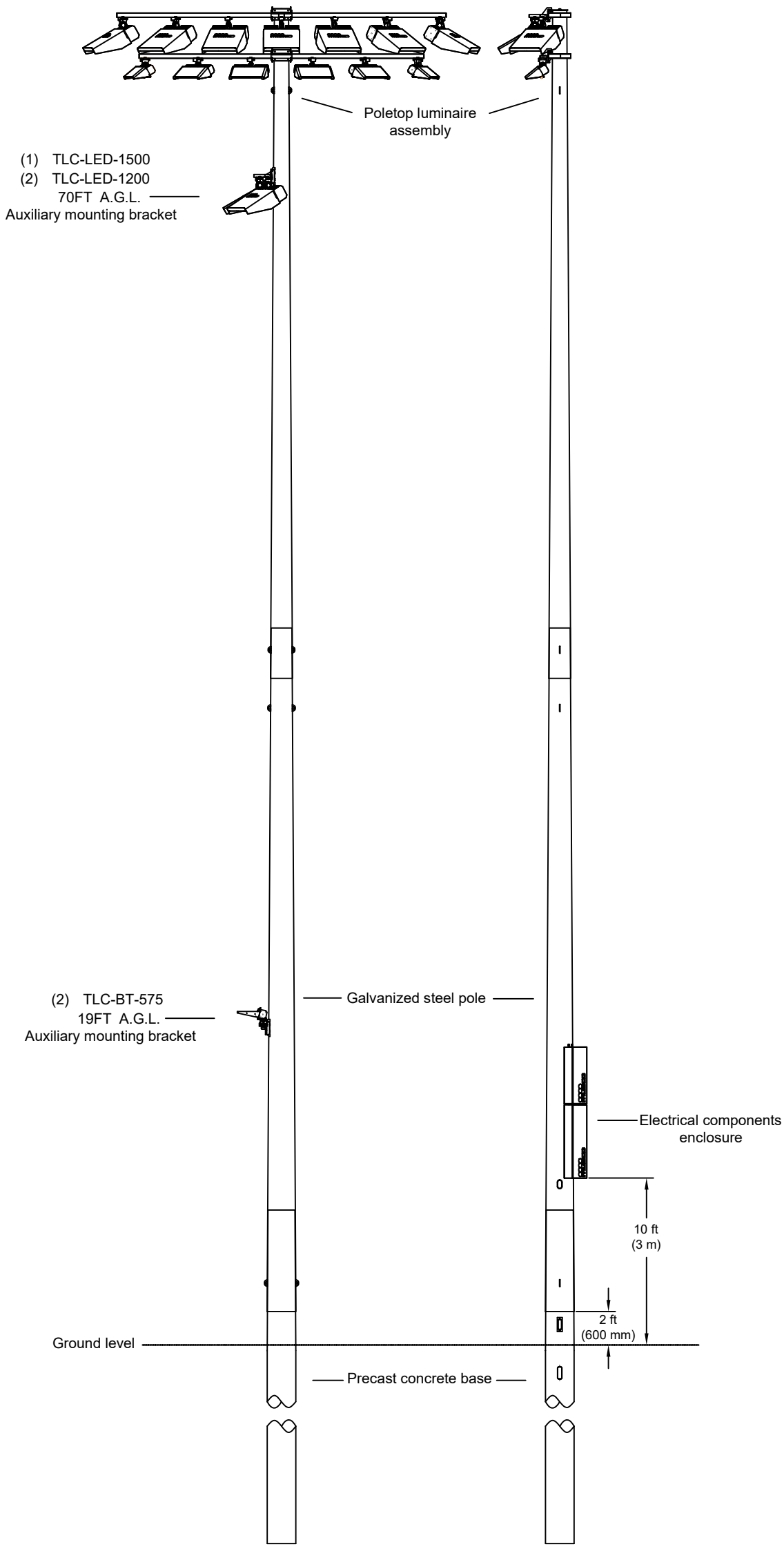
+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing
B



POLE(S): S1

Musco 80FT Light-Structure System™ pole
TLC for LED™ luminaires
(12) TLC-LED-1500
(1) TLC-LED-1200

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/10/2025	161492P2

6 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

musco Lighting
CORPORATE OFFICE:
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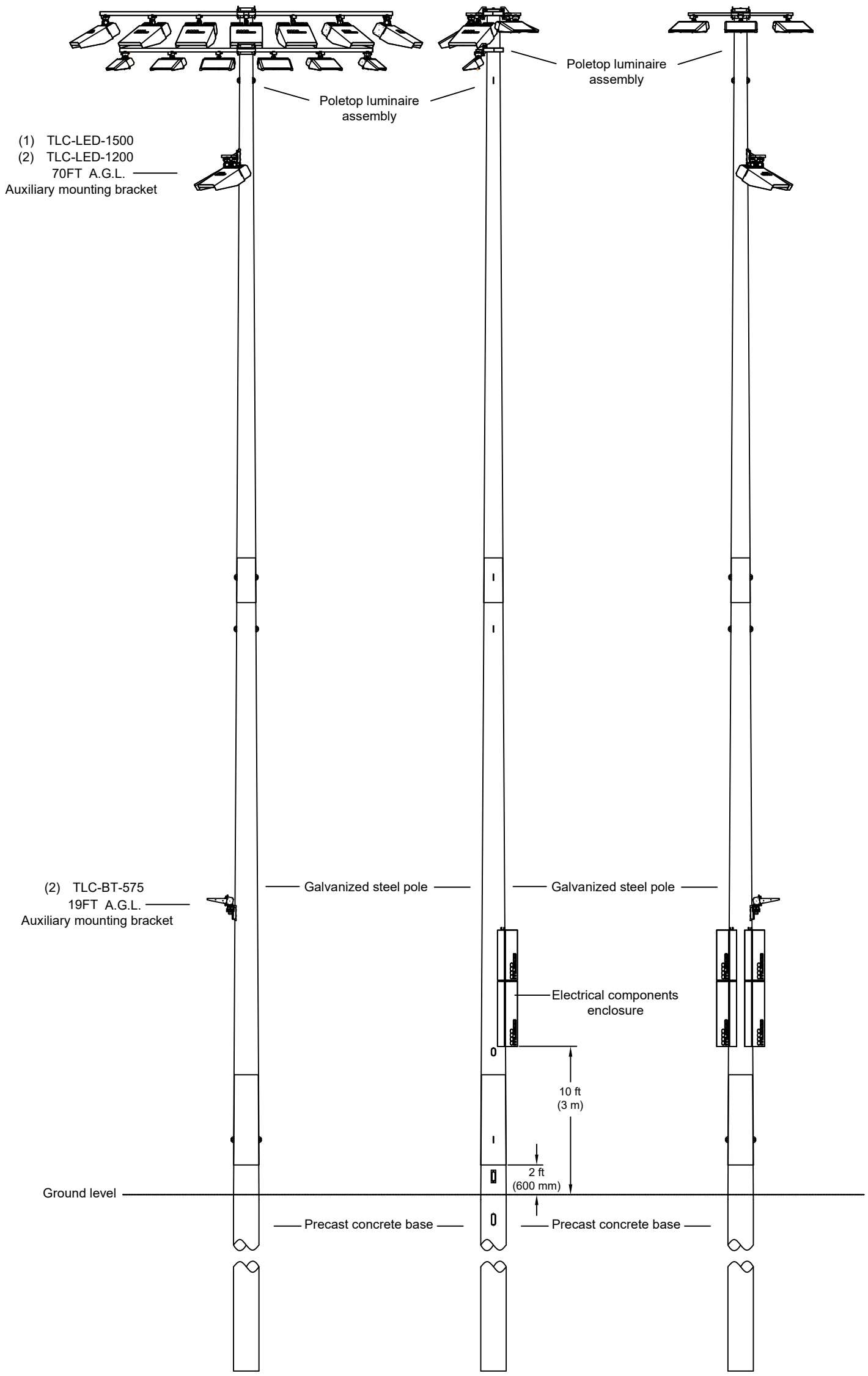
+1-800-825-6020
+1-641-673-0411

101

Episcopal High School Soccer
Baseball
Pole Configuration Drawing

B



POLE(S): S2

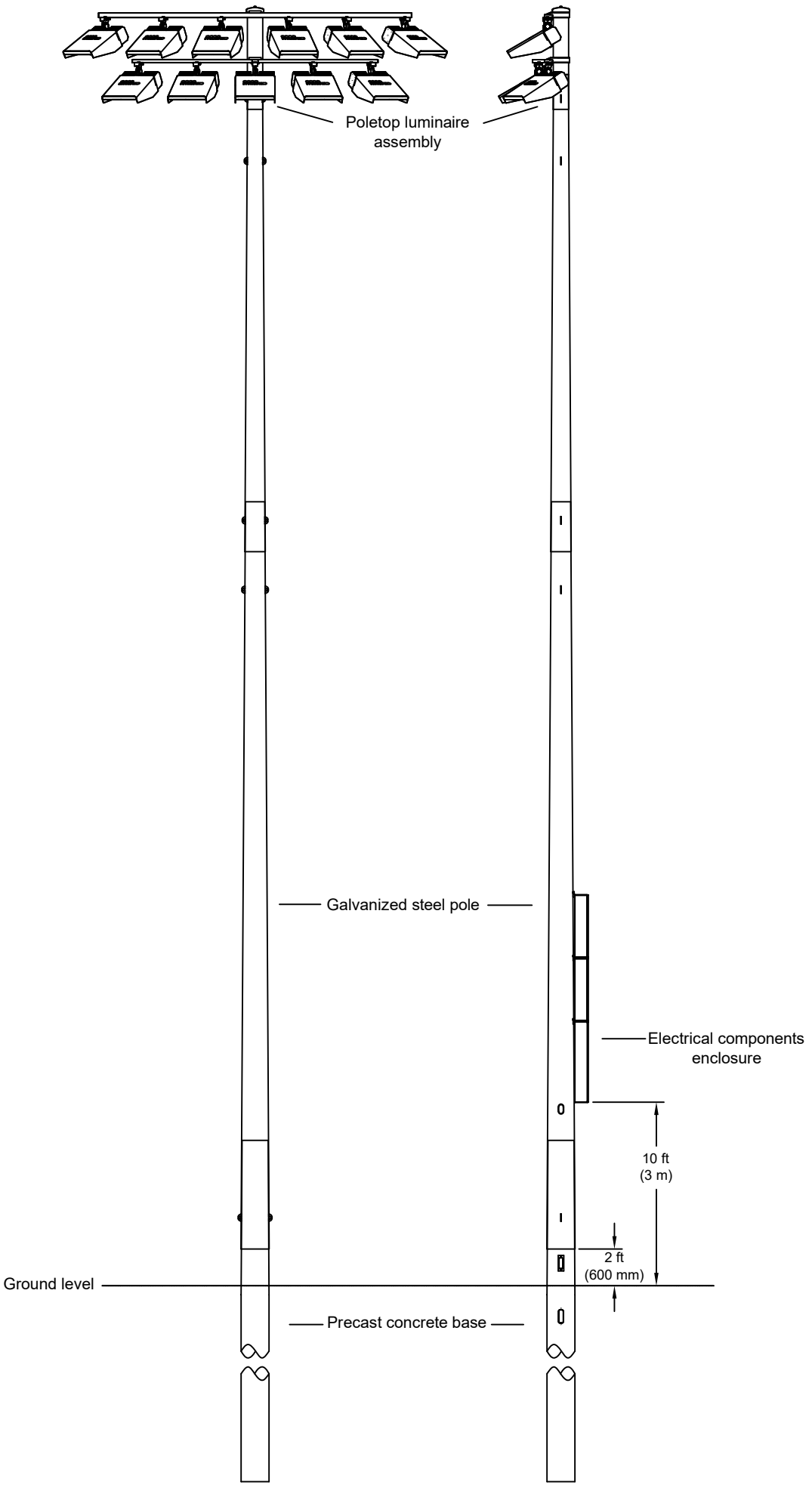
Musco 80FT Light-Structure System™ pole
TLC for LED™ luminaires
(12) TLC-LED-1500 (Front)
(1) TLC-LED-1200 (Front)
(3) TLC-LED-1200 (Back)

PROJECT NUMBER:	161492
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/10/2025
DRAWING NUMBER:	161492P2
7 OF 8 SHEETS	

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing B



POLE(S): S3-S4

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(11) TLC-LED-1500

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
161492	B.Carter	NTS	03/10/2025	161492P2
				8 OF 8 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
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+1-641-673-0411

Episcopal High School Soccer
Baseball
Pole Configuration Drawing

System Requirements: Control System Summary

Project Name: Episcopal High School Hummel Bowl | Project #: 161492
Control System ID: 1 of 1
Distribution Panel Location/ID: BB/SB/SO Service

Project Information

Control System

Control System ID:	1 of 1
Control System Type:	Control-Link ® Control and Monitoring System
Communication Type:	PowerLine-ST

Power Requirements

Control cabinet(s):	
Control voltage (phase to neutral)	120/60
VA loading - Inrush	3513.0
VA loading - Sealed	388.0
Lighting Circuits:	
Voltage/Hertz/Phase	480/60/3

Project Notes:

Equipment Listing

Description	Qty	Size (in)
Control and monitoring cabinet - primary	1	24 X 72
Contactors, 30 amperes	12	-
Off/On/Auto switches	4	-

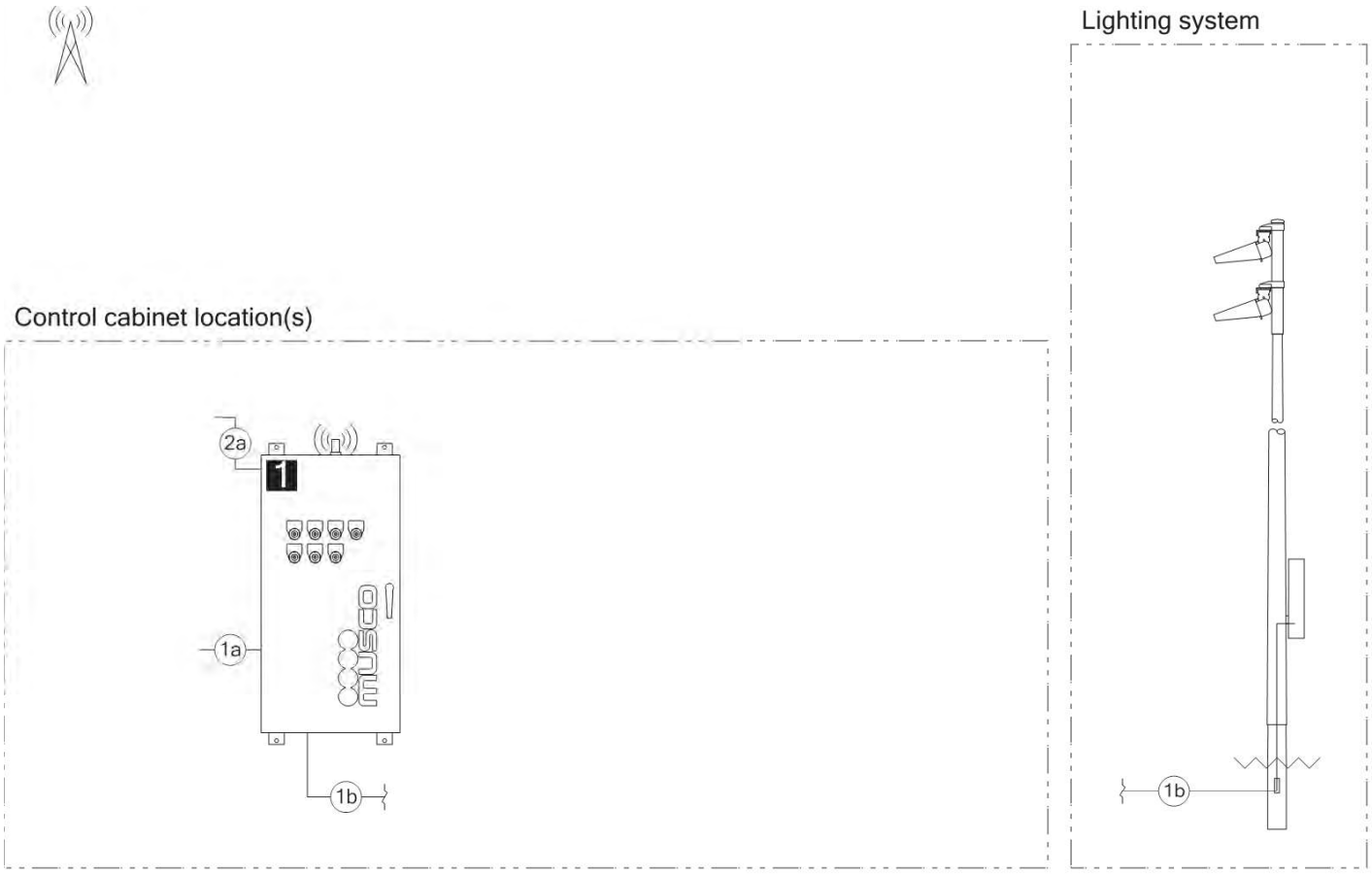
Important Notes:

1. Please confirm that the lighting circuit voltage listed above is accurate for this facility. This is the voltage/phase being connected and utilized at each lighting pole's electrical components enclosure disconnect. Inaccurate voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
2. In a 3 phase design, all 3 phases are to be run to each pole location. Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
3. One contactor is required for each circuit at each pole location. Contactors are 3 pole and 100% rated for the published continuous load.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. Size overcurrent devices using the full load amps column of the Circuit Summary by Switch chart (Minimum power factor is 0.9). Size conduit per code unless otherwise specified as larger to allow for harness connectors.
6. Avoid use of in-ground junction/pull boxes when possible. If used, all wire connectors must be UL listed for Wet Locations to prevent leakage current.
7. Control power wiring must be in separate conduit from line or load power wiring. Communication cables must be in separate conduit from any power wiring.
8. Refer to Installation Instructions for more details on equipment information and the installation requirements.

System Requirements: Control System Summary

Project Name: Episcopal High School Hummel Bowl | Project #: 161492
Control System ID: 1 of 1
Distribution Panel Location/ID: BB/SB/SO Service

Equipment Layout and Connection Details



Connection Details	
ID	**Description**
1a	Line power to contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
1b	Load power from contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
2a	Control power with equipment ground to control cabinet. Requires dedicated 20 A circuit. Provide transformer if control voltage not present.

Equipment	
ID	**Description**
1	Control and monitoring cabinet - primary

Circuit Summary

Switching Schedule	
Field/Switch Description	**Switches**
Baseball	**2,3**
Soccer/Baseball	2
Baseball	3
Softball	**4**
Soccer	**1,2**
Soccer	1
Soccer/Baseball	2

Control Module ID: 1

Lighting Circuit Voltage: 480/60/3

Circuit Summary by Switch							
Switch	**Zone Description**	**Pole ID**	**Qty of Fixtures**	**Full load amperes**	**Contactor Size (Amps)**	**Cabinet #**	**Contactor ID**
1	Soccer	S1	9	18.86	30	1	C1
	Soccer	S2	9	18.86	30	1	C2
	Soccer	S3	9	18.86	30	1	C3
	Soccer	S4	9	18.86	30	1	C4
2	Soccer/Baseball	S1, S2	8	18.86	30	1	C5
	Soccer/Baseball	S3, S4	4	9.43	30	1	C6
3	Baseball	A1, B1	11	18.54	30	1	C7
	Baseball	A2, S1	10	17.21	30	1	C8
	Baseball	C1, S2	11	17.3	30	1	C9
4	Softball	A3, B2	8	11.17	30	1	C10
	Softball	A4, B3	8	11.17	30	1	C11
	Softball	C1, S2	9	13.61	30	1	C12

FIELD HOCKEY AND LACROSSE

Episcopal High School Field Hockey
Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
FH1	70'	70'	2	TLC-LED-1200	2.34 kW	A
		70'	2	TLC-LED-900	1.76 kW	A
FH2	70'	70'	2	TLC-LED-900	1.76 kW	A
		70'	4	TLC-LED-1500	5.64 kW	A
FH3	70'	70'	2	TLC-LED-1200	2.34 kW	A
		70'	2	TLC-LED-900	1.76 kW	A
FH4-FH5	80'	80'	4	TLC-LED-900	3.52 kW	A
		80'	5	TLC-LED-1200	5.85 kW	A
FH6	70'	70'	3	TLC-LED-900	2.64 kW	A
FH7	70'	70'	6	TLC-LED-1200	7.02 kW	A
FH8	70'	70'	3	TLC-LED-900	2.64 kW	A
8			**44**		**46.64 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Field Hockey	46.64 kW	44

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1200	LED 5700K - 75 CRI	1170W	150,000	>120,000	>120,000	>120,000	20
TLC-LED-1500	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	4
TLC-LED-900	LED 5700K - 75 CRI	880W	104,000	>120,000	>120,000	>120,000	20

Single Luminaire Amperage Draw Chart

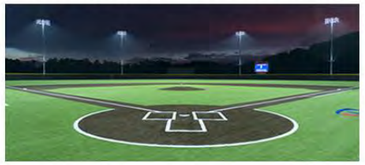
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-1500	8.4	7.9	7.3	6.3	5.0	4.6	3.6
TLC-LED-1200	6.9	6.5	6.0	5.2	4.2	3.8	3.0
TLC-LED-900	5.2	4.9	4.5	3.9	3.1	2.9	2.3

Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
FieldHockey 1	Horizontal Illuminance	50.65	43	58	1.36	1.19	A	44
FieldHockey 2	Horizontal Illuminance	50.56	41	59	1.43	1.23	A	44
Property Line	Horizontal	0.03	0	0	-	-	A	44

From Hometown to Professional



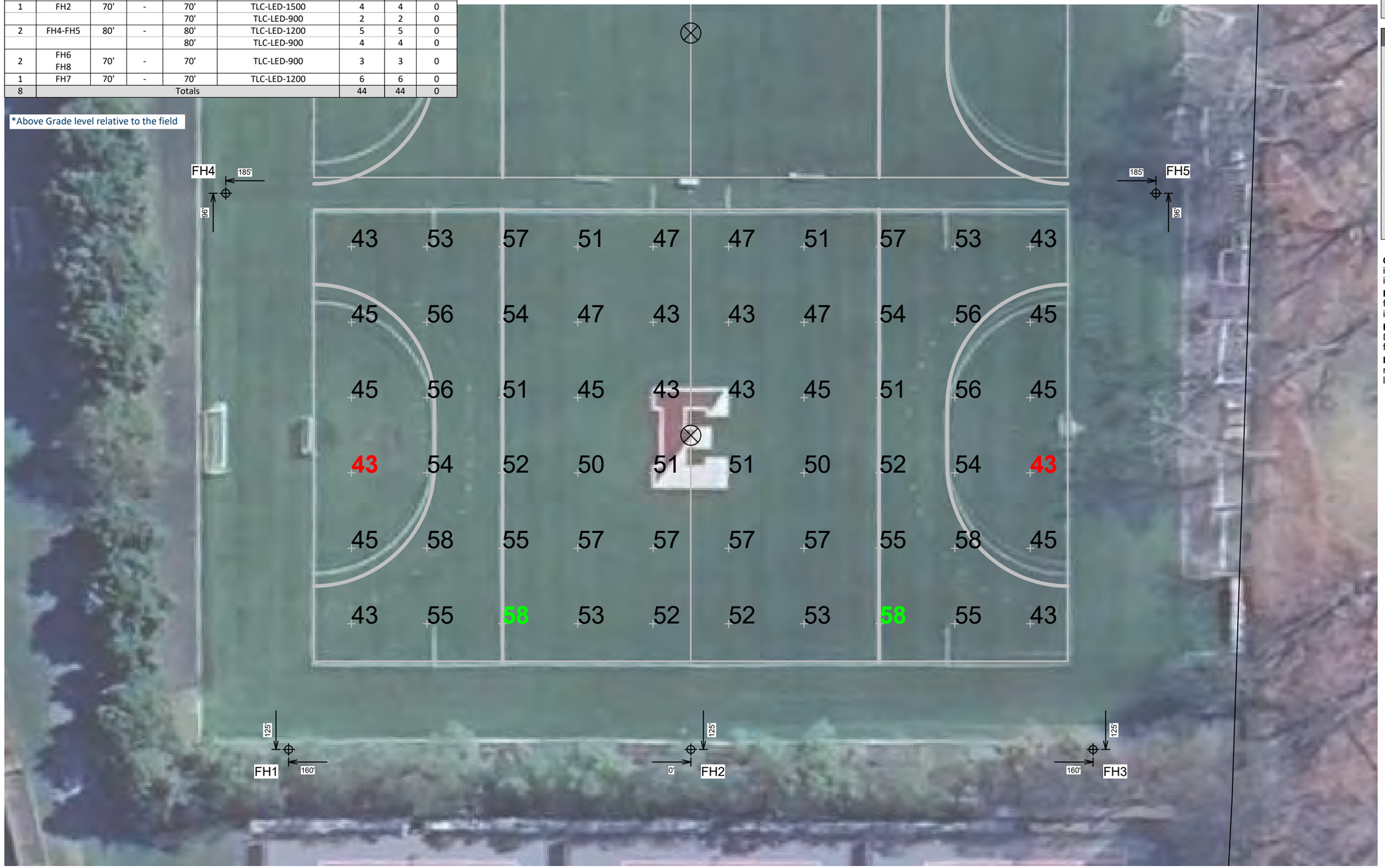
Episcopal High School Field Hockey

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	FH1 FH3	70'	-	70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-900	2	2	0
1	FH2	70'	-	70'	TLC-LED-1500	4	4	0
				70'	TLC-LED-900	2	2	0
2	FH4-FH5	80'	-	80'	TLC-LED-1200	5	5	0
				80'	TLC-LED-900	4	4	0
2	FH6 FH8	70'	-	70'	TLC-LED-900	3	3	0
1	FH7	70'	-	70'	TLC-LED-1200	6	6	0
8	Totals					44	44	0

*Above Grade level relative to the field



Grid Summary

Name:	**FieldHockey 1**
Size:	300' x 180'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL FOOTCANDLES
	Entire Grid
Guaranteed Average:	**50**
Scan Average:	50.65
Maximum:	58
Minimum:	43
Avg/Min:	1.19
Guaranteed Max/Min:	**2**
Max/Min:	1.36
UG (adjacent pts):	1.27
CU:	0.47
No. of Points:	60
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**44**
Total Load:	46.64 kW

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 : 40

0' 40' 80'

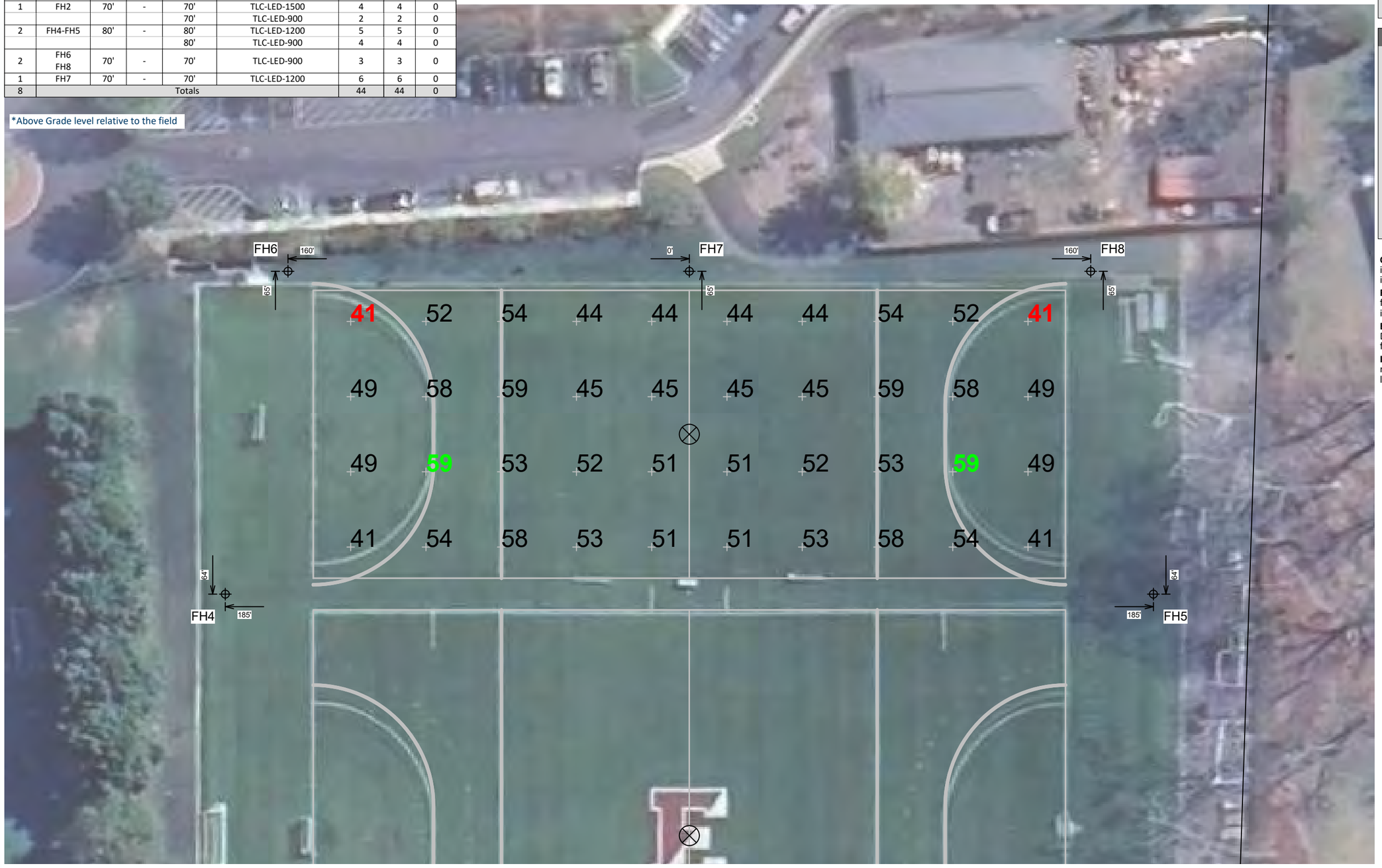
ENGINEERED DESIGN By: • File #243158A • 05-Mar-25

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

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	FH1 FH3	70'	-	70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-900	2	2	0
1	FH2	70'	-	70'	TLC-LED-1500	4	4	0
				70'	TLC-LED-900	2	2	0
2	FH4-FH5	80'	-	80'	TLC-LED-1200	5	5	0
				80'	TLC-LED-900	4	4	0
2	FH6 FH8	70'	-	70'	TLC-LED-900	3	3	0
1	FH7	70'	-	70'	TLC-LED-1200	6	6	0
8	Totals					44	44	0

*Above Grade level relative to the field



Episcopal High School Field Hockey

Alexandria,VA

Grid Summary

Name:	**FieldHockey 2**
Size:	300' x 115'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES	
	Entire Grid
Guaranteed Average:	**50**
Scan Average:	50.56
Maximum:	59
Minimum:	41
Avg/Min:	1.23
Guaranteed Max/Min:	**2**
Max/Min:	1.43
UG (adjacent pts):	1.29
CU:	0.31
No. of Points:	40
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**44**
Total Load:	46.64 kW

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 : 40

0' 40' 80'

ENGINEERED DESIGN By: • File #243158A • 05-Mar-25

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

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	FH1 FH3	70'	-	70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-900	2	2	0
1	FH2	70'	-	70'	TLC-LED-1500	4	4	0
				70'	TLC-LED-900	2	2	0
2	FH4-FH5	80'	-	80'	TLC-LED-1200	5	5	0
				80'	TLC-LED-900	4	4	0
2	FH6 FH8	70'	-	70'	TLC-LED-900	3	3	0
1	FH7	70'	-	70'	TLC-LED-1200	6	6	0
8	Totals					44	44	0

*Above Grade level relative to the field

Episcopal High School Field Hockey

Alexandria,VA

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL FOOTCANDLES
	Entire Grid
Scan Average:	**0.03**
Maximum:	0
Minimum:	0
Avg/Min:	-
Max/Min:	**-**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**44**
Total Load:	46.64 kW

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 : 100

0' 100' 200'

ENGINEERED DESIGN By: Brayton Carter • File #243158A • 05-Mar-25

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

Episcopal High School Field Hockey

Alexandria,VA

Equipment Layout

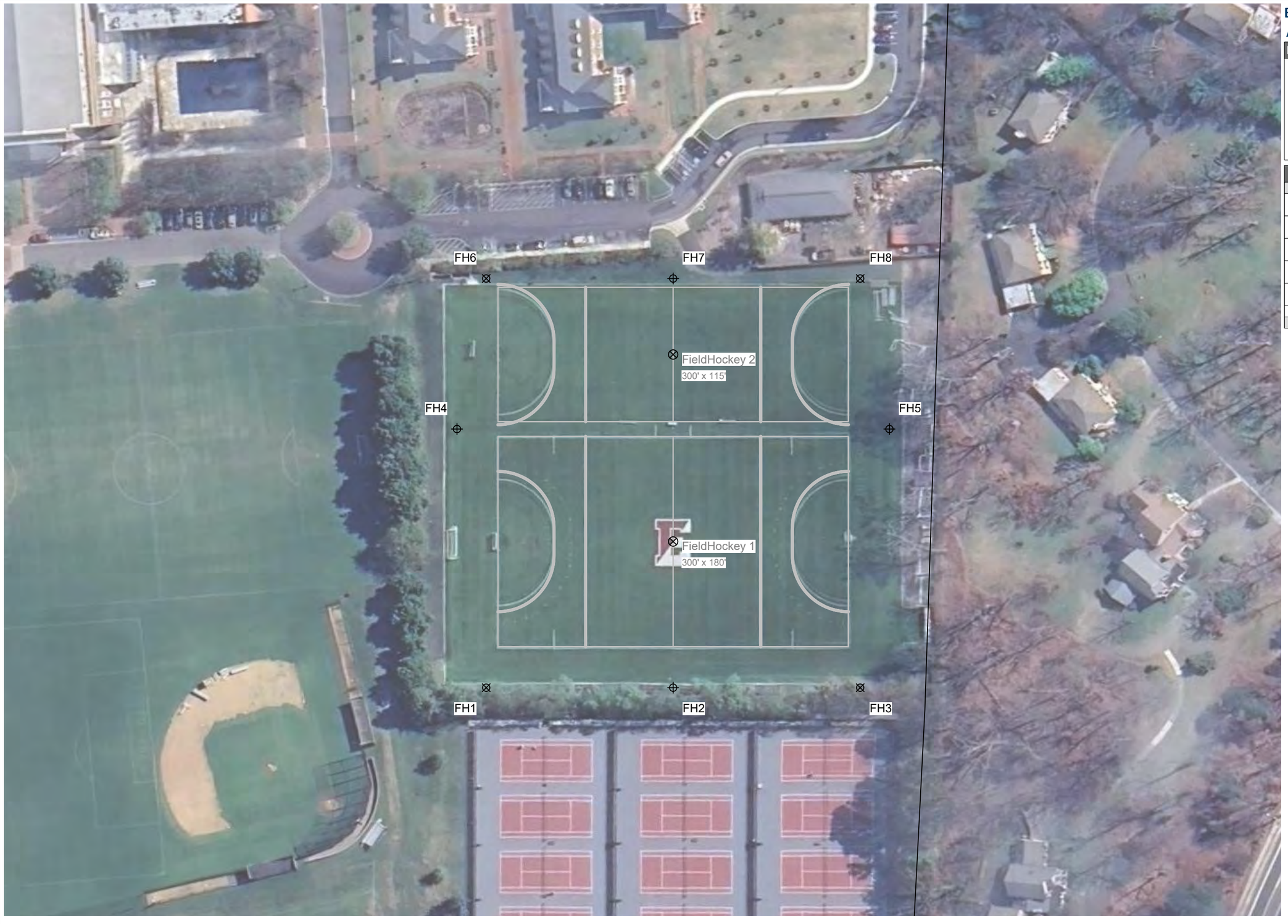
INCLUDES:
· FieldHockey 1
· FieldHockey 2

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

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	FH1 FH3	70'	-	70' 70'	TLC-LED-1200 TLC-LED-900	2 2
1	FH2	70'	-	70' 70'	TLC-LED-1500 TLC-LED-900	4 2
2	FH4-FH5	80'	-	80' 80'	TLC-LED-1200 TLC-LED-900	5 4
2	FH6 FH8	70'	-	70'	TLC-LED-900	3
1	FH7	70'	-	70'	TLC-LED-1200	6
8	Totals					44

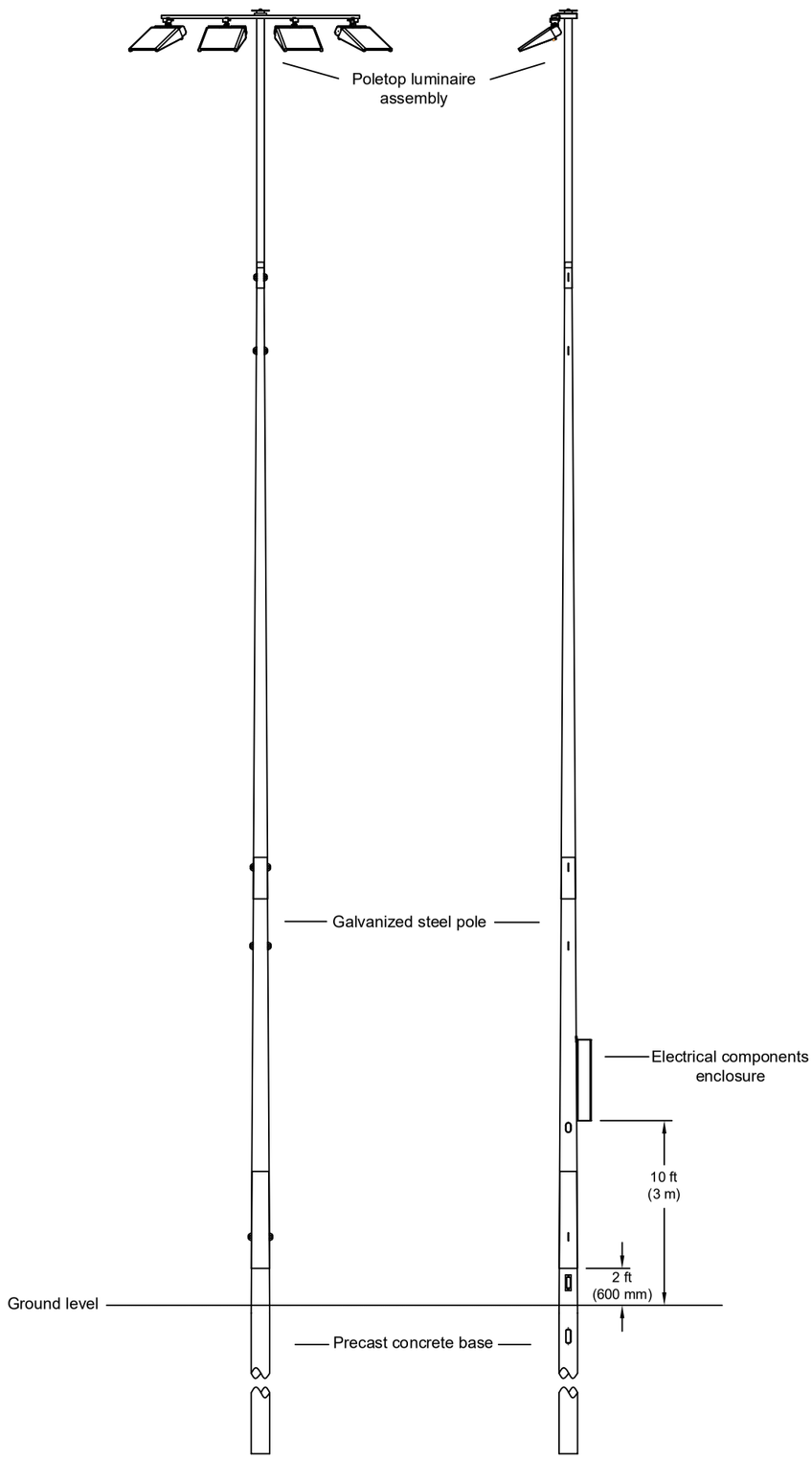


SCALE IN FEET 1 : 80

0' 80' 160'

ENGINEERED DESIGN By: Brayton Carter • File #243158A • 05-Mar-25

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



POLE(S): FH1, FH3

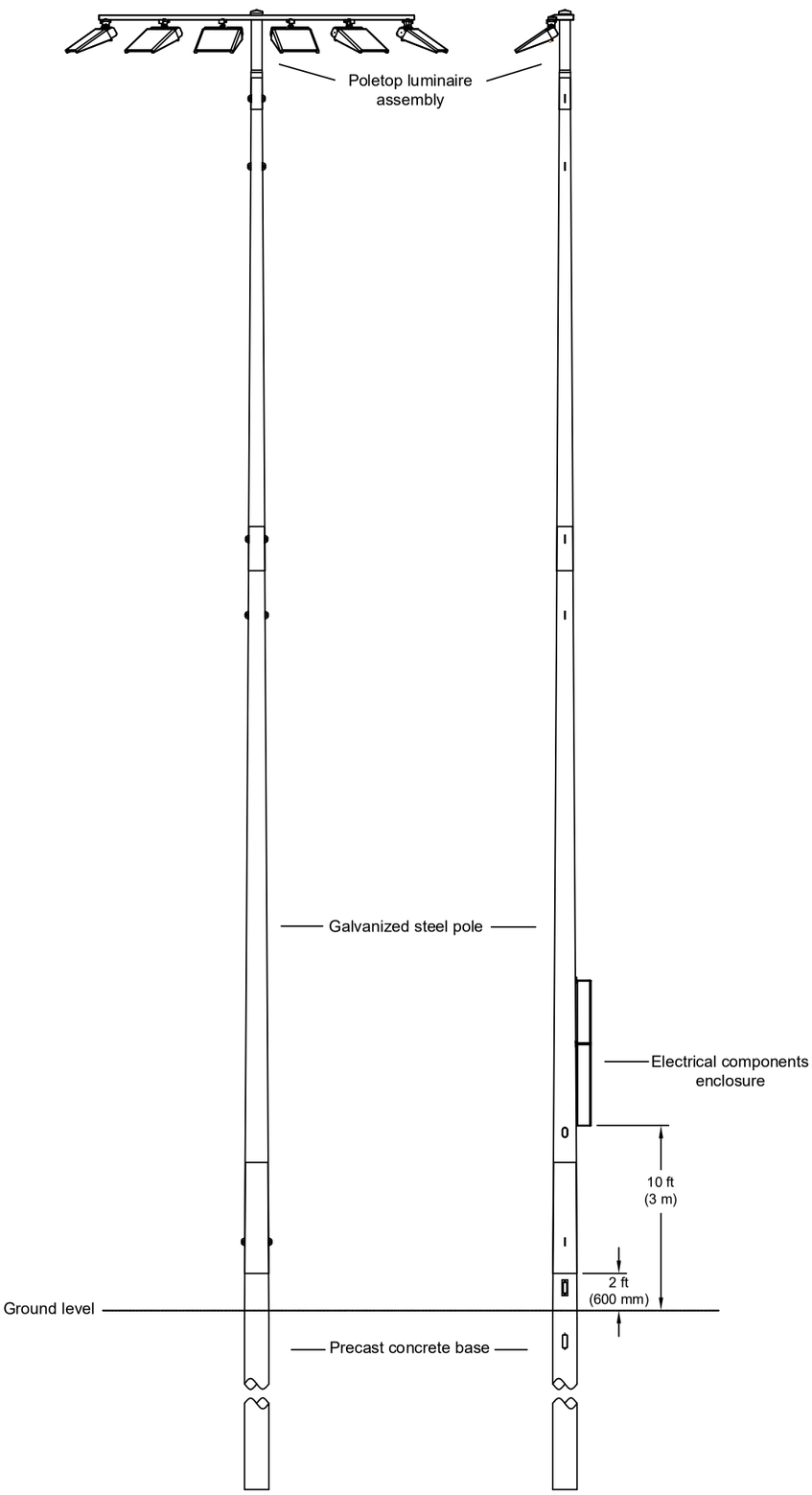
Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(2) TLC-LED-1200
(2) TLC-LED-900

PROJECT NUMBER:	243158
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	243158P1
	1 OF 5 SHEETS

DATE:	BY:	R.L.	REVISIONS:

musco Lighting
CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Field Hockey
AlexandriaVA
Pole Configuration Drawing B



POLE(S): FH2

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-1500
(2) TLC-LED-900

PROJECT NUMBER:	243158
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	243158P1
	2 OF 5 SHEETS

DATE:	BY:	R.L.	REVISIONS:

musco Lighting
CORPORATE OFFICE:
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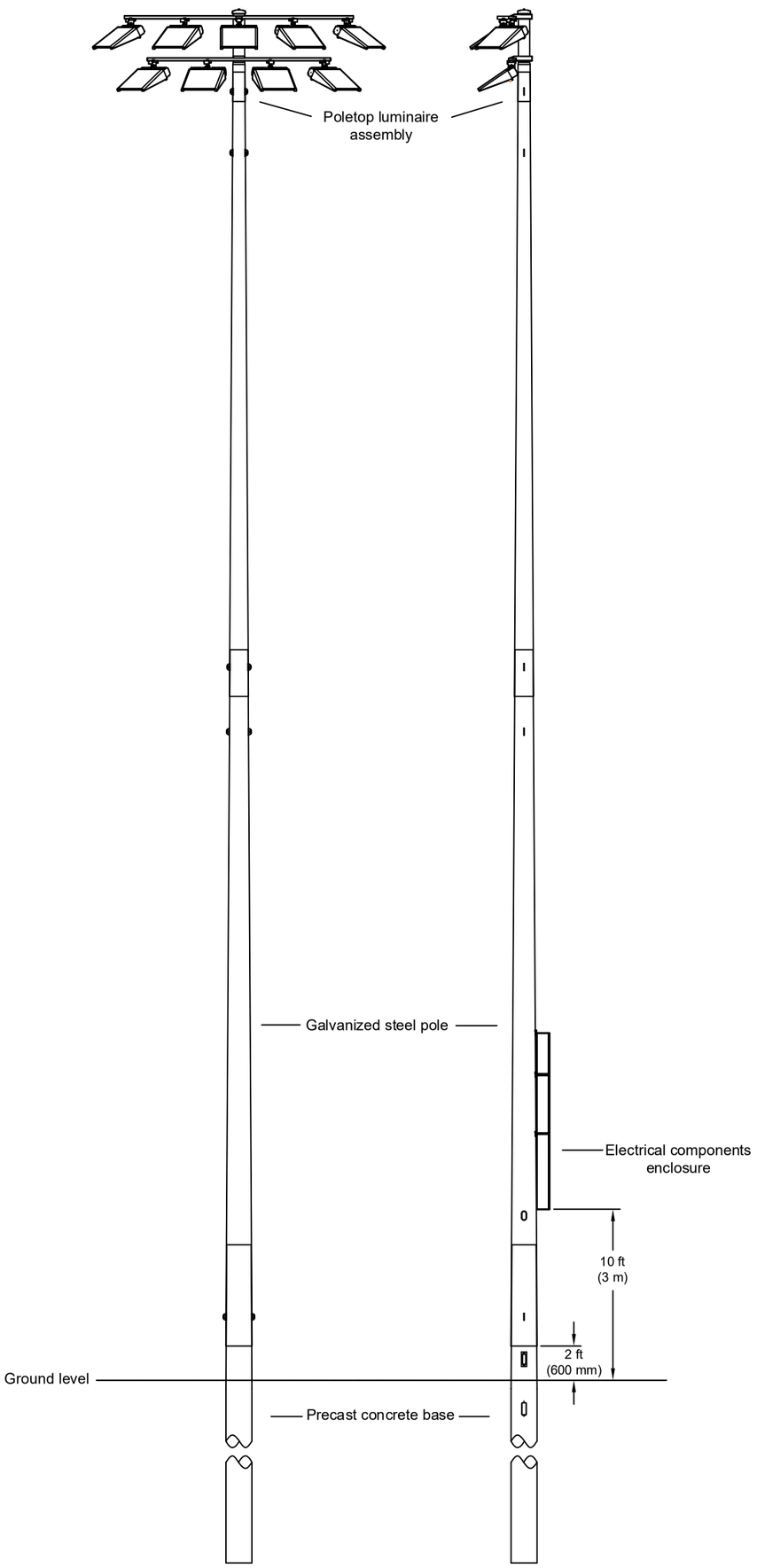
+1-641-673-0411

Episcopal High School Field Hockey
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): FH4 - FH5

Musco 80FT Light-Structure System™ pole
TLC for LED™ luminaires
(5) TLC-LED-1200
(4) TLC-LED-900

115

PROJECT NUMBER:	243158
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	243158P1
SHEETS	3 OF 5

DATE:	BY:	R.L.	REVISIONS:

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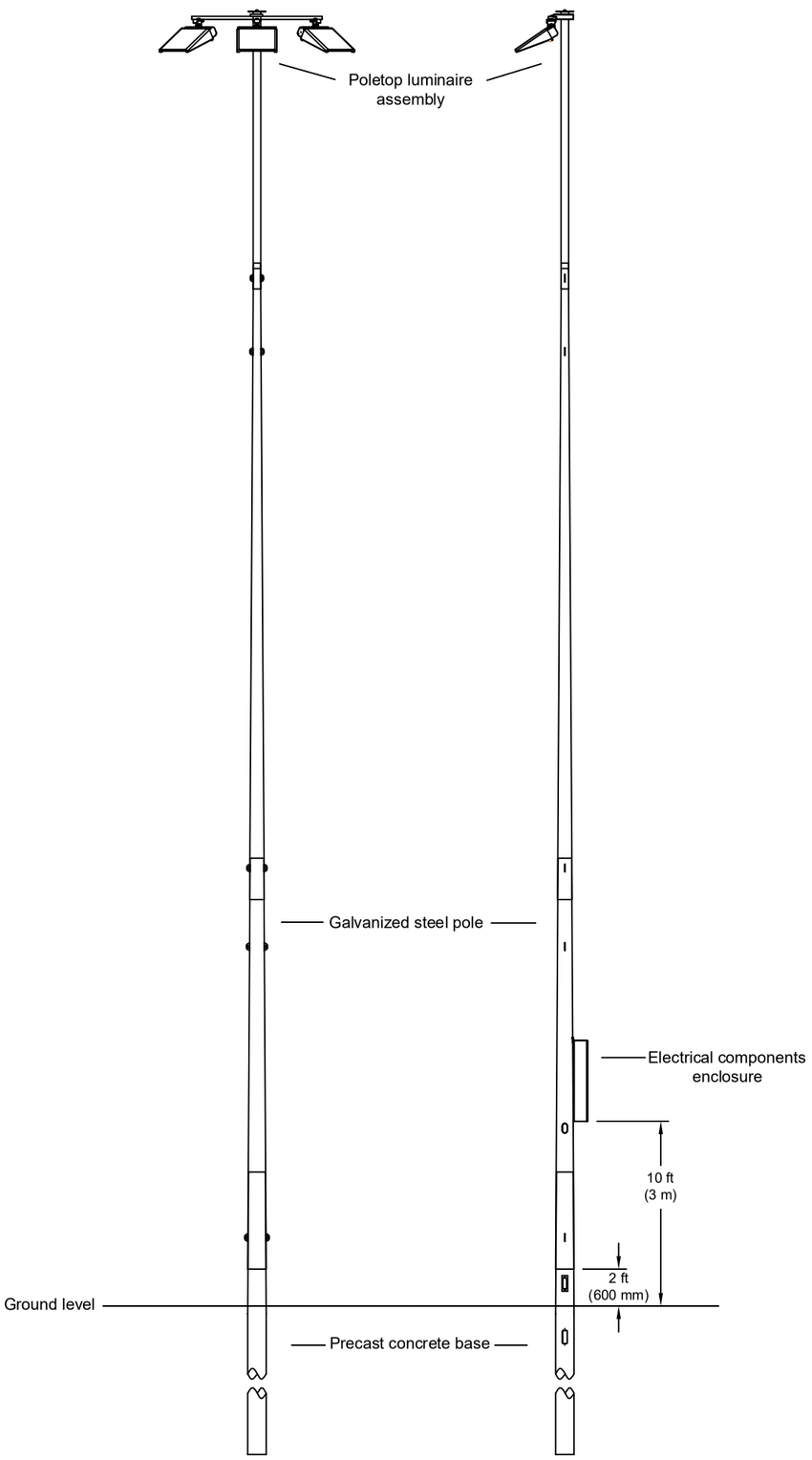
+1-641-673-0411

Episcopal High School Field Hockey
AlexandriaVA
Pole Configuration Drawing B



POLE(S): FH6, FH8

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(3) TLC-LED-900

PROJECT NUMBER:	243158
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	243158P1
	4 OF 6 SHEETS

DATE:	BY:	R.L.	REVISIONS:

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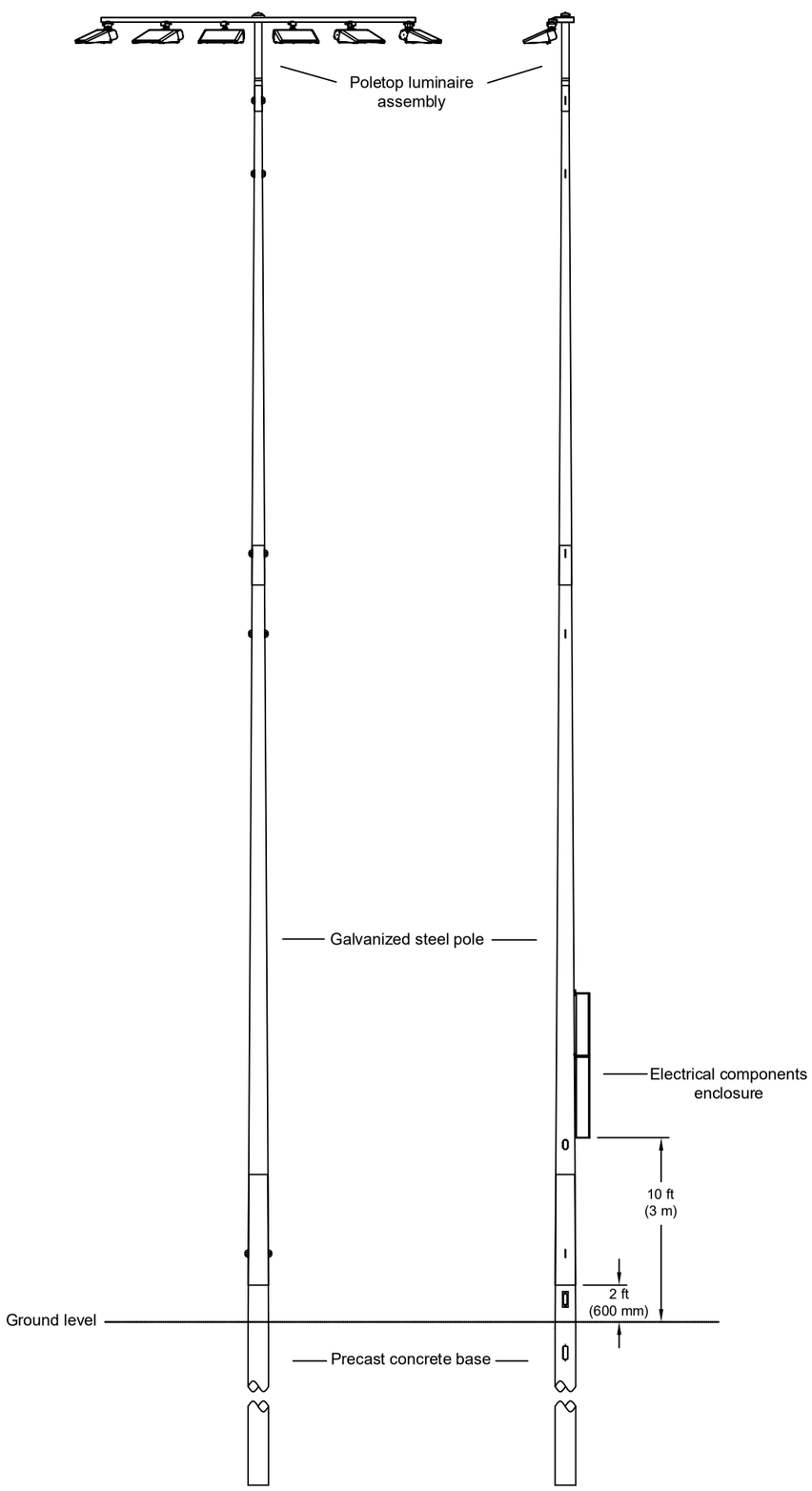
Episcopal High School Field Hockey
AlexandriaVA
Pole Configuration Drawing
B



POLE(S): FH7

Musco 70FT Light-Structure System™ pole
TLC for LED™ luminaires
(6) TLC-LED-1200

PROJECT NUMBER:	243158
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	243158P1
	5 OF 5 SHEETS

DATE:	BY:	R.L.	REVISIONS:

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+1-641-673-0411

Episcopal High School Field Hockey
AlexandriaVA
Pole Configuration Drawing
B

System Requirements: Control System Summary

Project Information

Control System

Control System ID:	1 of 1
Control System Type:	Control-Link ® Control and Monitoring System
Communication Type:	PowerLine-ST

Power Requirements

Control cabinet(s):	
Control voltage (phase to neutral)	120/60
VA loading - Inrush	2533.0
VA loading - Sealed	284.0
Lighting Circuits:	
Voltage/Hertz/Phase	480/60/3

Project Notes:

Equipment Listing

Description	Qty	Size (in)
Control and monitoring cabinet - primary	1	24 X 72
Contactors, 30 amperes	8	-
Off/On/Auto switches	1	-

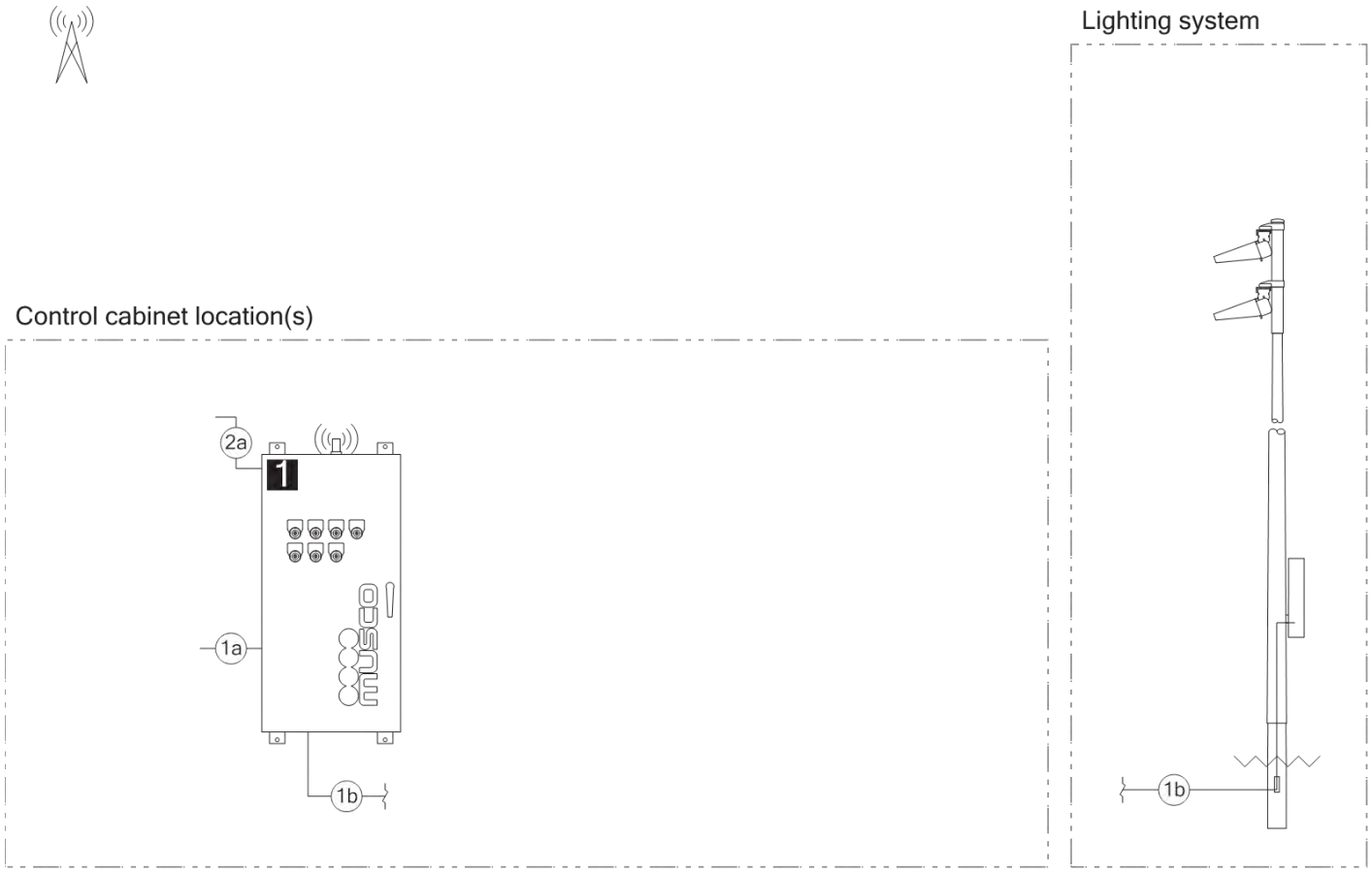
Important Notes:

1. Please confirm that the lighting circuit voltage listed above is accurate for this facility. This is the voltage/phase being connected and utilized at each lighting pole's electrical components enclosure disconnect. Inaccurate voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
2. In a 3 phase design, all 3 phases are to be run to each pole location. Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
3. One contactor is required for each circuit at each pole location. Contactors are 3 pole and 100% rated for the published continuous load.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. Size overcurrent devices using the full load amps column of the Circuit Summary by Switch chart (Minimum power factor is 0.9). Size conduit per code unless otherwise specified as larger to allow for harness connectors.
6. Avoid use of in-ground junction/pull boxes when possible. If used, all wire connectors must be UL listed for Wet Locations to prevent leakage current.
7. Control power wiring must be in separate conduit from line or load power wiring. Communication cables must be in separate conduit from any power wiring.
8. Refer to Installation Instructions for more details on equipment information and the installation requirements.

System Requirements: Control System Summary

Project Name: Episcopal High School Field Hockey | Project #: 243158
Control System ID: 1 of 1
Distribution Panel Location/ID: Service - Field Hockey

Equipment Layout and Connection Details



Connection Details	
ID	**Description**
1a	Line power to contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
1b	Load power from contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
2a	Control power with equipment ground to control cabinet. Requires dedicated 20 A circuit. Provide transformer if control voltage not present.

Equipment	
ID	**Description**
1	Control and monitoring cabinet - primary

Circuit Summary

Switching Schedule	
Field/Switch Description	**Switches**
Field Hockey	1

Control Module ID: 1

Lighting Circuit Voltage: 480/60/3

Circuit Summary by Switch							
Switch	**Zone Description**	**Pole ID**	**Qty of Fixtures**	**Full load amperes**	**Contactor Size (Amps)**	**Cabinet #**	**Contactor ID**
1	Field Hockey	FH1	4	7.15	30	1	C1
	Field Hockey	FH2	6	11.39	30	1	C2
	Field Hockey	FH3	4	7.15	30	1	C3
	Field Hockey	FH4	9	14.31	30	1	C4
	Field Hockey	FH5	9	14.31	30	1	C5
	Field Hockey	FH6	3	3.91	30	1	C6
	Field Hockey	FH7	6	10.39	30	1	C7
	Field Hockey	FH8	3	3.91	30	1	C8

TENNIS COURTS

Episcopal High School Tennis
Alexandria,VA

Lighting System

Pole/Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
T1-T2	40'	40'	2	TLC-LED-400	0.80 kW	A
T3	40'	40'	4	TLC-LED-400	1.60 kW	A
T4	40'	40'	4	TLC-LED-400	1.60 kW	A
		40'	4	TLC-LED-400	1.60 kW	B
T5-T6	40'	40'	2	TLC-LED-400	0.80 kW	A
T7-T8	40'	40'	2	TLC-LED-400	0.80 kW	C
T9	40'	40'	4	TLC-LED-400	1.60 kW	B
		40'	4	TLC-LED-400	1.60 kW	C
T10	40'	40'	4	TLC-LED-400	1.60 kW	C
T11-T12	40'	40'	2	TLC-LED-400	0.80 kW	C
T13-T16	40'	40'	2	TLC-LED-400	0.80 kW	B
16			**48**		**19.20 kW**	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Tennis 1-4	6.40 kW	16
B	Tennis 5-8	6.40 kW	16
C	Tennis 9-12	6.40 kW	16

Fixture Type Summary

Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-400	LED 5700K - 75 CRI	400W	46,500	>120,000	>120,000	>120,000	48

Single Luminaire Amperage Draw Chart

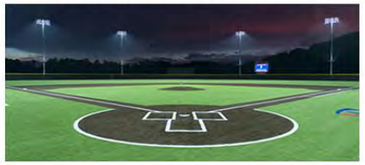
Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-400	2.3	2.2	2.0	1.7	1.4	1.3	1.0

Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Property Line	Horizontal	0.04	0	0	-	-	A,B,C	48
Tennis 1-4	Horizontal Illuminance	34.55	23	43	1.91	1.53	A	16
Tennis 5-8	Horizontal Illuminance	32.33	24	38	1.58	1.35	B	16
Tennis 9-12	Horizontal Illuminance	35.61	23	41	1.82	1.57	C	16

From Hometown to Professional



We Make It Happen.

Episcopal High School Tennis

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
4	T1-T2 T5-T6	40'	-	40'	TLC-LED-400	2	2	0
1	T3	40'	-	40'	TLC-LED-400	4	4	0
1	T4	40'	-	40'	TLC-LED-400	4/4*	4	4
6	Totals					20	16	4

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Grid Summary

Name:	**Tennis 1-4**
Size:	4 Court - 12' Spacing
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Guaranteed Average:	**30**
Scan Average:	34.55
Maximum:	43
Minimum:	23
Avg/Min:	1.53
Guaranteed Max/Min:	**2.5**
Max/Min:	1.91
UG (adjacent pts):	0.00
CU:	1.00
No. of Points:	60
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	**16**
Total Load:	6.40 kW

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 : 40

0' 40' 80'

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

ENGINEERED DESIGN By: Brayton Carter • File #243156A • 04-Mar-25

Episcopal High School Tennis

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
2	T4 T9	40'	-	40'	TLC-LED-400	4/4*	4	4
4	T13-T16	40'	-	40'	TLC-LED-400	2	2	0
6	Totals					24	16	8

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Grid Summary

Name:	**Tennis 5-8**
Size:	4 Court - 12' Spacing
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Guaranteed Average:	**30**
Scan Average:	32.33
Maximum:	38
Minimum:	24
Avg/Min:	1.35
Guaranteed Max/Min:	**2.5**
Max/Min:	1.58
UG (adjacent pts):	0.00
CU:	1.00
No. of Points:	60
LUMINAIRE INFORMATION	
Applied Circuits:	B
No. of Luminaires:	**16**
Total Load:	6.40 kW

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 : 40

0' 40' 80'

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

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Episcopal High School Tennis

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
4	T7-T8 T11-T12	40'	-	40'	TLC-LED-400	2	2	0
1	T9	40'	-	40'	TLC-LED-400	4/4*	4	4
1	T10	40'	-	40'	TLC-LED-400	4	4	0
6	Totals					20	16	4

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Grid Summary

Name:	**Tennis 9-12**
Size:	4 Court - 12' Spacing
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

Illumination Summary

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Guaranteed Average:	**30**
Scan Average:	35.61
Maximum:	41
Minimum:	23
Avg/Min:	1.57
Guaranteed Max/Min:	**2.5**
Max/Min:	1.82
UG (adjacent pts):	0.00
CU:	1.00
No. of Points:	60
LUMINAIRE INFORMATION	
Applied Circuits:	C
No. of Luminaires:	**16**
Total Load:	6.40 kW

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 : 40

0' 40' 80'

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

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Episcopal High School Tennis

Alexandria,VA

Equipment List For Areas Shown

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
12	T1-T2 T5-T8 T11-T16	40'	-	40'	TLC-LED-400	2	2	0
2	T3 T10	40'	-	40'	TLC-LED-400	4	4	0
2	T4 T9	40'	-	40'	TLC-LED-400	4/4*	8	0
16	Totals					48	48	0

*Above Grade level relative to the field
*This structure utilizes a back-to-back mounting configuration

Grid Summary

Name:	**Property Line**
Spacing:	30.0' x 10.0'
Height:	3.0' above grade

Illumination Summary

	MAINTAINED HORIZONTAL FOOTCANDLES
	Entire Grid
Scan Average:	**0.04**
Maximum:	0
Minimum:	0
Avg/Min:	-
Max/Min:	**-**
UG (adjacent pts):	0.00
CU:	0.00
No. of Points:	410
LUMINAIRE INFORMATION	
Applied Circuits:	A,B,C
No. of Luminaires:	**48**
Total Load:	19.20 kW

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 : 50

0' 50' 100'

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

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Episcopal High School Tennis

Alexandria,VA

Equipment Layout

INCLUDES:
· Tennis 1-4
· Tennis 5-8
· Tennis 9-12

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

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
12	T1-T2 T5-T8 T11-T16	40'	-	40'	TLC-LED-400	2
2	T3 T10	40'	-	40'	TLC-LED-400	4
2	T4 T9	40'	-	40'	TLC-LED-400	4/4*
16	Totals					48

*This structure utilizes a back-to-back mounting configuration

Single Luminaire Amperage Draw Chart

Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-LED-400	2.3	2.2	2.0	1.7	1.4	1.3	1.0

SCALE IN FEET 1 : 50

0' 50' 100'

ENGINEERED DESIGN By: Brayton Carter • File #243156A • 04-Mar-25

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

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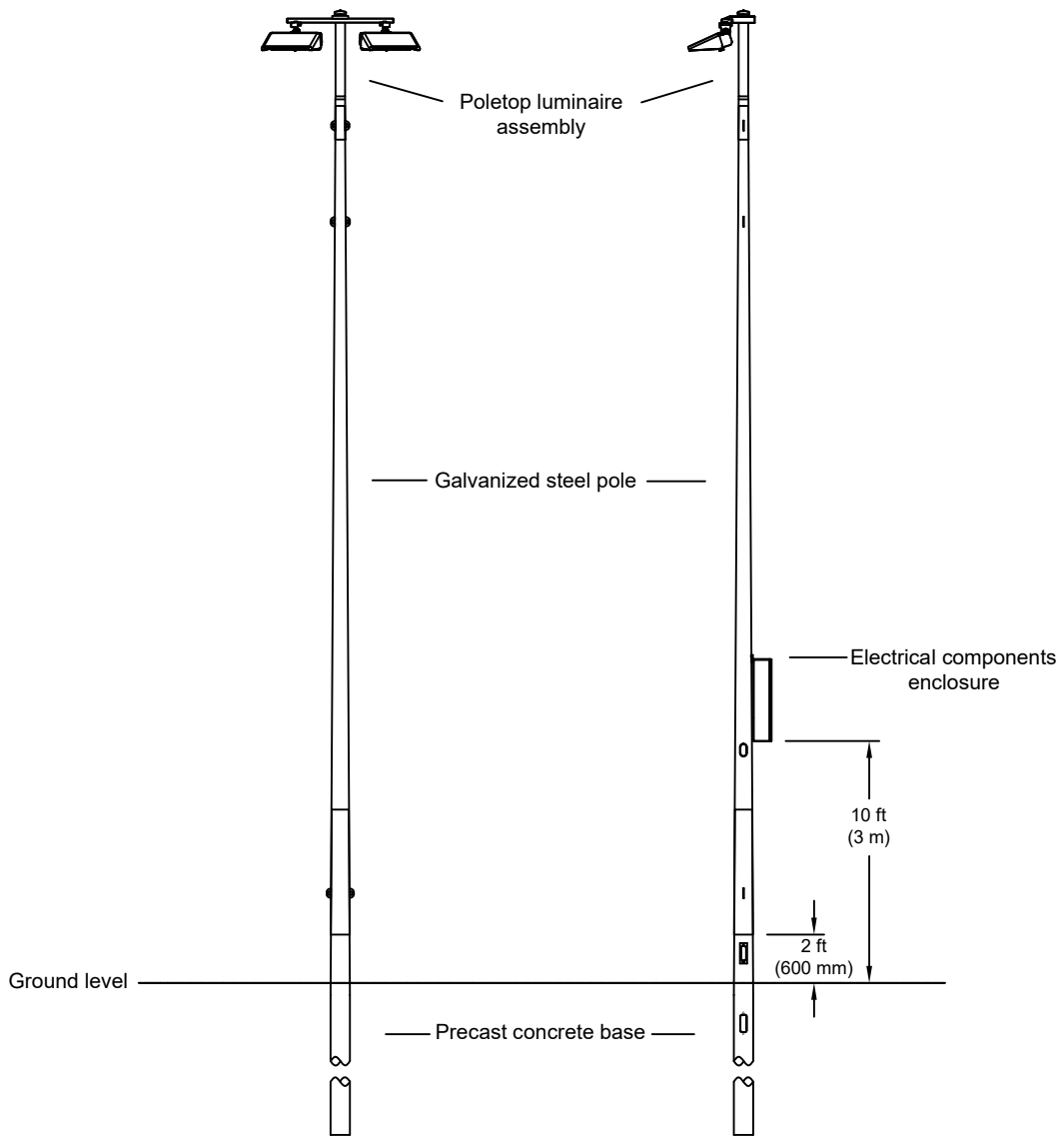

POLE(S): T1-T2,T5-T8, T11-T16

Musco 40FT Light-Structure System™ pole
TLC for LED™ luminaires
(2) TLC-LED-400

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
243156	B.Carter	NTS	03/06/2025	243156P1

1 OF 3 SHEETS

DATE:	BY:	R.L.	REVISIONS:

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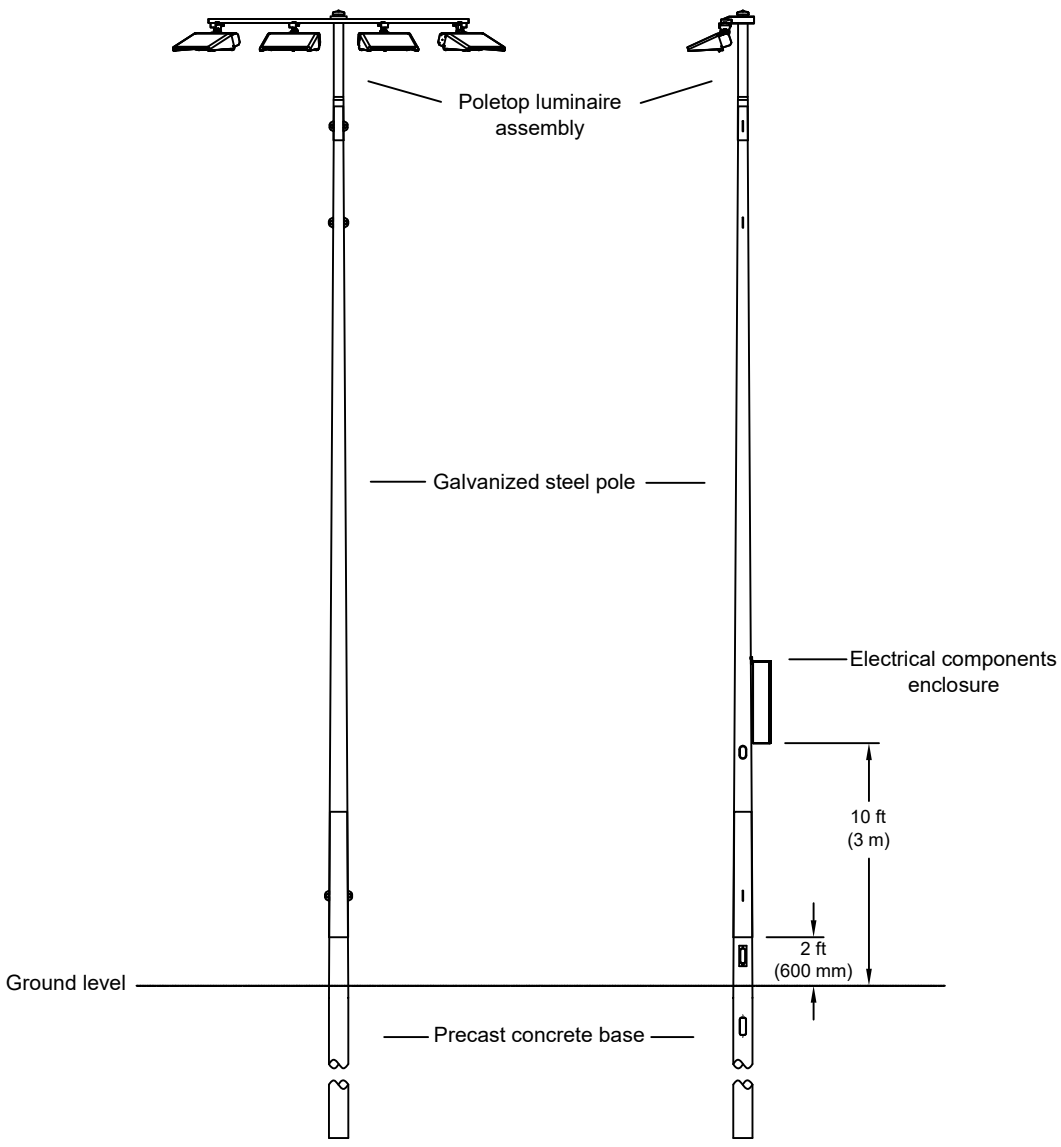
Episcopal High School Tennis
AlexandriaVA
Pole Configuration Drawing

B



POLE(S): T3, T10

Musco 40FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-400

PROJECT NUMBER:	DRAWN BY:	SCALE:	DATE:	DRAWING NUMBER:
243156	B.Carter	NTS	03/06/2025	243156P1

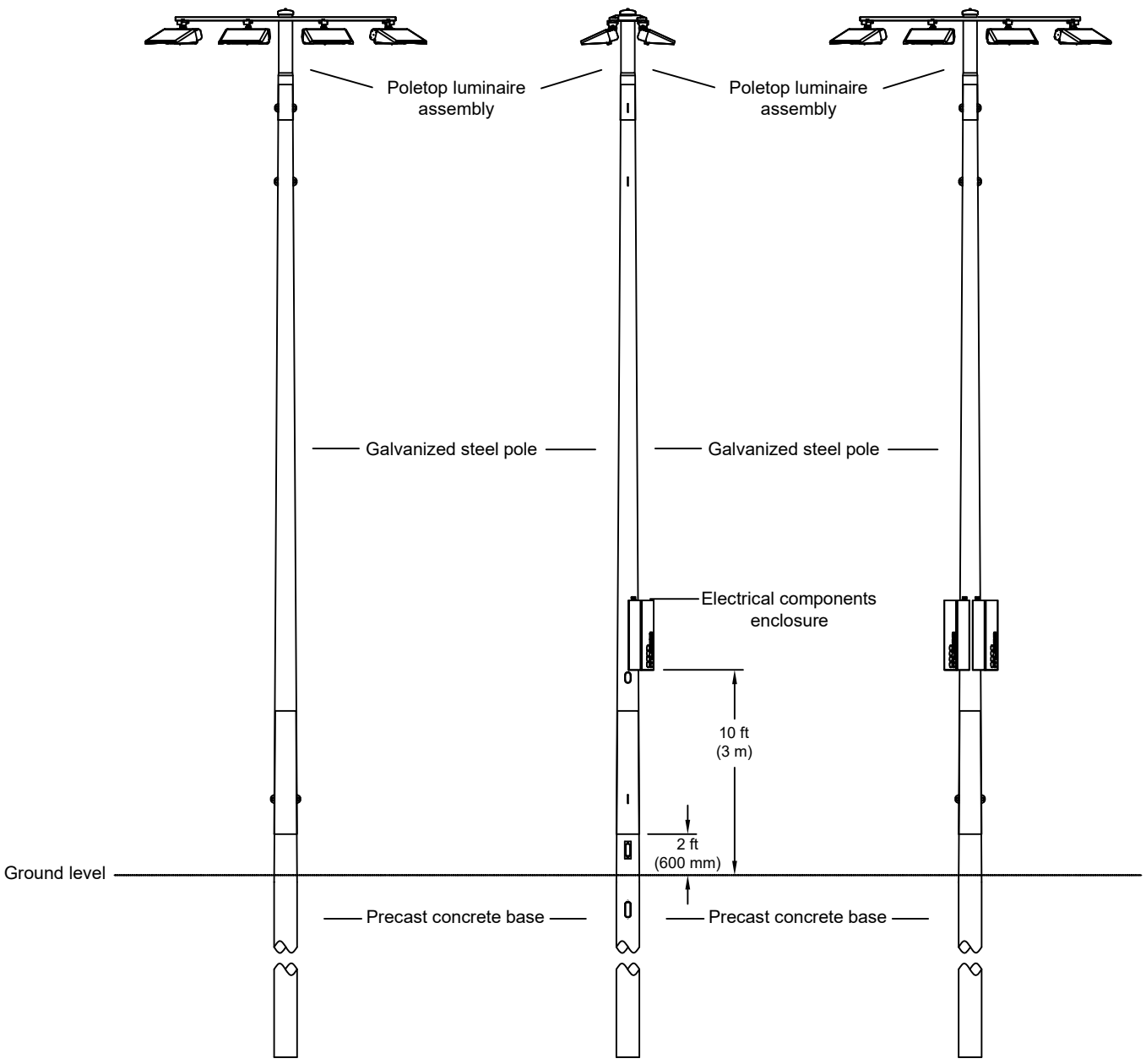
2 OF 3 SHEETS

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411

Episcopal High School Tennis
AlexandriaVA
Pole Configuration Drawing

B



POLE(S): T4, T9

Musco 40FT Light-Structure System™ pole
TLC for LED™ luminaires
(4) TLC-LED-400 (Front)
(4) TLC-LED-400 (Back)

PROJECT NUMBER:	243156
DRAWN BY:	B.Carter
SCALE:	NTS
DATE:	03/06/2025
DRAWING NUMBER:	243156P1
	3 OF 3 SHEETS

DATE:	BY:	R.L.	REVISIONS:

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+1-800-825-6020
+1-641-673-0411

Episcopal High School Tennis
AlexandriaVA
Pole Configuration Drawing B

System Requirements: Control System Summary

Project Information

Control System

Control System ID:	1 of 1
Control System Type:	Control-Link® Control and Monitoring System
Communication Type:	PowerLine-ST

Power Requirements

Control cabinet(s):	
Control voltage (phase to neutral)	120/60
VA loading - Inrush	3513.0
VA loading - Sealed	388.0
Lighting Circuits:	
Voltage/Hertz/Phase	480/60/3

Project Notes:

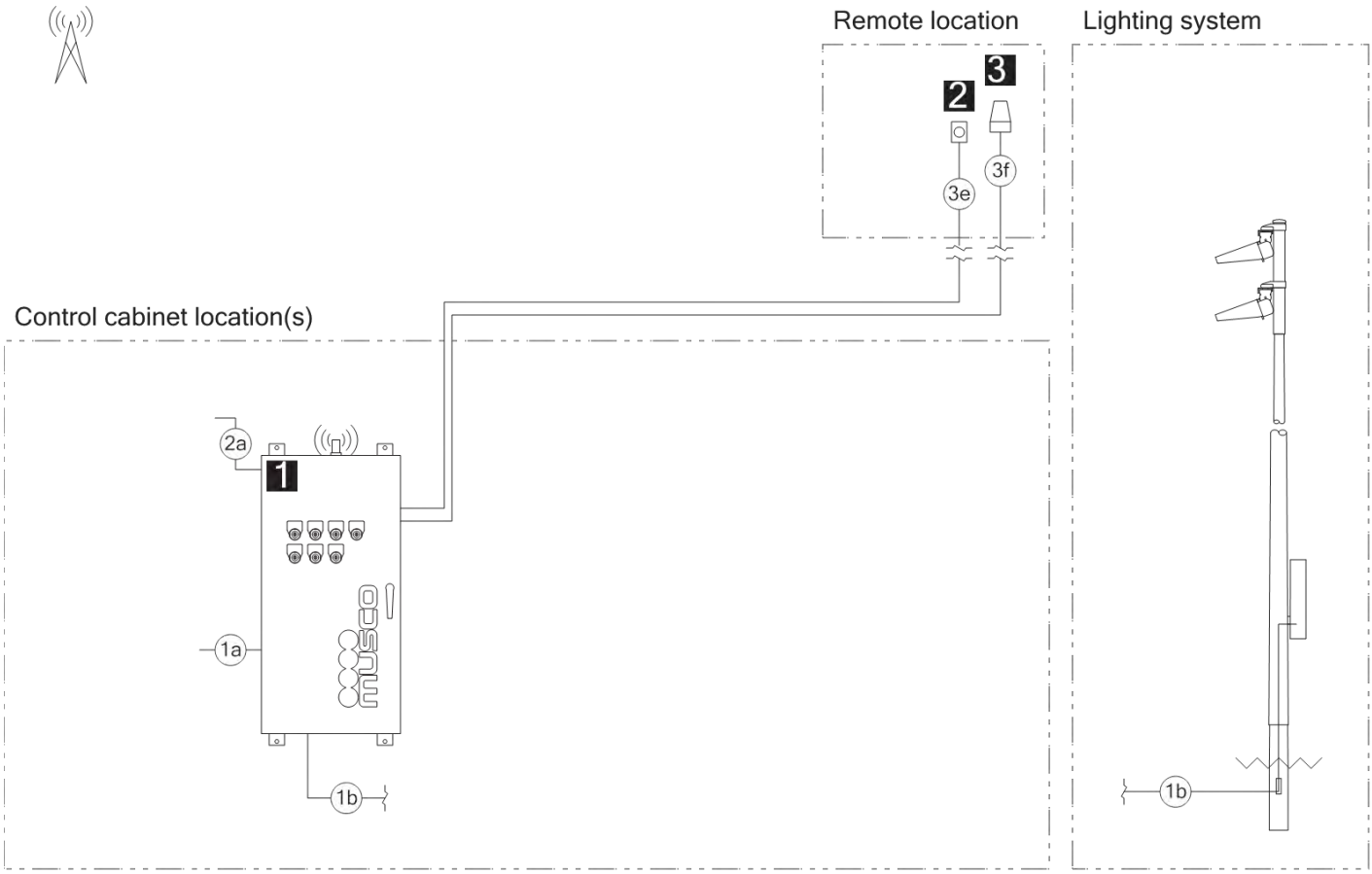
Equipment Listing

Description	Qty	Size (in)
Control and monitoring cabinet - primary	1	24 X 72
Contactors, 30 amperes	12	-
Off/On/Auto switches	3	-
Push button switches	3	-
Strobe signal lights	3	-

Important Notes:

1. Please confirm that the lighting circuit voltage listed above is accurate for this facility. This is the voltage/phase being connected and utilized at each lighting pole's electrical components enclosure disconnect. Inaccurate voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
2. In a 3 phase design, all 3 phases are to be run to each pole location. Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
3. One contactor is required for each circuit at each pole location. Contactors are 3 pole and 100% rated for the published continuous load.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. Size overcurrent devices using the full load amps column of the Circuit Summary by Switch chart (Minimum power factor is 0.9). Size conduit per code unless otherwise specified as larger to allow for harness connectors.
6. Avoid use of in-ground junction/pull boxes when possible. If used, all wire connectors must be UL listed for Wet Locations to prevent leakage current.
7. Control power wiring must be in separate conduit from line or load power wiring. Communication cables must be in separate conduit from any power wiring.
8. Refer to Installation Instructions for more details on equipment information and the installation requirements.

Equipment Layout and Connection Details



Connection Details	
ID	**Description**
1a	Line power to contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
1b	Load power from contactors, and equipment grounding conductor. Requires one circuit per contactor, size wiring per load and voltage drop.
2a	Control power with equipment ground to control cabinet. Requires dedicated 20 A circuit. Provide transformer if control voltage not present.
3e	Control harness - Control cabinet to push button switch. Use 12 AWG copper conductor for up to 300 feet. Requires 2 conductors per push button.
3f	Control harness - Control cabinet to strobe signal light. Use 12 AWG copper conductor for up to 300 feet. Requires 2 conductors per strobe light.

Equipment	
ID	**Description**
1	Control and monitoring cabinet - primary
2	Push button switches
3	Strobe signal lights

Circuit Summary

Switching Schedule	
Field/Switch Description	**Switches**
Tennis 1-4	**1 ‡**
Tennis 5-8	**2 ‡**
Tennis 9-12	**3 ‡**

‡ Push button control with strobe light.

Control Module ID: 1

Lighting Circuit Voltage: 480/60/3

Circuit Summary by Switch							
Switch	**Zone Description**	**Pole ID**	**Qty of Fixtures**	**Full load amperes**	**Contactor Size (Amps)**	**Cabinet #**	**Contactor ID**
1	Tennis 1-4	T1, T2	4	3.46	30	1	C1
	Tennis 1-4	T3	4	3.46	30	1	C2
	Tennis 1-4	T4	4	3.46	30	1	C3
	Tennis 1-4	T5, T6	4	3.46	30	1	C4
2	Tennis 5-8	T4	4	3.46	30	1	C5
	Tennis 5-8	T9	4	3.46	30	1	C6
	Tennis 5-8	T13, T14	4	3.46	30	1	C7
	Tennis 5-8	T15, T16	4	3.46	30	1	C8
3	Tennis 9-12	T7, T8	4	3.46	30	1	C9
	Tennis 9-12	T9	4	3.46	30	1	C10
	Tennis 9-12	T10	4	3.46	30	1	C11
	Tennis 9-12	T11, T12	4	3.46	30	1	C12

FULL SITE UTILITY MAP

COLOR	UTILITY
RED	ELECTRICAL LINE
YELLOW	GAS LINE
BLUE	WATER LINE
PURPLE	SANITARY SEWER
GREEN	STORM SEWER

0' 100' 200'

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UTILITY PLAN

EPISCOPAL HIGH SCHOOL

#1200 N QUAKER LANE

CITY OF ALEXANDRIA, VIRGINIA

DATE	REVISION

DESIGN: ARO
CHECKED: TD
SCALE: 1"=100'
DATE: 11/2023

OVERALL SITE UTILITES MAP (1 OF 2)

SHEET 1 OF 8

FILE: 22-126

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MATCHLINE SEE SHEET 1

EX. ACCESS ROAD

COXE FIELD

HUMMEL BOWL

ATHLETIC FIELDS

HUMMEL LOCKER ROOMS

FACULTY HOUSING

LOOP ROAD

FLIPPIN PARKING

EX. WET POND

PARKING

FLIPPIN FIELD HOUSE

SQUASH COURT

HOXTON GIRLS DORMITORY

HARRISON/ANDERSON

FINE ARTS

PENDLETON

BERKELEY

ROBERTSON

HEADMISTERS RESIDENCE

CENTENNIAL GYM

EX. LOOP ROAD

FINE ARTS

BRYAN

CORE CAMPUS

EVANS

PENICK

CENTENNIAL

MCALLISTER

HUMMEL

TOWNSEND

HOXTON

LARD

BLACKFORD

ALUMNI COTTAGE

MAIN DRIVE

NORTH QUAKER LANE

TRAIL

TENNIS COURTS

EX ATHLETIC FIELD

STEWART

DALRYMPLE

SCIENCE CENTER

CALLAWAY

HENDERSON

EX. ASPHALT ROAD

FACULTY HOUSING

LOOP ROAD

COLOR	UTILITY
RED	ELECTRICAL LINE
YELLOW	GAS LINE
BLUE	WATER LINE
PURPLE	SANITARY SEWER
GREEN	STORM SEWER

0' 100' 200'

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#1200 N QUAKER LANE

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DATE: 11/2023

OVERALL SITE UTILITIES MAP (2 OF 2)

SHEET 2 OF 8

FILE: 22-126

COLOR	UTILITY
RED	ELECTRICAL LINE
YELLOW	GAS LINE
BLUE	WATER LINE
PURPLE	SANITARY SEWER
GREEN	STORM SEWER

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DATE	REVISION

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SCALE: 1"=100'
DATE: 11/2023

STORMWATER MAP (1 OF 2)

SHEET 3 OF 8

FILE: 22-126

MATCHLINE SEE SHEET 3

MATCHLINE SEE SHEET 5

N 83° E

23"X14" STORM
15" STORM
18" STORM
EX. ACCESS ROAD
FACULTY HOUSING
18" STM
15" STM.
18" STM.
42" STM.
15" STM.
TWIN 36" STM.
LOOP ROAD
12" STM.
24" STM.
COXE FIELD
HUMMEL BOWL
6" STM.
FLIPPIN PARKING
HOXTON GIRLS DORMITORY
SQUASH COURT
FLIPPIN FIELD HOUSE
12" STORM
27" STM.
EX 42" DETENTION FACILITY
ATHLETIC FIELDS
HUMMEL LOCKER ROOMS
EX 18" STM.
CENTENNIAL GYM
BERKELEY
FINE ARTS
PENDLETON
HARRISON/ANDERSON
ROBERTSON
HEADMISTERS RESIDENCE
PENICK
EVANS
CORE CAMPUS
BRYAN
HUMMEL
CENTENNIAL
MCALLISTER
TOWNSEND
LARD
BLACKFORD
HOXTON
ALUMNI COTTAGE
STEWART
DALRYMPLE
SCIENCE CENTER
CALUMNY
HENDERSON
EX. ASPHALT ROAD
MAIN DRIVE
NORTH QUAKER LANE
DITCH
EX. INTERMITTENT STREAM
DITCH STREAM
EX. CONC. DITCH
EX. HEAD WALL
TWIN 24" STM.
LOOP ROAD
TENNIS COURTS
EX. UNDERGROUND STORMWATER DETENTION SYSTEM
EX ATHLETIC FIELD
10" STORM
8" STM.
30" STM.
36" STM.
2-30" STM.
36"STM.

0' 100' 200'

COLOR	UTILITY
RED	ELECTRICAL LINE
YELLOW	GAS LINE
BLUE	WATER LINE
PURPLE	SANITARY SEWER
GREEN	STORM SEWER

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DATE	REVISION

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SCALE: 1"=100'
DATE: 11/2023

STORMWATER MAP (2 OF 2)

SHEET 4 OF 8
FILE: 22-126

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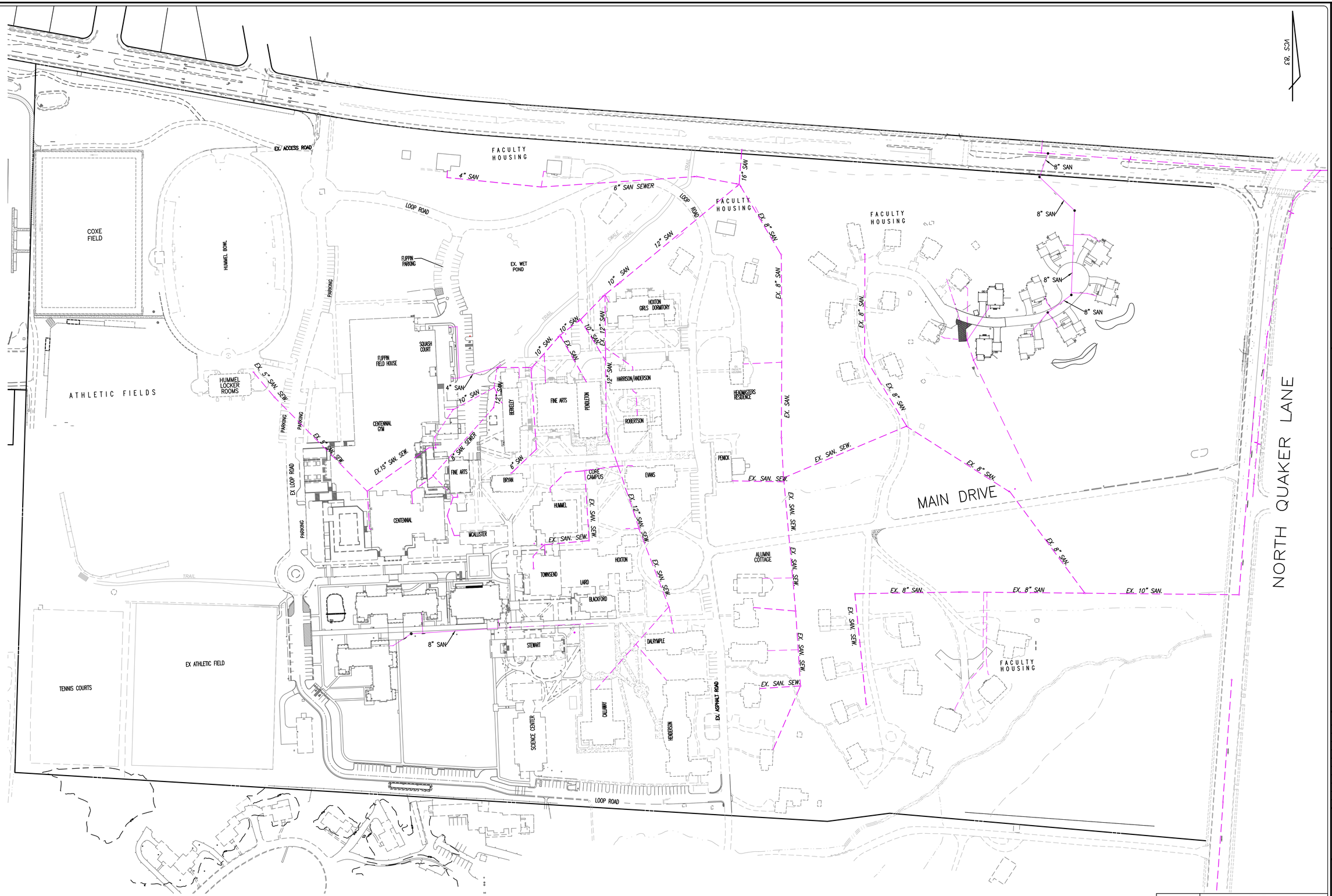

COLOR	UTILITY
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YELLOW	GAS LINE
BLUE	WATER LINE
PURPLE	SANITARY SEWER
GREEN	STORM SEWER

0' 100' 200'

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DATE: 11/2023

SANITARY SEWER MAP

SHEET 5 OF 8
FILE: 22-126

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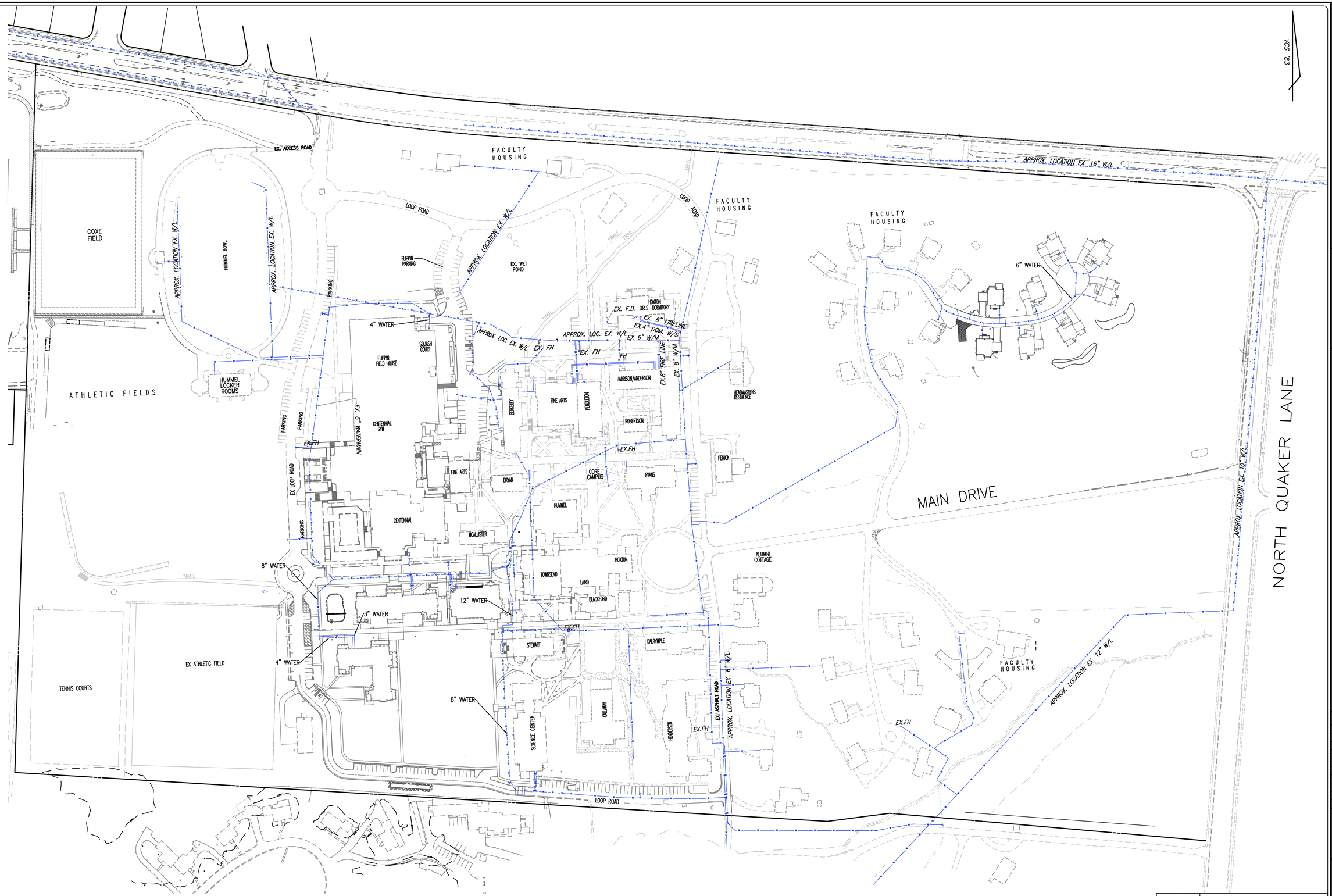

COLOR	UTILITY
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SCALE: 1"=100'
DATE: 11/2023

WATER LINES MAP

SHEET 6 OF 8
FILE: 22-126

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COLOR	UTILITY
RED	ELECTRICAL LINE
YELLOW	GAS LINE
BLUE	WATER LINE
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DATE	REVISION

DESIGN: ARO
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SCALE: 1"=100'
DATE: 11/2023

GAS LINES MAP

SHEET 7 OF 8
FILE: 22-126

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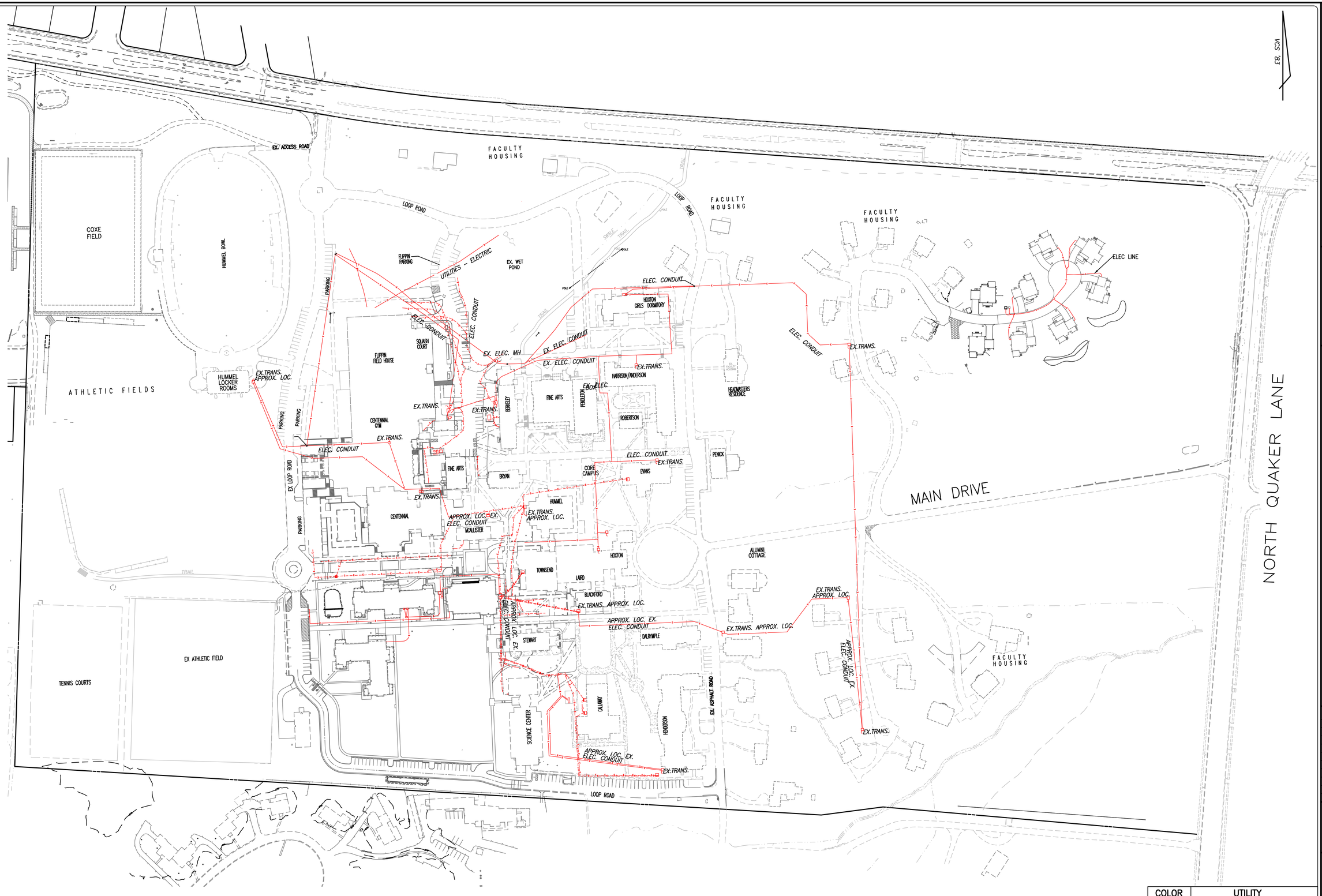

COLOR	UTILITY
RED	ELECTRICAL LINE
YELLOW	GAS LINE
BLUE	WATER LINE
PURPLE	SANITARY SEWER
GREEN	STORM SEWER

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ELECTRICAL LINES MAP

SHEET 8 OF 8

FILE: 22-126

MUSCO Lighting's FAQs

SPORTS LIGHTING

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

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?

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.

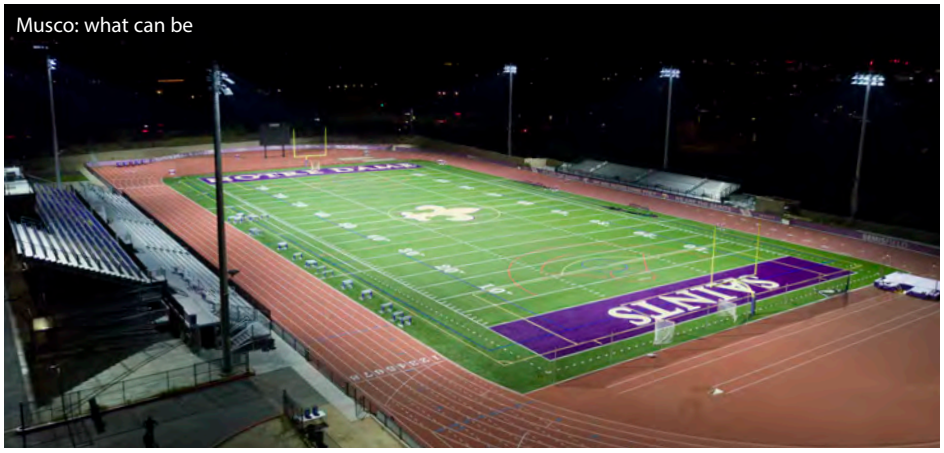
Add Entertainment Features

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.

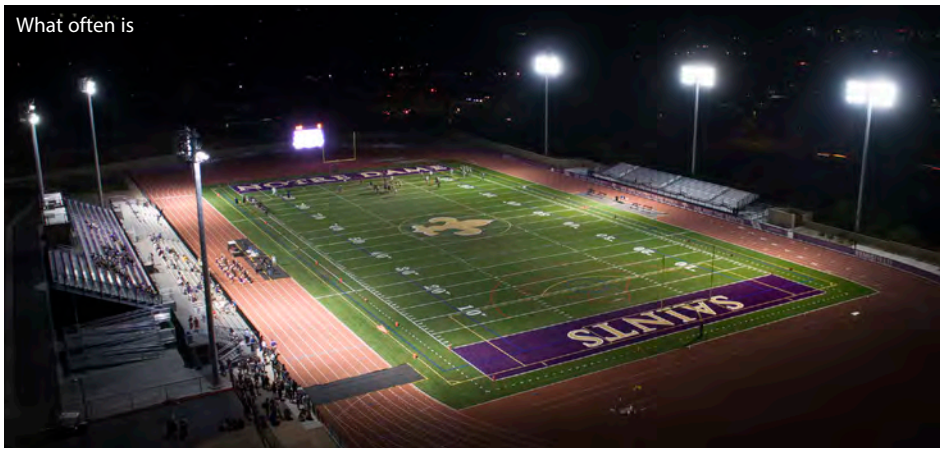
"Two aspects of energy efficiency are important to consider: the efficiency of the LED device itself (source efficacy) and how well the device and fixture work together in providing the necessary lighting (luminaire efficacy)."

— 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

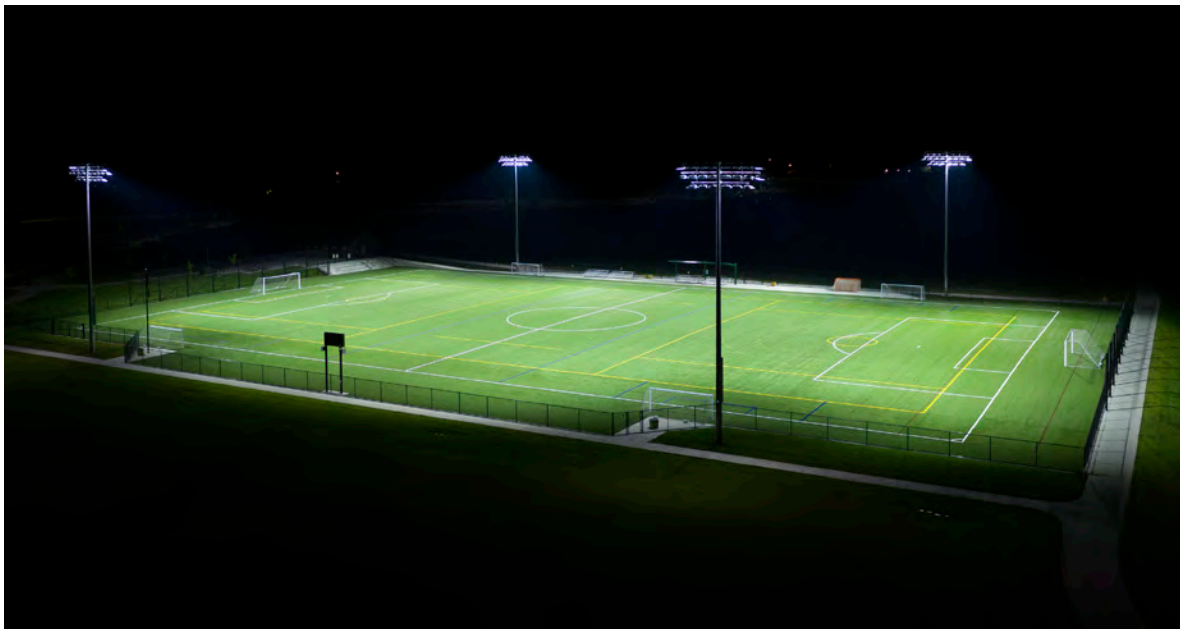
	LIGHTING	STRUCTURAL	ELECTRICAL
DESIGN	?	?	?
SUPPLY	?	?	?
INSTALL	?	?	?
	OPERATE		

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.

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?

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

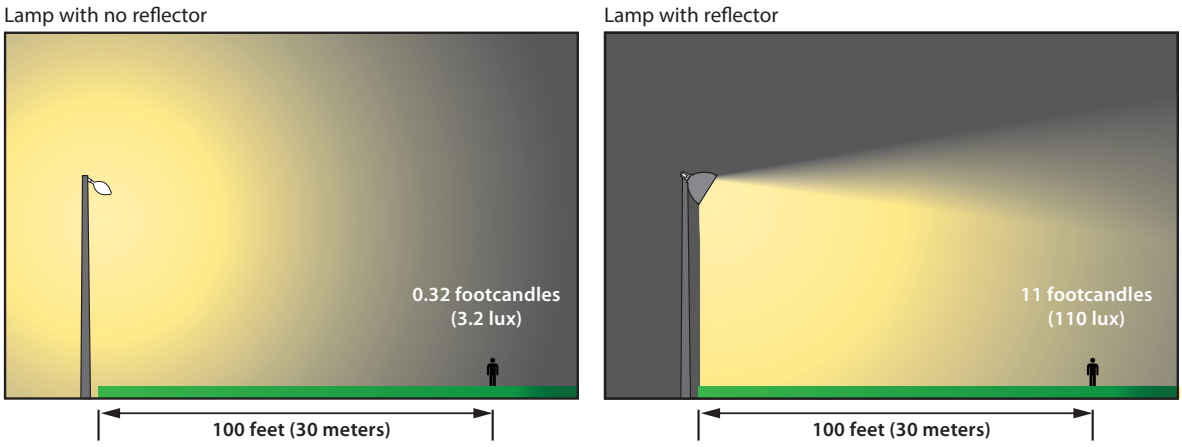
Sport	Sport Level	Seating Capacity	Footcandles	Lux
Baseball / Softball	Recreational	Limited or none	30/20	300/200
	Schools / Leagues	Up to 2000	50/30	500/300
	Schools / Leagues / Semi-Pro	Up to 5000	100/70	1000/700
Basketball (indoor)	Recreational	Limited or none	30	300
	Schools / Leagues	Up to 2000	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.

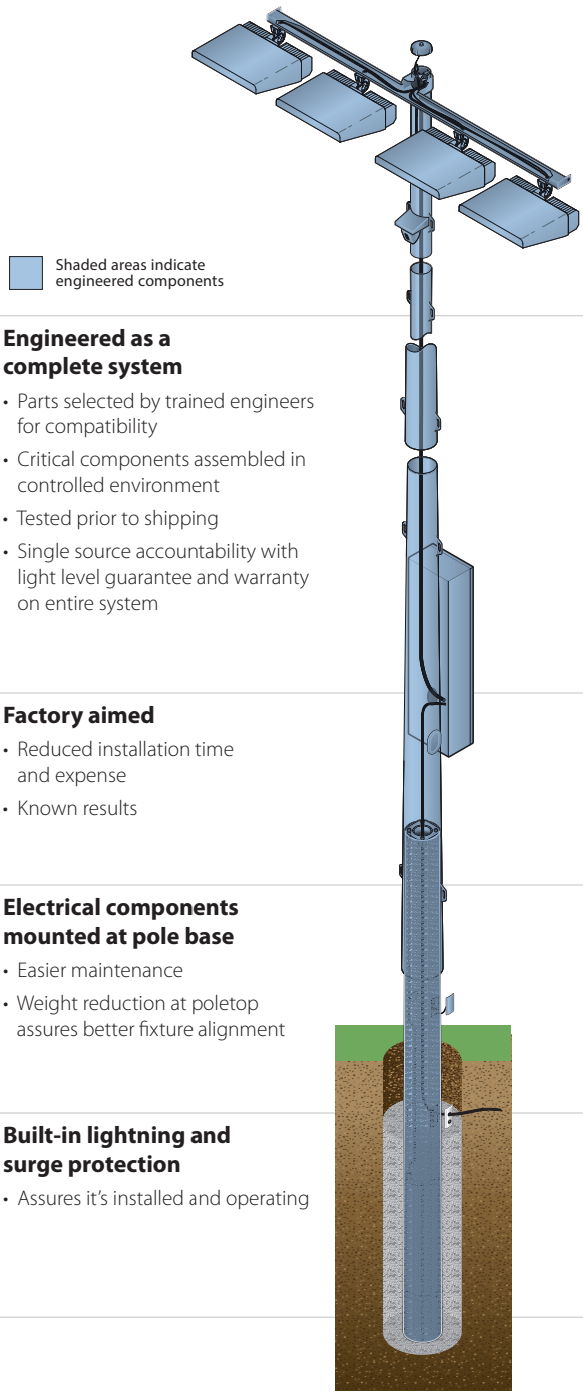
In the illustration above, the fixture produces the same amount of light at the poletop. Without a reflector, it projects less than one footcandle (10 lux) onto an area 100 feet (30 meters) away. With a basic reflector it projects 30 times that amount, redirecting what would otherwise be wasted spill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

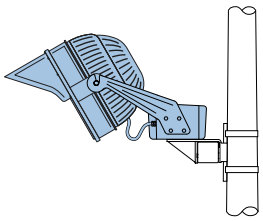
RETROFITS

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.

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:





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

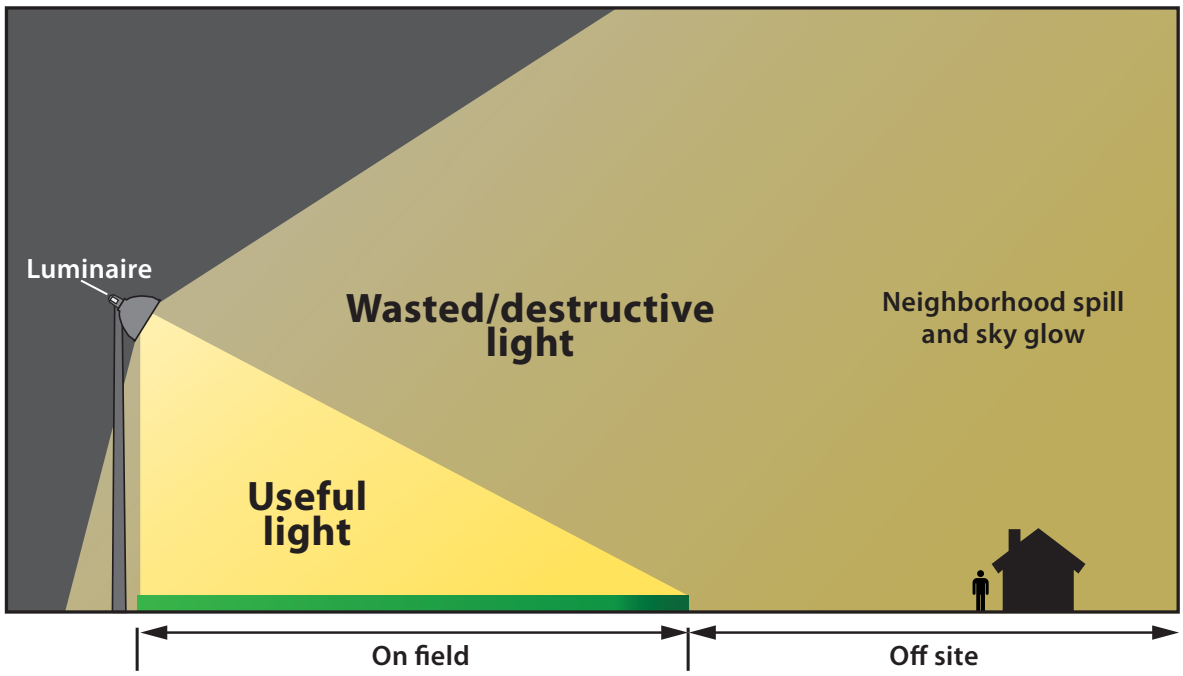
Musco's complete system is engineered from foundation to poletop in 5 Easy Pieces™ for optimal light control, easy installation, and trouble-free operation.

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.

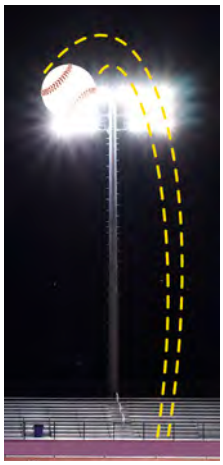


RETROFITS

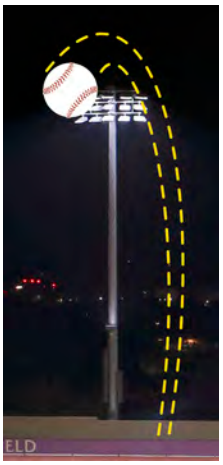
Planning a retrofit in which new LEDs are swapped in for old fixtures on a 1:1 basis can lead to serious problems with glare and spill if the fixture is not properly designed. Since LED involves hundreds of tiny light sources instead of one large one, effectively controlling the light being emitted is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

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.

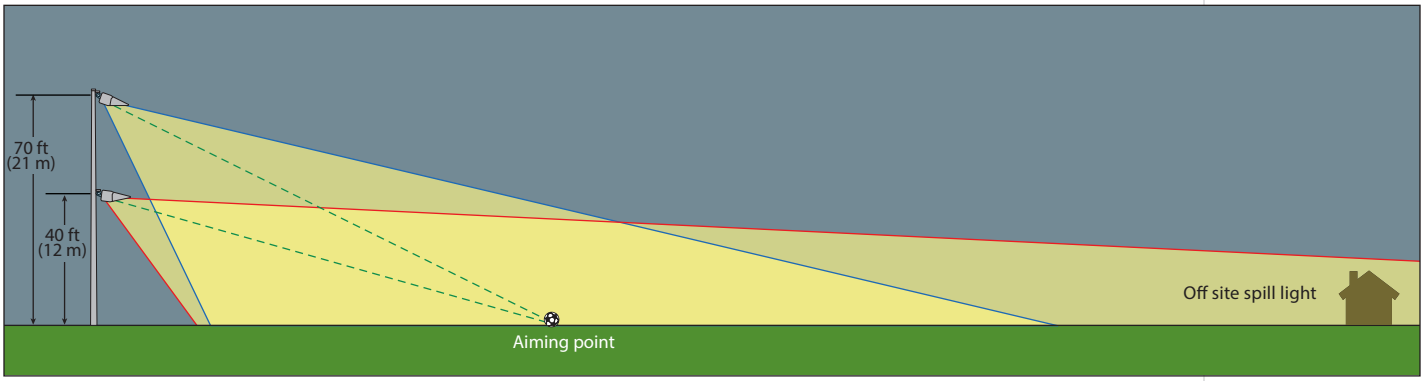
Musco's Light-Structure System™ combines the benefits of both concrete and steel poles.

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.

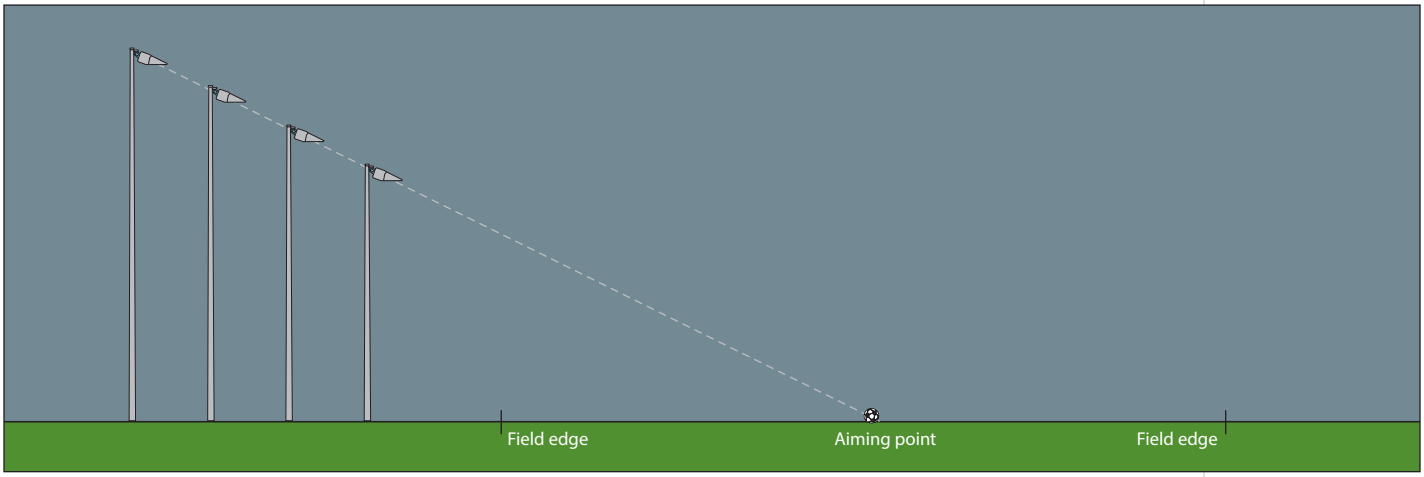
Pole Height

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 kW·h 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.

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?

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.

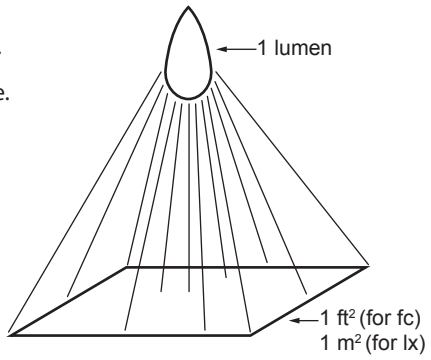
Measuring Light Energy

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.

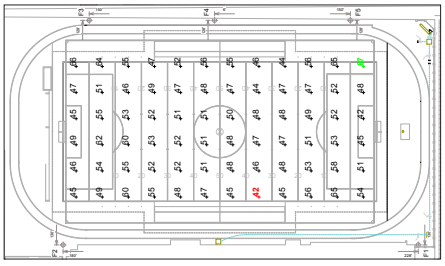
Uniformity: The smoothness of light on the field.

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

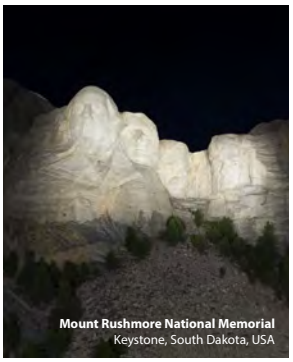
We will help get you started

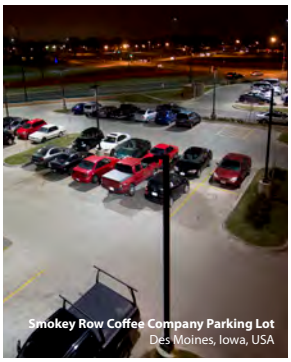
From our expert project managers to our team of certified engineers, we will work with you to design a custom foundation-to-poletop or retrofit lighting solution that:

- 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

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: