

Appendix A Lighting Plans

Appendices

This page intentionally left blank.

Garden Grove High School Athletic Fields

Garden Grove, CA

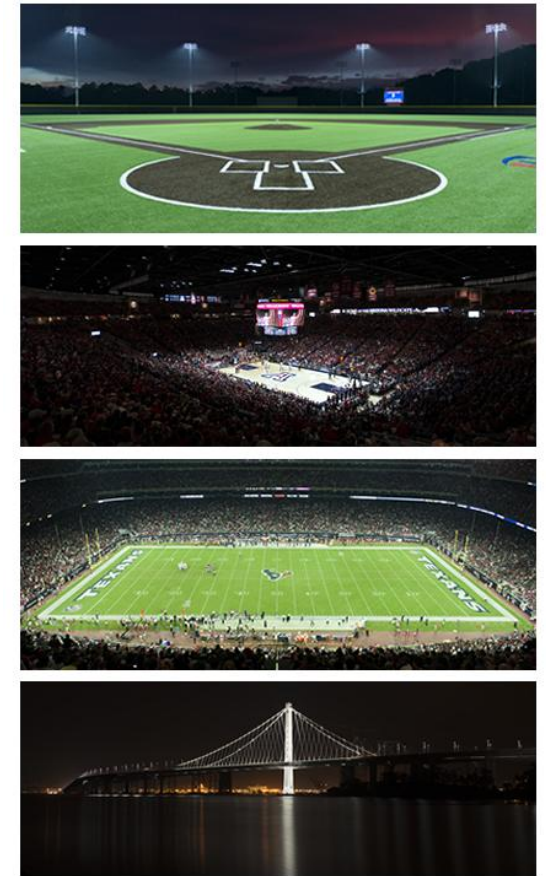
Lighting System

Pole / Fixture Summary						
Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
A1-A2	70'	70'	4	TLC-LED-1200	4.68 kW	A
		16'	1	TLC-BT-575	0.58 kW	A
A3-A4	70'	70'	2	TLC-LED-1200	2.34 kW	B
		70'	1	TLC-LED-900	0.89 kW	B
		16'	1	TLC-BT-575	0.58 kW	B
B1	80'	80'	2	TLC-LED-1200	2.34 kW	E
		80'	6	TLC-LED-1500	8.58 kW	A
		80'	2	TLC-LED-900	1.78 kW	E
		16'	1	TLC-BT-575	0.58 kW	A
B2	80'	80'	4	TLC-LED-1500	5.72 kW	A
		80'	2	TLC-LED-900	1.78 kW	A
		16'	1	TLC-BT-575	0.58 kW	A
B4	70'	70'	3	TLC-LED-1500	4.29 kW	B
		70'	1	TLC-LED-900	0.89 kW	B
		16'	1	TLC-BT-575	0.58 kW	B
C1	70'	70'	4	TLC-LED-1500	5.72 kW	A
		70'	1	TLC-LED-900	0.89 kW	A
		16'	2	TLC-BT-575	1.15 kW	A
C2	70'	70'	2	TLC-LED-1500	2.86 kW	A
		70'	3	TLC-LED-900	2.67 kW	A
		16'	2	TLC-BT-575	1.15 kW	A
F2	90'	90'	15	TLC-LED-1150	17.25 kW	F
		25'	1	TLC-LED-1150	1.15 kW	F
		75'	3	TLC-LED-400	1.20 kW	G
		90'	4	TLC-LED-1500	5.72 kW	C
S1	70'	70'	3	TLC-LED-1500	4.29 kW	D
		70'	3	TLC-LED-900	2.67 kW	D
		16'	1	TLC-BT-575	0.58 kW	D
S2	70'	70'	4	TLC-LED-1500	5.72 kW	C
		70'	2	TLC-LED-900	1.78 kW	C
S4	70'	70'	4	TLC-LED-1500	5.72 kW	C
T2-T4	70'	70'	2	TLC-LED-1200	2.34 kW	E
		70'	2	TLC-LED-900	1.78 kW	E
16			107		118.10 kW	

Circuit Summary			
Circuit	Description	Load	Fixture Qty
A	Baseball	42.18 kW	38
B	Softball	13.37 kW	13
C	Soccer	18.94 kW	14
D	Softball/Soccer	7.54 kW	7
E	Tennis 1-4	16.48 kW	16
F	Football (Existing)	18.4 kW	16
G	Egress (Existing)	1.2 kW	3

Fixture Type Summary							
Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1150	LED 5700K - 75 CRI	1150W	121,000	>120,000	>120,000	>120,000	16
TLC-LED-900	LED 5700K - 75 CRI	890W	89,600	>120,000	>120,000	>120,000	22
TLC-LED-1500	LED 5700K - 75 CRI	1430W	160,000	>120,000	>120,000	>120,000	34
TLC-LED-1200	LED 5700K - 75 CRI	1170W	136,000	>120,000	>120,000	>120,000	20
TLC-LED-400	LED 5700K - 75 CRI	400W	38,600	>120,000	>120,000	>120,000	3
TLC-BT-575	LED 5700K - 75 CRI	575W	52,000	>120,000	>120,000	>120,000	12

From Hometown to Professional



We Make It Happen.

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2022 Musco Sports Lighting, LLC.

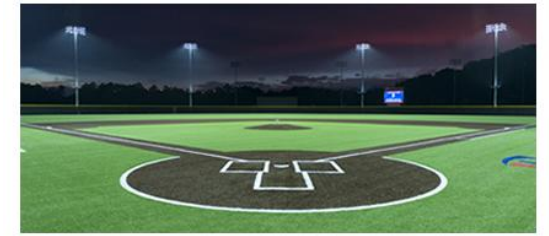
Garden Grove High School Athletic Fields

Garden Grove, CA

Light Level Summary

Calculation Grid Summary								
Grid Name	Calculation Metric	Illumination					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Baseball (Infield)	Horizontal Illuminance	51.4	35	62	1.76	1.47	A	38
Baseball (Outfield)	Horizontal Illuminance	30.8	18	42	2.40	1.71	A	38
Property Line Spill	Horizontal	0.19	0	0.50	0.00		A,B,C,D,E	88
Property Line Spill	Max Candela (by Fixture)	3330	100	6686	66.69	33.21	A,B,C,D,E	88
Property Line Spill	Max Vertical Illuminance Metric	0.28	0	0.65	2311.67		A,B,C,D,E	88
Soccer	Horizontal Illuminance	30.3	21	38	1.76	1.44	C,D	21
Softball (Infield)	Horizontal Illuminance	52.1	34	62	1.80	1.53	B,D	20
Softball (Outfield)	Horizontal Illuminance	30.8	20	48	2.42	1.54	B,D	20
Tennis 1-4	Horizontal Illuminance	50.7	41	63	1.54	1.24	E	16
Track	Horizontal Illuminance	9.80	0	58	2210.34		F	16

From Hometown to Professional



We Make It Happen.

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2022 Musco Sports Lighting, LLC.

EQUIPMENT LIST FOR AREAS SHOWN									
Pole				Luminaires					
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS	
2	A1-A2	70'	-	15.5'	TLC-BT-575	1	1	0	
				70'	TLC-LED-1200	4	4	0	
1	B1	80'	-	80'	TLC-LED-900	2*	0	2	
				80'	TLC-LED-1200	2*	0	2	
				15.5'	TLC-BT-575	1	1	0	
				80'	TLC-LED-1500	6	6	0	
1	B2	80'	-	80'	TLC-LED-900	2	2	0	
				15.5'	TLC-BT-575	1	1	0	
				80'	TLC-LED-1500	4	4	0	
				70'	TLC-LED-900	1	1	0	
1	C1	70'	-	70'	TLC-LED-900	1	1	0	
				15.5'	TLC-BT-575	2	2	0	
				70'	TLC-LED-1500	4	4	0	
				70'	TLC-LED-900	3	3	0	
1	C2	70'	-	70'	TLC-LED-900	3	3	0	
				15.5'	TLC-BT-575	2	2	0	
				70'	TLC-LED-1500	2	2	0	
				70'	TLC-LED-900	3	3	0	
6	TOTALS					42	38	4	

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

GRID SUMMARY	
Name:	Baseball
Size:	Irregular 295' / 343' / 308'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

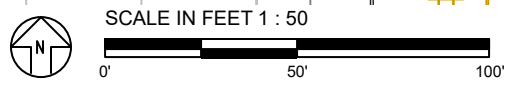
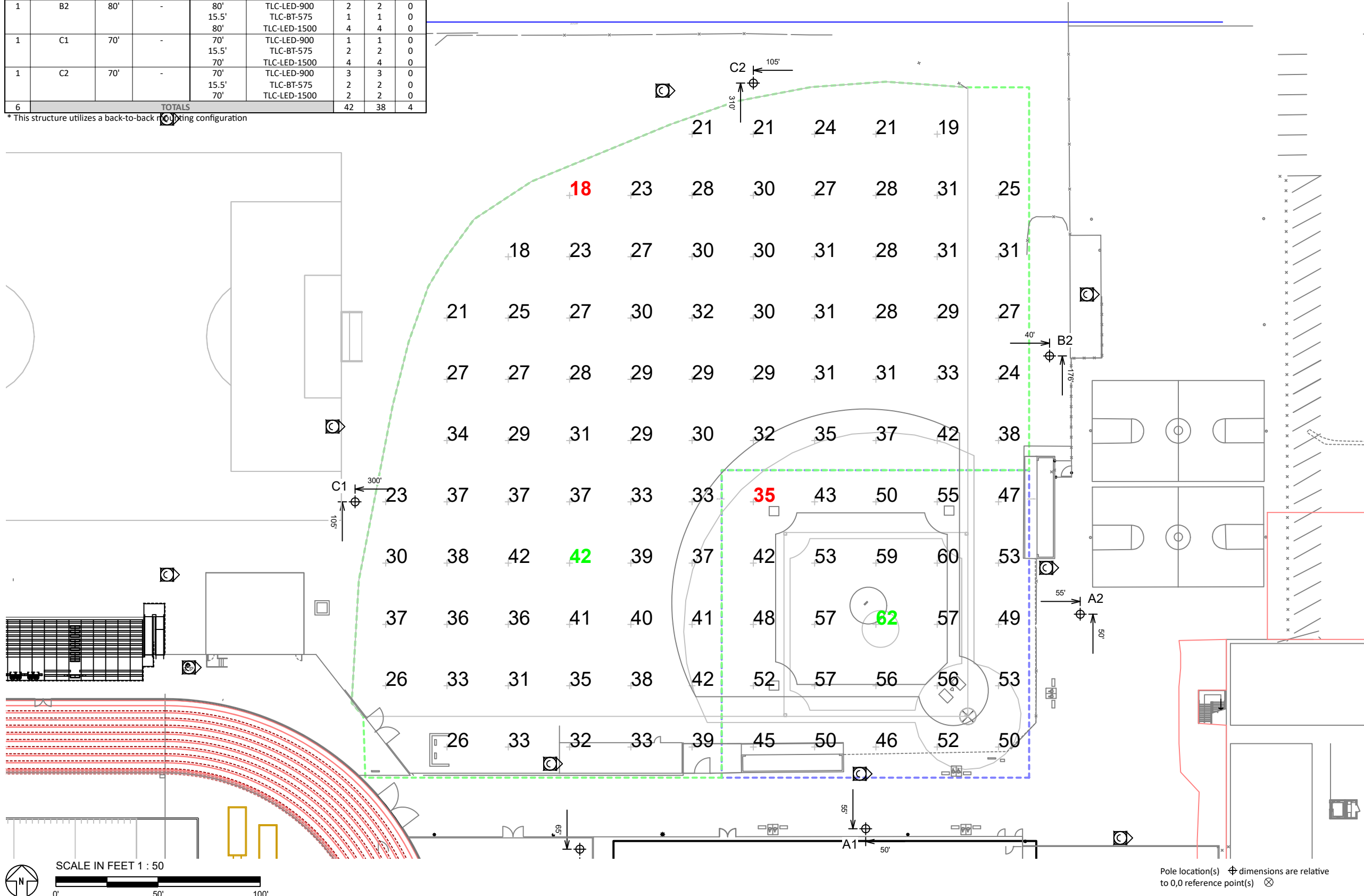
ILLUMINATION SUMMARY		
MAINTAINED HORIZONTAL FOOTCANDLES		
	Infield	Outfield
Guaranteed Average:	50	30
Scan Average:	51.4	30.8
Maximum:	62	42
Minimum:	35	18
Avg / Min:	1.46	1.75
Guaranteed Max / Min:	2	2.5
Max / Min:	1.76	2.40
UG (adjacent pts):	1.24	1.61
CU:	0.75	
No. of Points:	25	81
LUMINAIRE INFORMATION		
Applied Circuits:	A	
No. of Luminaires:	38	
Total Load:	42.18 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.



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



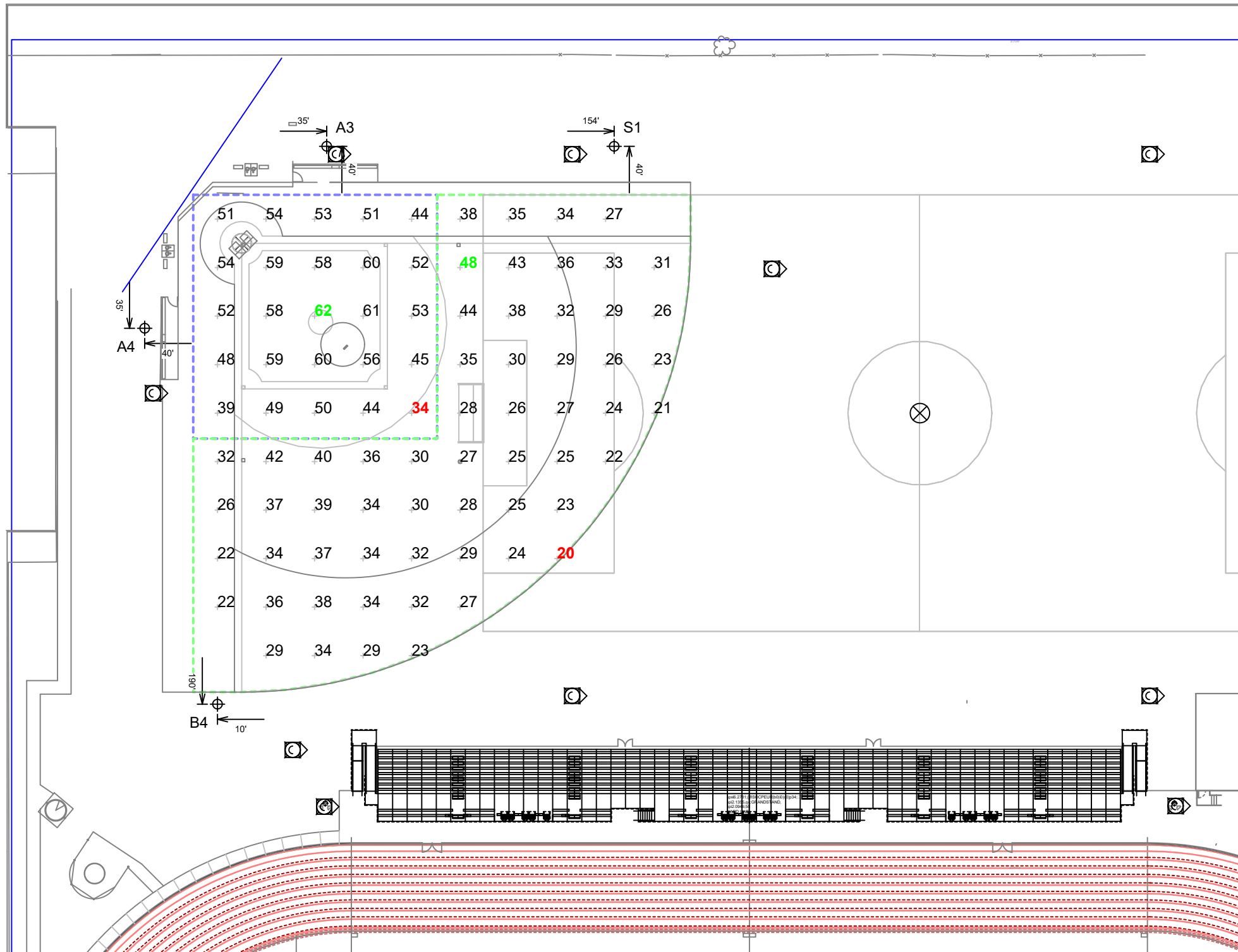
EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	A3-A4	70'	-	70'	TLC-LED-1200	2	2	0
				15.5'	TLC-BT-575	1	1	0
				70'	TLC-LED-900	1	1	0
1	B4	70'	-	70'	TLC-LED-900	1	1	0
				15.5'	TLC-BT-575	1	1	0
				70'	TLC-LED-1500	3	3	0
1	S1	70'	-	70'	TLC-LED-1500	3	3	0
				15.5'	TLC-BT-575	1	1	0
				70'	TLC-LED-900	3	3	0
4	TOTALS					20	20	0

Garden Grove High School Athletic Fields
Garden Grove, CA

GRID SUMMARY	
Name:	Softball
Size:	185'/185'/185' - 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:	52.1	30.8
Maximum:	62	48
Minimum:	34	20
Avg / Min:	1.51	1.56
Guaranteed Max / Min:	2	2.5
Max / Min:	1.80	2.42
UG (adjacent pts):	1.31	1.61
CU:	0.56	
No. of Points:	25	59
LUMINAIRE INFORMATION		
Applied Circuits:	B, D	
No. of Luminaires:	20	
Total Load:	20.9 kW	

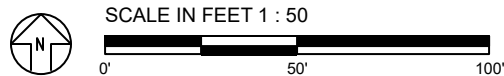


Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

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.



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



We Make It Happen.

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2022 Musco Sports Lighting, LLC.

EQUIPMENT LIST FOR AREAS SHOWN

Pole		Luminaires						
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
1	F2	90'	-	90'	TLC-LED-1500	4*	4	0
				25'	TLC-LED-1150	1	0	1
				75'	TLC-LED-400	3	0	3
				90'	TLC-LED-1150	15	0	15
1	S1	70'	-	70'	TLC-LED-1500	3	3	0
				15.5'	TLC-BT-575	1	1	0
				70'	TLC-LED-900	3	3	0
1	S2	70'	-	70'	TLC-LED-900	2	2	0
1	S4	70'	-	70'	TLC-LED-1500	4	4	0
TOTALS						40	21	19

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

Garden Grove High School Athletic Fields
Garden Grove, CA

GRID SUMMARY	
Name:	Soccer
Size:	360' x 180'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

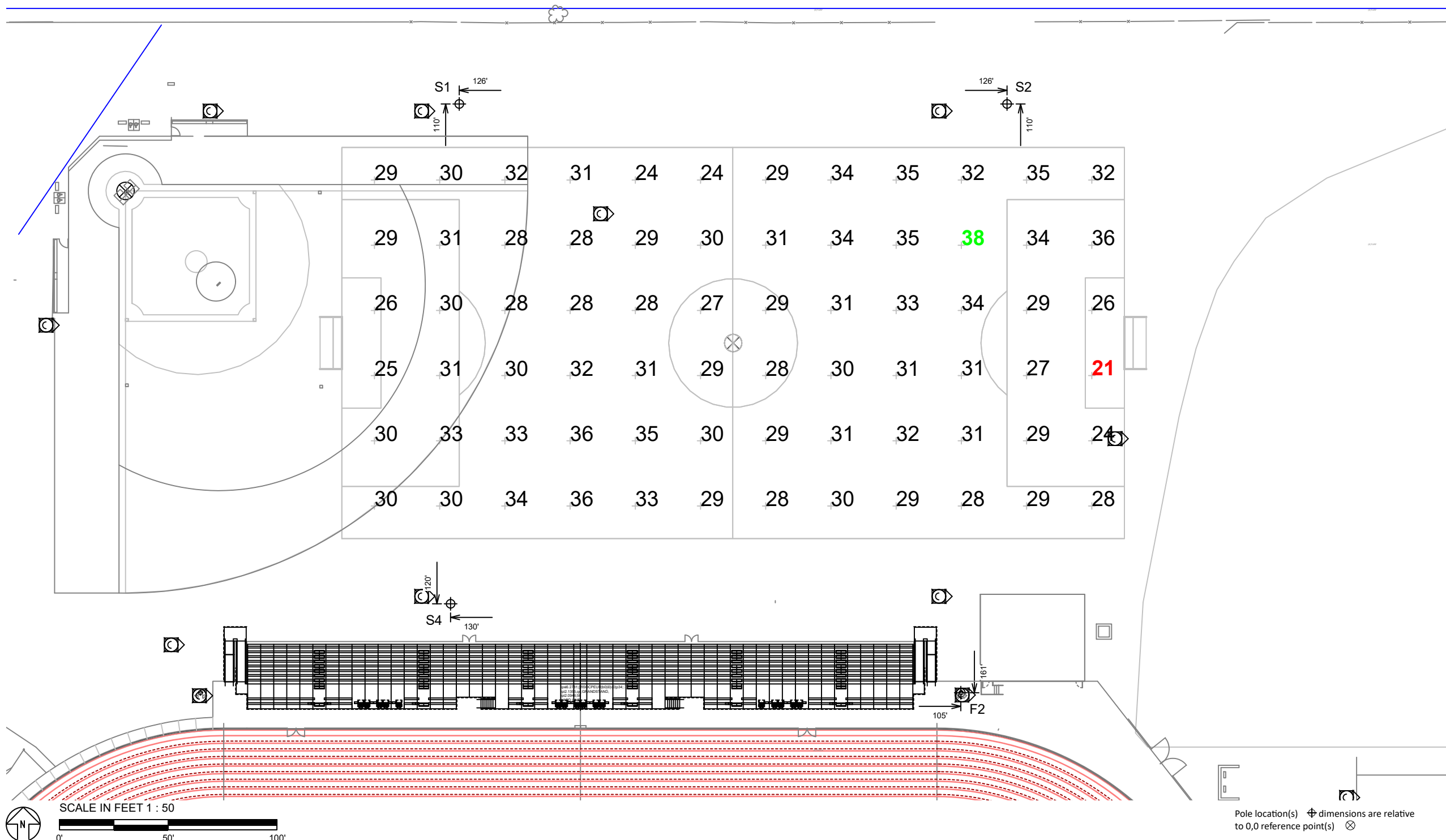
ILLUMINATION SUMMARY	
MAINTAINED HORIZONTAL FOOTCANDLES	
Entire Grid	
Guaranteed Average:	30
Scan Average:	30.3
Maximum:	38
Minimum:	21
Avg / Min:	1.42
Guaranteed Max / Min:	2.5
Max / Min:	1.76
UG (adjacent pts):	1.36
CU:	0.68
No. of Points:	72
LUMINAIRE INFORMATION	
Applied Circuits:	C, D
No. of Luminaires:	21
Total Load:	26.48 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.



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

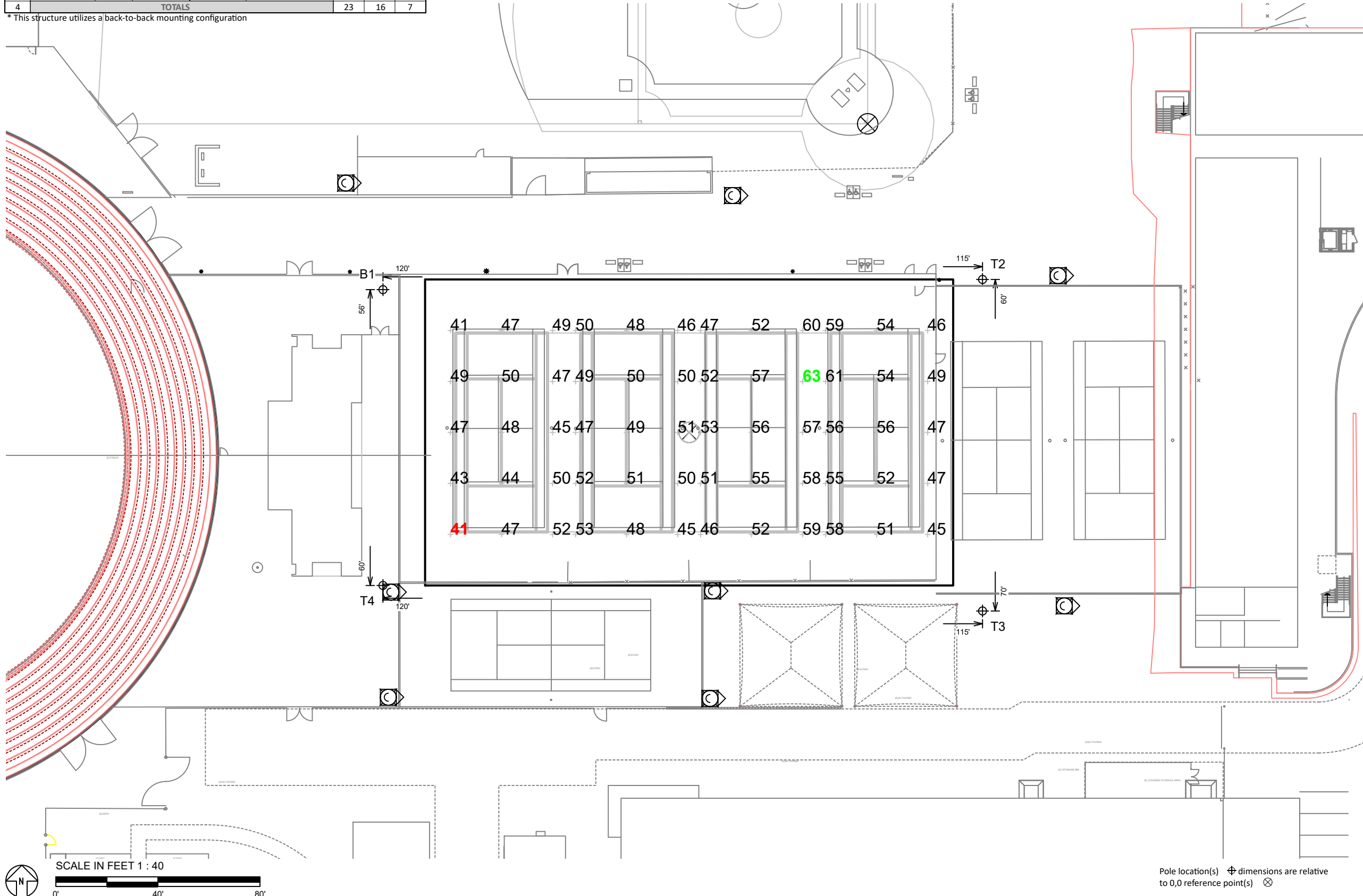


We Make It Happen.

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2022 Musco Sports Lighting, LLC.

EQUIPMENT LIST FOR AREAS SHOWN								
Pole			Luminaires					
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
1	B1	80'	-	80'	TLC-LED-900	2*	2	0
				80'	TLC-LED-1200	2*	2	0
				15.5'	TLC-BT-575	1	0	1
				80'	TLC-LED-1500	6	0	6
3	T2-T4	70'	-	70'	TLC-LED-900	2	2	0
				70'	TLC-LED-1200	2	2	0
4	TOTALS					23	16	7

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



GRID SUMMARY	
Name:	Tennis 1-4
Size:	4 Court - 13' Spacing
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY	
MAINTAINED HORIZONTAL FOOTCANDLES	
Entire Grid	
Guaranteed Average:	50
Scan Average:	50.7
Maximum:	63
Minimum:	41
Guaranteed Avg / Min:	2
Avg / Min:	1.25
Max / Min:	1.54
UG (adjacent pts):	0.00
CU:	0.69
No. of Points:	60
LUMINAIRE INFORMATION	
Applied Circuits:	E
No. of Luminaires:	16
Total Load:	16.48 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.

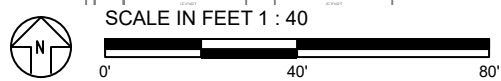
Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

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.

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2022 Musco Sports Lighting, LLC.



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

GRID SUMMARY	
Name:	Property Line Spill
Spacing:	30.0'
Height:	3.0' above grade

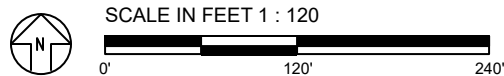
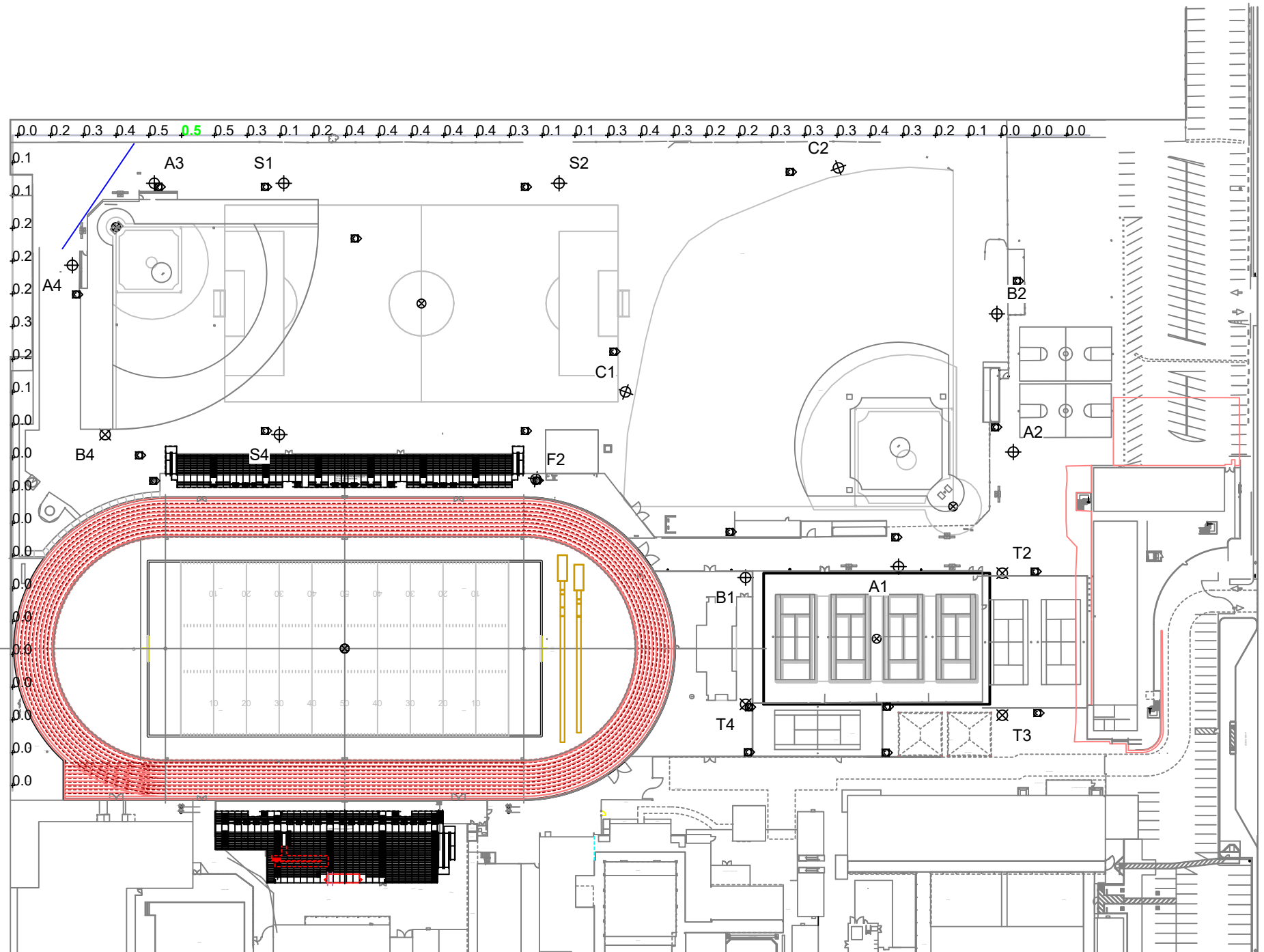
ILLUMINATION SUMMARY	
HORIZONTAL FOOTCANDLES	
Scan Average:	Entire Grid 0.193
Maximum:	0.50
Minimum:	0.00
No. of Points:	53
LUMINAIRE INFORMATION	
Applied Circuits:	A, B, C, D, E
No. of Luminaires:	88
Total Load:	98.5 kW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document.

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

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

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



Pole location(s) \oplus dimensions are relative to 0,0 reference point(s) \otimes



We Make It Happen.

GRID SUMMARY	
Name:	Property Line Spill
Spacing:	30.0'
Height:	3.0' above grade

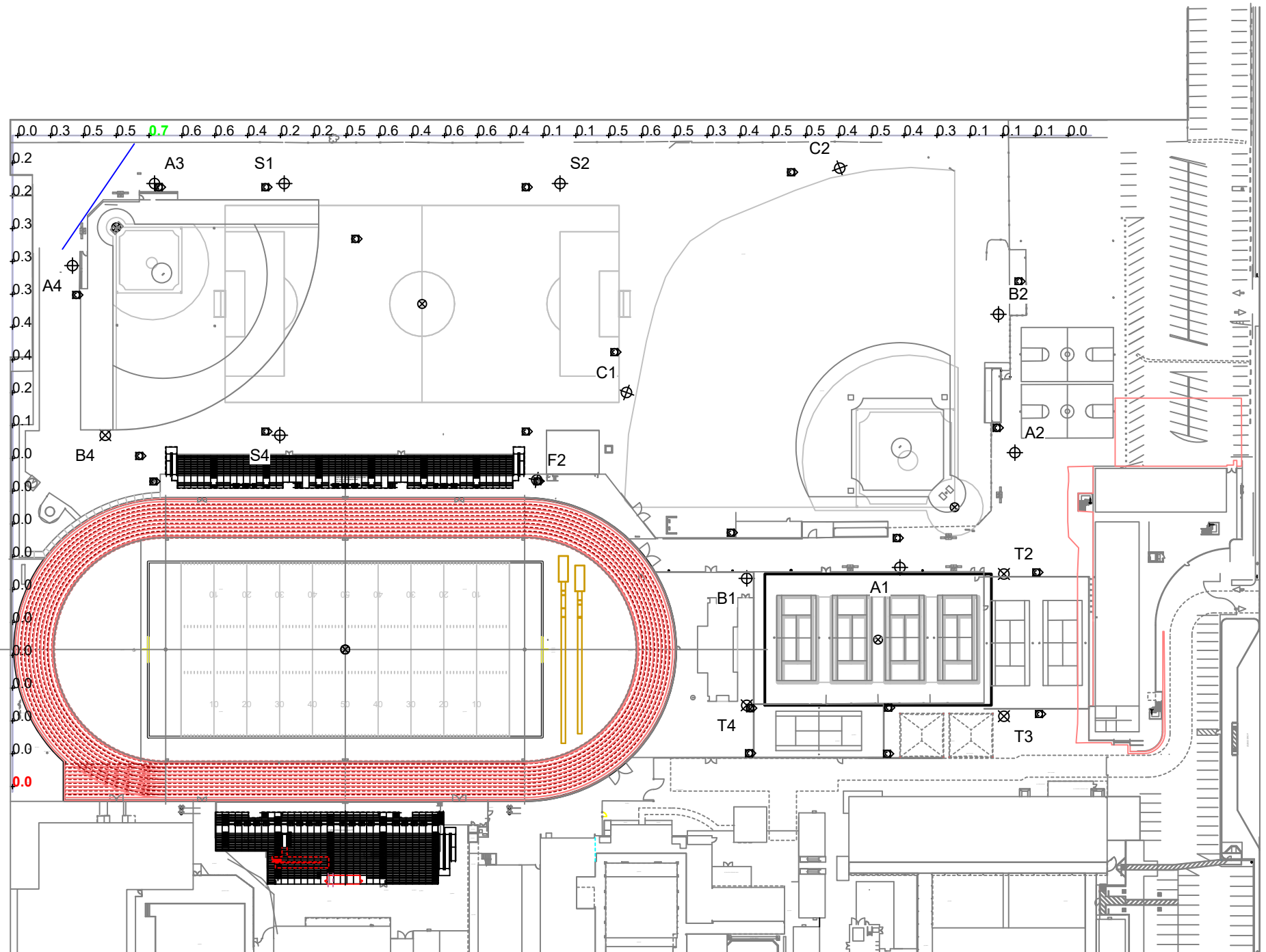
ILLUMINATION SUMMARY	
MAX VERTICAL FOOTCANDLES	
Entire Grid	
Scan Average:	0.280
Maximum:	0.65
Minimum:	0.00
No. of Points:	53
LUMINAIRE INFORMATION	
Applied Circuits:	A, B, C, D, E
No. of Luminaires:	88
Total Load:	98.5 kW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document.

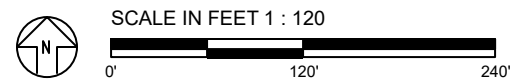
Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

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

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



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



We Make It Happen.

GRID SUMMARY	
Name:	Property Line Spill
Spacing:	30.0'
Height:	3.0' above grade

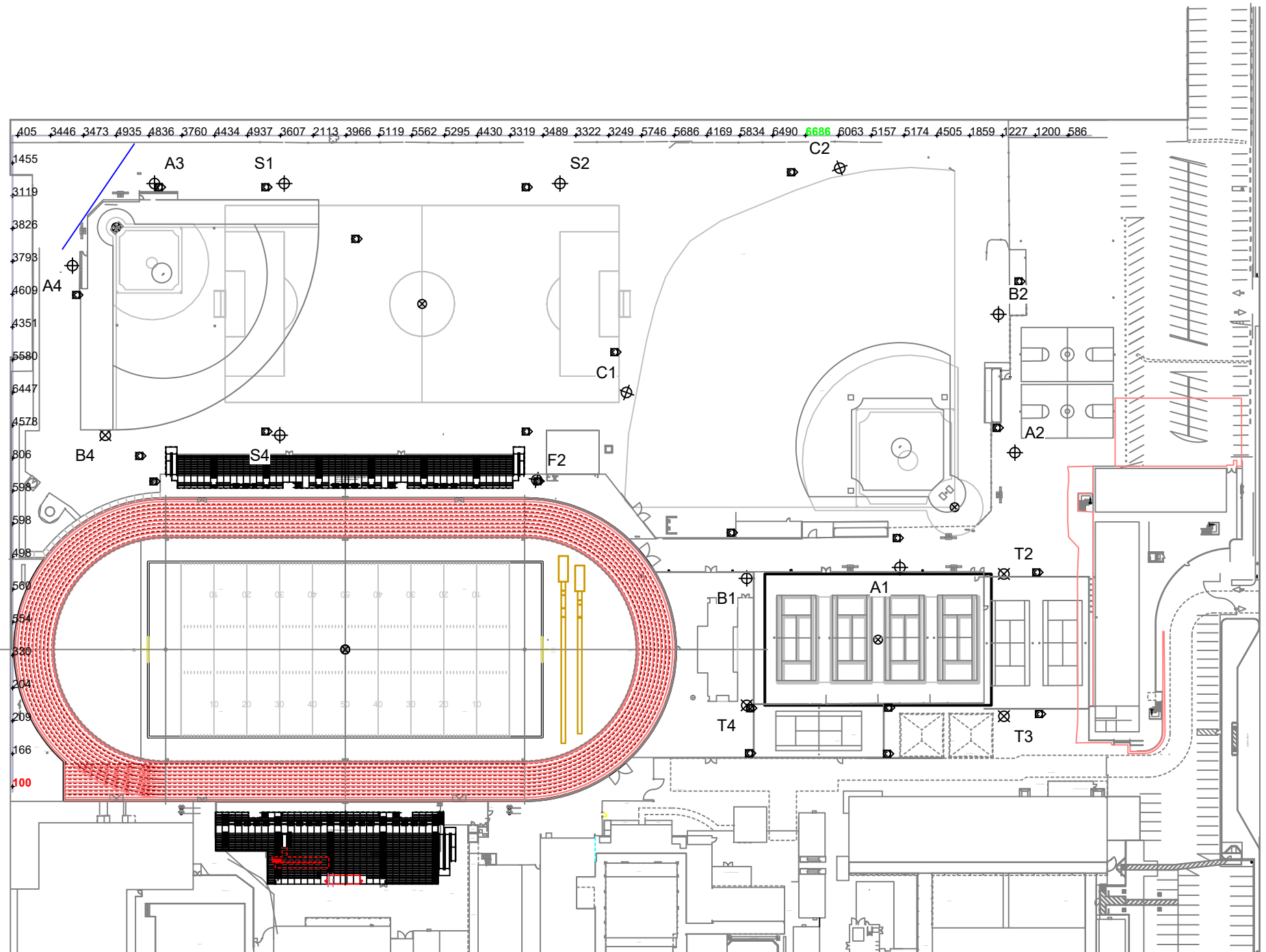
ILLUMINATION SUMMARY	
CANDELA (PER FIXTURE)	
Entire Grid	
Scan Average:	3329.577
Maximum:	6686.05
Minimum:	100.26
No. of Points:	53
LUMINAIRE INFORMATION	
Applied Circuits:	A, B, C, D, E
No. of Luminaires:	88
Total Load:	98.5 kW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document.

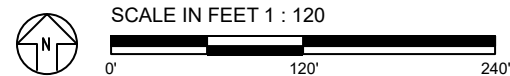
Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

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

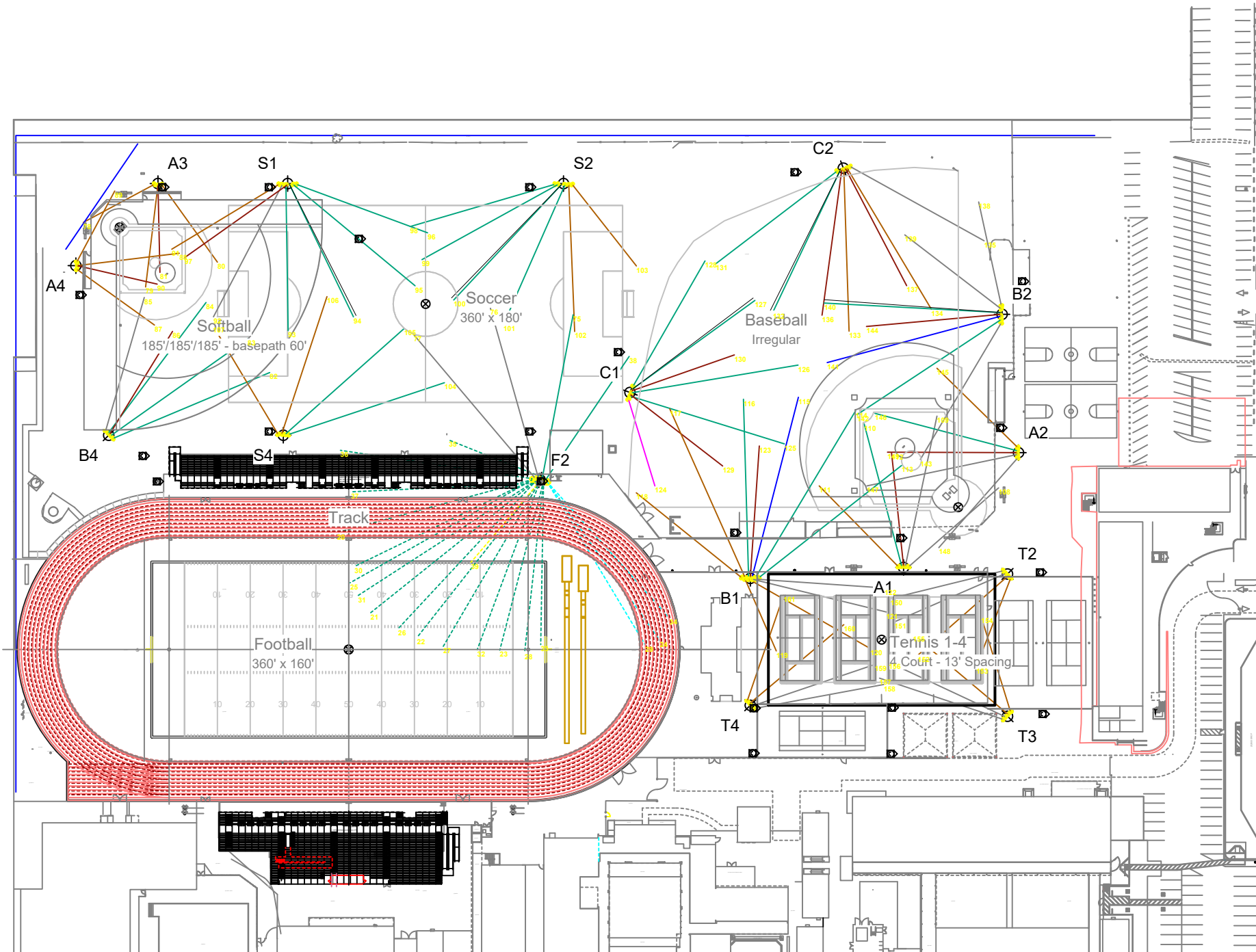
Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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



We Make It Happen.



EQUIPMENT LAYOUT

INCLUDES:

- Baseball
- Football
- Soccer
- Softball
- Tennis 1-4
- 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.

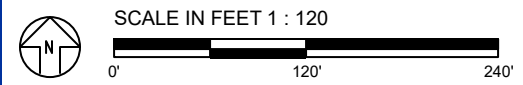
EQUIPMENT LIST FOR AREAS SHOWN

QTY	Pole			Luminaires		
	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE
2	A1-A2	70'	-	15.5'	TLC-BT-575	1
				70'	TLC-LED-1200	4
2	A3-A4	70'	-	70'	TLC-LED-1200	2
				15.5'	TLC-BT-575	1
				70'	TLC-LED-900	1
1	B1	80'	-	80'	TLC-LED-900	2*
				15.5'	TLC-BT-575	1
				80'	TLC-LED-1500	6
1	B2	80'	-	80'	TLC-LED-900	2
				15.5'	TLC-BT-575	1
				80'	TLC-LED-1500	4
1	B4	70'	-	70'	TLC-LED-900	1
				15.5'	TLC-BT-575	1
				70'	TLC-LED-1500	3
1	C1	70'	-	70'	TLC-LED-900	1
				15.5'	TLC-BT-575	2
				70'	TLC-LED-1500	4
1	C2	70'	-	70'	TLC-LED-900	3
				15.5'	TLC-BT-575	2
				70'	TLC-LED-1500	2
1	F2	90'	-	90'	TLC-LED-1500	4*
				25'	TLC-LED-1150	1
				75'	TLC-LED-400	3
				90'	TLC-LED-1150	15
1	S1	70'	-	70'	TLC-LED-1500	3
				15.5'	TLC-BT-575	1
				70'	TLC-LED-900	3
1	S2	70'	-	70'	TLC-LED-900	2
				70'	TLC-LED-1500	4
1	S4	70'	-	70'	TLC-LED-1500	4
3	T2-T4	70'	-	70'	TLC-LED-900	2
				70'	TLC-LED-1200	2
16	TOTALS					107

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

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)					
	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	480 (60)
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	480 (60)
TLC-LED-1150	6.8	6.5	5.9	5.1	4.1	3.7
TLC-LED-900	5.3	5.0	4.6	4.0	3.2	2.9
TLC-LED-1500	8.5	8.1	7.4	6.4	5.1	4.7
TLC-LED-1200	7.0	6.6	6.1	5.2	4.2	4.0
TLC-LED-400	2.5	2.3	2.1	1.9	1.5	1.4
TLC-BT-575	3.4	3.2	2.9	2.5	2.0	1.8



ENGINEERED DESIGN By: Vashon Alexander · File #216614A · 17-Feb-22

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



Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2022 Musco Sports Lighting, LLC.