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# Appendix A

## Lightning Plan



# San Marcos High School Athletic Fields LED

San Marcos, CA

## LIGHTING SYSTEM

Structure/Fixture Summary						
Structure ID	Structure Height	Fixt. Attachment Ht.	Fixture Qty	Fixture Type	Load	Circuit
F1-F4	70'	70'	2	TLC-LED-1200	2.34 kW	A
		70'	3	TLC-LED-1500	4.23 kW	A
<b>4</b>			<b>20</b>		<b>26.28 kW</b>	

Circuit Summary			
Circuit	Description	Load	Fixture Qty
A		26.28 kW	20

Fixture Type Summary								
Type	Circuit	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1200	A	LED 5700K - 75 CRI	1170W	150,000	>120,000	>120,000	>120,000	8
TLC-LED-1500	A	LED 5700K - 75 CRI	1410W	181,000	>120,000	>120,000	>120,000	12

Single Fixture Amperage Draw Chart								
Driver Specifications (.90 min power factor)		Line Amperage Per Fixture (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

## Light Level Summary

Calculation Grid Summary								
Grid Name	Calculation Metric	Illumination Ave					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Football	Horizontal Illuminance	41.55	35	50	1.42	1.18	A	20
Project Spill @ 3ft.	Horizontal Illuminance	0.1024	0.00	0.55	-	-	A	20
Project Spill @ 5ft.	Max Candela Metric	2114.7827	0.00	9945.44	-	-	A	20
Project Spill @ 5ft.	Max Vertical Illuminance Metric	0.1680	0.00	0.93	-	-	A	20
Project Spill @ 5ft.	True Max Vert Illuminance Metric	0.1488	0.00	0.80	-	-	A	20

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

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions.

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

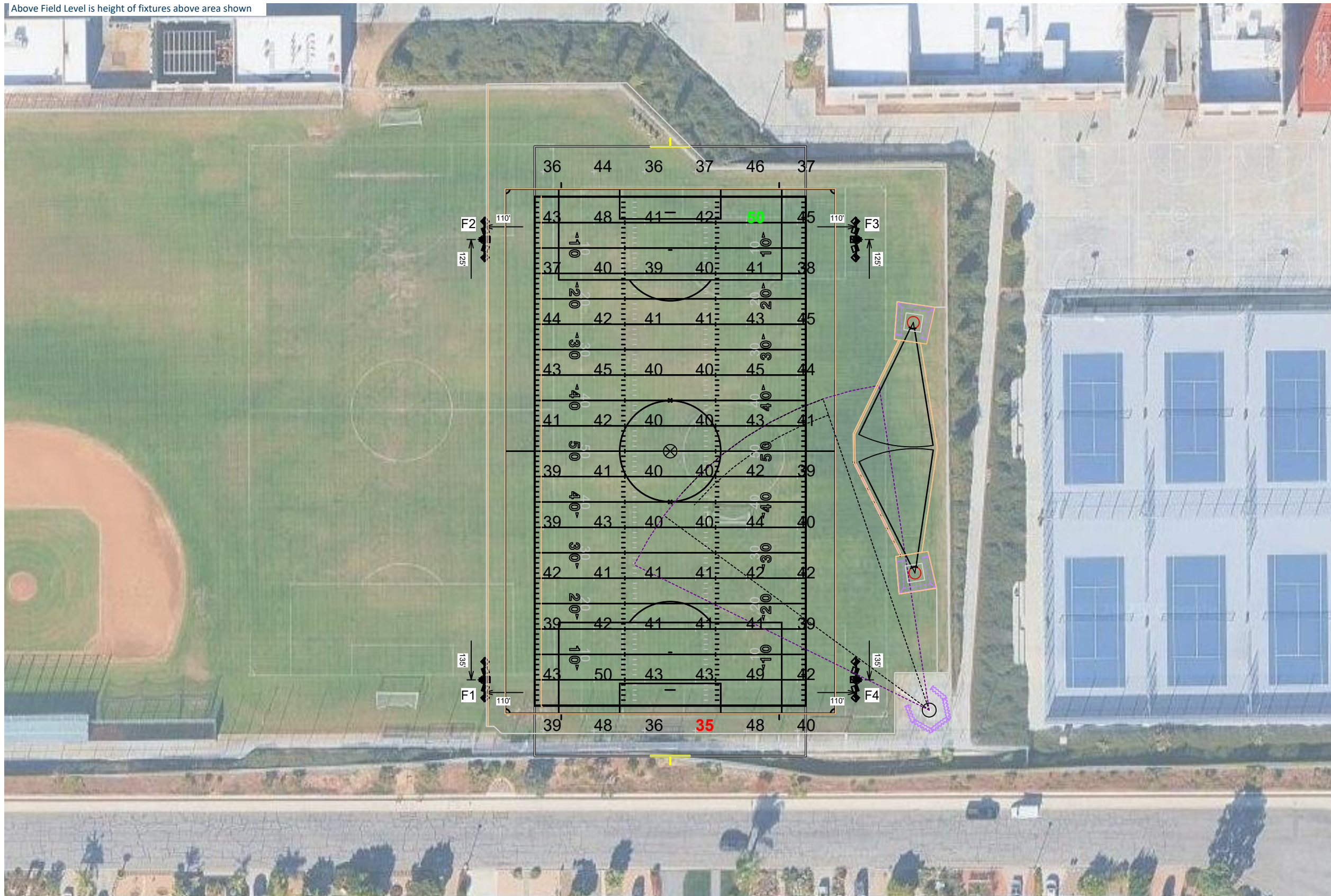
**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.





Structure				Fixtures				
QTY	STRUCTURE ID	SIZE	GRADE ELEVATION	ABOVE FIELD LEVEL	FIXTURE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
4	F1-F4	70'	-	70'	TLC-LED-1200	2	2	0
4				70'	TLC-LED-1500	3	3	0
Totals						20	20	0

Above Field Level is height of fixtures above area shown



## San Marcos High School Athletic Fields LED

San Marcos, CA

Grid Summary	
Name:	Football
Size:	360' x 160'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

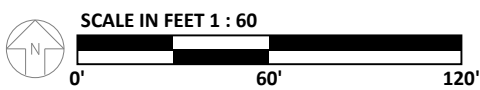
Illumination Summary	
	ENTIRE GRID
Guaranteed Average:	40
Scan Average:	41.55
Maximum:	50
Minimum:	35
Avg/Min:	1.18
Guaranteed Max/Min:	2
Max/Min:	1.42
UG (adjacent pts):	1.37
CU:	0.78
No. of Points:	72
<b>FIXTURE INFORMATION</b>	
Applied Circuits:	A
No. of Fixtures:	20
Total Load:	26.28 kW

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



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## ILLUMINATION SUMMARY



**Equipment List For Areas Shown**

Structure				Fixtures				
QTY	STRUCTURE ID	SIZE	GRADE ELEVATION	ABOVE FIELD LEVEL	FIXTURE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
4	F1-F4	70'	-	70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-1500	3	3	0
4	Totals					20	20	0

Above Field Level is height of fixtures above area shown



**San Marcos High School Athletic Fields LED**

San Marcos, CA

**Grid Summary**

Name: Project Spill @ 3ft.  
 Spacing: 30.0'  
 Height: 3.0' above grade

**Illumination Summary**

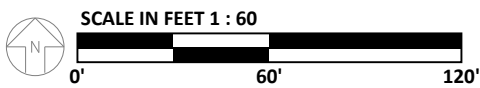
	INITIAL HORIZONTAL FOOTCANDLES
Entire Grid	
Scan Average:	<b>0.1024</b>
Maximum:	0.55
Minimum:	0.00
CU:	0.00
No. of Points:	39
<b>FIXTURE INFORMATION</b>	
Applied Circuits:	A
No. of Fixtures:	20
Total Load:	26.28 kW

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**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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**Equipment List For Areas Shown**

Structure				Fixtures				
QTY	STRUCTURE ID	SIZE	GRADE ELEVATION	ABOVE FIELD LEVEL	FIXTURE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
4	F1-F4	70'	-	70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-1500	3	3	0
4	Totals					20	20	0

Above Field Level is height of fixtures above area shown



**San Marcos High School Athletic Fields LED**

San Marcos, CA

Grid Summary	
Name:	Project Spill @ 5ft.
Spacing:	30.0'
Height:	5.0' above grade

Illumination Summary	
	INITIAL CANDELA (PER FIXTURE)
Entire Grid	2114.7827
Scan Average:	9945.44
Maximum:	0.00
Minimum:	0.00
CU:	0.00
No. of Points:	39
<b>FIXTURE INFORMATION</b>	
Applied Circuits:	A
No. of Fixtures:	20
Total Load:	26.28 kW

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**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**

Structure				Fixtures				
QTY	STRUCTURE ID	SIZE	GRADE ELEVATION	ABOVE FIELD LEVEL	FIXTURE TYPE	QTY/POLE	THIS GRID	OTHER GRIDS
4	F1-F4	70'	-	70'	TLC-LED-1200	2	2	0
				70'	TLC-LED-1500	3	3	0
4	Totals					20	20	0

Above Field Level is height of fixtures above area shown



**San Marcos High School Athletic Fields LED**

San Marcos, CA

Grid Summary	
Name:	Project Spill @ 5ft.
Spacing:	30.0'
Height:	5.0' above grade

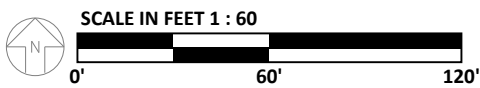
Illumination Summary		INITIAL MAX VERTICAL FOOTCANDLES
		Entire Grid
Scan Average:	0.1680	
Maximum:	0.93	
Minimum:	0.00	
CU:	0.00	
No. of Points:	39	
<b>FIXTURE INFORMATION</b>		
Applied Circuits:	A	
No. of Fixtures:	20	
Total Load:	26.28 kW	

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**ILLUMINATION SUMMARY**



# San Marcos High School Athletic Fields LED

San Marcos, CA

## Equipment Layout

**INCLUDES:**  
· Football

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

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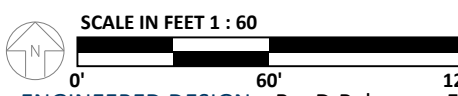
## Equipment List For Areas Shown

QTY	Structure			Fixtures		QTY/POLE
	STRUCTURE ID	SIZE	GLOBAL ELEVATION	ABOVE GLOBAL LEVEL	FIXTURE TYPE	
4	F1-F4	70'	-	70'	TLC-LED-1200	2
				70'	TLC-LED-1500	3
4	Totals					20

Above Global Level is height of fixtures above design (0,0,0)

## Single Fixture Amperage Draw Chart

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



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