

APPENDIX C
Illumination Summary

Sherbeck Field

Fullerton, CA

Lighting System

Pole / Fixture Summary						
Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Group
F1-F2	100'	25'	2	TLC-BT-575	1.15 kW	A
		100'	13	TLC-LED-1150	14.95 kW	A
F3-F4	120'	80'	2	TLC-LED-400	0.80 kW	B
		30'	2	TLC-BT-575	1.15 kW	A
		120'	15	TLC-LED-1150	17.25 kW	A
		80'	3	TLC-LED-400	1.20 kW	B
P1-P2	60'	60'	3	TLC-LED-1150	3.45 kW	C
6			80		79.90 kW	

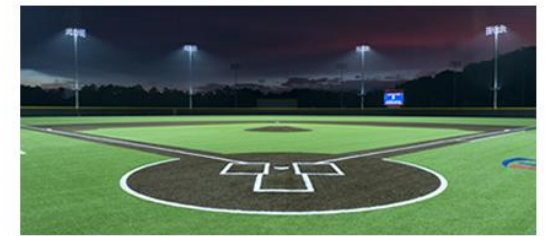
Group Summary			
Group	Description	Load	Fixture Qty
A	Football	69.0 kW	64
B	Egress	4.0 kW	10
C	Track	6.9 kW	6

Fixture Type Summary							
Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1150	LED 5700K - 75 CRI	1150W	121,000	>51,000	>51,000	>51,000	62
TLC-LED-400	LED 5700K - 75 CRI	400W	38,600	61,000	>72,000	>72,000	10
TLC-BT-575	LED 5700K - 75 CRI	575W	52,000	--	--	--	8

Light Level Summary

Calculation Grid Summary								
Grid Name	Calculation Metric	Illumination					Groups	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Away Egress	Horizontal Illuminance	7.40	3	12	4.48	2.47	B	10
Football	Horizontal Illuminance	54.3	48	59	1.23	1.13	A	64
Home Egress	Horizontal Illuminance	6.40	1	16	10.72	6.40	B	10
Soccer	Horizontal Illuminance	53.6	45	60	1.32	1.19	A	64
Spill	Horizontal	0.01	0	0.04	1569.64		A,B,C	80
Spill	Max Candela (by Fixture)	615	4.39	4245	966.69	140.02	A,B,C	80
Spill	Max Vertical Illuminance Metric	0.01	0	0.08	1546.06		A,B,C	80
Track	Horizontal Illuminance	31.5	18	44	2.51	1.75	A,C	70

From Hometown to Professional



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EQUIPMENT LIST FOR AREAS SHOWN									
Pole			Luminaires						
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS	
2	F1-F2	100'	-	25'	TLC-BT-575	2	2	0	
				80'	TLC-LED-400	2	0	2	
				100'	TLC-LED-1150	13	13	0	
2	F3-F4	120'	-	30'	TLC-BT-575	2	2	0	
				80'	TLC-LED-400	3	0	3	
				120'	TLC-LED-1150	15	15	0	
4	TOTALS					74	64	10	

Sherbeck Field

Fullerton, CA

GRID SUMMARY	
Name:	Football
Size:	360' x 160'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

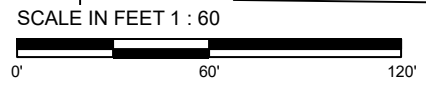
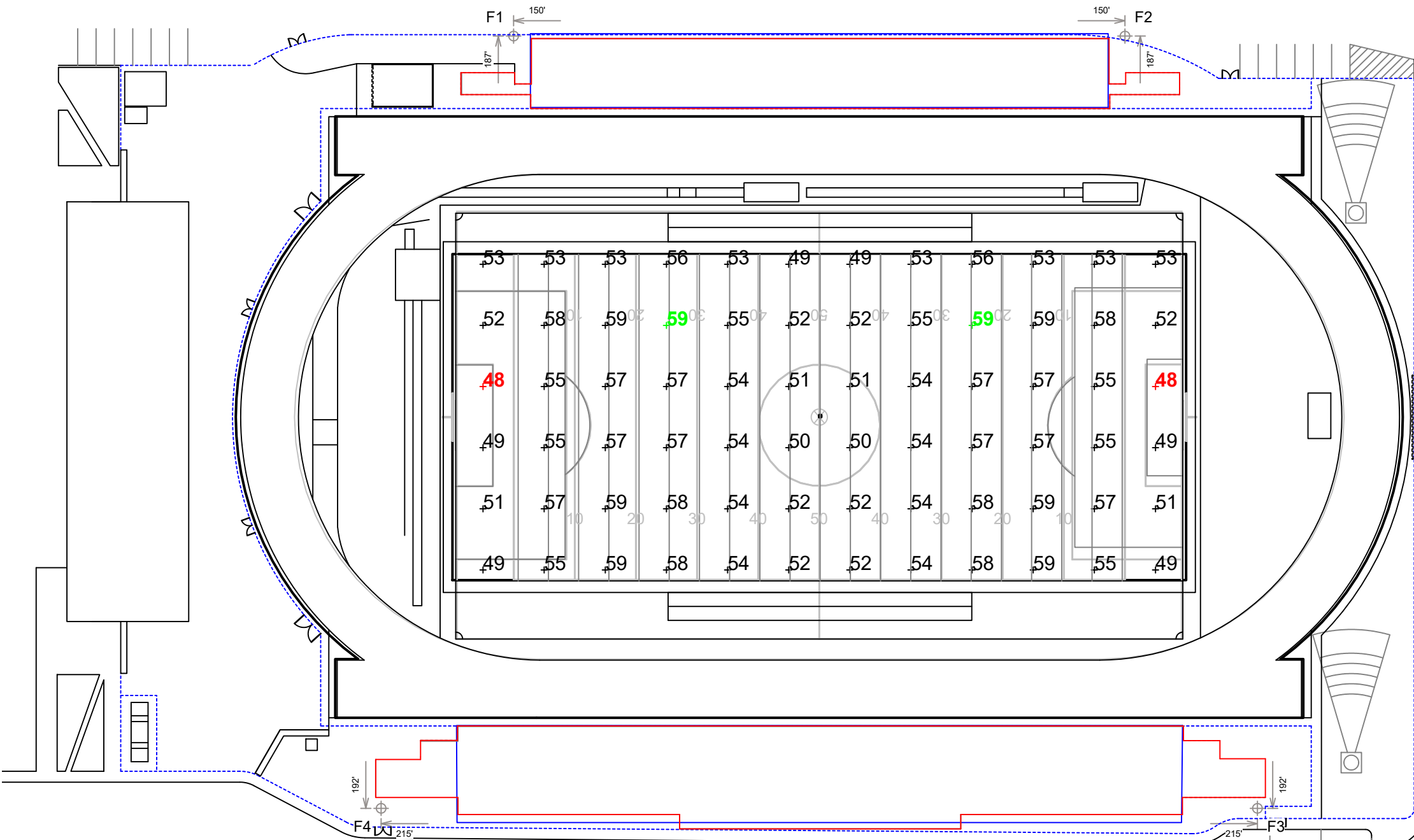
ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
Entire Grid			
Guaranteed Average:	50		
Scan Average:	54.3		
Maximum:	59		
Minimum:	48		
Avg / Min:	1.13		
Guaranteed Max / Min:	2		
Max / Min:	1.23		
UG (adjacent pts):	1.15		
No. of Points:	72		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 52,000 lumens		
No. of Luminaires:	64		
Total Load:	69.0 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
TLC-BT-575	--	--	--
Reported per TM-21-11. See luminaire datasheet for details.			

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

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

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

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



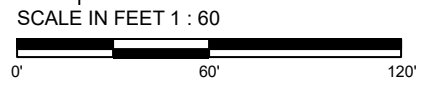
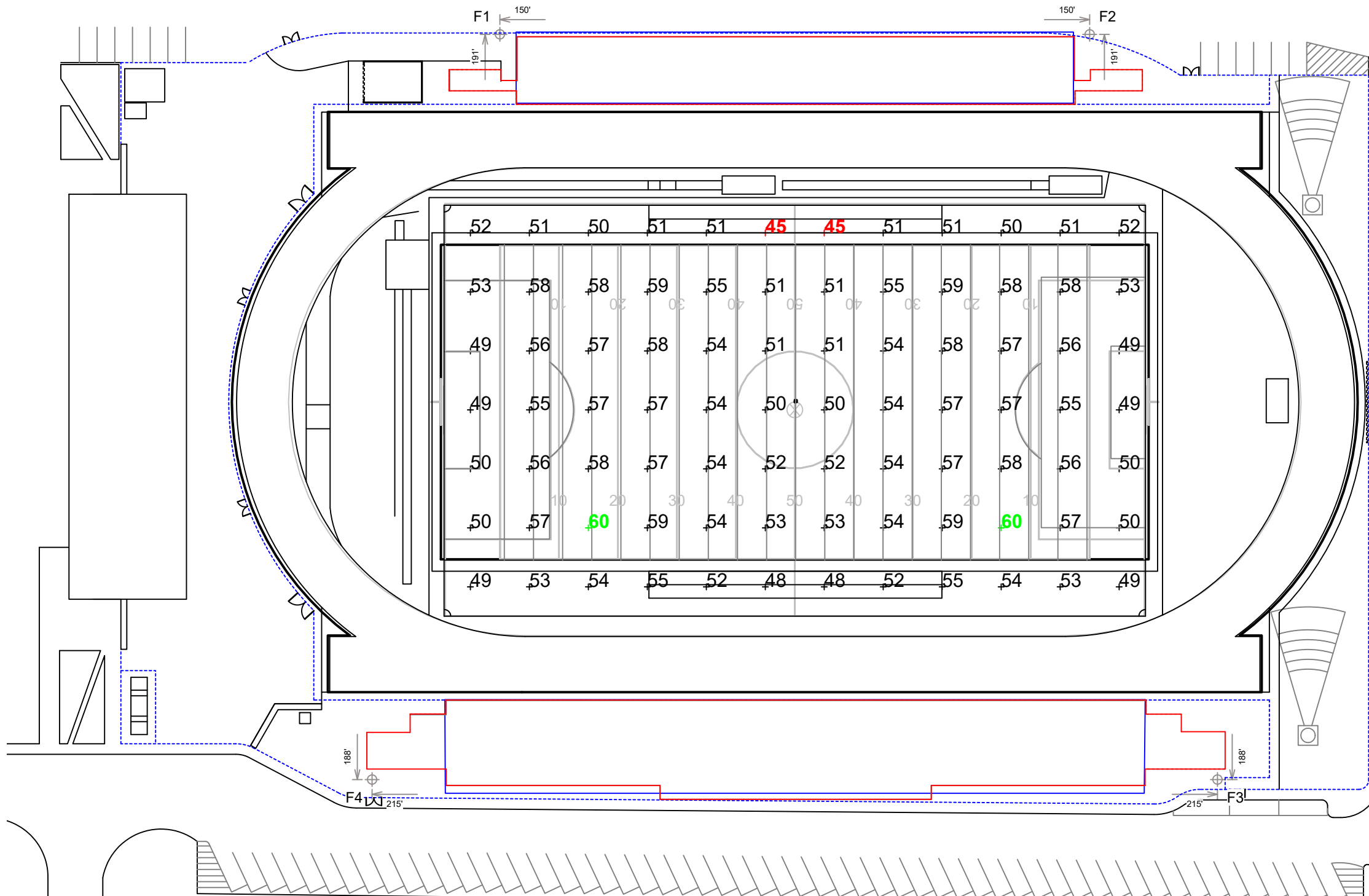
Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗



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EQUIPMENT LIST FOR AREAS SHOWN								
Pole			Luminaires					
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	100'	-	25'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	2	0	2
				100'	TLC-LED-1150	13	13	0
2	F3-F4	120'	-	30'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	3	0	3
				120'	TLC-LED-1150	15	15	0
4	TOTALS					74	64	10



Pole location(s) ⊕ dimensions are relative to 0.0 reference point(s) ⊗

Sherbeck Field

Fullerton, CA

GRID SUMMARY	
Name:	Soccer
Size:	356' x 210'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
Entire Grid			
Guaranteed Average:	50		
Scan Average:	53.6		
Maximum:	60		
Minimum:	45		
Avg / Min:	1.18		
Guaranteed Max / Min:	2		
Max / Min:	1.32		
UG (adjacent pts):	1.17		
No. of Points:	84		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 52,000 lumens		
No. of Luminaires:	64		
Total Load:	69.0 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
TLC-BT-575	--	--	--
Reported per TM-21-11. See luminaire datasheet for details.			

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

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

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



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ILLUMINATION SUMMARY

EQUIPMENT LIST FOR AREAS SHOWN								
Pole			Luminaires					
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	100'	-	25'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	2	0	2
				100'	TLC-LED-1150	13	13	0
2	F3-F4	120'	-	30'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	3	0	3
				120'	TLC-LED-1150	15	15	0
2	P1-P2	60'	-	60'	TLC-LED-1150	3	3	0
6	TOTALS					80	70	10

Sherbeck Field

Fullerton, CA

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

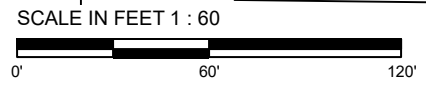
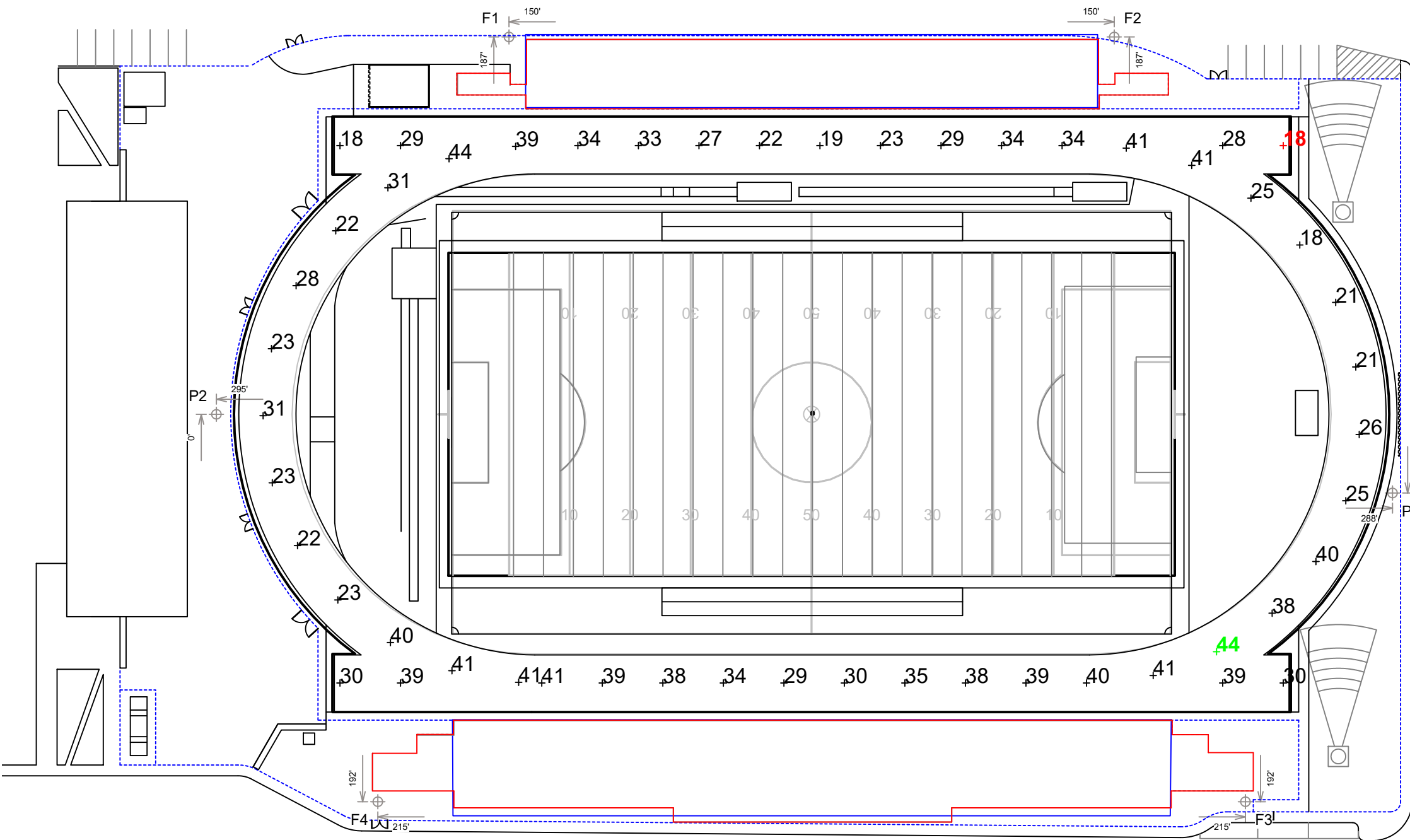
ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
Entire Grid			
Guaranteed Average:	30		
Scan Average:	31.5		
Maximum:	44		
Minimum:	18		
Avg / Min:	1.80		
Guaranteed Max / Min:	3		
Max / Min:	2.51		
UG (adjacent pts):	0.00		
No. of Points:	52		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 52,000 lumens		
No. of Luminaires:	70		
Total Load:	75.9 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
TLC-BT-575	--	--	--
Reported per TM-21-11. See luminaire datasheet for details.			

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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) ⊗



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EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	100'	-	25'	TLC-BT-575	2	0	2
				80'	TLC-LED-400	2	2	0
				100'	TLC-LED-1150	13	0	13
2	F3-F4	120'	-	30'	TLC-BT-575	2	0	2
				80'	TLC-LED-400	3	3	0
				120'	TLC-LED-1150	15	0	15
4	TOTALS					74	10	64

Sherbeck Field

Fullerton, CA

GRID SUMMARY	
Name:	Home Egress
Size:	1' x 1'
Spacing:	10.0' x 10.0'
Height:	21.3' above grade

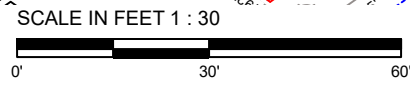
ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
Entire Grid			
Scan Average:	6.4		
Maximum:	16		
Minimum:	1		
Avg / Min:	4.31		
Max / Min:	10.72		
UG (adjacent pts):	0.00		
No. of Points:	180		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	38,600 lumens		
No. of Luminaires:	10		
Total Load:	4.0 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-400	61,000	>72,000	>72,000
Reported per TM-21-11. See luminaire datasheet for details.			

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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	F1-F2	100'	-	25'	TLC-BT-575	2	0	2
				80'	TLC-LED-400	2	2	0
				100'	TLC-LED-1150	13	0	13
2	F3-F4	120'	-	30'	TLC-BT-575	2	0	2
				80'	TLC-LED-400	3	3	0
				120'	TLC-LED-1150	15	0	15
4	TOTALS					74	10	64

Sherbeck Field

Fullerton, CA

GRID SUMMARY	
Name:	Away Egress
Size:	1' x 1'
Spacing:	10.0' x 10.0'
Height:	5.3' above grade

ILLUMINATION SUMMARY	
MAINTAINED HORIZONTAL FOOTCANDLES	
Entire Grid	
Scan Average:	7.4
Maximum:	12
Minimum:	3
Avg / Min:	2.79
Max / Min:	4.48
UG (adjacent pts):	0.00
No. of Points:	112

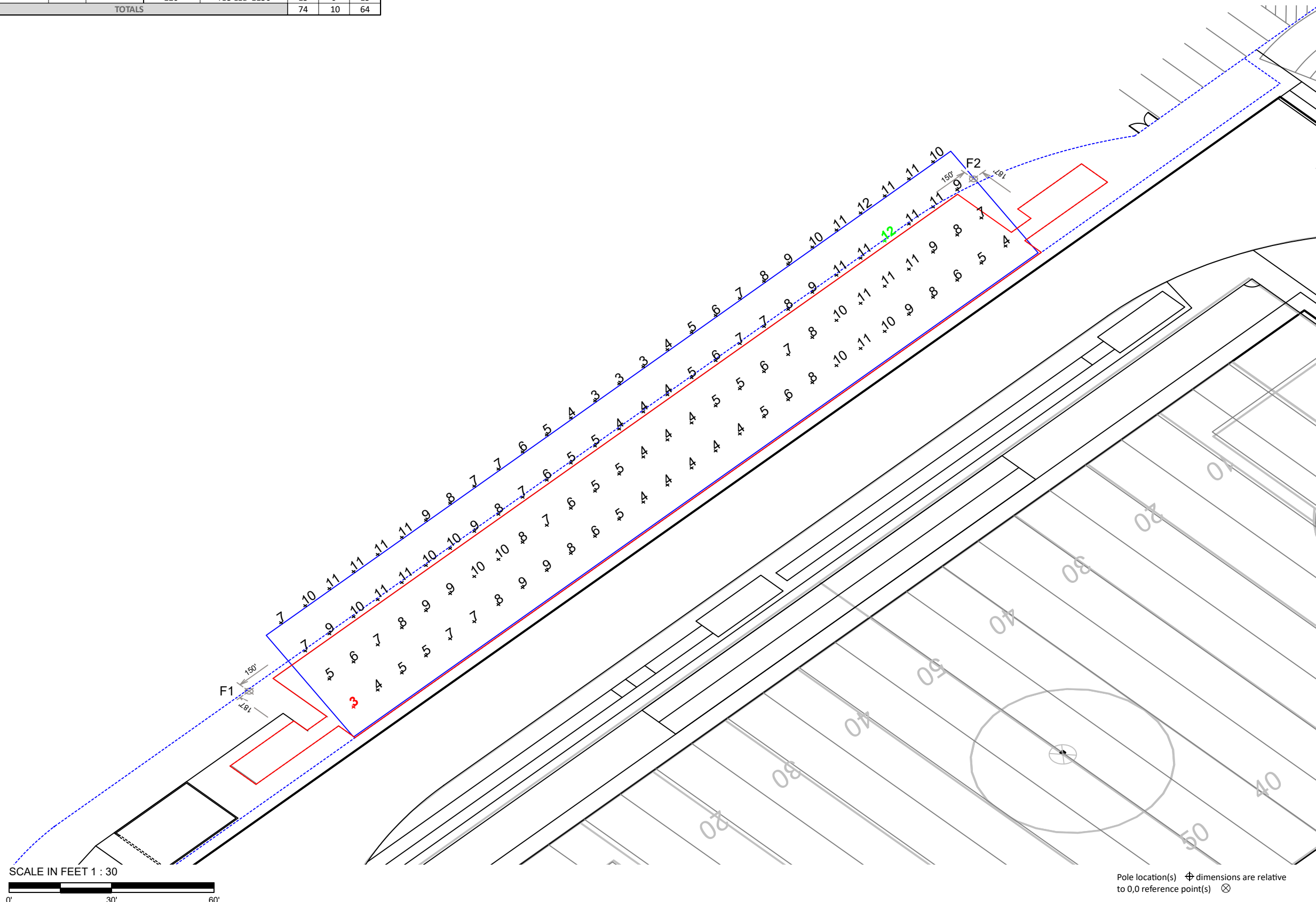
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	38,600 lumens		
No. of Luminaires:	10		
Total Load:	4.0 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-400	61,000	>72,000	>72,000
Reported per TM-21-11. See luminaire datasheet for details.			

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SCALE IN FEET 1 : 30
 0' 30' 60'

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	F1-F2	100'	-	25'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	2	2	0
				100'	TLC-LED-1150	13	13	0
2	F3-F4	120'	-	30'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	3	3	0
				120'	TLC-LED-1150	15	15	0
2	P1-P2	60'	-	60'	TLC-LED-1150	3	3	0
6	TOTALS					80	80	0

Sherbeck Field

Fullerton, CA

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

ILLUMINATION SUMMARY	
MAINTAINED HORIZONTAL FOOTCANDLES	
Entire Grid	
Scan Average:	0.006
Maximum:	0.04
Minimum:	0.00
No. of Points:	17

LUMINAIRE INFORMATION	
Color / CRI:	5700K - 75 CRI
Luminaire Output:	121,000 / 38,600 / 52,000 lumens
No. of Luminaires:	80
Total Load:	79.9 kW

Luminaire Type	Lumen Maintenance		
	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
TLC-LED-400	61,000	>72,000	>72,000
TLC-BT-575	--	--	--

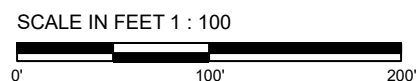
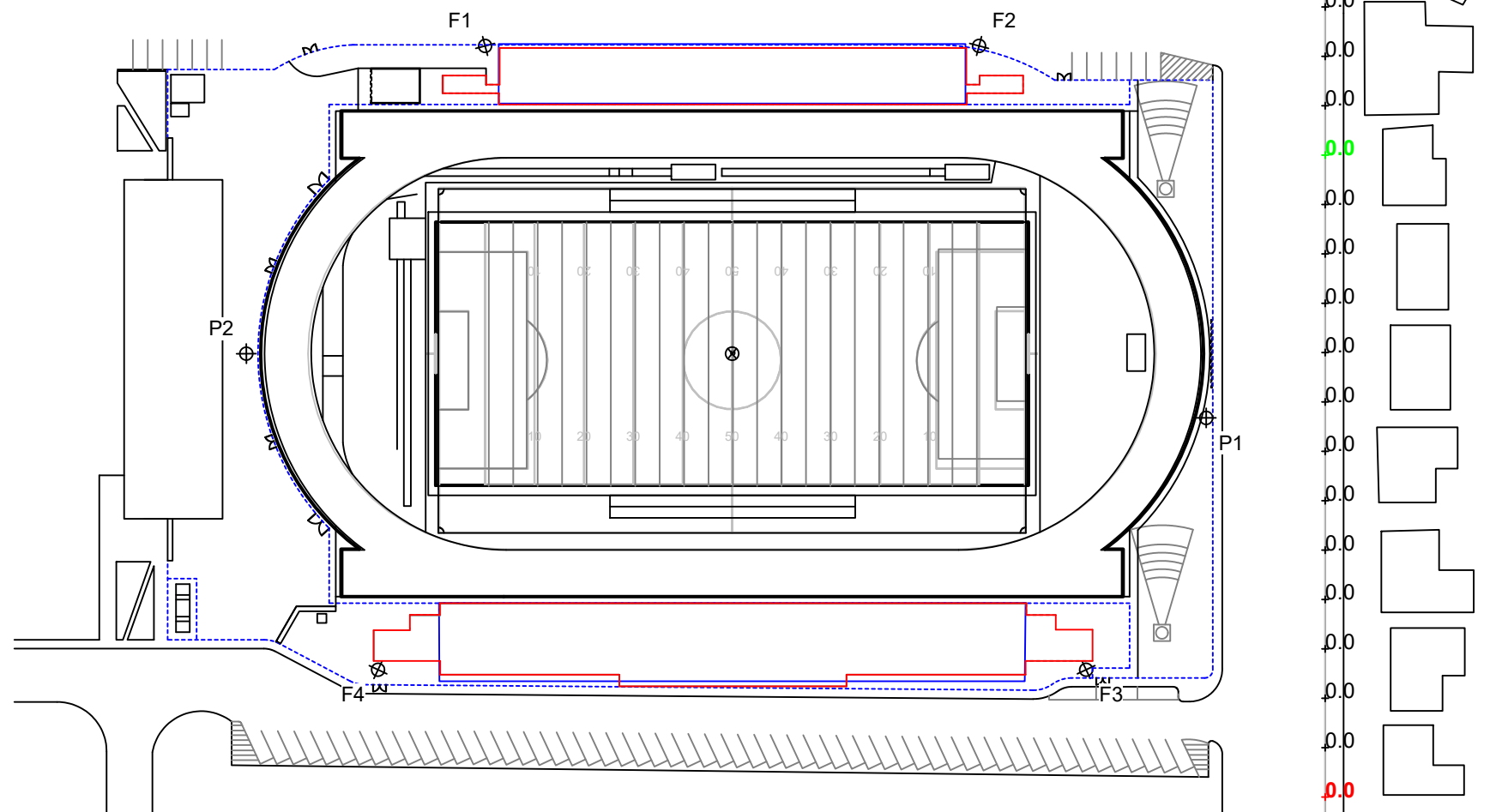
Reported per TM-21-11. See luminaire datasheet for details.

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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) ⊗



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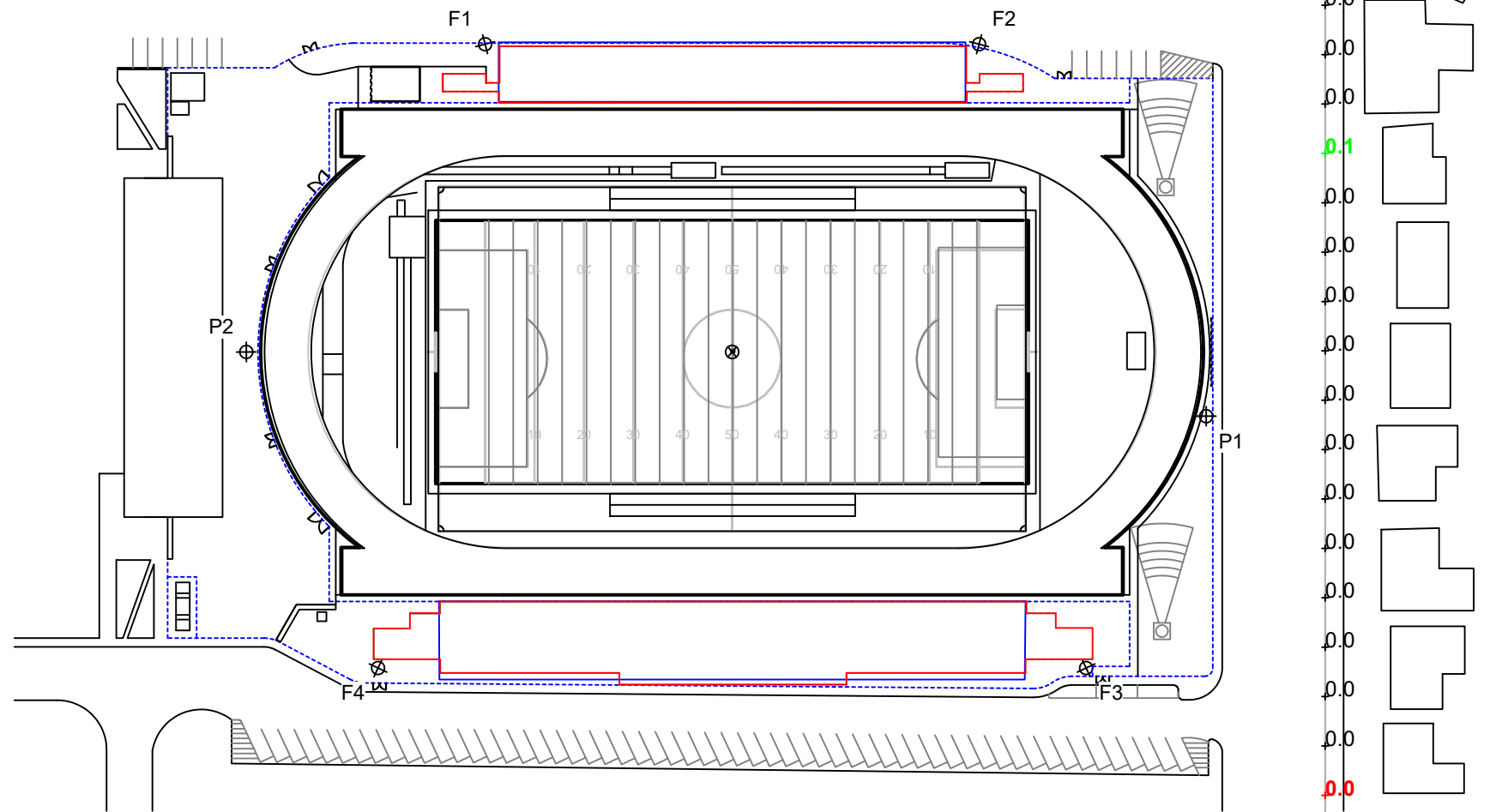
EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	100'	-	25'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	2	2	0
				100'	TLC-LED-1150	13	13	0
2	F3-F4	120'	-	30'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	3	3	0
				120'	TLC-LED-1150	15	15	0
2	P1-P2	60'	-	60'	TLC-LED-1150	3	3	0
6	TOTALS					80	80	0

Sherbeck Field

Fullerton, CA

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

ILLUMINATION SUMMARY			
MAINTAINED MAX VERTICAL FOOTCANDLES			
Entire Grid			
Scan Average:	0.014		
Maximum:	0.08		
Minimum:	0.00		
No. of Points:	17		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 38,600 / 52,000 lumens		
No. of Luminaires:	80		
Total Load:	79.9 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
TLC-LED-400	61,000	>72,000	>72,000
TLC-BT-575	--	--	--
Reported per TM-21-11. See luminaire datasheet for details.			



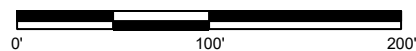
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Installation Requirements: Results assume $\pm 3\%$ nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

SCALE IN FEET 1 : 100



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



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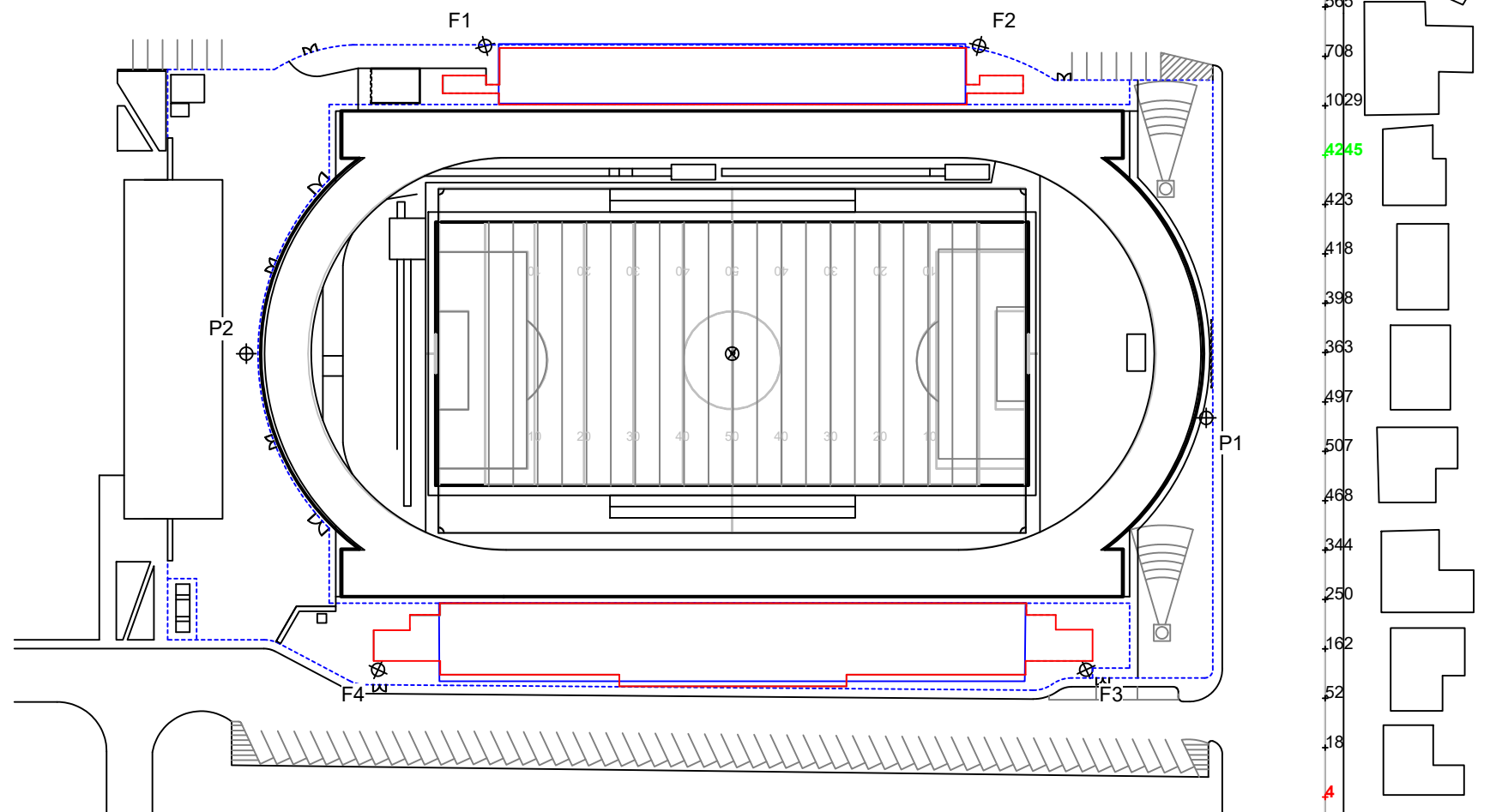
EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	100'	-	25'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	2	2	0
				100'	TLC-LED-1150	13	13	0
2	F3-F4	120'	-	30'	TLC-BT-575	2	2	0
				80'	TLC-LED-400	3	3	0
				120'	TLC-LED-1150	15	15	0
2	P1-P2	60'	-	60'	TLC-LED-1150	3	3	0
6	TOTALS					80	80	0

Sherbeck Field

Fullerton, CA

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

ILLUMINATION SUMMARY			
MAINTAINED CANDELA (PER FIXTURE)			
Entire Grid			
Scan Average:	614.709		
Maximum:	4245.44		
Minimum:	4.39		
No. of Points:	17		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 38,600 / 52,000 lumens		
No. of Luminaires:	80		
Total Load:	79.9 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
TLC-LED-400	61,000	>72,000	>72,000
TLC-BT-575	--	--	--
Reported per TM-21-11. See luminaire datasheet for details.			



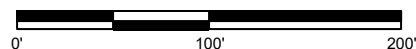
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SCALE IN FEET 1 : 100



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



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Sherbeck Field
Fullerton, CA

EQUIPMENT LAYOUT

INCLUDES:

- Egress
- Football
- Soccer
- Track

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

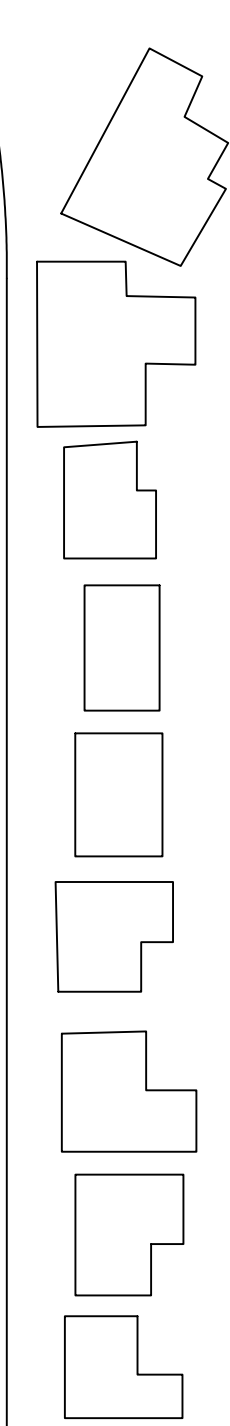
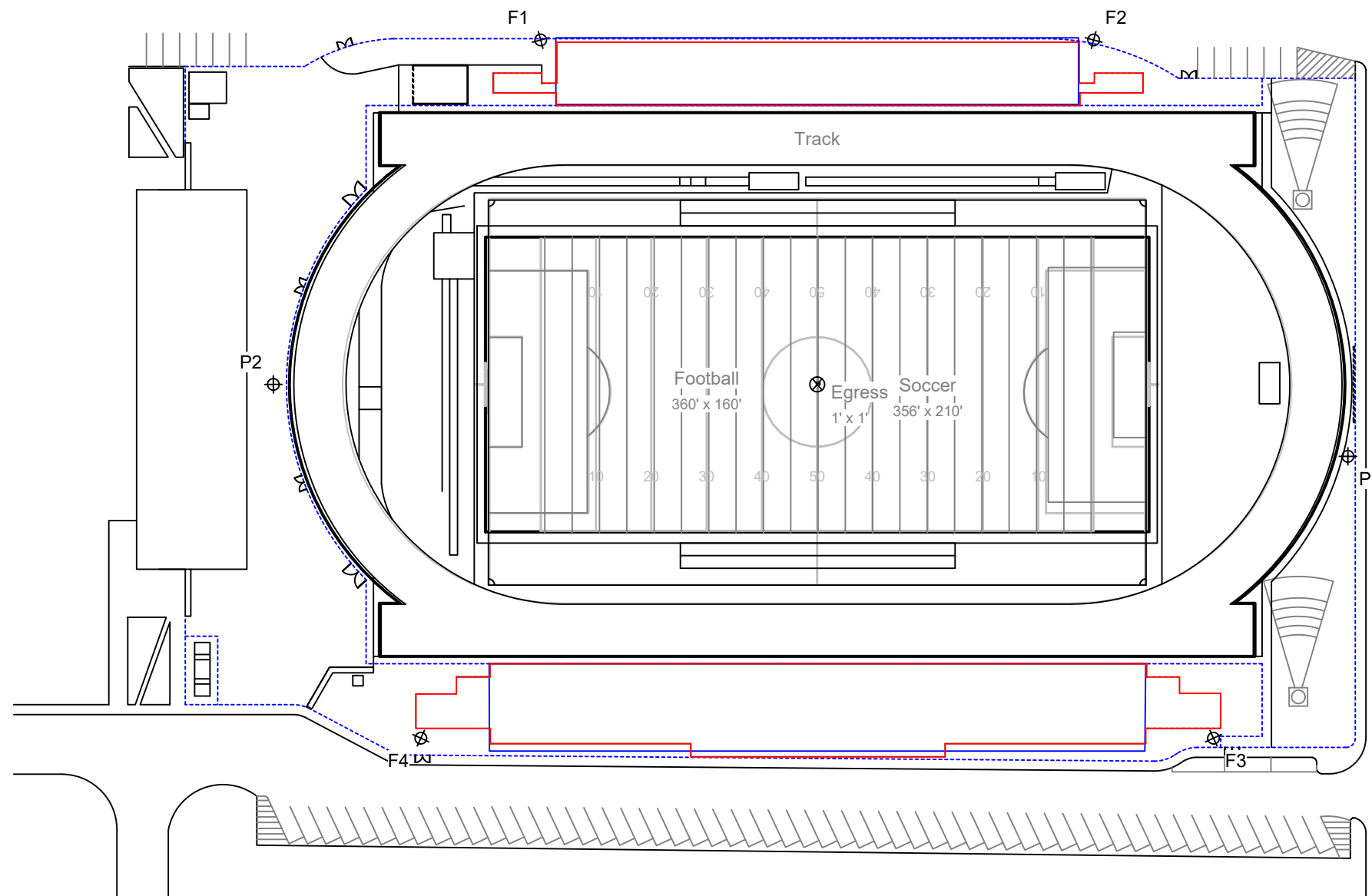
Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

QTY	Pole			Luminaires		
	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE
2	F1-F2	100'	-	25'	TLC-BT-575	2
				80'	TLC-LED-400	2
				100'	TLC-LED-1150	13
2	F3-F4	120'	-	30'	TLC-BT-575	2
				80'	TLC-LED-400	3
				120'	TLC-LED-1150	15
2	P1-P2	60'	-	60'	TLC-LED-1150	3
6	TOTALS					80

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
Single Phase Voltage	6.8	6.5	5.9	5.1	4.1	3.7	3.0
TLC-LED-1150	2.5	2.3	2.1	1.9	1.5	1.4	1.1
TLC-LED-400	3.2	3.0	2.8	2.4	1.9	1.7	1.4



SCALE IN FEET 1 : 80
0' 80' 160'

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



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Sherbeck Field

Fullerton, CA

GLARE IMPACT

Summary

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

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

GLARE

Candela Levels

High Glare: 150,000 or more candela

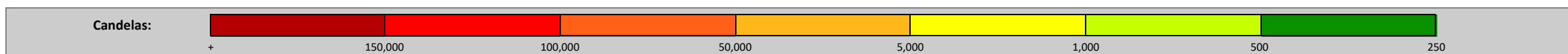
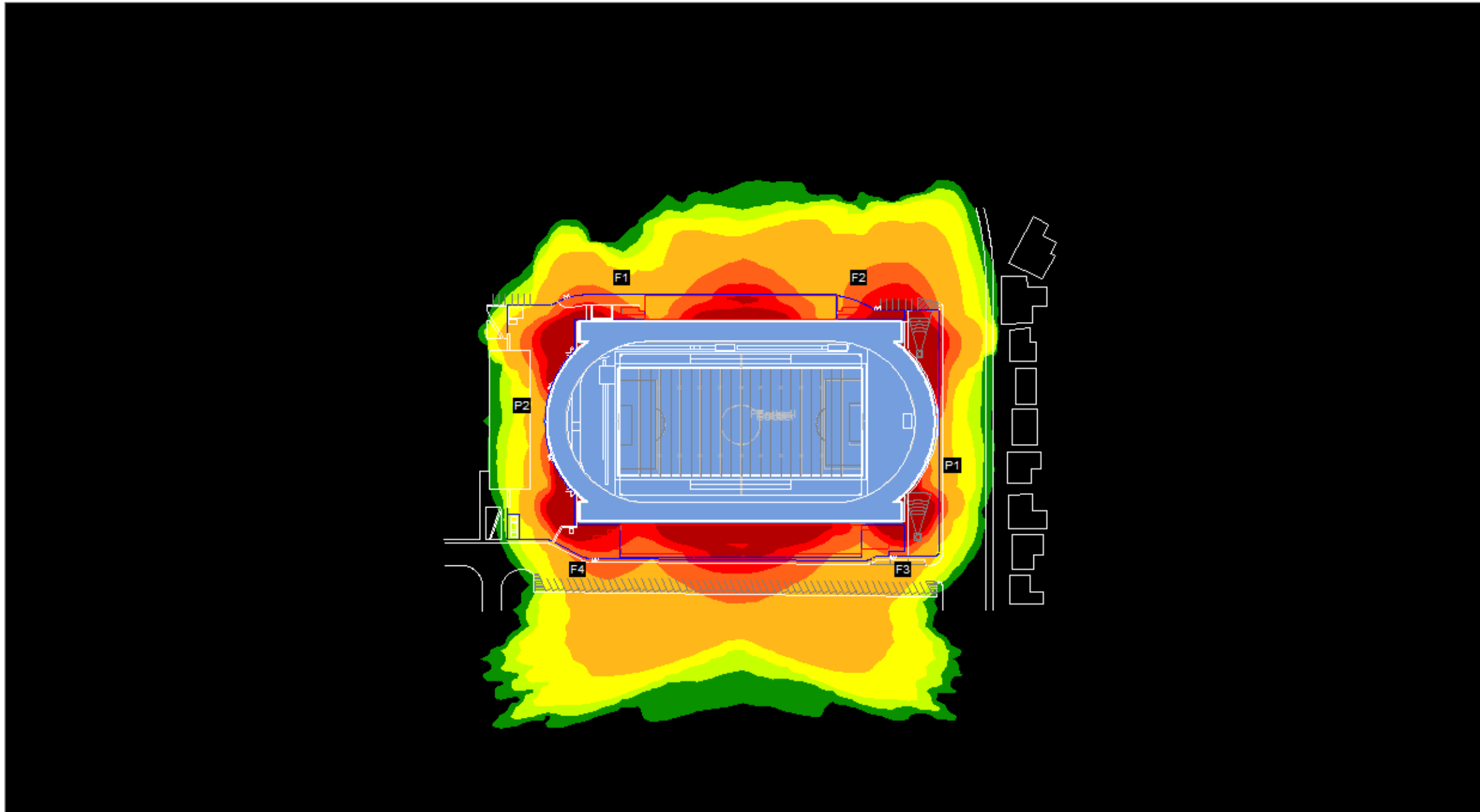
Should only occur on or very near the lit area where the light source is in direct view. Care must be taken to minimize high glare zones.

Significant Glare: 25,000 to 75,000 candela

Equivalent to high beam headlights of a car.

Minimal to No Glare: 500 or less candela

Equivalent to 100W incandescent light bulb.



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