

APPENDIX F

LONG BEACH SPORTS PARK MULTIPLE FIELD LIGHTING PROJECT, PRELIMINARY INFORMATION PACKAGE



Presented to:

Long Beach Sports Park
Multiple Fields Lighting Project
Long Beach, California
March 1, 2004

Submitted by:

Musco Lighting, LLC
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Date: March 1, 2004

To: LSA Associates
20 Executive Park
Suite 20
Irvine, CA 92614

From: Mr. Michael Marchetti
Orange & San Diego Counties Representative

Lighting criteria presented in this prototype proposal are computer-generated from projects similar to yours, based on the following assumption:

1. Size of your fields -

Softball Fields:	Varying sizes all with 60' basepaths
Skate Park:	120' x 150'
Volleyball Courts:	60' x 30', 10' between sidelines
Soccer Fields:	330' x 210'
Driving Range:	440' x 210'
2. Level of play - Recreation
3. Light levels -

Softball Fields:	50 footcandles maintained infield
	30 footcandles maintained outfield
Skate Park:	30 footcandles maintained
Volleyball Courts:	50 footcandles maintained
Soccer Fields:	30 footcandles maintained
Driving Range:	19 footcandles maintained
D. Range @ 200 yards:	5 footcandles maintained at 15'
4. 2000 PSF soil (the nationwide average)

This package is provided to assist you during preliminary planning and to introduce the capabilities of Musco's products and services.

Final criteria for the project will be formulated on a detailed analysis of your facility. As the project develops and exact standards are defined, I will be able to provide you with a project-specific design, which may differ in several aspects from this prototype.

Once customized specifications have been developed, Ms. Pat Guertin in our Customer Service Department will ensure that equipment is manufactured in accordance with project criteria and that delivery is timely.

Throughout the project, we will be available to answer questions and to work with you in developing a final result that meets your requirements and budget.





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Preliminary Specification:
LIGHT-STRUCTURE SYSTEM

DRAFT – For discussion purposes ONLY

The following criteria are to be met by the product proposed to be provided for lighting the multiple fields for Long Beach Sports Park.

1. STRUCTURAL STEEL

- a. **PRESSURES** applied against all structural components shall be determined based upon 70 m.p.h. winds as defined by CBC-C criteria.
- b. **STRENGTH** of the materials used in the structures shall be calculated based upon AASHTO Pole Structure Criteria.
- c. **FOUNDATION** design criteria are to be based upon BROMS Standards using a safety factor of 3. (Alternate UBC.)
- d. **FINISH SHALL BE GALVANIZED** by hot-dipping processing to ASTM A-123 standards shall be used for pole, crossarms, braces, hubs, or any extensions attached to the pole.

2. CONCRETE BASE

- a. **BASE** is to be formed with concrete that obtains 9500 PSI strength and contains pre-stressed steel cable that is stressed to 28,910 lbs. (which shall be 70% of the ultimate yield strength of the cable).
- b. **BACKFILL** around the embedded base shall be achieved with concrete to assure the foundation design criteria.

3. ALUMINUM COMPONENTS

ALUMINUM materials shall be powder coat painted or anodized to MIL-A-8625E and coated with a clear thermoset polymer.

4. STAINLESS STEEL DEVICES

STAINLESS STEEL materials shall be used for all fasteners, latches, hinges, and threaded devices. All stainless steel shall be coated with clear thermoset polymer coated.

5. ELECTRICAL CIRCUITS

BRANCH CIRCUITS for each lighting structure shall be provided that include the following:

- a. **DISCONNECT** - Circuit disconnect type.

- b. **LANDING LUGS** for the feeder circuit as part of the disconnecting device.
- c. **FUSE BLOCK** for individual fusing for each load carrying conductor of each lamp circuit. (Neutral conductors are not fused.)
- d. **PLUG IN OR LANDING PLUG CONNECTIONS** - Manufacturer shall provide all branch circuits completed from the disconnecting device to the lamp with either plug-in or landing lug connections provided for completion of circuits during the field installation. This is to assure that the electrical equipment on the pole is in conformance with U.L. standards.
- e. **WIRE HARNESS** shall be provided with:
 - (1) **UNIFORMLY WOUND** conductors to avoid excessive stress on any individual conductors.
 - (2) **MYLAR WRAPPED** wire harness to prevent unraveling of the conductors.
 - (3) **WIRE SUPPORT GRIPS** attached and **TIED** for mounting the wires inside the pole.
 - (4) **ABRASION PROTECTION SLEEVING** shall completely encase the wire harness to alleviate wear on the insulation of the conductors caused by abrading the interior of the pole.
 - (5) **PLUG-IN CONNECTIONS** for each end of the wire harness to connect it to the electrical component enclosure near the base of the pole and to the lamps at the top of the pole to assure proper matching of circuits.
- f. **ASSEMBLY** and wiring of the fixtures to a plug-in connection is to be completed by the manufacturer who is to provide a warranty of the entire assembly. Manufacturer shall provide a schematic of the wiring on the inside of the door of the electrical component enclosure.
- g. **GROUNDING** of the electrical system and the equipment shall be provided throughout the pole structure for connection to ground rods and feeder circuit ground wires.
- h. **MOUNTING** of the NEMA 3R enclosure containing all electrical components, except the lamps, shall be near the base of the pole with the bottom of the enclosure 10 feet above the ground to allow for step ladder maintenance access.
- i. **(UNDERWRITER LABORATORIES) LISTING REPORT** shall be provided for the entire Light-Structure and its included electrical system in addition to the use of U.L. listed components within the system.

6. PHOTOMETRIC UNIT

- a. **STRUCTURES** for the luminaire assembly on each pole are to be completely assembled in the factory and aimed to form one single photometric unit with the alignment and performance to be guaranteed by the manufacturer.
- b. **RECAPTURE OF THE AIMING** after movement of the fixture during installation or relamping shall be achieved by a positive latching device. In addition there shall be stainless steel bolt and nut to secure the alignment.

7. LIGHT CONTROL

- a. **ENERGY EFFICIENT LUMINAIRES** which control light energy and resulting electrical energy use must be such that the reflector system design places more than 60% of the total light output in the lower portion of the projected light below the maximum candlepower point and thereby onto the field to be illuminated.
- b. **SPILL** light onto adjoining areas and into sky glow must also be restricted and shall meet the same criteria that more than 60% of the total light is in the lower portion of the projected light below the maximum candlepower.
- c. **GLARE** light as viewed from off-site locations shall also be controlled with a reflector system that projects more than 60% of the total light into the lower portion of the projected light below the maximum candlepower.

8. LIGHT LEVELS

GUARANTEED footcandles of light as measured by a light meter on a horizontal plane shall be provided as follows:

- a. **INITIAL** light levels are to average:

FIELD	INFIELD	OUTFIELD
Fenway Park – Field 1	62.50 footcandles	37.50 footcandles
Yankee Stadium – Field 2	62.50 footcandles	37.50 footcandles
Tiger Stadium – Field 3	62.50 footcandles	37.50 footcandles
Ebbett’s Field – Field 4	62.50 footcandles	37.50 footcandles
Crosley Field – Field 5	62.50 footcandles	37.50 footcandles
Wrigley Field – Field 6	62.50 footcandles	37.50 footcandles

FIELD	ENTIRE FIELD
Skate Park	37.50 footcandles
Each Volleyball Court	62.50 footcandles
Each Soccer Field	37.50 footcandles
Driving Range	23.75 footcandles
Driving Range @ 200 yards	6.25 footcandles at 15'

These initial light levels are designed to provide **MAINTAINED** footcandles of 80% of the initial and would produce an average of:

FIELD	INFIELD	OUTFIELD
Fenway Park – Field 1	50 footcandles	30 footcandles
Yankee Stadium – Field 2	50 footcandles	30 footcandles
Tiger Stadium – Field 3	50 footcandles	30 footcandles
Ebbett's Field – Field 4	50 footcandles	30 footcandles
Crosley Field – Field 5	50 footcandles	30 footcandles
Wrigley Field – Field 6	50 footcandles	30 footcandles

FIELD	ENTIRE FIELD
Skate Park	30 footcandles
Each Volleyball Court	50 footcandles
Each Soccer Field	30 footcandles
Driving Range	19 footcandles
Driving Range @ 200 yards	5 footcandles at 15'

- b. **UNIFORMITY** of the brightest to darkest measurements of horizontal footcandles shall be:

FIELD	INFIELD	OUTFIELD
Fenway Park – Field 1	2.0:1	2.5:1
Yankee Stadium – Field 2	2.0:1	2.5:1
Tiger Stadium – Field 3	2.0:1	2.5:1
Ebbett's Field – Field 4	1.5:1	2.5:1
Crosley Field – Field 5	2.0:1	2.5:1
Wrigley Field – Field 6	2.0:1	2.5:1

FIELD	ENTIRE FIELD
Skate Park	2.5:1
Each Volleyball Court	2.0:1
Each Soccer Field	2.0:1
Driving Range	3.0:1
Driving Range @ 200 yards	11.0:1

- c. **SPILL** light surrounding the playing field shall be measured during the initial hours of operation and the manufacturer shall guarantee that there will be less than the below listed footcandles of light generated at the number and location of point around the playing facility shown on the drawings. The spill light at these defined locations shall be measured by pointing a light meter at the brightest light source visible from the designated location.

FIELD	MAXIMUM	AVERAGE
All Fields Together	.56	.25

9. WARRANTY – 7 Year

- a. Manufacturer shall warrant in writing the entire structure (excluding fuses and lamps) to be free from defects in materials and workmanship for a period of seven years starting from the date of delivery.
- b. Manufacturer agrees in writing to provide labor and materials for a period of two years to replace defective parts or repair defects in workmanship, or, at its election, to pay reasonable costs of labor for such repairs. For the remainder of the warranty period, replacement materials will be provided at no charge.
- c. Lamps shall be warranted by the manufacturer in writing not to fail for two years from the date of delivery. Lamps which fail during the first year of the warranty period will be replaced and installed at no cost to the owner. Lamps which fail during the second 12 months will be replaced by the manufacturer but installation will be the owner's responsibility.
- d. Manufacturer warrants in writing accurate alignment of the luminaires on the luminaire assembly for a period of seven years starting from the date of delivery

10. PATENT RIGHTS AND INFRINGEMENT

There are various established performance criteria throughout this request for products and services. There may exist patent coverage for some means and methods of achieving those performance criteria. Bidders are responsible for ascertaining that means and methods of the products and services which they are providing are not being provided in violation of any such patent rights. Bidders responsibilities are as follows:

- a. To hold harmless, the owner, as to any violation to include dollar amounts that could be owing as a result of damages for infringement including potential treble damages as provided for under U.S. Patent Law.
- b. Any and all costs that the owner would incur in replacing materials and services which are determined to infringe patent rights.
- c. All administrative, legal and other costs that would be incurred as a result of an infringement.

If any product or services proposed to be provided by the bidder are known by the bidder to be subject to any existing claims of infringement, bidder shall notify owner of such claim and provide evidence of financial ability to perform on the above hold harmless requirements.

11. DOCUMENTATION

COMPLIANCE with the criteria set out in this specification shall be demonstrated by the following documentation to be provided at least 10 days prior to bid as a condition for approval to bid:

- a. **INITIAL HORIZONTAL LIGHT LEVELS** at the number and location of points shown on the drawings.
- b. **MAINTAINED HORIZONTAL LIGHT LEVELS** at the number and location of points shown on the drawings.
- c. **COMPUTER GENERATED SPILL/GLARE ANALYSIS** at the number and location of points shown on the drawings.
- d. **POLE CALCULATIONS** certified by a licensed structural engineer.
- e. **FOUNDATION DESIGN** with soils assumptions.
- f. **U.L. CONFIRMATION LETTER** for the Light-Structure, including the equipment and electrical system for the pole, crossarms, and fixtures.
- g. **WARRANTY** by manufacturer.
- h. **STRUCTURAL DRAWINGS** for the luminaire assembly with licensed structural engineer's certificate to verify that the fixtures and support will withstand 125 m.p.h. wind with 1.3 gust factor without damage or misalignment.
- i. **PHOTOMETRIC REPORT** by Independent Testing Laboratories showing that 60% of light energy is projected below maximum candlepower point.
- j. **BRANCH ELECTRICAL** circuit and drawings.
- k. **CORROSION PROTECTION** certification by the manufacturer that all latches, fasteners, hinges, and threaded devices, excluding those being used for electrical connections, for the pole and luminaire assembly are of stainless steel construction; that all aluminum is anodized; and that all steel not required to be stainless steel is hot-dip galvanized to ASTM A-123 standards.

How to read Musco light level scans:

On the right hand side of the scan there is a box beneath the Musco logo, within this box is a summary of the light level information on the scans.

The first line in the box describes which scan you are viewing; there are four possible options. *Initial Illumination* and *Maintained Illumination* depict light levels on the playing field; *Initial Spill Light Maximum* and *Initial Spill Light Horizontal* depict off-site or 'spill' light levels. All levels are given in footcandles, below is a description of the four possible scans:

- **INITIAL ILLUMINATION** = The initial footcandle level for the field on the scan. These are the footcandle values you can expect to achieve the first time you turn the lights on for approximately the first 100 hour of operation of the lighting system.
- **MAINTAINED ILLUMINATION** = The maintained footcandle level for the field on the scan. These are the footcandle values you can expect to achieve for the useful life of the lamp (approximately 3,000 hours for a 1500 watt metal halide lamp), after the 'initial' burn-in of the lamps (first 100 hours). Please Note – all footcandle values decrease by approximately 20%, this is a natural characteristic of the metal halide lamp.
- **INITIAL SPILL LIGHT, MAXIMUM FOOTCANDLES** = These scans depict the initial spill light (0-100 hours of operation) along a given spill line. The **MAXIMUM** value means the light meter is pointed directly towards the brightest light source at the facility (this measurement can be loosely defined as 'glare').
- **INITIAL SPILL LIGHT, HORIZONTAL FOOTCANDLES** = These scans depict the initial spill light (0-100 hours of operation) along a given spill line. The **HORIZONTAL** value means the light meter is placed on the horizontal plane (parallel with the ground, light sensor pointing up) and measures the quantity of light striking that horizontal surface (this measurement can be loosely defined as 'spill'). Typically, 'horizontal' reading will be significantly lower than the 'maximum' values.
- **Please note – all 'spill scans' are run in the initial only. This means the footcandle values on these scan will drop by 20% after approximately 100 hours. We run them in the initial so everything is a worst case scenario on the spill scans.**

The next line in the box says 'Horizontal footcandles on plane at z = 3' this simply means all light levels are calculated at 3' above the ground. Below this line are a series of numbers, which are a summary of the scan itself. The 'important' ones are as follows:

- **Target Points** = How many different locations were used to calculate the light levels.
- **Average** = Average footcandle level on that scan.

- Maximum = The largest footcandle value on that scan.
- Minimum = The lowest footcandle value on that scan.
- Max/Min = This is the uniformity ratio and compares the highest and lowest footcandle reading on the scan, it is a way to measure the smoothness of light.

Below those number is a line for 'Number of Luminaires' which tells you how many lights we are using to light the area on the scan, and then there is the 'KW Consumption' which shows what your kilowatt consumption will be per hour with all Musco lights turned on.

The other important information on the scan is located in the upper left hand corner in box titled 'Equipment Listing'. In this box you will find the pole identification, the height of the pole, the number of fixtures on each pole, and kilowatt consumption for each pole per hour.

LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60"	0'	8	12.8
1	A3	60'	60"	0'	4	6.4
1	A5	60'	60"	0'	8	12.8
1	A6	60'	60"	0'	4	6.4
1	A8	60'	60"	0'	8	12.8
1	A9	60'	60"	0'	4	6.4
1	A10	60'	60"	0'	8	12.8
1	A12	60'	60"	0'	4	6.4
2	B1-B2	80'	80"	0'	20	32
3	B3-B6	80'	80"	0'	10	16
1	B7	80'	80"	0'	21	33.6
1	B8	80'	80"	0'	20	32
1	B9	80'	80"	0'	11	17.6
5	C1-C5	70'	70"	0'	8	12.8
1	C6	70'	70"	0'	11	17.6
6	C7-C12	70'	70"	0'	8	12.8
3	S1-S3	50'	50"	0'	4	6.4
4	V1-V4	50'	50"	0'	2	3.2



INITIAL ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3

	Infield	Outfield
Target Points:	25	181
Average:	63.09	37.88
Maximum:	78.15	52.17
Minimum:	47.50	21.03
Avg/Min:	1.328	1.801
Max/Min:	1.645	2.481
UG (Adj pts)	1.373	1.636
CV:	0.141	0.205

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.971
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.971

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

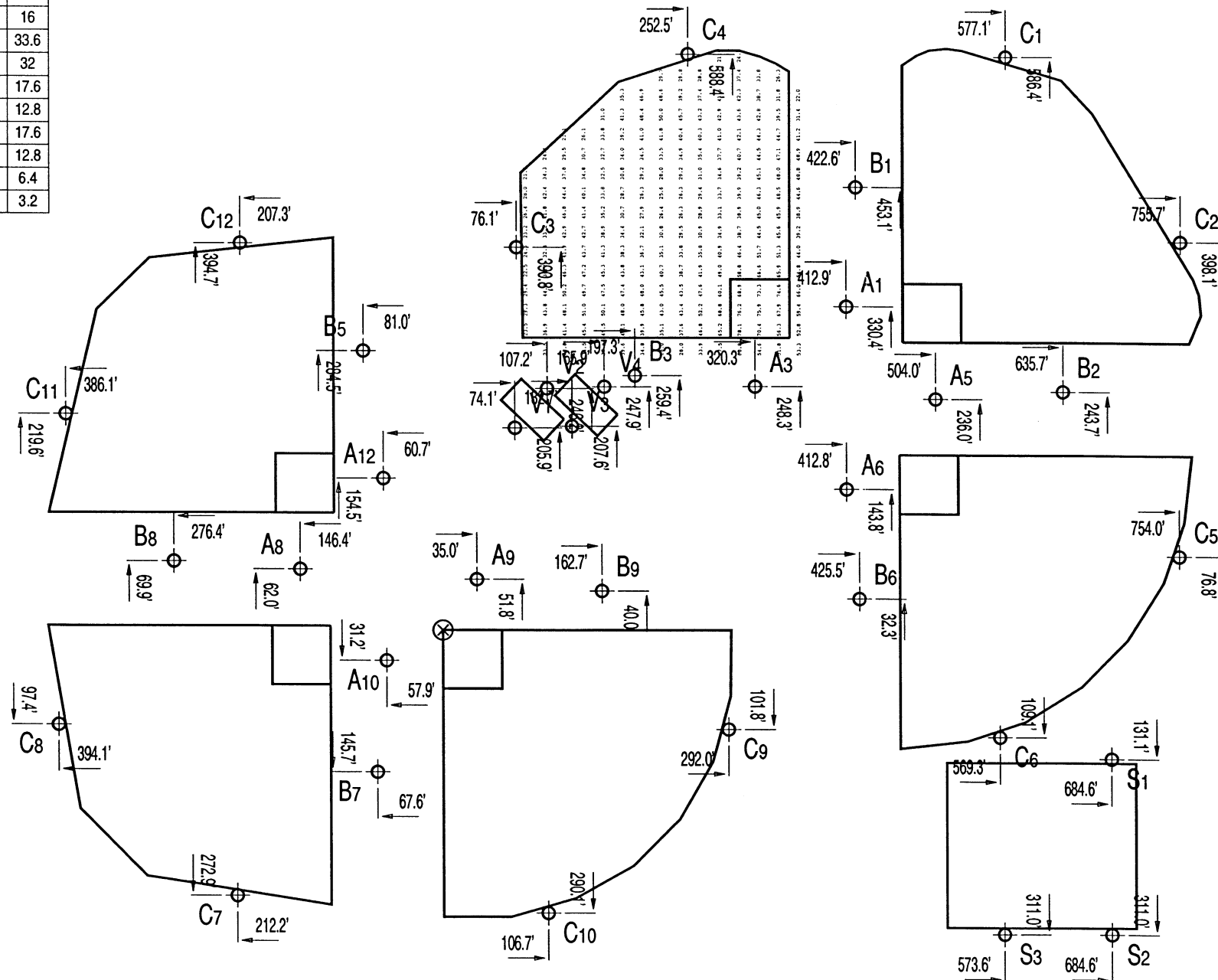
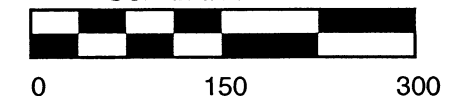
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60"	0'	8	12.8
1	A3	60'	60"	0'	4	6.4
1	A5	60'	60"	0'	8	12.8
1	A6	60'	60"	0'	4	6.4
1	A8	60'	60"	0'	8	12.8
1	A9	60'	60"	0'	4	6.4
1	A10	60'	60"	0'	8	12.8
1	A12	60'	60"	0'	4	6.4
2	B1-B2	80'	80"	0'	20	32
3	B3-B6	80'	80"	0'	10	16
1	B7	80'	80"	0'	21	33.6
1	B8	80'	80"	0'	20	32
1	B9	80'	80"	0'	11	17.6
5	C1-C5	70'	70"	0'	8	12.8
1	C6	70'	70"	0'	11	17.6
6	C7-C12	70'	70"	0'	8	12.8
3	S1-S3	50'	50"	0'	4	6.4
4	V1-V4	50'	50"	0'	2	3.2



MAINTAINED ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3

	Infield	Outfield
Target Points:	25	181
Average:	50.47	30.30
Maximum:	62.52	41.74
Minimum:	38.00	16.82
Avg/Min:	1.328	1.801
Max/Min:	1.645	2.481
UG (Adj pts)	1.373	1.636
CV:	0.141	0.205

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.971
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.777

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

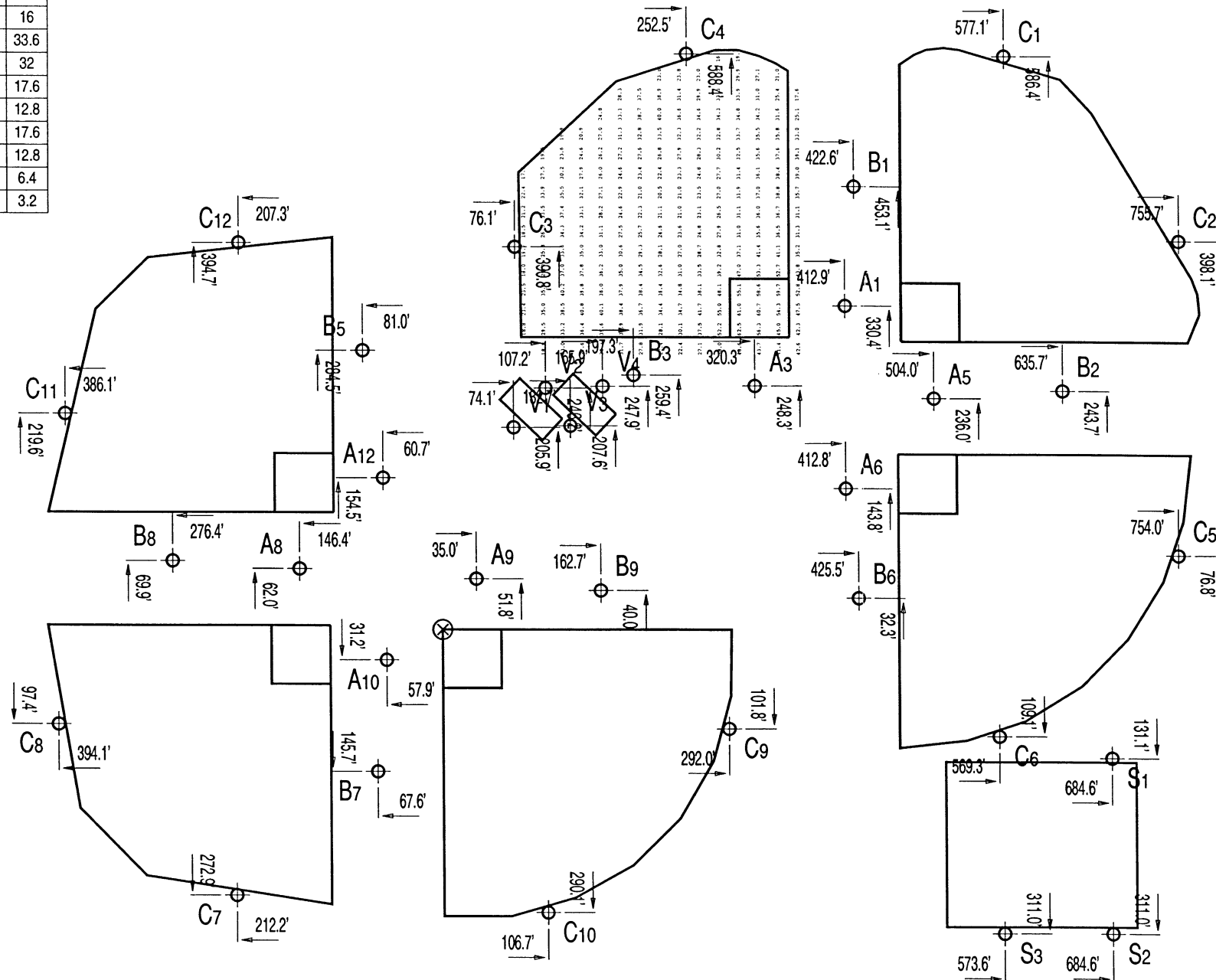
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

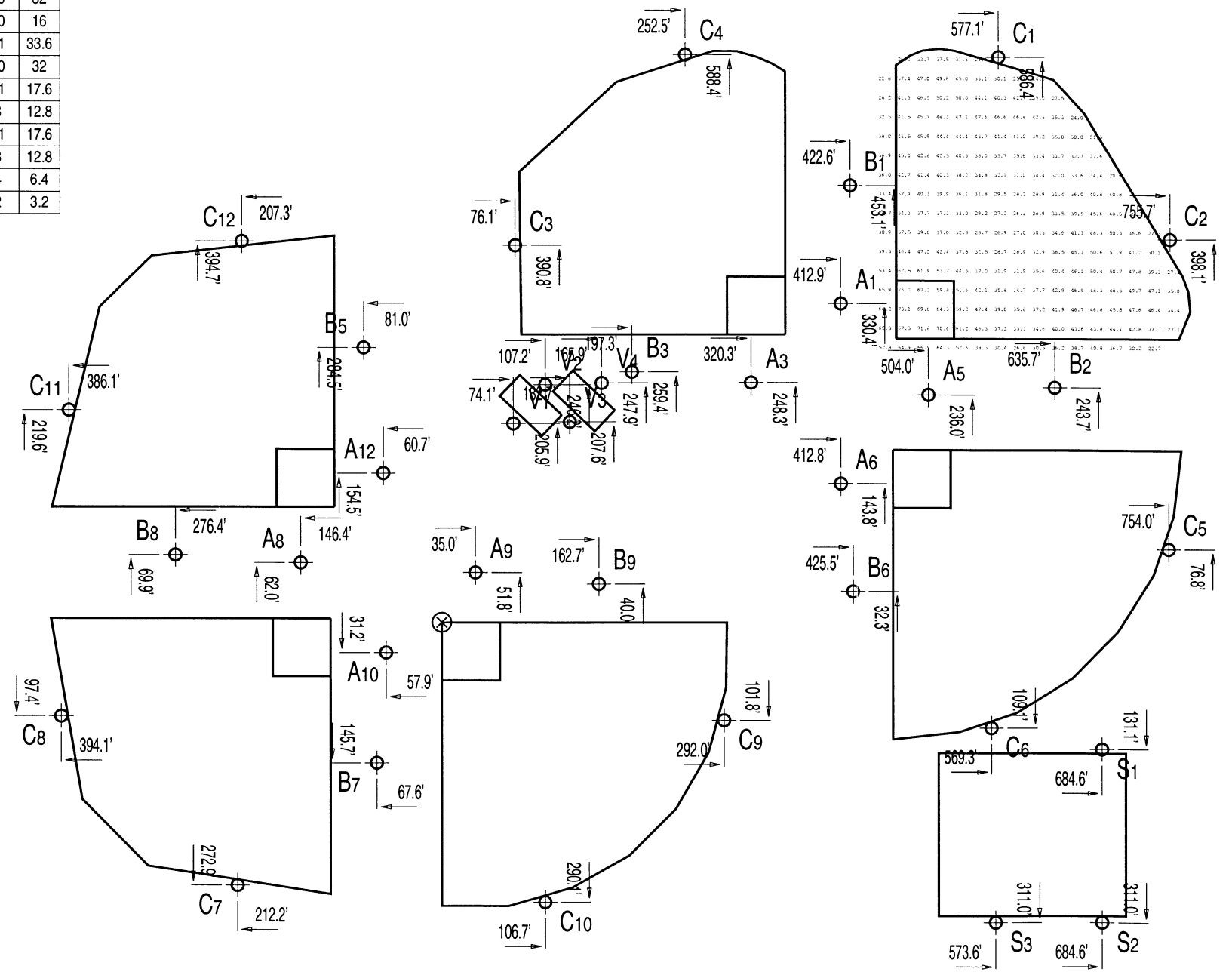
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 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
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1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



INITIAL ILLUMINATION		
BASEBALL		
HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	183
Average:	62.62	37.73
Maximum:	73.23	51.88
Minimum:	44.46	21.14
Avg/Min:	1.409	1.784
Max/Min:	1.647	2.454
UG (Adj pts)	1.238	1.651
CV:	0.118	0.191

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.971
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.971



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

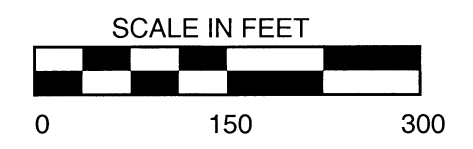
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NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

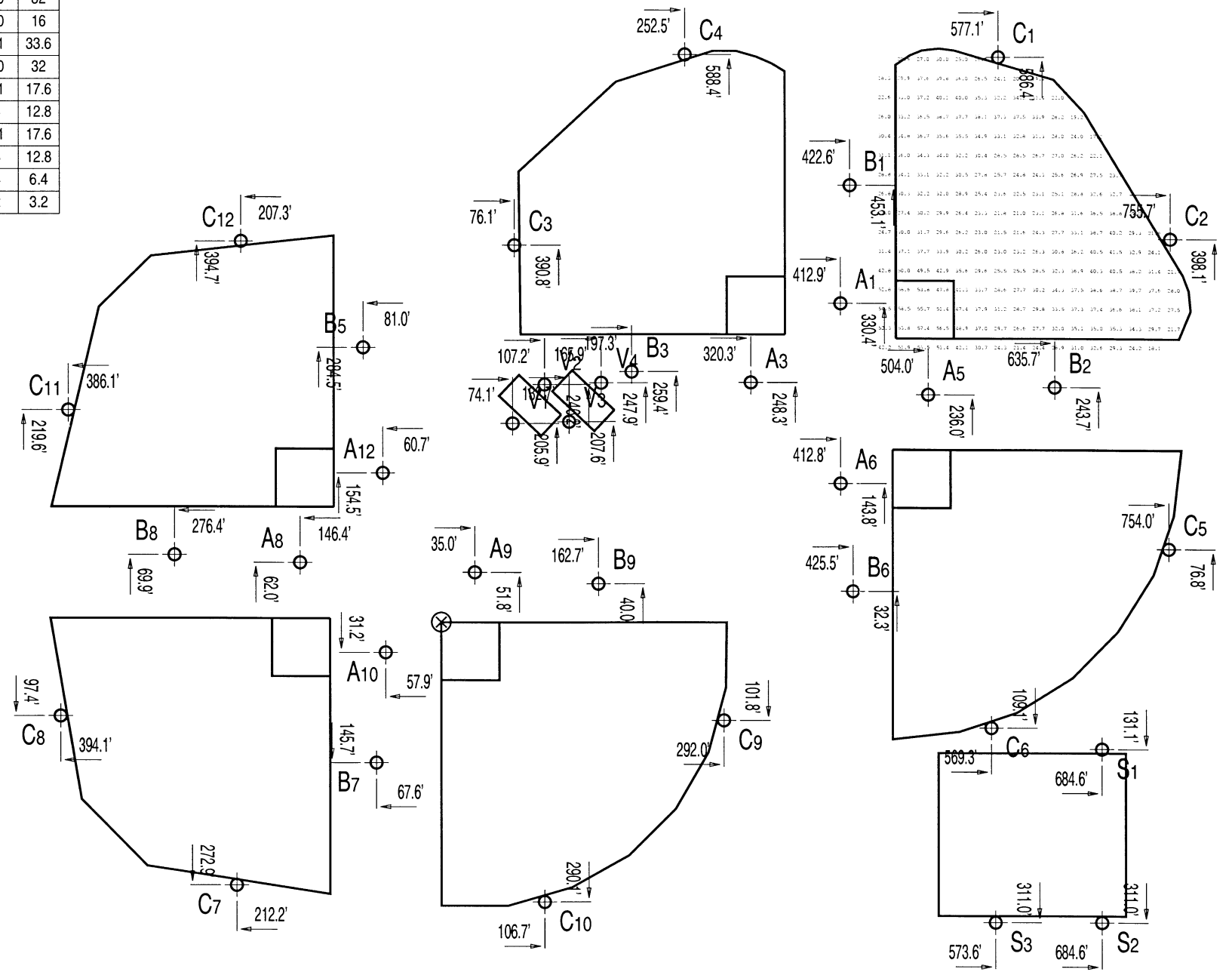
Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilowatt /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



MAINTAINED ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	183
Average:	50.10	30.18
Maximum:	58.58	41.50
Minimum:	35.57	16.91
Avg/Min:	1.409	1.784
Max/Min:	1.647	2.454
UG (Adj pts)	1.238	1.651
CV:	0.118	0.191

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.971
***Recoverable Light Loss Factors: x 0.800	
Total Light Loss Factor(LLF)	0.777



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

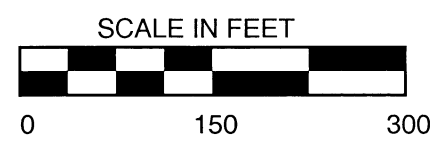
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

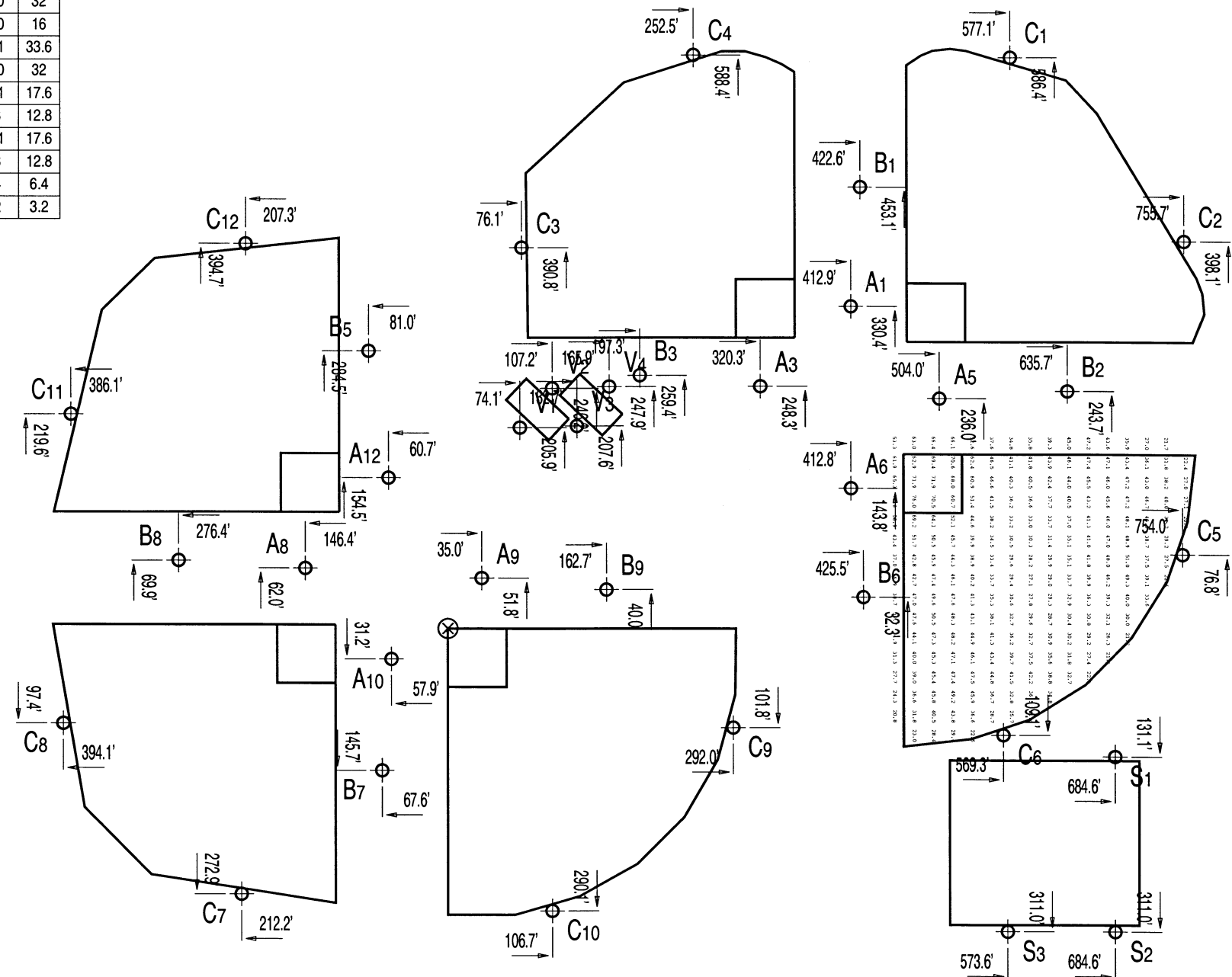
EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA



INITIAL ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	183
Average:	63.39	37.75
Maximum:	76.04	51.71
Minimum:	44.59	20.82
Avg/Min:	1.422	1.814
Max/Min:	1.705	2.484
UG (Adj pts)	1.256	1.730
CV:	0.120	0.205

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.970
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.970



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

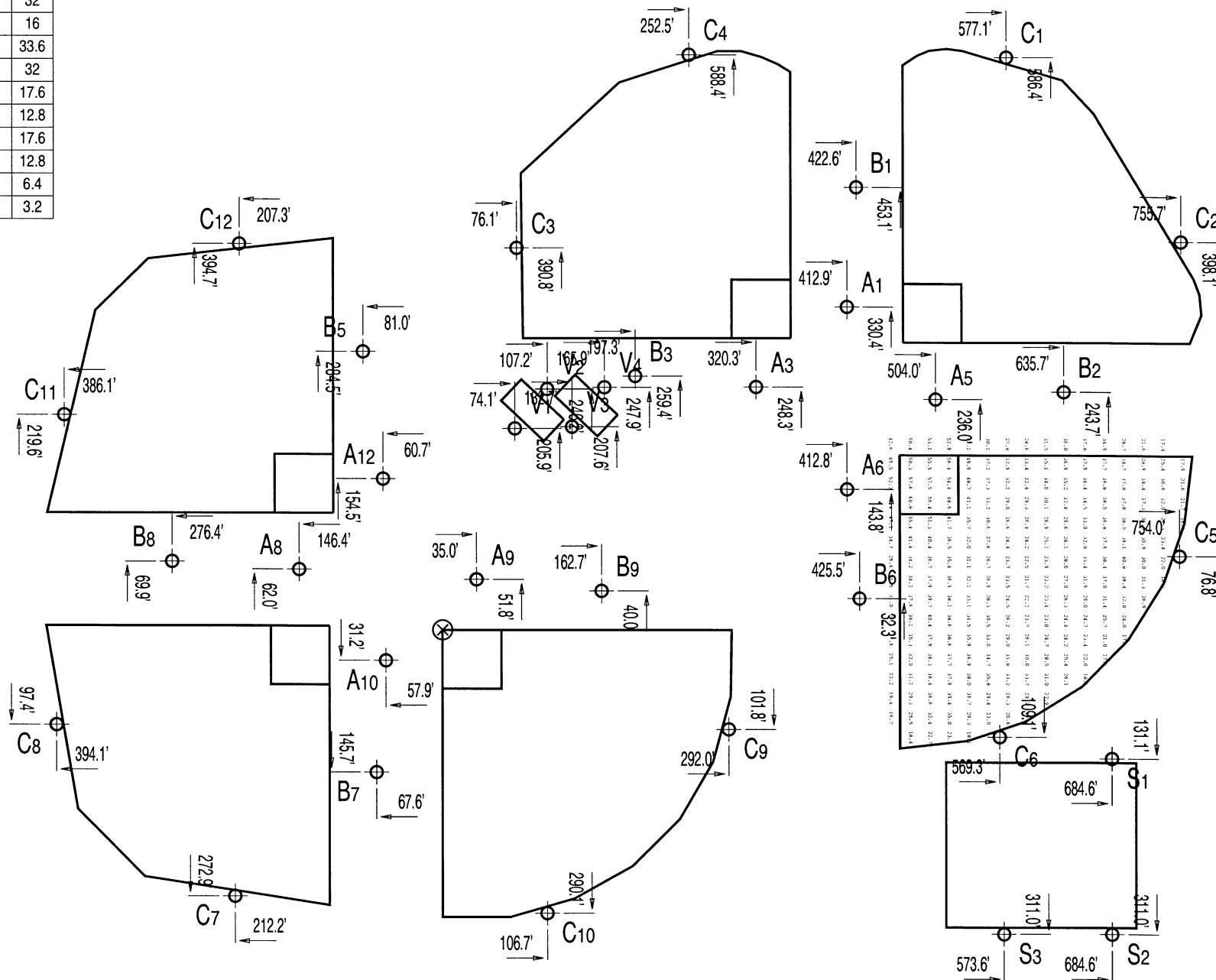
Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilowatt /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



MAINTAINED ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	183
Average:	50.71	30.20
Maximum:	60.83	41.37
Minimum:	35.67	16.65
Avg/Min:	1.422	1.814
Max/Min:	1.705	2.484
UG (Adj pts)	1.256	1.730
CV:	0.120	0.205

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.970
***Recoverable Light Loss Factors: x 0.800	
Total Light Loss Factor(LLF)	0.776



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

0 150 300

LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



INITIAL ILLUMINATION
 BASEBALL
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3

	Infield	Outfield
Target Points:	25	175
Average:	62.91	38.60
Maximum:	73.77	54.92
Minimum:	49.41	22.35
Avg/Min:	1.273	1.727
Max/Min:	1.493	2.457
UG (Adj pts)	1.275	1.555
CV:	0.116	0.191

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.969
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.969

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

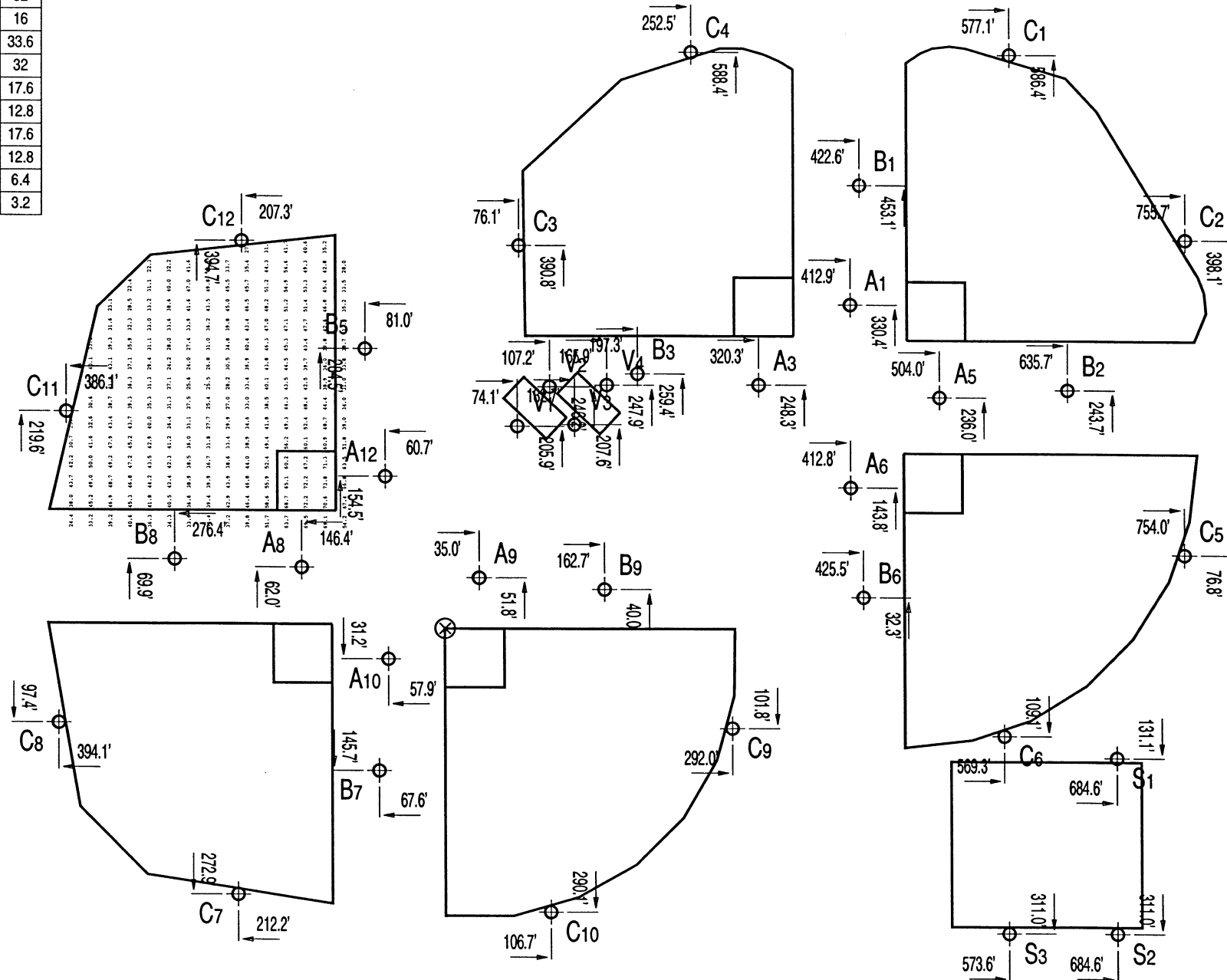
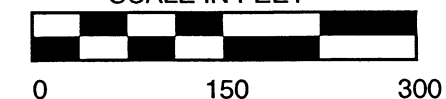
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊕ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊕.

LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



MAINTAINED ILLUMINATION
BASEBALL
HORIZONTAL FOOTCANDLES
ON PLANE AT Z= 3

Target Points:	Infield	Outfield
Average:	50.33	30.88
Maximum:	59.02	43.93
Minimum:	39.53	17.88
Avg/Min:	1.273	1.727
Max/Min:	1.493	2.457
UG (Adj pts)	1.275	1.555
CV:	0.116	0.191

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.969
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.775

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

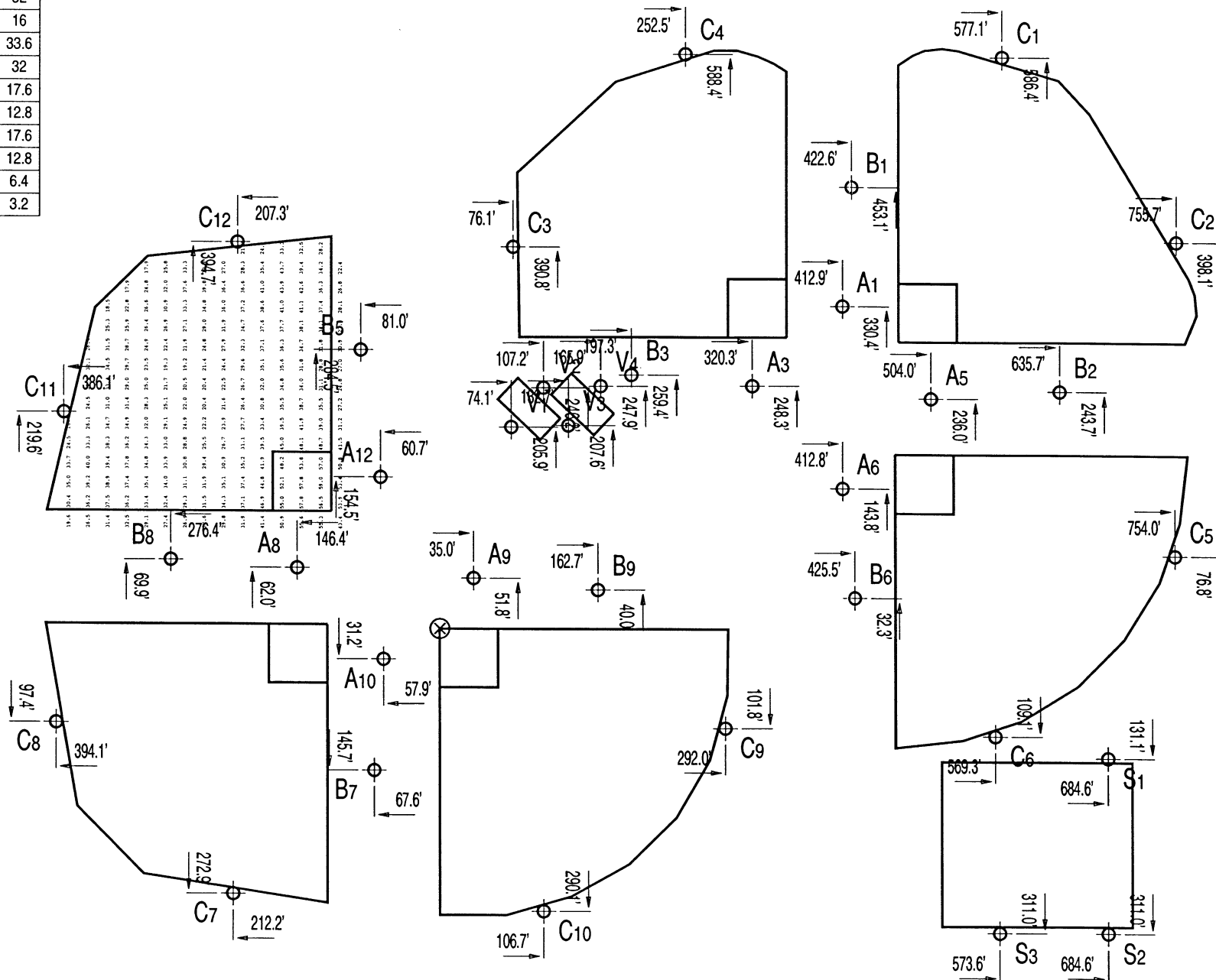
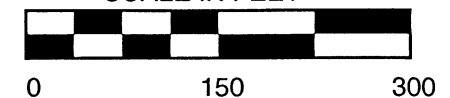
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊕ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

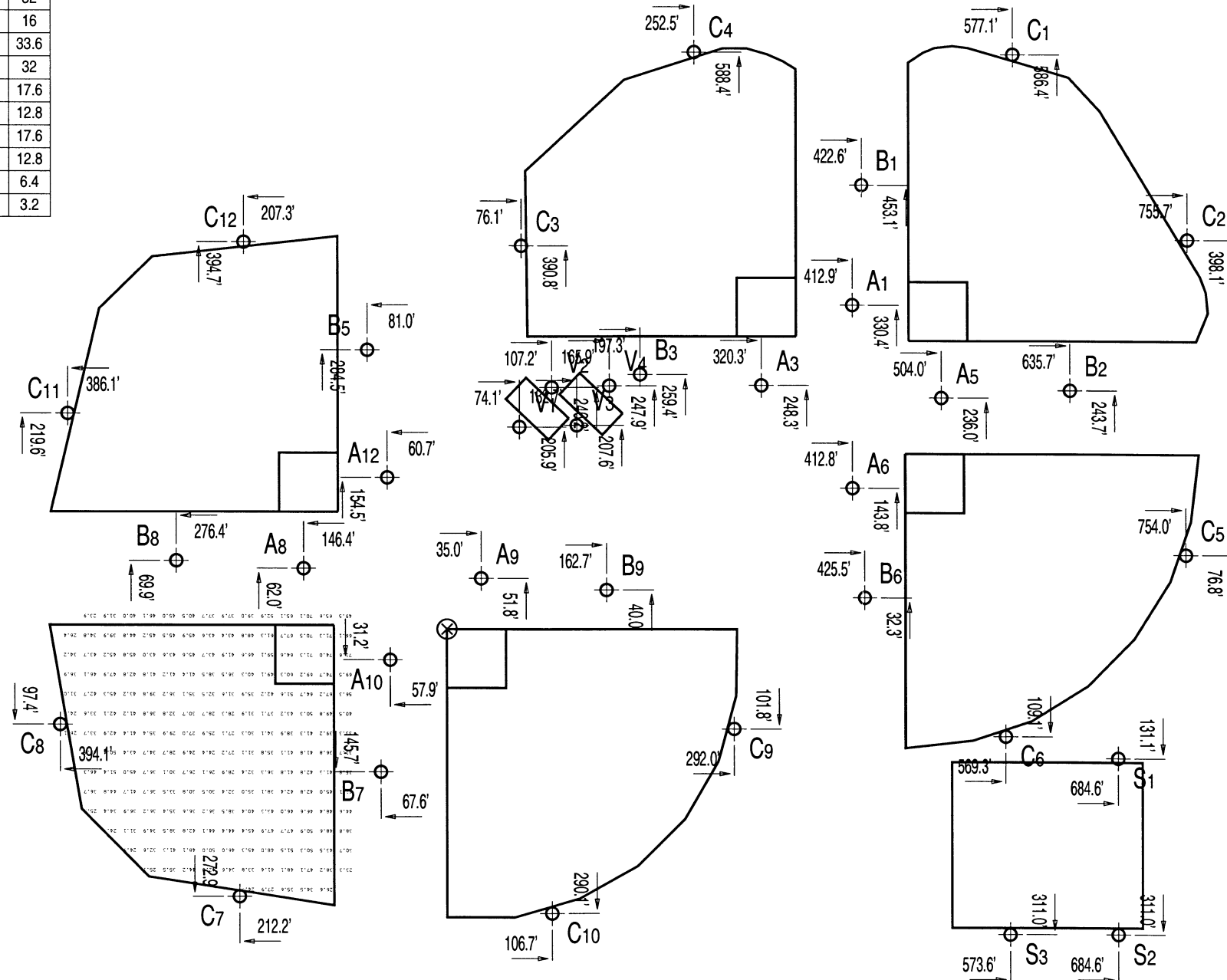
EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA



INITIAL ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	176
Average:	63.42	38.34
Maximum:	74.70	51.50
Minimum:	42.16	23.26
Avg/Min:	1.504	1.648
Max/Min:	1.772	2.214
UG (Adj pts)	1.335	1.643
CV:	0.135	0.186

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.970
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.970



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

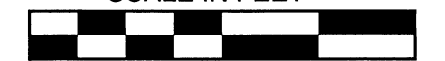
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊗ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

0 150 300

LONG BEACH SPORTS PARK

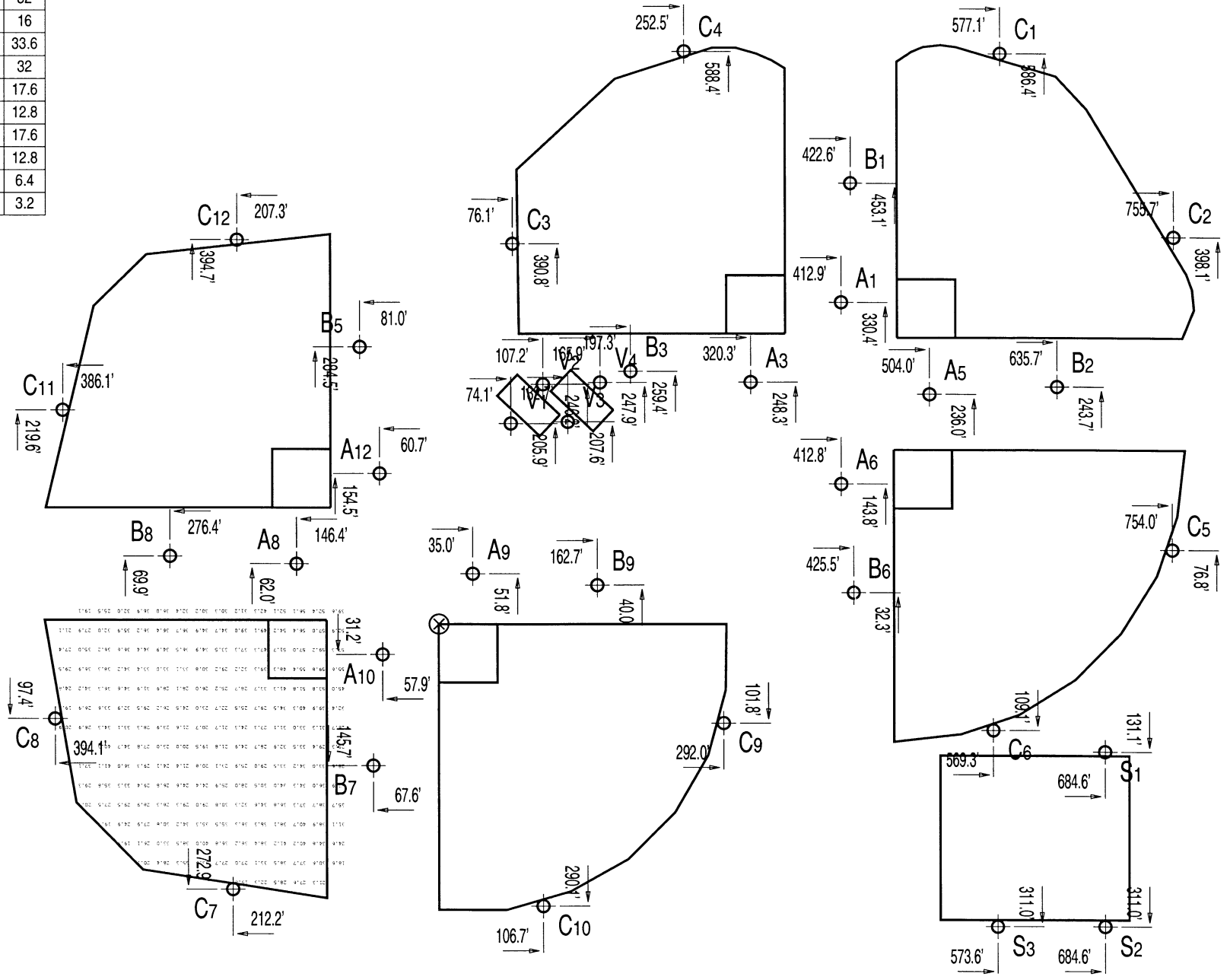
Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60"	0'	8	12.8
1	A3	60'	60"	0'	4	6.4
1	A5	60'	60"	0'	8	12.8
1	A6	60'	60"	0'	4	6.4
1	A8	60'	60"	0'	8	12.8
1	A9	60'	60"	0'	4	6.4
1	A10	60'	60"	0'	8	12.8
1	A12	60'	60"	0'	4	6.4
2	B1-B2	80'	80"	0'	20	32
3	B3-B6	80'	80"	0'	10	16
1	B7	80'	80"	0'	21	33.6
1	B8	80'	80"	0'	20	32
1	B9	80'	80"	0'	11	17.6
5	C1-C5	70'	70"	0'	8	12.8
1	C6	70'	70"	0'	11	17.6
6	C7-C12	70'	70"	0'	8	12.8
3	S1-S3	50'	50"	0'	4	6.4
4	V1-V4	50'	50"	0'	2	3.2



MAINTAINED ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	176
Average:	50.74	30.67
Maximum:	59.76	41.20
Minimum:	33.73	18.61
Avg/Min:	1.504	1.648
Max/Min:	1.772	2.214
UG (Adj pts)	1.335	1.643
CV:	0.135	0.186

Number of Luminaires:	44
* KW Consumption:	462.40
**Average Tilt Factor:	0.970
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.776



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

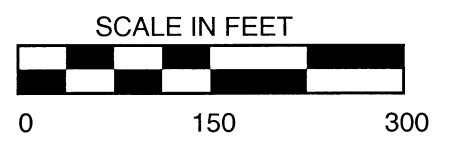
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

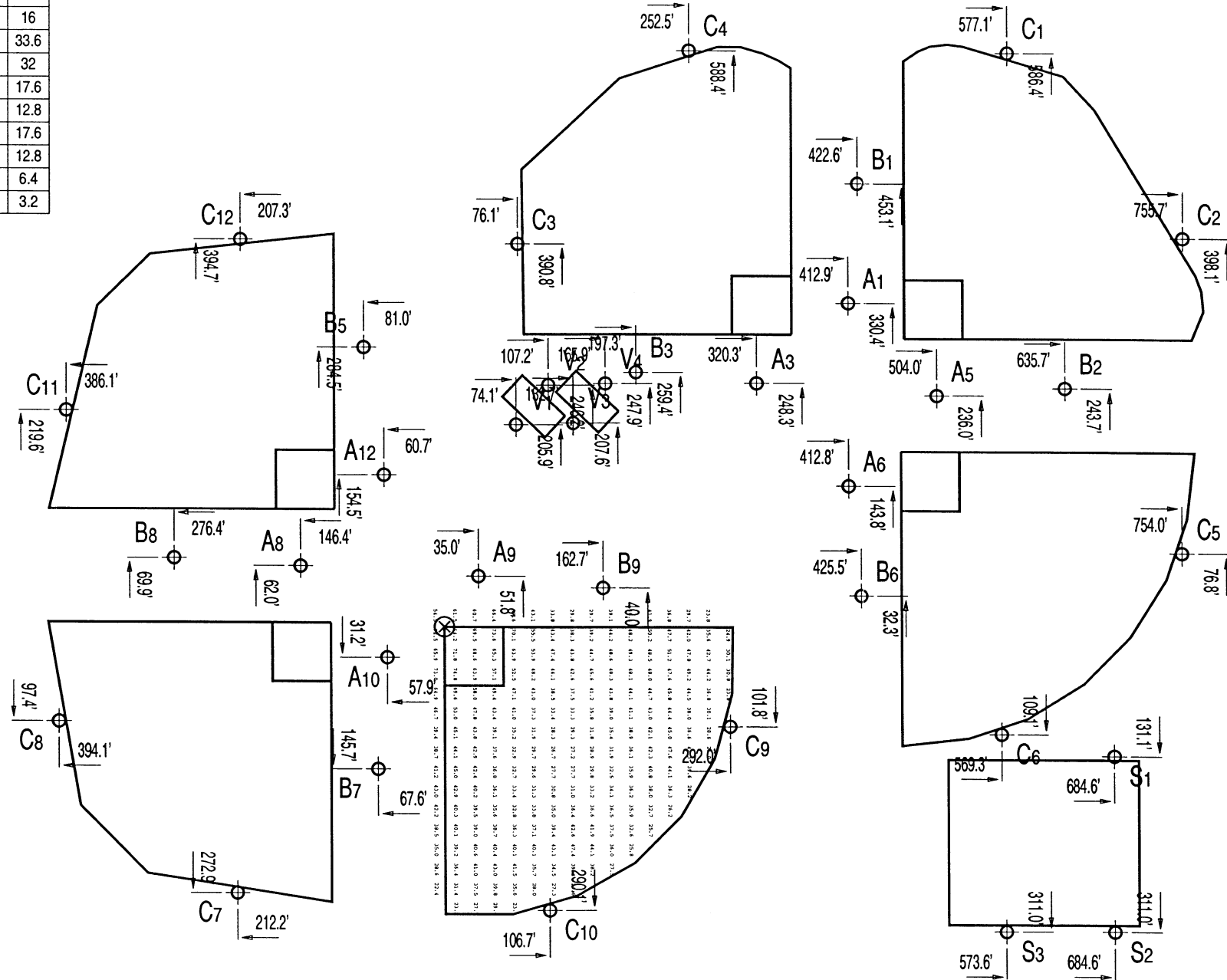
Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wvc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Kilow /unit	
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



INITIAL ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	185
Average:	63.53	37.94
Maximum:	74.81	55.49
Minimum:	47.10	22.35
Avg/Min:	1.349	1.697
Max/Min:	1.588	2.483
UG (Adj pts)	1.215	1.668
CV:	0.114	0.185

Number of Luminaires:	46
* KW Consumption:	462.40
**Average Tilt Factor:	0.969
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.969



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

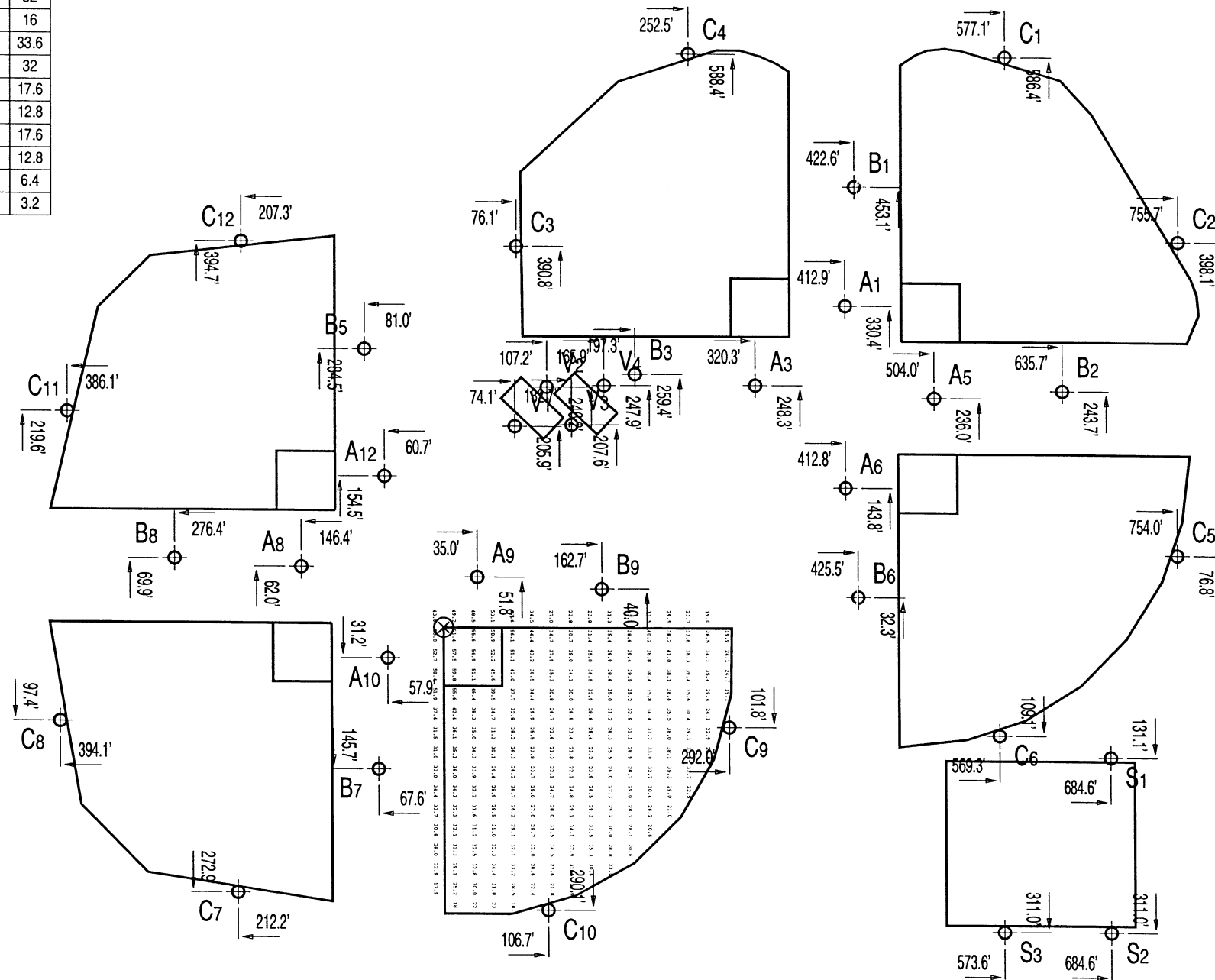
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev. /unit	Kilow /unit	
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



MAINTAINED ILLUMINATION BASEBALL HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3		
	Infield	Outfield
Target Points:	25	185
Average:	50.82	30.35
Maximum:	59.85	44.39
Minimum:	37.68	17.88
Avg/Min:	1.349	1.697
Max/Min:	1.588	2.483
UG (Adj pts)	1.215	1.668
CV:	0.114	0.185
Number of Luminaires:		46
* KW Consumption:		462.40
**Average Tilt Factor:		0.969
***Recoverable Light Loss Factors: x 0.800		
Total Light Loss Factor(LLF)		0.775



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location



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LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



INITIAL ILLUMINATION
 RECTANGLE
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3

Target Points:	18
Average:	66.54
Maximum:	84.57
Minimum:	46.97
Avg/Min:	1.417
Max/Min:	1.800
UG (Adj pts)	1.355
CV:	0.172

Number of Luminaires:	4
* KW Consumption:	462.40
**Average Tilt Factor:	0.842
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.842

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

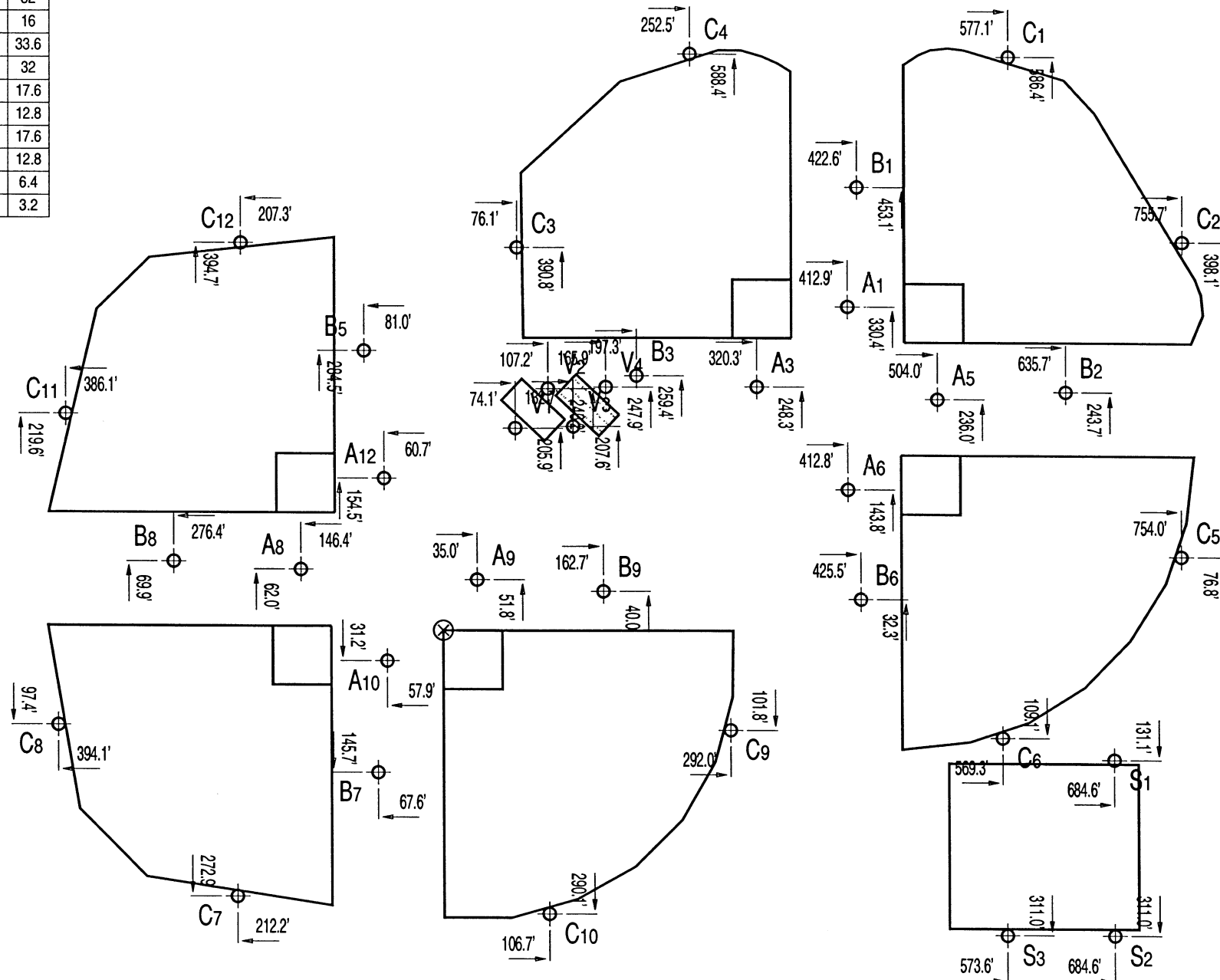
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt./unit	Kilow./unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA



**MAINTAINED ILLUMINATION
 RECTANGLE
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3**

Target Points:	18
Average:	53.23
Maximum:	67.65
Minimum:	37.58
Avg/Min:	1.417
Max/Min:	1.800
UG (Adj pts)	1.355
CV:	0.172

Number of Luminaires:	4
* KW Consumption:	462.40

**Average Tilt Factor:	0.842
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.674

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

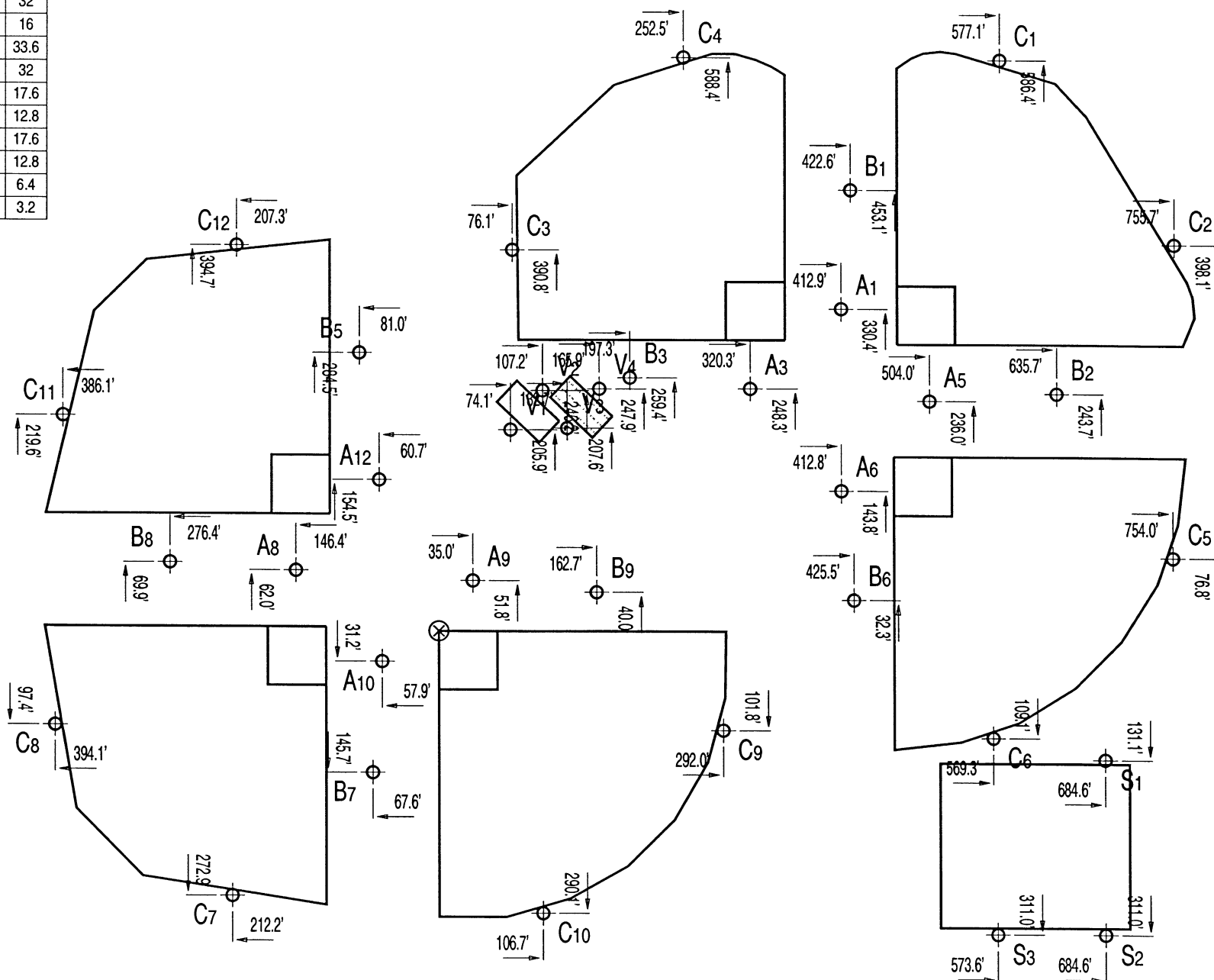
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊕ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60"	0'	8	12.8
1	A3	60'	60"	0'	4	6.4
1	A5	60'	60"	0'	8	12.8
1	A6	60'	60"	0'	4	6.4
1	A8	60'	60"	0'	8	12.8
1	A9	60'	60"	0'	4	6.4
1	A10	60'	60"	0'	8	12.8
1	A12	60'	60"	0'	4	6.4
2	B1-B2	80'	80"	0'	20	32
3	B3-B6	80'	80"	0'	10	16
1	B7	80'	80"	0'	21	33.6
1	B8	80'	80"	0'	20	32
1	B9	80'	80"	0'	11	17.6
5	C1-C5	70'	70"	0'	8	12.8
1	C6	70'	70"	0'	11	17.6
6	C7-C12	70'	70"	0'	8	12.8
3	S1-S3	50'	50"	0'	4	6.4
4	V1-V4	50'	50"	0'	2	3.2



INITIAL ILLUMINATION
 RECTANGLE
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3

Target Points:	18
Average:	64.93
Maximum:	79.81
Minimum:	47.63
Avg/Min:	1.363
Max/Min:	1.676
UG (Adj pts)	1.313
CV:	0.149

Number of Luminaires:	4
* KW Consumption:	462.40
** Average Tilt Factor:	0.844
*** Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.844

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

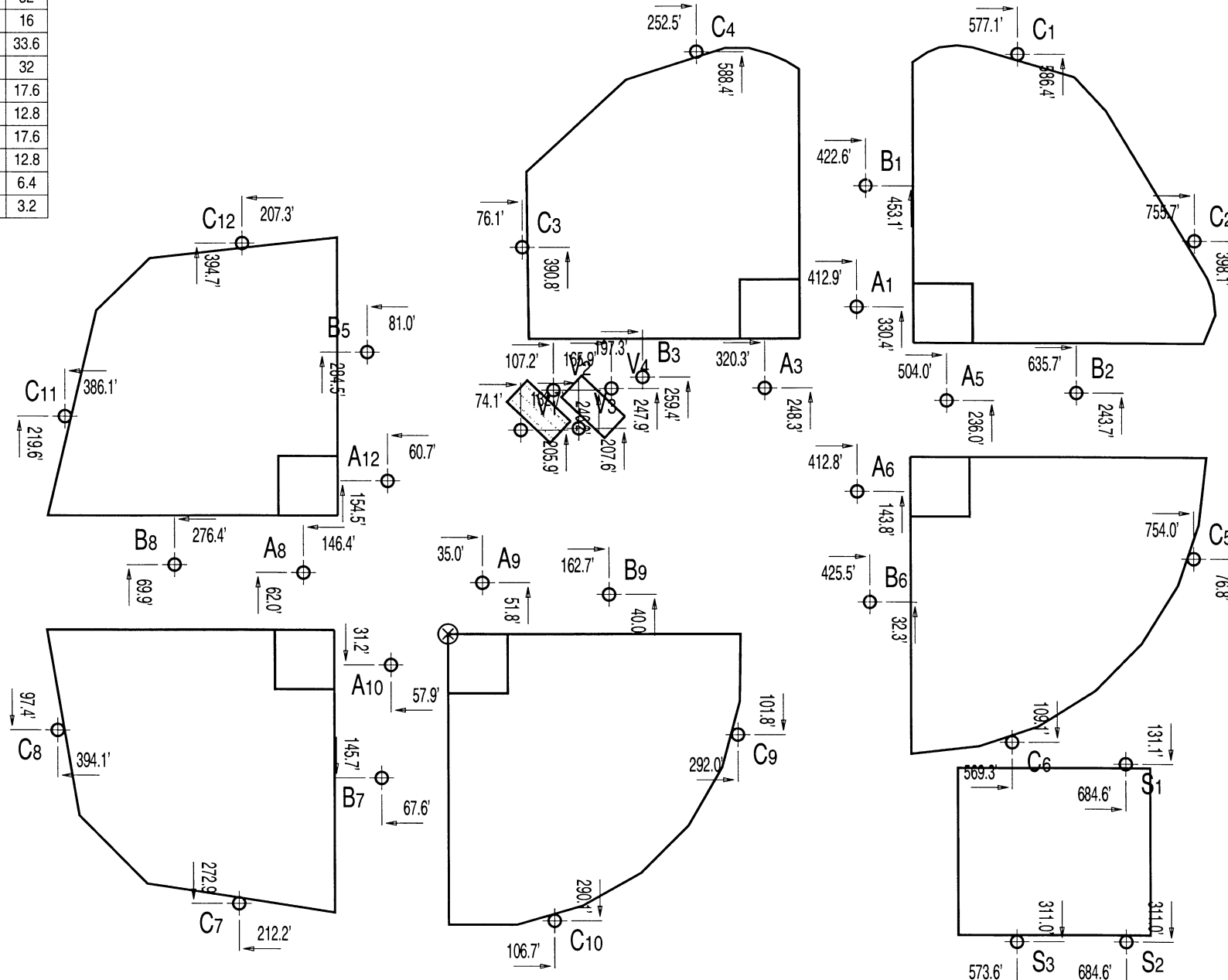
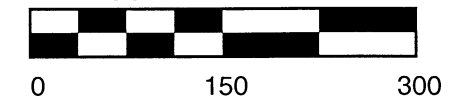
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊗ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

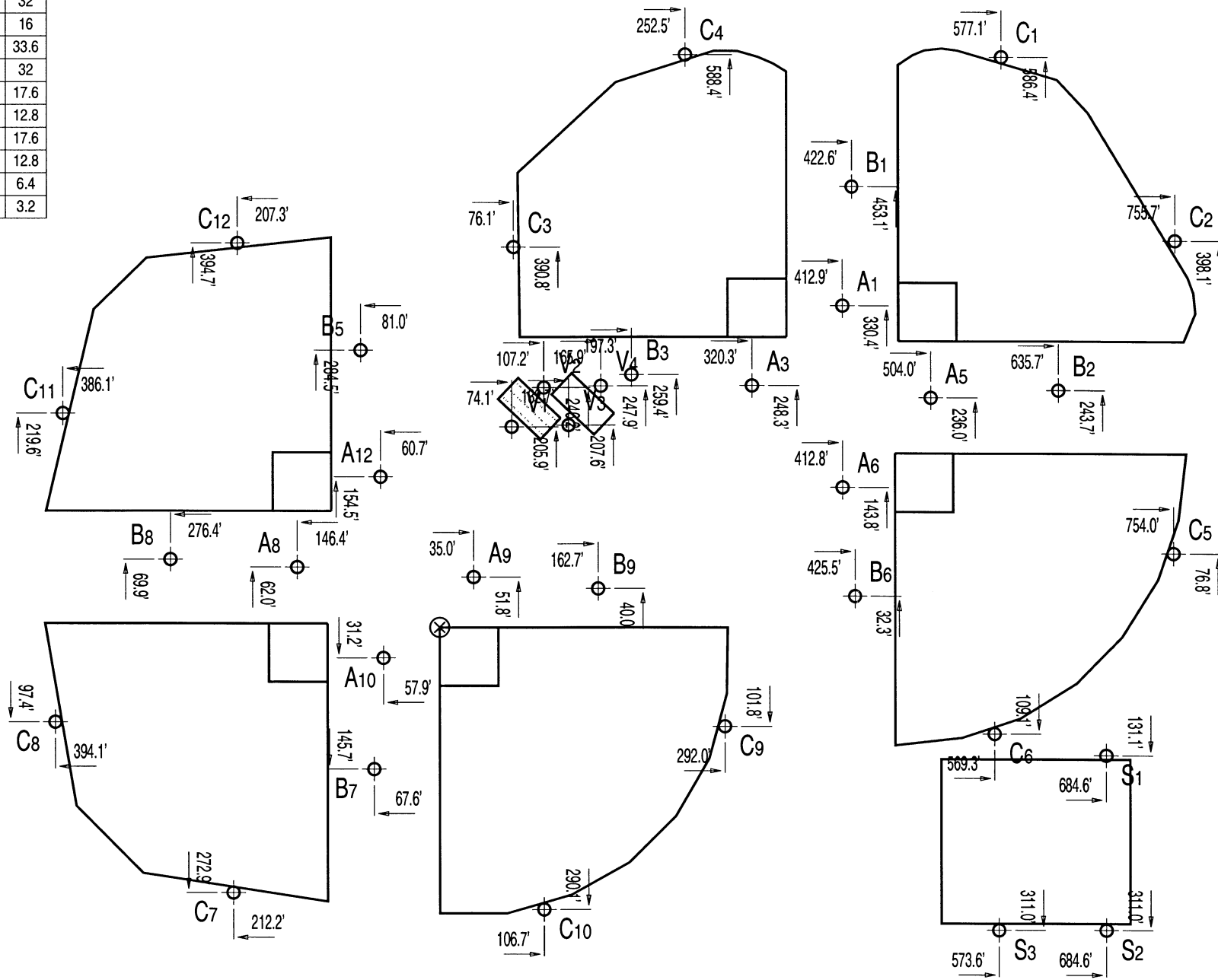
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilowatt /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



MAINTAINED ILLUMINATION RECTANGLE HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3	
Target Points:	18
Average:	51.94
Maximum:	63.85
Minimum:	38.10
Avg/Min:	1.363
Max/Min:	1.676
UG (Adj pts)	1.313
CV:	0.149
Number of Luminaires:	4
* KW Consumption:	462.40
**Average Tilt Factor:	0.844
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.675



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

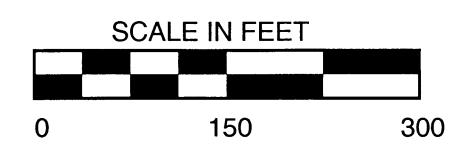
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

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INSTALLATION REQUIREMENTS:
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⊗ = Pole Location



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LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilowatt /unit
1	A1	60'	60"	0'	8	12.8
1	A3	60'	60"	0'	4	6.4
1	A5	60'	60"	0'	8	12.8
1	A6	60'	60"	0'	4	6.4
1	A8	60'	60"	0'	8	12.8
1	A9	60'	60"	0'	4	6.4
1	A10	60'	60"	0'	8	12.8
1	A12	60'	60"	0'	4	6.4
2	B1-B2	80'	80"	0'	20	32
3	B3-B6	80'	80"	0'	10	16
1	B7	80'	80"	0'	21	33.6
1	B8	80'	80"	0'	20	32
1	B9	80'	80"	0'	11	17.6
5	C1-C5	70'	70"	0'	8	12.8
1	C6	70'	70"	0'	11	17.6
6	C7-C12	70'	70"	0'	8	12.8
3	S1-S3	50'	50"	0'	4	6.4
4	V1-V4	50'	50"	0'	2	3.2



INITIAL ILLUMINATION
 RECTANGLE
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3

Target Points:	63
Average:	37.98
Maximum:	56.43
Minimum:	23.29
Avg/Min:	1.631
Max/Min:	2.423
UG (Adj pts)	1.900
CV:	0.240

Number of Luminaires:	15
* KW Consumption:	462.40
** Average Tilt Factor:	0.952
*** Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.952

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

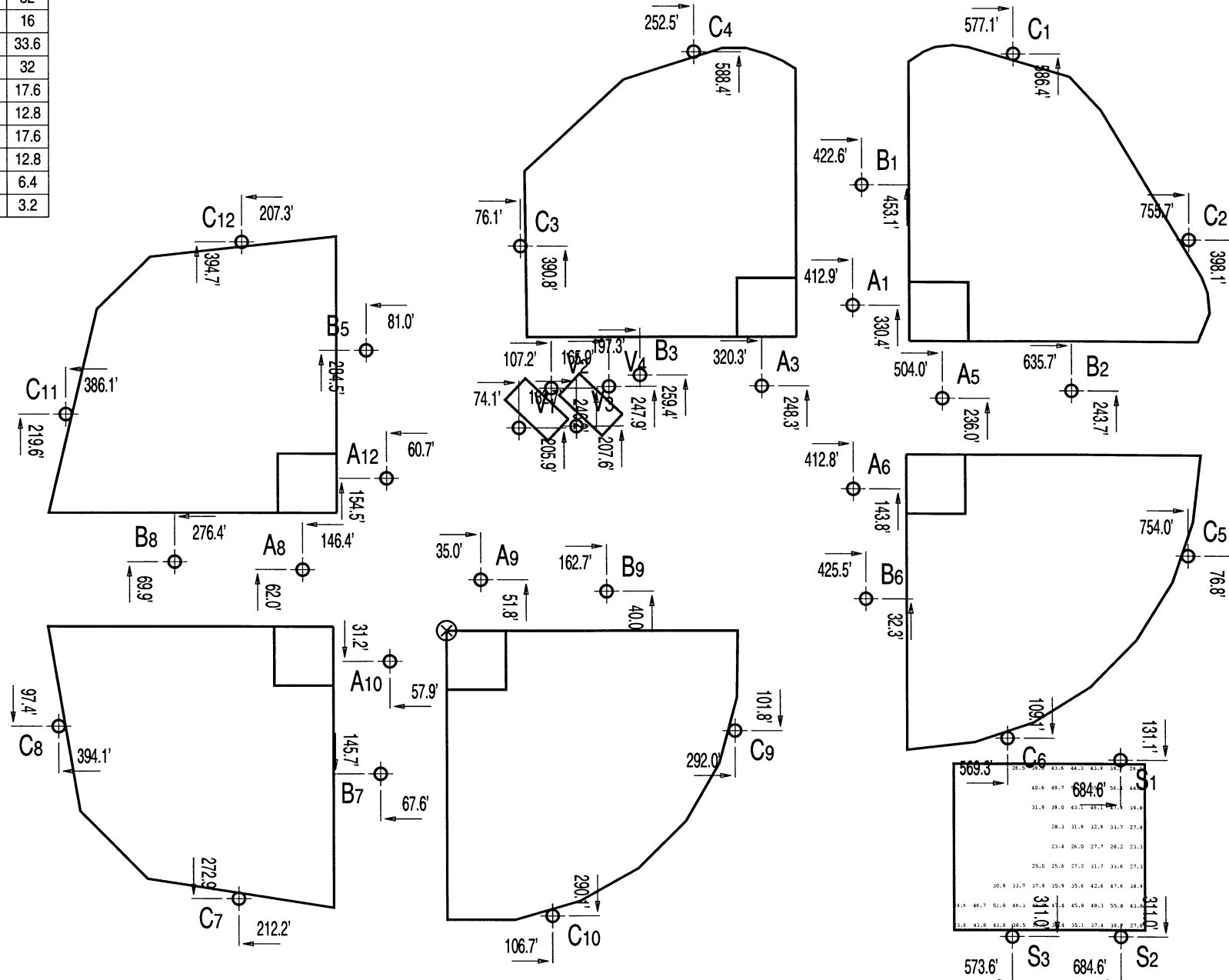
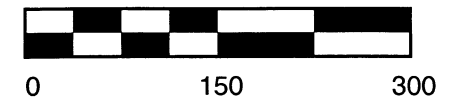
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊗ = Pole Location

SCALE IN FEET



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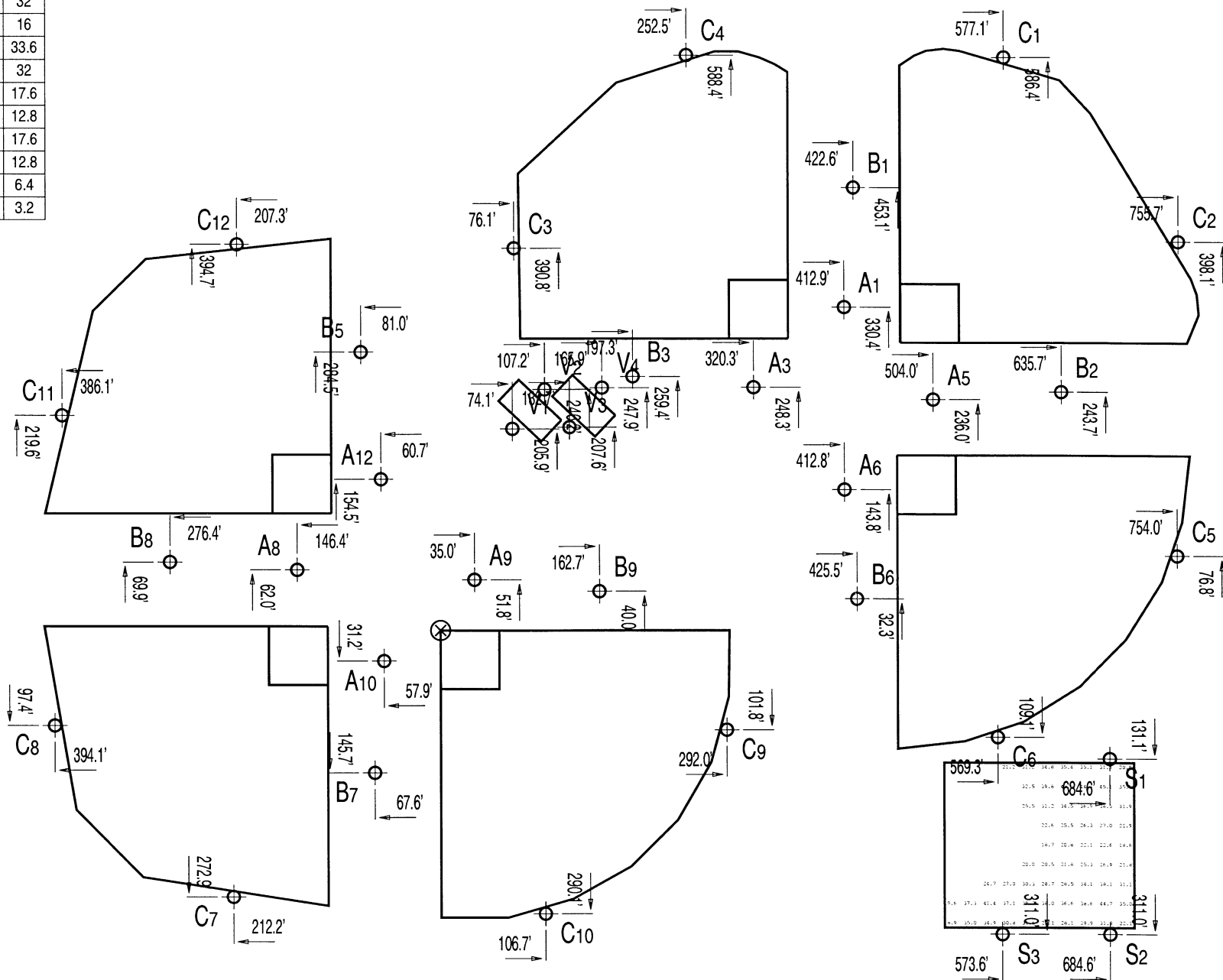
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273wwc / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
3	S1-S3	50'	50'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2



MAINTAINED ILLUMINATION RECTANGLE HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3	
Target Points:	63
Average:	30.38
Maximum:	45.15
Minimum:	18.63
Avg/Min:	1.631
Max/Min:	2.423
UG (Adj pts)	1.900
CV:	0.240
Number of Luminaires:	15
* KW Consumption:	462.40
**Average Tilt Factor:	0.952
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.762



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
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⊗ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

0 150 300

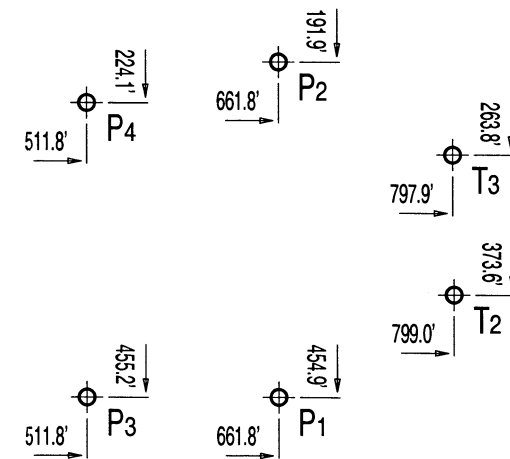
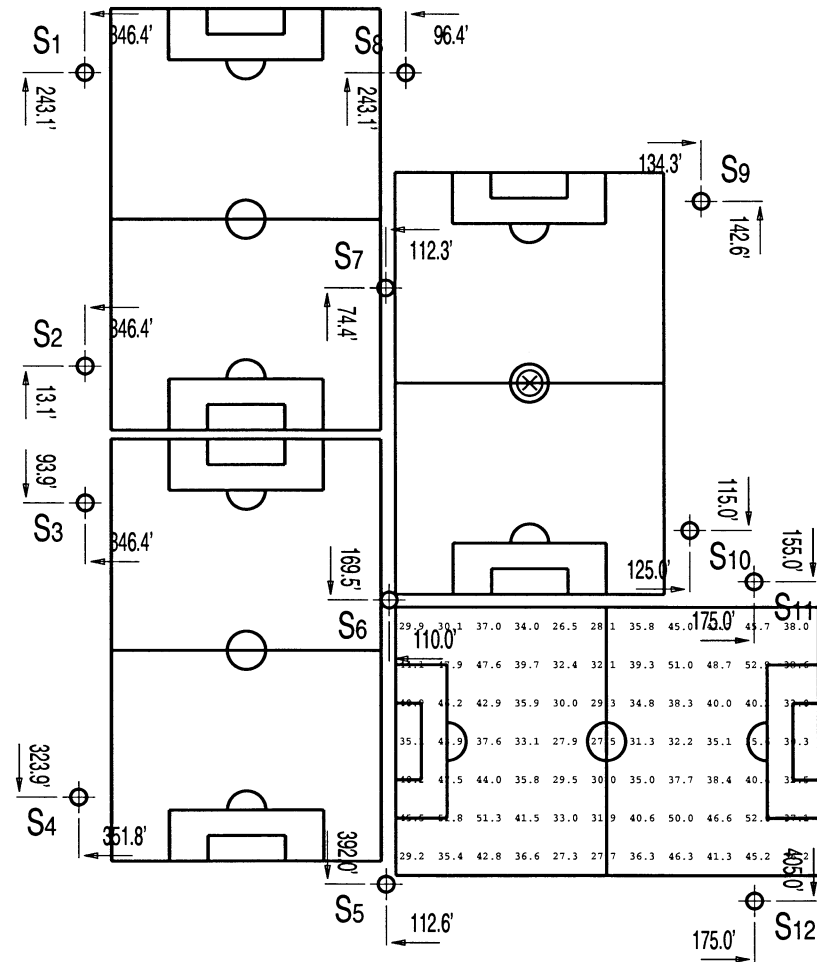
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



INITIAL ILLUMINATION	
SOCCER	
HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3	
Target Points:	77
Average:	38.23
Maximum:	52.86
Minimum:	26.55
Avg/Min:	1.440
Max/Min:	1.991
UG (Adj pts)	1.591
CV:	0.182
Number of Luminaires:	36
* KW Consumption:	268.80
**Average Tilt Factor:	0.961
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.961



Pole location dimensions are relative to 0,0 reference point ⊗.

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

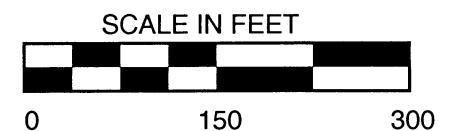
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊗ = Pole Location



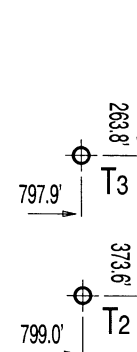
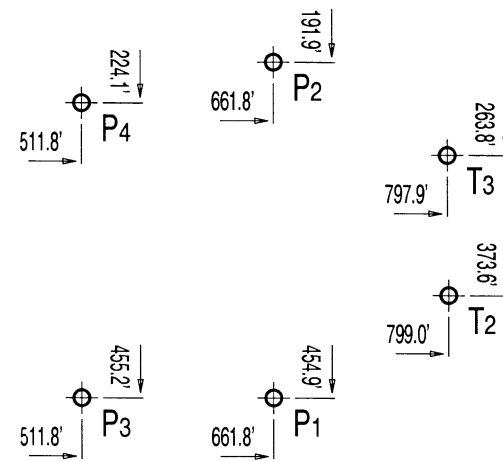
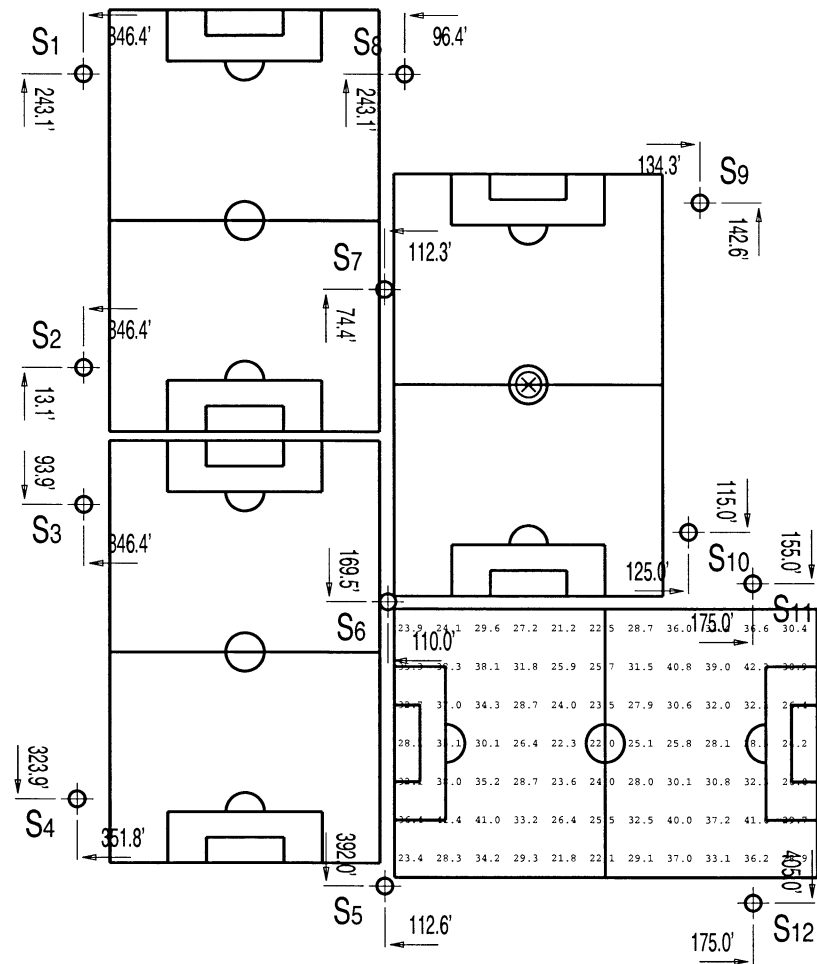
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



MAINTAINED ILLUMINATION SOCCER HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3	
Target Points:	77
Average:	30.59
Maximum:	42.29
Minimum:	21.24
Avg/Min:	1.440
Max/Min:	1.991
UG (Adj pts)	1.591
CV:	0.182
Number of Luminaires:	36
* KW Consumption:	268.80
**Average Tilt Factor:	0.961
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.769



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

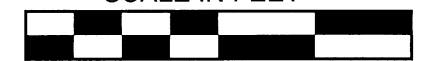
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊗.

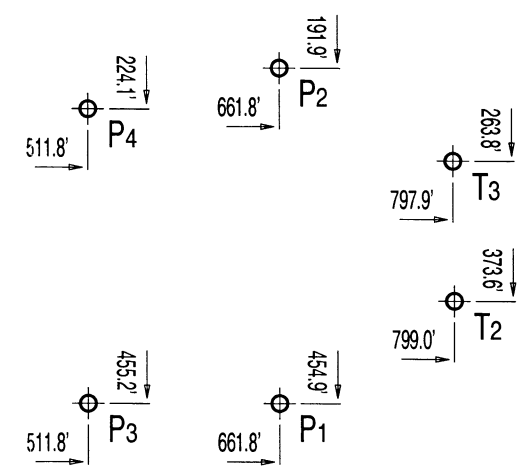
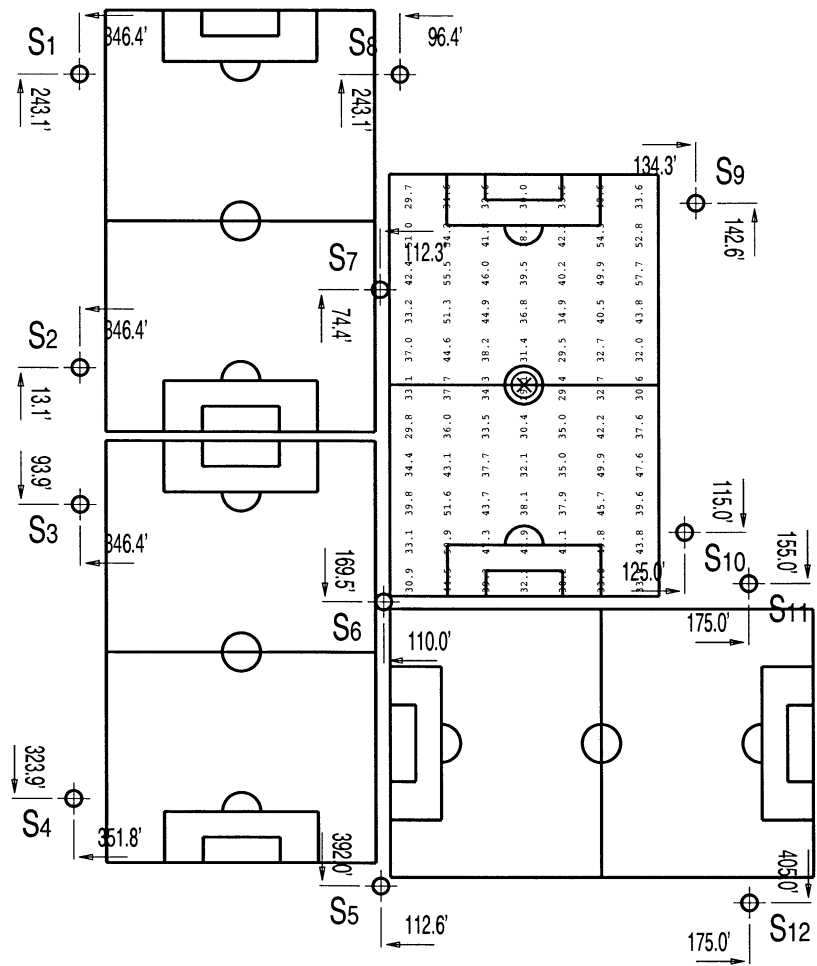
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



INITIAL ILLUMINATION	
SOCCER	
HORIZONTAL FOOTCANDLES	
ON PLANE AT Z= 3	
Target Points:	77
Average:	39.36
Maximum:	57.74
Minimum:	29.10
Avg/Min:	1.352
Max/Min:	1.984
UG (Adj pts)	1.716
CV:	0.188
Number of Luminaires:	36
* KW Consumption:	268.80
**Average Tilt Factor:	0.965
***Recoverable Light Loss Factors: x 1.000	
Total Light Loss Factor(LLF)	0.965



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

*Refer to amperage draw for electrical sizing.

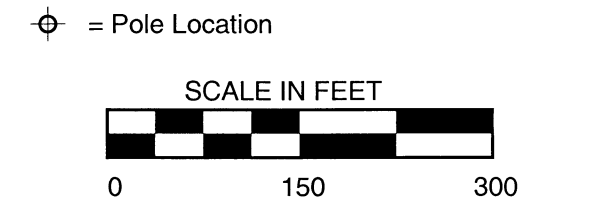
** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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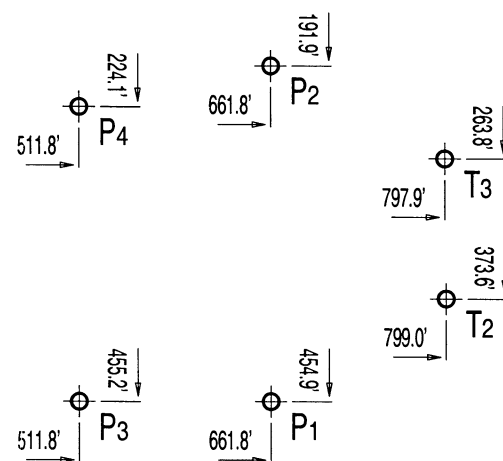
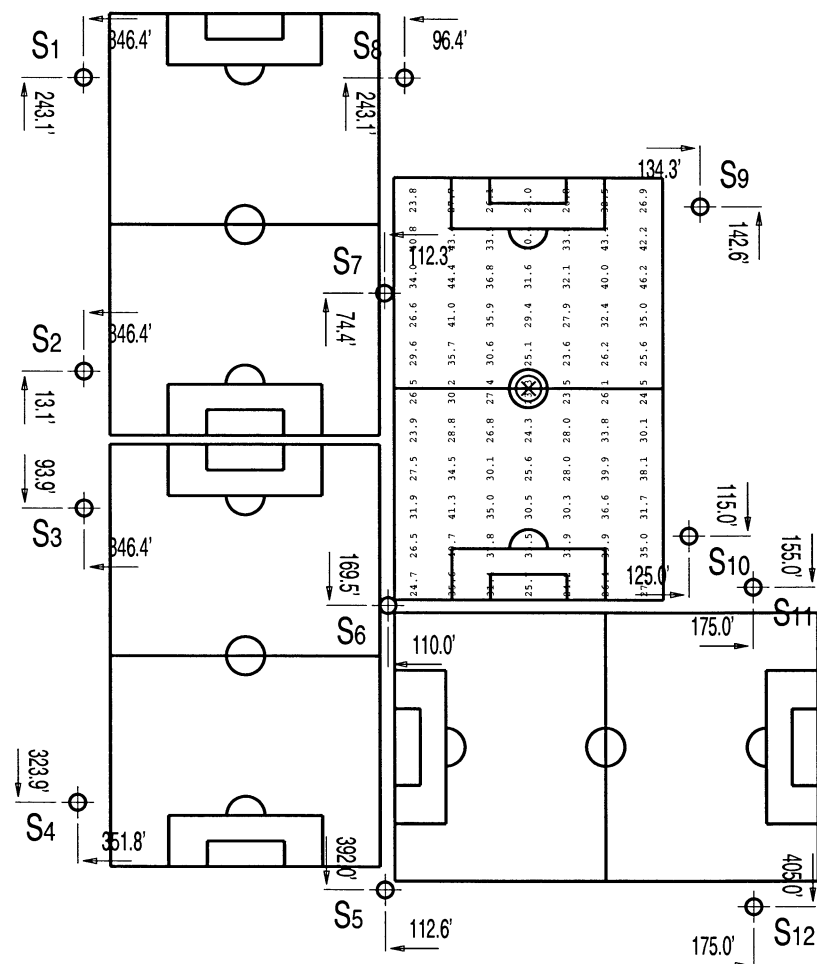
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



MAINTAINED ILLUMINATION SOCCER HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3	
Target Points:	77
Average:	31.49
Maximum:	46.19
Minimum:	23.28
Avg/Min:	1.352
Max/Min:	1.984
UG (Adj pts)	1.716
CV:	0.188
Number of Luminaires:	36
* KW Consumption:	268.80
**Average Tilt Factor:	0.965
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.772



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

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

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⊗ = Pole Location



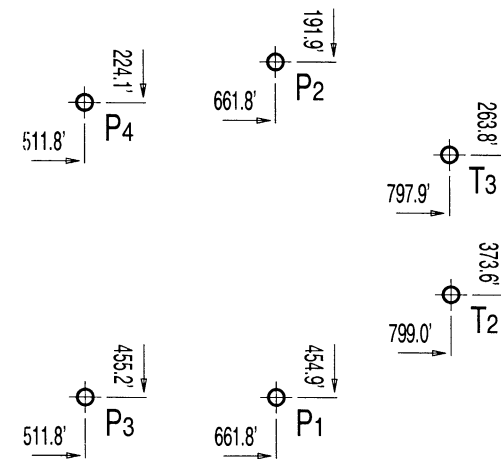
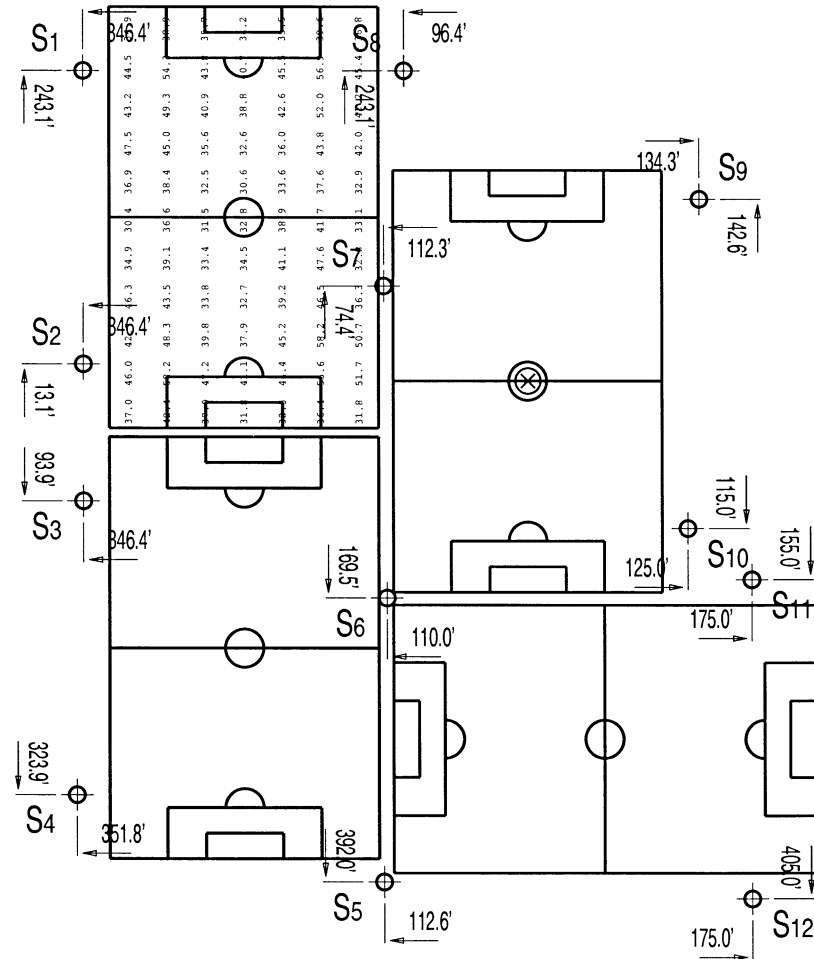
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



INITIAL ILLUMINATION	
SOCCER	
HORIZONTAL FOOTCANDLES	
ON PLANE AT Z= 3	
Target Points:	77
Average:	40.58
Maximum:	58.24
Minimum:	30.42
Avg/Min:	1.334
Max/Min:	1.915
UG (Adj pts)	1.626
CV:	0.169
Number of Luminaires:	36
* KW Consumption:	268.80
**Average Tilt Factor:	0.963
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.963



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

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⊗ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

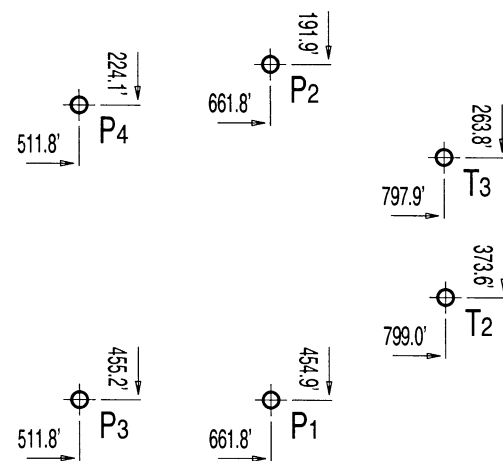
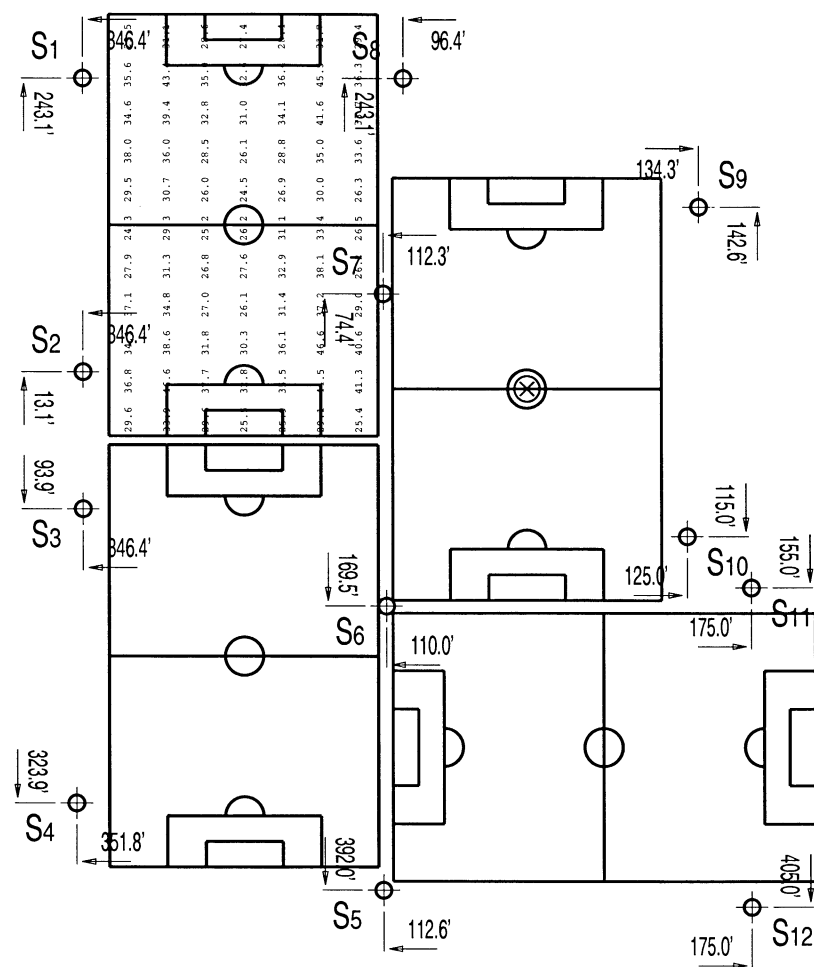
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



MAINTAINED ILLUMINATION SOCCER HORIZONTAL FOOTCANDLES ON PLANE AT Z= 3	
Target Points:	77
Average:	32.47
Maximum:	46.59
Minimum:	24.33
Avg/Min:	1.334
Max/Min:	1.915
UG (Adj pts)	1.626
CV:	0.169
Number of Luminaires:	36
* KW Consumption:	268.80
**Average Tilt Factor:	0.963
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.770



Pole location dimensions are relative to 0,0 reference point ⊗.

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

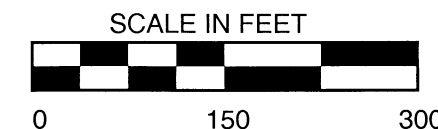
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

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⊗ = Pole Location



LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



INITIAL ILLUMINATION
 SOCCER
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3

Target Points: 77
 Average: 38.20
 Maximum: 51.12
 Minimum: 28.64
 Avg/Min: 1.334
 Max/Min: 1.785
 UG (Adj pts) 1.676
 CV: 0.161

Number of Luminaires: 36
 * KW Consumption: 268.80

**Average Tilt Factor: 0.963
 ***Recoverable Light Loss Factors: x 1.000
 Total Light Loss Factor(LLF) 0.963

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

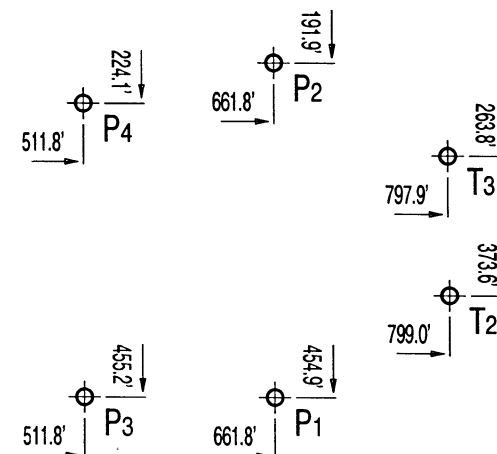
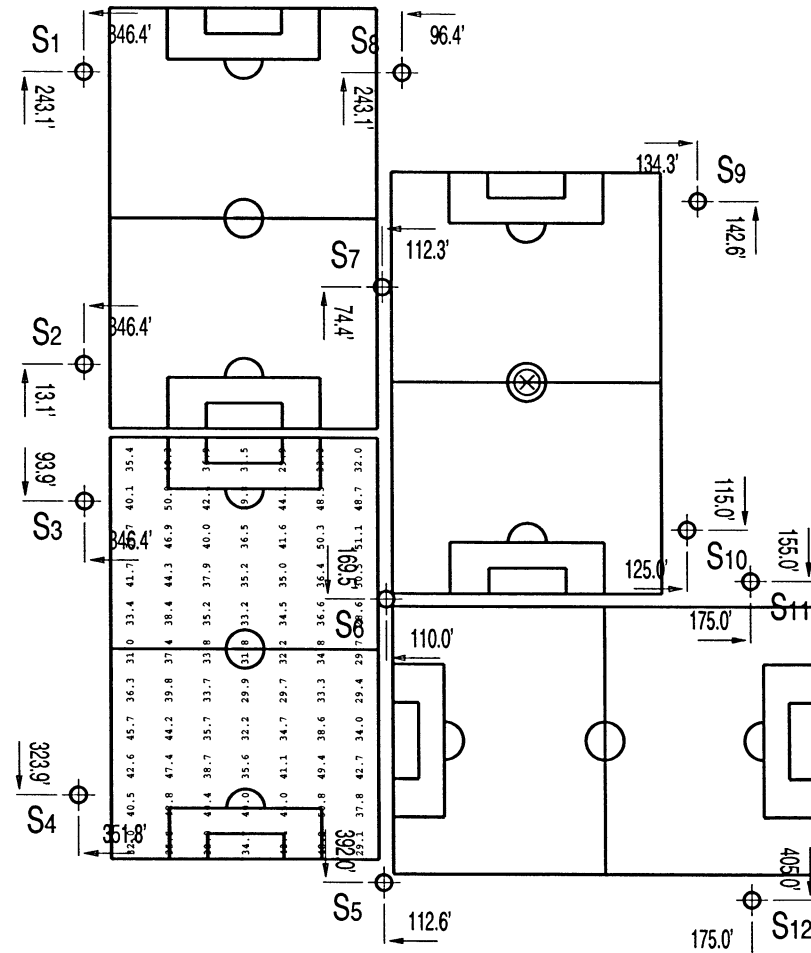
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INSTALLATION REQUIREMENTS:
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⊕ = Pole Location



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LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



MAINTAINED ILLUMINATION
 SOCCER
 HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 3

Target Points: 77
 Average: 30.56
 Maximum: 40.89
 Minimum: 22.91
 Avg/Min: 1.334
 Max/Min: 1.785
 UG (Adj pts) 1.676
 CV: 0.161

Number of Luminaires: 36
 * KW Consumption: 268.80
 **Average Tilt Factor: 0.963
 ***Recoverable Light Loss Factors: x 0.800
 Total Light Loss Factor(LLF) 0.770

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

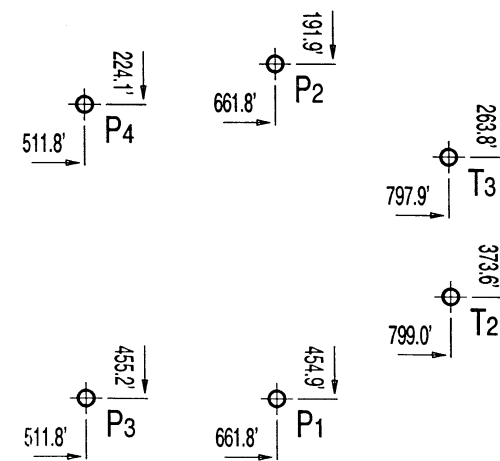
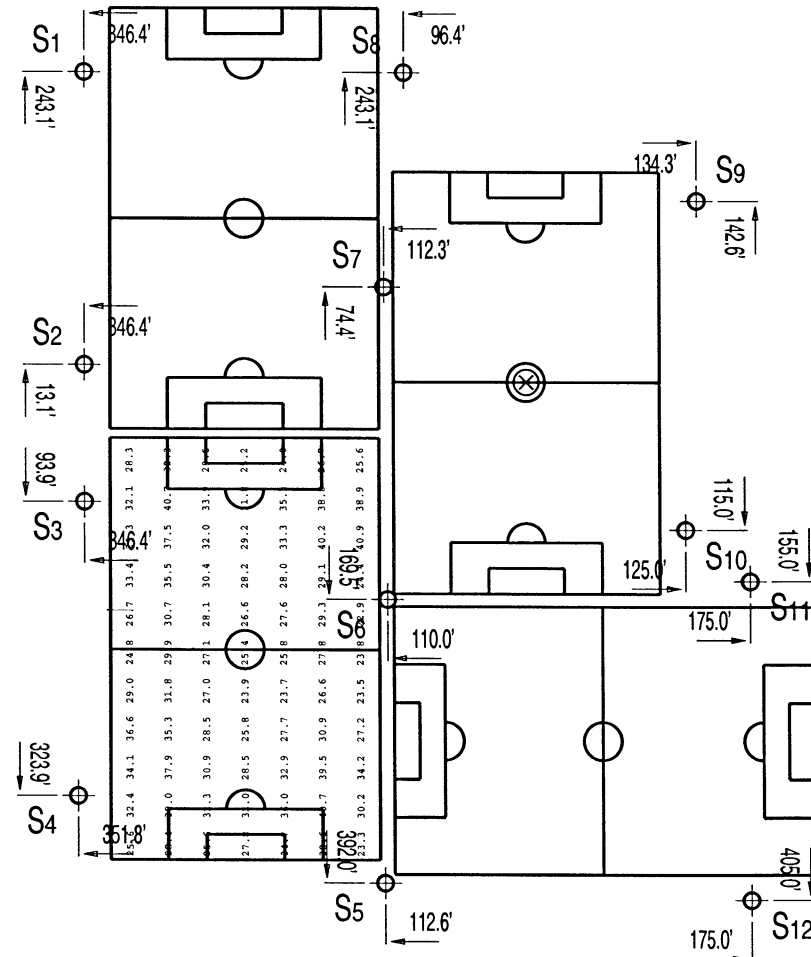
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

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⊕ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

LONG BEACH SPORTS PARK

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA



INITIAL ILLUMINATION
 Custom
HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 0

Target Points:	52
Average:	23.99
Maximum:	32.96
Minimum:	12.42
Avg/Min:	1.931
Max/Min:	2.654
UG (Adj pts)	1.347
CV:	0.203

Number of Luminaires:	24
* KW Consumption:	268.80
**Average Tilt Factor:	0.956
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.956

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

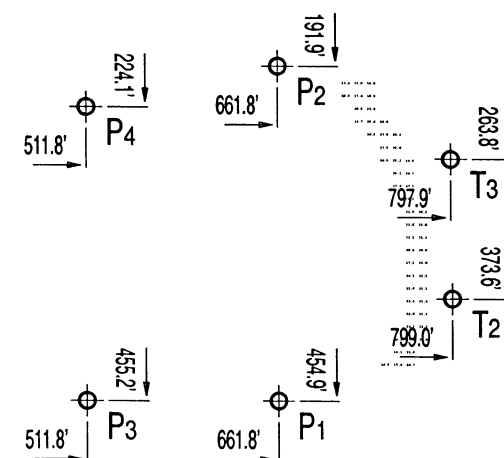
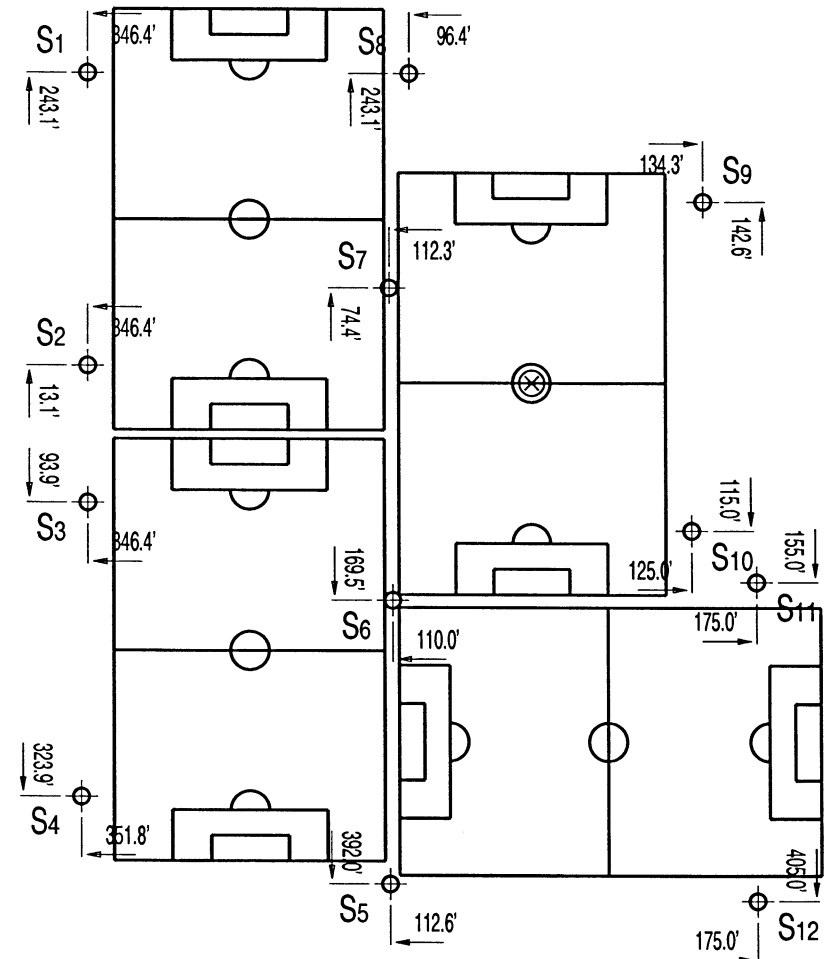
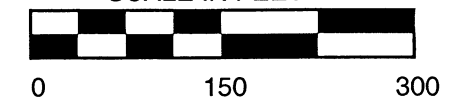
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location

SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊕.

LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



MAINTAINED ILLUMINATION
 Custom
HORIZONTAL FOOTCANDLES
 ON PLANE AT Z= 0

Target Points: 52
 Average: 19.19
 Maximum: 26.37
 Minimum: 9.94
 Avg/Min: 1.931
 Max/Min: 2.654
 UG (Adj pts) 1.347
 CV: 0.203

Number of Luminaires: 24
 * KW Consumption: 268.80
 **Average Tilt Factor: 0.956
 ***Recoverable Light Loss Factors: x 0.800
 Total Light Loss Factor(LLF) 0.764

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

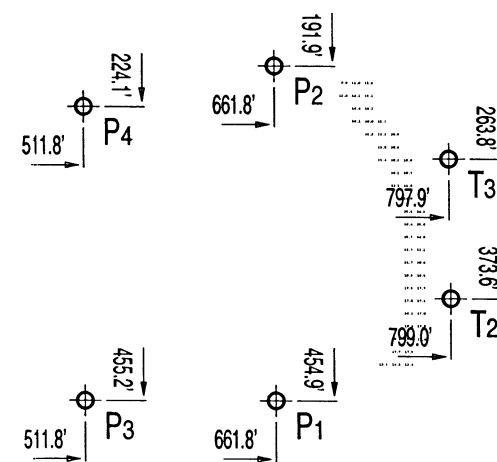
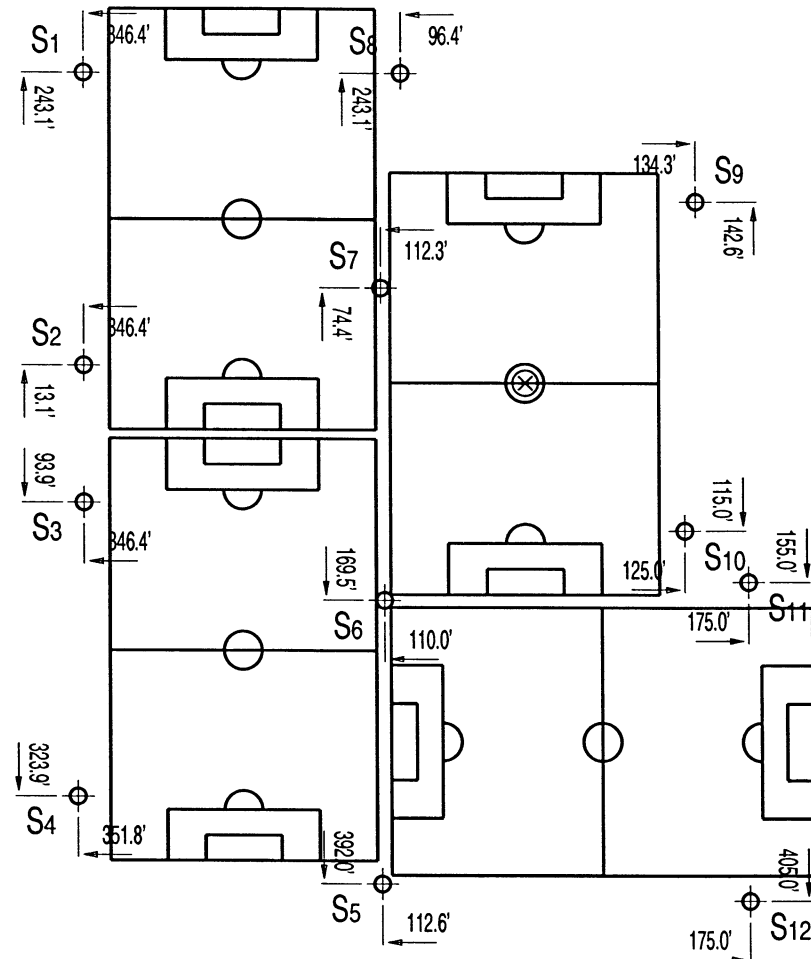
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

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⊕ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊗.

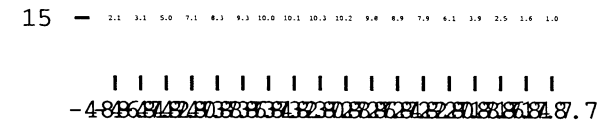
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



INITIAL ILLUMINATION	
200 YDS	
VERTICAL FOOTCANDLES	
ON PLANE AT X= 330	
Target Points:	18
Average:	6.51
Maximum:	10.34
Minimum:	0.98
Avg/Min:	6.671
Max/Min:	10.593
UG (Adj pts)	1.000
CV:	0.505
Number of Luminaires:	24
* KW Consumption:	268.80
**Average Tilt Factor:	0.956
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.956



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

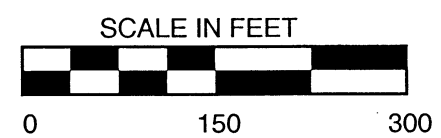
*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +/-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location



Left/right labels are Y coordinates; up/down labels are Z coordinates. Meter orientation: 0° is positive y-direction, 90° is positive x-direction, etc.

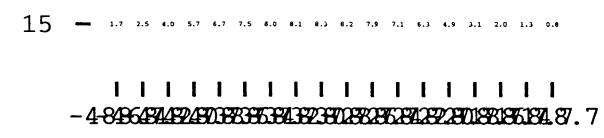
LONG BEACH SPORTS PARK

Fixture Type: TLC MZ
 Lamp Type: 1500W MZ
 Lumens: 155000
 File # / Date: 105273sodr1 / 18-Feb-2004
 Prepared By: MBELLOMA

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilow /unit
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
2	S3-S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4



MAINTAINED ILLUMINATION	
200 YDS	
VERTICAL FOOTCANDLES	
ON PLANE AT X= 330	
Target Points:	18
Average:	5.21
Maximum:	8.28
Minimum:	0.78
Avg/Min:	6.671
Max/Min:	10.593
UG (Adj pts)	1.000
CV:	0.505
Number of Luminaires:	24
* KW Consumption:	268.80
**Average Tilt Factor:	0.956
***Recoverable Light Loss Factors: x	0.800
Total Light Loss Factor(LLF)	0.764



*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location

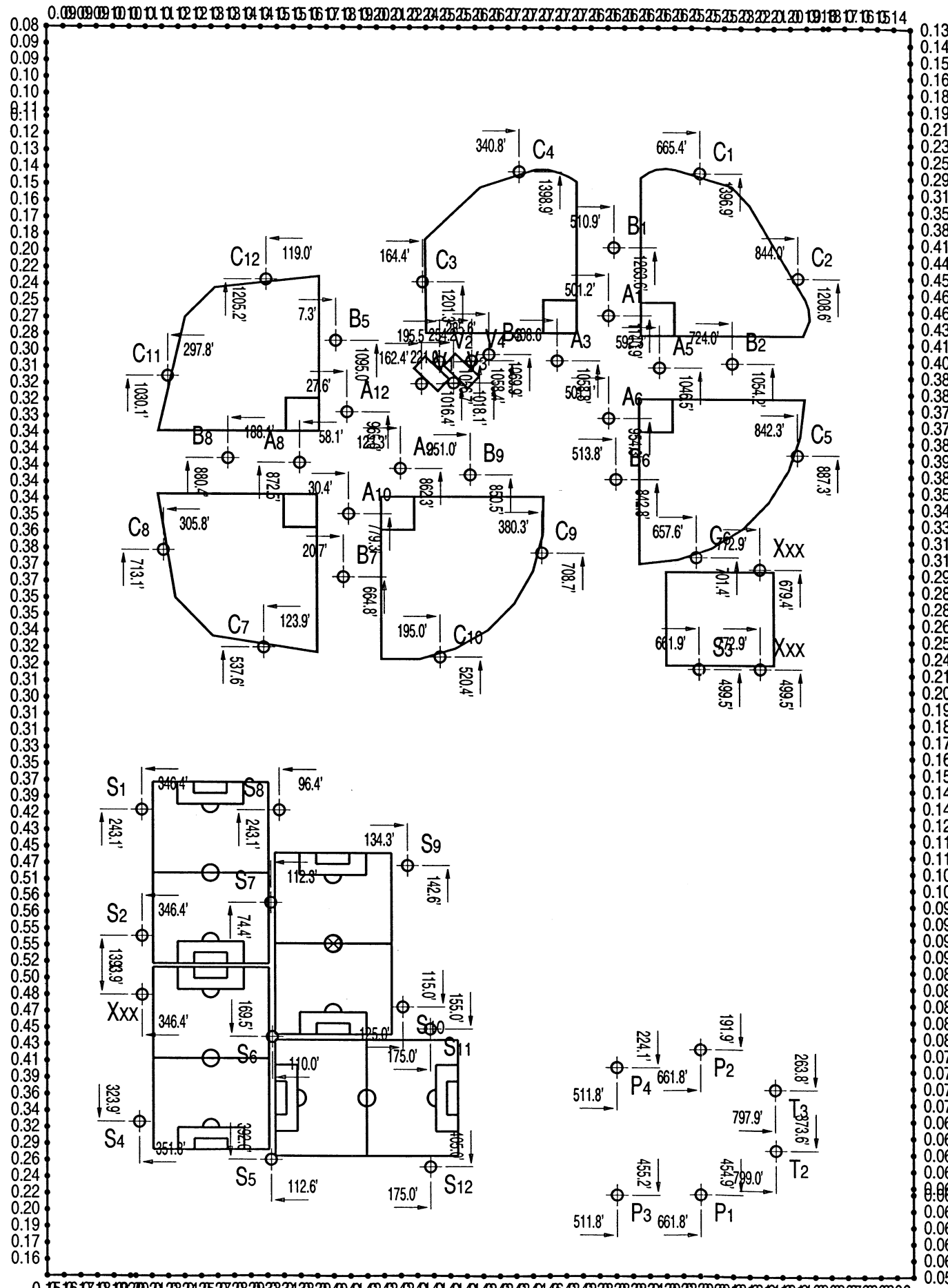


Left/right labels are Y coordinates; up/down labels are Z coordinates. Meter orientation: 0° is positive y-direction, 90° is positive x-direction, etc.

LONG BEACH SPORTS PARK

EQUIPMENT LISTING

Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt. /unit	Kilowatt /unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
1	S3	50'	50'	0'	4	6.4
1	S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2
2	XXX-XXX	50'	50'	0'	4	6.4
1	XXX	80'	80'	0'	9	14.4



Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273allc / 18-Feb-2004
 Prepared By: MBELLOMA



INITIAL SPILL LIGHT MAXIMUM FOOTCANDLES

Target Points:	258
Average:	0.25
Maximum:	0.56
Minimum:	0.05
Avg/Min:	4.653
Max/Min:	10.529

Number of Luminaires:	457
* KW Consumption:	731.20
**Average Tilt Factor:	0.964
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.964

*Refer to amperage draw for electrical sizing.

** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

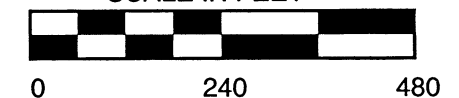
NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
Results assume +3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location

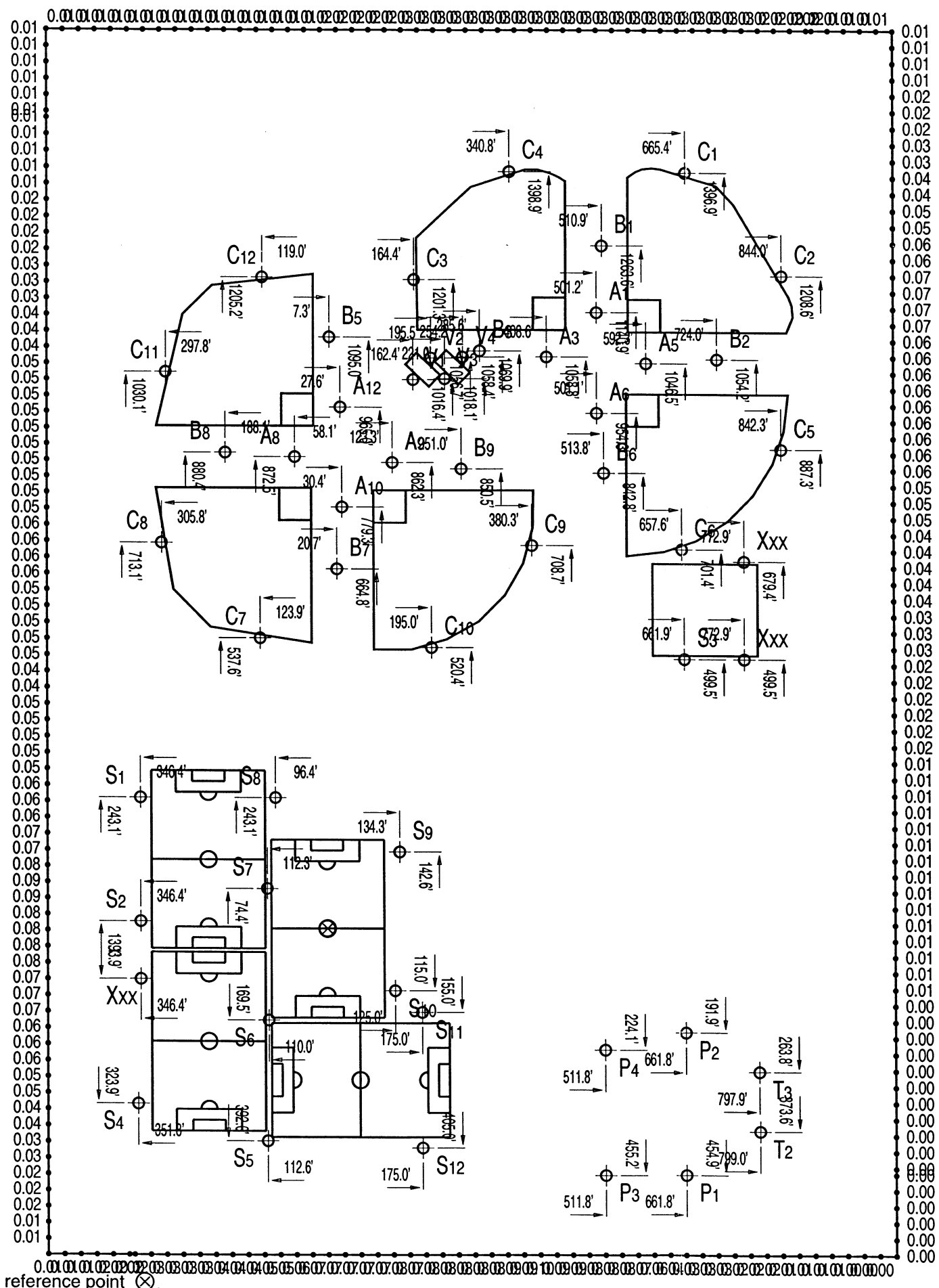
SCALE IN FEET



Pole location dimensions are relative to 0,0 reference point ⊕.

LONG BEACH SPORTS PARK

EQUIPMENT LISTING						
Pole count	Pole location	Mounting height	Pole size	Elev.	Fixt./unit	Kilow./unit
1	A1	60'	60'	0'	8	12.8
1	A3	60'	60'	0'	4	6.4
1	A5	60'	60'	0'	8	12.8
1	A6	60'	60'	0'	4	6.4
1	A8	60'	60'	0'	8	12.8
1	A9	60'	60'	0'	4	6.4
1	A10	60'	60'	0'	8	12.8
1	A12	60'	60'	0'	4	6.4
2	B1-B2	80'	80'	0'	20	32
3	B3-B6	80'	80'	0'	10	16
1	B7	80'	80'	0'	21	33.6
1	B8	80'	80'	0'	20	32
1	B9	80'	80'	0'	11	17.6
5	C1-C5	70'	70'	0'	8	12.8
1	C6	70'	70'	0'	11	17.6
6	C7-C12	70'	70'	0'	8	12.8
4	P1-P4	80'	80'	0'	4	6.4
2	S1-S2	70'	70'	0'	9	14.4
1	S3	50'	50'	0'	4	6.4
1	S4	80'	80'	0'	9	14.4
1	S5	80'	80'	0'	18	28.8
1	S6	80'	80'	0'	27	43.2
1	S7	70'	70'	0'	18	28.8
5	S8-S12	70'	70'	0'	9	14.4
2	T2-T3	60'	60'	0'	4	6.4
4	V1-V4	50'	50'	0'	2	3.2
2	XXX-XXX	50'	50'	0'	4	6.4
1	XXX	80'	80'	0'	9	14.4



Fixture Type: TLC MZ/TLC MZ
 Lamp Type: 1500W MZ/1500W MZ
 Lumens: 155000
 File # / Date: 105273allc / 18-Feb-2004
 Prepared By: MBELLOMA



INITIAL SPILL LIGHT HORIZONTAL FOOTCANDLES	
Target Points:	258
Average:	0.04
Maximum:	0.10
Minimum:	0.00
Avg/Min:	11.526
Max/Min:	32.658
Number of Luminaires:	457
* KW Consumption:	731.20
**Average Tilt Factor:	0.964
***Recoverable Light Loss Factors: x	1.000
Total Light Loss Factor(LLF)	0.964

*Refer to amperage draw for electrical sizing.
 ** Additional non-recoverable Light Loss Factors are design constants equal to 1.0 at maintained illumination levels.

*** Includes Luminaire Dirt Depreciation and Lamp Lumen Depreciation - per IESNA Lighting Handbook 9th Edition, page 9-17.

NOTE: Light level averages and uniformities are guaranteed by MUSCO. However, individual location measurements may vary from computer predictions.

INSTALLATION REQUIREMENTS:
 Results assume +/-3% nominal voltage at load side of ballast box and poles located within 3 feet of design locations.

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⊕ = Pole Location



Pole location dimensions are relative to 0,0 reference point ⊕.