SECTION 16510
INTERIOR LUMINAIRES

PART 1 - GENERAL

1.1 Section Includes:

a. Interior luminaires and accessories.

b. Ballasts.

c. Fluorescent dimming ballasts.

d. Lamps

e. Luminaire accessories

1.2 References:

a. ANSI C78.379 – Electric Lamps – Incandescent and High-Intensity Discharge Reflector Lamps – Classification of Beam Patterns.

b. ANSI C82.1 – Ballast for Fluorescent Lamps – Specifications.

c. ANSI C82.4 – Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).

d. CEC – California Electrical Code.

e. ANSI/NFPA 101 – Life Safety Code.

f. NEMA WD 6 – Wiring Devices-Dimensional Requirements.

1.3 Submittals:

a. Submit under provisions of Section 01340.

b. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

c. Product Data: Provide dimensions, ratings, and performance data.

d. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

e. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.4 Project Record Documents:

a. Accurately record actual locations of each luminaire.

1.5 Operation and Maintenance Data:

a. Maintenance Data: Include replacement parts list.

1.6 Qualifications:

a. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.7 Regulatory Requirements:

a. Conform to requirements of CEC.

b. Conform to requirements of NFPA 101 and NEMA WD6.

c. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.8 Extra Materials:

a. Provide two of each plastic lens.

b. Provide 10% replacement lamps for each type lamp installed, minimum one lamp of each type.

c. Provide two of each ballast type.

PART 2 - PRODUCTS

2.1 Luminaires:

a. Furnish products as specified on Drawings.

b. Substitutions: Under provisions of Section 01600.

c. Install ballasts and specified accessories at factory.

d. Install lamp(s) in fixtures.

2.2 Ballasts:

a. Fluorescent Ballast:

1. Advance Transformer Co., Model Mark V.

2. Universal Mfg. Co., Model.

3. Magnetek Model HP.

4. Description: ANSI C82.1, high power factor type electronic ballast.

5. Provide ballast suitable for lamps specified. .97 ballast factor minimum and transient harmonic distortion of less than 10 percent.

6. Voltage: Match luminaire voltage.

7. Source Quality Control: Certify ballast design and construction by Certified Ballast Manufacturers, Inc.

a. Fluorescent Dimming Ballast:

1. Lutron, Hi-Lume FDB, electronic ballasts.

b. High Intensity Discharge (HID) Ballast:

1. Advance Transformer Co.

2. Universal Mfg. Co.

3. General Electric

4. Description: ANSI C82.4, mercury vapor, metal halide, high pressure sodium lamp ballast as indicated on drawings.

5. Provide ballasts suitable for lamp specified.

6. Voltage: Match luminaire voltage.

2.3 Lamps:

a. Incandescent Lamp Manufacturers:

1. Phillips.
2. Sylvania
3. General Electric.

b. Fluorescent Lamp Manufacturers:

1. Phillips.
2. Sylvania
3. General Electric.

c. High Intensity Discharge (HID) Lamp Manufacturers:

1. Phillips.
2. Sylvania
3. General Electric.

d. Provide lamp type specified for luminaire.

e. Reflector Lamp Beam Patterns: ANSI C78.379.

PART 3 - EXECUTION

3.1 Examination:

a. Examine substrate and supporting grids for luminaries.

b. Examine each luminaire to determine suitability for lamps specified.

3.2 Installation:

a. Install in accordance with manufacturers instructions.

b. Install suspended luminaries and exit signs using pendant supported from seismically approved swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

c. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.

d. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

e. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other.

f. Exposed Grid ceilings: Support surface mounted luminaires on grid ceiling directly from building structure and provide auxiliary members spanning ceilings T's to support surface mounted luminaires.

g. Install recessed luminaires to permit removal from below.

h. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.

i. Install clips to secure recessed grid-supported luminaires in place.

j. Install wall mounted luminaires emergency lighting units and exit sign at height as indicated on Drawings.

k. Install accessories furnished with each luminaire.

l. Connect luminaires emergency lighting units and exit signs to branch circuit outlets provided under Section 16130 as indicated on drawings.

m. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

n. Bond products and metal accessories to branch circuit equipment grounding conductor.

o. Install specified lamps in each luminaire emergency lighting unit and exit sign.

3.3 Field Quality Control:

a. Operate each luminaire after installation and connection. Inspect for improper connection and operation.

3.4 Adjusting:

a. Aim and adjust luminaires as indicated on Drawings and as approved by Architect.

b. Adjust exit sign directional arrows as indicated.

c. Relamp luminaires that have failed lamps at Substantial Completion.

3.5 Cleaning:

a. Clean electrical parts to remove conductive and deleterious materials.

b. Remove dirt and debris from enclosure.

c. Clean photometric control surface as recommended by manufacturer.

d. Clean finishes and touch up damage.

3.6 Demonstration:

a. Provide systems demonstration.

b. Provide minimum of 8 hours demonstration of luminaire operation.

END OF SECTION - 16510

SECTION 16526
SPORTS FIELD LIGHTING

PART 1 – GENERAL

1.1 SUMMARY

a. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.

b. The purpose of these specifications is to define the performance and design standards for Big League Dreams Perris, Perris, California. The manufacturer / contractor shall supply lighting equipment to meet or exceed the standards set forth by the criteria set forth in these specifications.

c. The sports lighting will be for the following fields:
   1. Minor League Field A
   2. Minor League Field B
   3. Angel Stadium
   4. Fenway Park
   5. Dodger Stadium
   6. Yankee Stadium

d. The primary goals of this sports lighting project are:
   1. Life Cycle Cost: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated, and the field(s) should be proactively monitored to detect fixture outages over a 25 year life cycle. To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system.
   2. Environmental Light Control: It is the primary goal of this project to minimize spill light and glare.
   3. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore the lighting system shall be designed such that the light levels are guaranteed for a period of 25 years.

1.2 LIGHTING PERFORMANCE

a. Performance Requirements: Playing surfaces shall be lit to an average constant light level and uniformity as specified in the chart below. Light levels shall be held constant for 25 years. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Measured average illumination level shall be +/- 10% of predicted mean in accordance with IESNA RP-6-01, and measured at the first 100 hours of operation.

Area of Lighting	Average Constant Light Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Minor League Field A Infield	50 footcandles	2.0:1.0	25	30' x 30'
Minor League Field A Outfield	30 footcandles	2.5:1.0	67	
Minor League Field B Infield	50 footcandles	2.0:1.0	25	30' x 30'
Minor League Field B Outfield	30 footcandles	2.5:1.0	79	

Angel Stadium Infield Angel Stadium Outfield	50 footcandles 30 footcandles	2.0:1.0 2.5:1.0	25 65	30' x 30'
Fenway Park Infield Fenway Park Outfield	50 footcandles 30 footcandles	2.0:1.0 2.5:1.0	25 62	30' x 30'
Dodger Stadium Infield Dodger Stadium Outfield	50 footcandles 30 footcandles	2.0:1.0 2.5:1.0	25 63	30' x 30'
Yankee Stadium Infield Yankee Stadium Outfield	50 footcandles 30 footcandles	2.0:1.0 2.5:1.0	25 65	30' x 30'

1.3 LIFE CYCLE COSTS

a. Energy Consumption: The average kWh consumption for the field lighting system shall be 53.18 or less for Minor League Field A, 56.3 or less for Minor League Field B, 50.05 or less for Angel Stadium, Fenway Park, Dodger Stadium, and Yankee Stadium.

b. Complete Lamp Replacement: Manufacturer shall include all group lamp replacements required to provide 25 years of operation based upon 1400 usage hours per year.

c. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual lamp outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

d. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The manufacturer shall notify the owner of outages within 24 hours, or the next business day. The controller shall determine switch position (Manual or Auto) and contactor status (open or closed).

e. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields, to only having permission to execute "early off" commands by phone.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

f. Management Tools: Manufacturer shall provide a web-based database of actual field usage and provide reports by facility and user group.

g. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.

h. 25-Year Life Cycle Cost: Manufacturer shall submit 25-year life cycle cost calculations as follows. Equipment price and total life cycle cost shall be entered separately on bid form.

a.	Luminaire energy consumption # luminaires x __kW demand per luminaire x .11 kW rate x 500 annual usage hours x 25 years		

b.	Cost for spot relamping and maintenance over 25 years Assume 7.5 repairs at $500 each if not included	+	
c.	Cost to relamp all luminaires during 25 years 500 annual usage hours x 25 years / lamp replacement hours x $125 lamp & labor x # fixtures	+	
d.	Extra energy used without base bid automated control system $ Energy consumption in item a. x 10%.	+	
	TOTAL 25-Year Life Cycle Operating Cost	=	

1.4 WARRANTY AND GUARANTEE

a. 25-Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for 25 years. Warranty shall guarantee light levels; lamp replacements; system energy consumption; monitoring, maintenance and control services, spill light control, and structural integrity. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty may exclude fuses, storm damage, vandalism, abuse and unauthorized repairs or alterations.

1.5 DELIVERY TIMING

a. Equipment On-Site: The equipment must be on-site four to six weeks from receipt of approved submittals and receipt of complete order information.

1.6 PRE-BID SUBMITTAL REQUIREMENTS

a. Approved Product: Musco's Light-Structure Green™ System is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.

b. Design Approval: The owner / engineer will review pre-bid shop drawings from the manufacturer's to ensure compliance to the specification. If the design meets the design requirements of the specifications, a letter will be issued to the manufacturer indicating approval for the specific design submitted.

1.7 ALTERNATE SYSTEM REQUIREMENTS

a. Compliance to Specifications: Acceptance of a bid alternate does not negate the contractor and lighting manufacturer's responsibility to comply fully with the requirements of these specifications. Any exceptions to the specifications must be clearly stated in the prior approval submittal documents.

b. Light Level Requirements: Manufacturer shall provide computer models guaranteeing light levels on the field over 25 years. If a constant light level cannot be provided, a maximum Recoverable Light Loss Factor of 0.70 shall be applied to the initial light level design to achieve the average constant light levels listed on section 1.2A. For alternate systems, scans for both initial and maintained light levels shall be submitted.

c. Revised Electrical Distribution: Manufacturer shall provide revised electrical distribution plans to include changes to service entrance, panel, and wire sizing.

PART 2 – PRODUCT

2.1 LIGHTING SYSTEM CONSTRUCTION

a. System Description: Lighting system shall consist of the following:

1. Galvanized steel poles and crossarm assembly. Concrete poles are not acceptable.

2. Pre-stressed concrete base embedded in concrete backfill. Alternate may be an anchor bolt foundation designed such that the steel pole and any exposed steel portion of the foundation be located a minimum of 18 inches above final grade. The concrete shall be allowed to harden for a minimum of 28 days before the pole stress is applied. Direct burial steel poles are not acceptable.

3. All luminaires shall be constructed with a die-cast aluminum housing to protect the luminaire reflector system.

4. Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted approximately 10' above grade. The enclosures shall include ballast, capacitor and fusing for each luminaire. Safety disconnect per circuit for each pole structure will be located in the enclosure.

5. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.

6. Manufacturer to provide a 1P auxiliary mounting bracket to be mounted on poles A1 & A3 at 20' to accommodate security fixtures. *(Security Fixtures to be provided by others)*

7. Manufacturer to provide (2) - 1P auxiliary mounting brackets to be mounted on pole A2 at 20' to accommodate security fixtures. (1x security fixture facing Field A, and 1x security fixture facing Field B.) *(Security Fixtures to be provided by others)*

8. Manufacturer to provide (2) - 1P auxiliary mounting brackets to be mounted on pole A1, and A3 at 25' to accommodate a speaker. *(Speakers to be provided by others)*

9. Manufacturer to provide (2) 1P auxiliary mounting bracket to be mounted on poles A2 at 25' to accommodate speakers. (1x speaker facing Field A, and 1x speaker facing Field B.) *(Speakers to be provided by others)*

10. Controls and Monitoring Cabinet to provide on- off control and monitoring of the lighting system, constructed of NEMA Type 4 aluminum. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured contactor modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual Off-On-Auto selector switches shall be provided.

b. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.

c. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed steel shall be hot dip galvanized per ASTM A123. All exposed hardware and fasteners shall be stainless steel of at least 18-8 grade, passivated and polymer coated to prevent possible galvanic corrosion to adjoining metals. All exposed aluminum shall be powder coated with high performance polyester. All exterior reflective inserts shall be anodized, coated with a clear, high gloss, durable fluorocarbon, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All wiring shall be enclosed within the crossarms, pole, or electrical components enclosure.

d. Lightning Protection: All structures shall be equipped with lightning protection meeting NFPA 780 standards. Contractor shall supply and install a ground rod of not less than 5/8" in diameter and 8' in length, with a minimum of 10' embedment. Ground rod should be connected to the structure by a copper main down conductor with a minimum size of #2 for poles with less than 75' mounting height and 2/0 for poles with more than 75' mounting height.

e. Safety: All system components shall be UL Listed for the appropriate application.

d. Electric Power Requirements for the Sports Lighting Equipment:

1. Electric power: 480 Volt, 3 Phase

2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

2.2 STRUCTURAL PARAMETERS

a. Support Structure Wind Load Strength: Poles and other support structures, brackets, arms, bases, anchorages and foundations shall be determined based on the 2007 edition of the CBC Building Code, wind speed of 85 MPH, exposure category C. Luminaire, visor, and crossarm shall withstand 150 mph winds and maintain luminaire aiming alignment. Foundation design will be based on the geotechnical report by Converse Consultants.

b. Structural Design: The stress analysis and safety factor of the poles shall conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

c. Soil Conditions: The design criteria for these specifications are based on soil design parameters as outlined in the geotechnical report prepared by Converse Consultants, see project number 07-81-368-01.

d. Foundation Drawings: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole. These drawings must be submitted at time of bid to allow for accurate pricing.

PART 3 – EXECUTION

3.1 FIELD QUALITY CONTROL

a. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA RP-6-01, Appendix B.

b. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles, uniformity ratios, and maximum kilowatt consumptions are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be liable to any or all of the following:

c. *Manufacturer shall at his expense provide and install any necessary additional fixtures to meet the minimum lighting standards. The Manufacturer shall also either replace the existing poles to meet the new wind load (EPA) requirements or verify by certification by a licensed structural engineer that the existing poles will withstand the additional wind load.*

d. Manufacturer shall minimize the Owner's additional long term fixture maintenance and energy consumption costs created by the additional fixtures by reimbursing the Owner the amount of $1,000.00 (one thousand dollars) for each additional fixture required.

SUBMITTAL INFORMATION

Design Submittal Data Checklist and Certification

All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements

Included	Tab	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	B	On Field Lighting Design	Lighting design drawing(s) showing: a. Field Name, date, file number, prepared by, and other pertinent data b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), or homeplate for baseball/softball fields. Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, as well as luminaire information including wattage, lumens and optics d. Height of meter above field surface e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance and uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor. f. Alternate manufacturers shall provide both initial and maintained light scans using a maximum 0.70 Light Loss Factor to calculate maintained values.
	C	Off Field Lighting Design	Lighting design drawings showing spill light levels in footcandles as specified in section 1.3 A.
	D	Life Cycle Cost calculation	Document life cycle cost calculations as defined in the specification. Identify energy costs for operating the luminaires, maintenance cost for the system including spot lamp replacement, and group relamping costs. All costs should be based on 25 Years.
	E	Luminaire Aiming Summary	Document showing each luminaire's aiming angle and the poles on which the luminaries are mounted. Each aiming point shall identify the type of luminaire.
	F	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of California.
	G	Control and Monitoring	Manufacturer shall provide written definition and schematics for automated control system to include monitoring. They will also provide examples of system reporting and access for numbers for personal contact to operate the system.
	H	Electrical distribution plans	If bidding an alternate system, manufacturer must include a revised electrical distribution plan including changes to service entrance, panels and wire sizing, signed by a licensed Electrical Engineer in the state of California.
	I	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed per specification for 25 years.
	J	Warranty	Provide written warranty information including all terms and conditions.
	K	Project References	Manufacturer to provide a list of project references of similar products completed within the past three years.
	L	Product Information	Complete set of product brochures for all components, including a complete parts list and UL Listings.
	M	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications.
	N	Compliance	Manufacturer shall sign off that all requirements of the specifications have been met at that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in item N – Non-Compliance

Manufacturer: _____ **Signature:** _____

Contact Name: _____ **Date:** _____/_____/_____

SECTION 16530
SITE LIGHTING

PART 1 - GENERAL

1.1 Section Includes:

a. Exterior luminaires and accessories.

b. Poles.

1.2 References:

a. ANSI C78.379 – Electric Lamps – Incandescent and High – Intensity Discharge Reflector Lamps- Classification of Beam Patterns.

b. ANSI C83.1 – Ballasts for Fluorescent Lamps Specification.

c. ANSI C82.4 – Ballasts for High-Intensity-Discharge and Low- Pressure Sodium Lamps (Multiple-Supply Type).

d. CEC-California Electrical Code.

e. ANSI/IES RP-20-Lighting for Parking Facilities.

1.3 Design Requirements:

a. Design and layout lighting system in conformance with IES recommended procedures.

b. Parking Lot: ANSI/IES RP-20, medium high activity level.

1.4 Submittals:

a. Submit under provisions of Section 01340.

b. Shop Drawings: Indicate dimensions and components for each luminaire which is not a standard product of the manufacturer.

c. Product Data: Provide dimensions, ratings, and performance data.

d. Design Data: Include lighting calculations.

e. Test Reports: Indicate measured illumination levels.

f. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under "Regulatory Requirements".

g. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

1.5 Project Record Documents:

a. Accurately record actual locations of each luminaire.

1.6 Operation and Maintenance Data:

a. Maintenance Data: Include instructions for maintaining luminaires.

1.7 Qualifications:

a. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.8 Regulatory Requirements:

a. Conform to requirements of CEC.

b. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.9 Delivery, Storage and Handling:

a. Accept products on site. Inspect for damage.

b. Protect poles from finish damage by handling carefully.

1.10 Coordination:

a. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.11 Extra Materials:

a. Provide two of each lamp type and wattage installed.

PART 2 - PRODUCTS

2.1 Luminaires:

a. Furnish products as specified on Drawings.

b. Install ballasts and specified accessories at factory.

c. Lamp: One each.

d. Accessories:

1. Provide photocell as indicated on drawings.

2. Provide fuse and fuse holder.

2.2 Ballasts:

a. Fluorescent Ballast:

1. Advance Transformer Co.

2. Universal Mfg. Co.

3. General Electric.

4. Description: ANSI C82.1, high power factor type electromagnetic ballast.

5. Provide ballast suitable for lamps specified.

6. Voltage: Match luminaire voltage.

7. Source Quality Control: Certify ballast design and construction by Certified Ballast Manufacturers, Inc.

b. High Intensity Discharge (HID) Ballast:

1. Advance Transformer Co.

2. Universal Mfg. Co.

3. General Electric

4. Description: ANSI C82.4, mercury vapor, metal halide, low pressure sodium, high pressure sodium or lamp ballast.

5. Provide ballast suitable for lamp specified.

6. Voltage: Match luminaire voltage.

2.3 LAMPS:

a. Fluorescent lamp Manufacturers:

1. Phillips.

2. Sylvania.

3. General Electric

b. High Intensity Discharge (HID) Lamp Manufacturers:

1. Phillips.

2. Sylvania

3. General Electric

c. Provide lamp type specified for luminaires.

d. Reflector lamp Beam Patterns: ANSI C78.379.

PART 3 - EXECUTION

3.1 Examination:

a. Examine excavation and concrete foundation for lighting poles.

b. Examine each luminaire to determine suitability for lamps specified.

3.2 Installation:

a. Install in accordance with manufacturer's instructions.

b. Install lighting poles at locations indicated.

c. Install poles plumb. Provide shims or double nuts to adjust plumb. Grout around each base.

d. Install lamps in each luminaires.

e. Bond luminaires, metal accessories and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.

3.3 Field Quality Control:

a. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

b. Measure illumination levels to verify conformance with performance requirements.

c. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.4 Adjusting:

a. Aim and adjust luminaires to provide illumination levels and distribution indicated on Drawings or as directed.

b. Relamp luminaires which have failed lamps at Date of Substantial Completion.

3.5 Cleaning:

a. Clean electrical parts to remove conductive and deleterious materials.

b. Remove dirt and debris from enclosure.

c. Clean photometric control surfaces as recommended by manufacturer.

d. Clean finishes and touch up damage.

END OF SECTION - 16530