

SECTION 265600 EXTERIOR LIGHTING-BUILDING MOUNTED

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this Section consists of Architectural Lighting, and includes but is not limited to the following:
 - 1. Exterior lighting fixtures, mounted to exterior building surfaces/structures
 - 2. Associated control gear mounted within the building
- B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. A list of those Documents and Sections includes, but is not limited to the following:
 - 1. Drawings and general provisions of the Contract, including General and Supplementary conditions and General Requirements, Division 01 Specification Sections, apply to this Section.
 - 2. Division 26 Section "Common Work Results for Electrical"
 - 3. Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

1.2 DEFINITIONS

- A. Fixture: The elements of a luminaire that are designed to distribute the light, and to position and protect the lamps.
- B. Luminaire: A complete lighting unit consisting of a lamp or lamps and transformers, LED drivers and/or ballasts (when applicable) together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.
- C. Gear: Another term for the transformers, LED drivers and/or ballasts required for luminaires. This term is most widely used outside of the United States.
- D. Lighting Unit: A fixture or an assembly of fixtures with a common support, including a pole or bracket plus mounting and support accessories.
- E. Average Rated Life:
 - 1. For solid state (LED) sources, average rated life is defined by the IESNA as L₇₀, which is the point in time when the source output in lumens reaches 70% of its initial rated value. Because LED sources do not burn out when they reach the end of their rated life, there will come a point in time after which the sources continue to provide light, but at a lower level than designed. At that time, an Owner may choose to replace the LED sources to restore the light level back to the designed amount. Average rated life for LEDs does not take into account the possibility of catastrophic failure.

- F. Flicker: Flicker is the amplitude modulation of light at frequencies that have effect of human physiology. Flicker may be perceptible to the human eye or imperceptible to the human eye.
 - 1. All LED sources shall provide visually flicker free operation throughout the dimming range specified on the specified control equipment.

1.3 QUALITY ASSURANCE

- A. Fixture Materials: Provide fixture parts and components that are constructed of materials most appropriate to their use or function, and that are resistant to corrosion in a marine environment and mechanical stresses encountered in the normal application and function of the fixtures.
- B. Manufacturers: Provide fixtures from manufacturers making like products for not less than five years prior to bid.
- C. Listing and Labeling: Provide fixtures and accessory components specified in this Section that are listed and labeled for their indicated use and installation conditions on Project.
 - 1. Special Listing and Labeling: Provide fixtures for use in damp or wet locations, and recessed in combustible construction, that are specifically listed and labeled for such use. Provide fixtures for use in hazardous (classified) locations that are listed and labeled for the specific hazard.
 - 2. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 - 3. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- D. Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL, ETL, CSA-US or other Nationally Recognized Testing Laboratory.
- E. Applicable Codes: Fixtures shall be made and installed in accordance with the current version of the National Electric Code, the Uniform Building Code, the Federal Occupational Safety & Health Act, local codes, and other applicable regulations.
- F. Measuring and Testing Equipment: Instruments for the measurement of voltage, luminaire temperature, lighting level and fixture brightness level shall be available at all times on the site.

1.4 BIDS & SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, unless noted otherwise.
 - 1. Bids and submittals shall include itemized unit pricing by fixture type, as labeled in the Luminaire Schedule and Drawings. Unit pricing shall describe any special conditions, such as an adder for custom colors, quantity discount, special warranties, etc.

- B. Product Data: Fixtures, lamps or LEDs, ballasts, drivers, transformers, and mounting components. Arrange Product Data for fixtures in order of fixture type, as labeled in the Luminaire Schedule. Include data on features and accessories and the following:
 - 1. Outline drawings indicating dimensions and principal features of fixtures.
 - 2. Electrical Ratings and Photometric Data: Certified results of independent laboratory tests for fixtures and lamps. Provide data for the specified lamp or lamp/ballast combination.
 - 3. LED Data: Manufacturer, ordering code and technical information.
 - 4. Driver Data: Manufacturer, ordering code, and technical information.
 - a. Where dimming is specified, technical data must specify dimming range provided by the driver.
 - b. Where multiple dimming curves are available, the dimming curve type shall be clearly indicated.
 - c. Dimming typology shall be clearly indicated.
- C. Scaled shop drawings detailing nonstandard fixtures and indicating dimensions, weights, method of field assembly, components, features, and accessories. Details shall be scaled at not less than half full size.
 - 1. Scaled shop drawings of continuous run fixtures shall indicate overall length of each run, lamp combinations used to achieve the length and any accessory components required.
- D. Wiring diagrams detailing wiring for control system coordination showing both factory-installed and field-installed wiring for specific system of this Project, and differentiating between factory-installed and field-installed wiring.
- E. Coordination Drawings showing fixtures mounted on, in, or above ceiling. Indicate coordination with ceiling grids and other equipment installed in vicinity.
- F. Wind Resistance Calculations: Certified by a registered professional engineer.
- G. Product certificates signed by manufacturers of lighting fixtures certifying that their products comply with specified requirements.
- H. Field test reports indicating and interpreting test results specified in Part 3 of this Section.
- I. Maintenance data for fixtures, lamps and ballasts, to include in the operation and maintenance manual specified in Division 1.
 - 1. Data shall include warranty information, lamp and ballast life and replacement costs, as well as other fixture information required in Division 1.

1.5 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall be in addition to, and run concurrent with, other warranties made under requirements of the Contract Documents.

- B. Special Warranty for Exterior Luminaire Finish: Submit a written warranty signed by manufacturer and Installer agreeing to replace external parts of lighting fixtures exhibiting a failure of finish as specified below. This warranty is in addition to, and not a limitation of, other rights and remedies specified elsewhere within the Contract Documents.
 - 1. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.
 - 2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.
 - 3. Special Warranty Period: 5 years from date of Substantial Completion.
- C. LED Fixture Warranties: Warrant complete LED systems, including LEDs, drivers, and all other system components for 5 years minimum against failure, variation in color temperature beyond plus/minus 200K, and depreciation of output below 70%.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Luminaires and lighting equipment shall be delivered to the project complete, including mounting devices, lamps and components necessary for the proper operation of the equipment.
- B. Marking: All equipment must be clearly and boldly identified as to the fixture type and, where practicable, the fixture location.
 - 1. Voltage identification: Fixtures designed for voltages other than 110-125 volt circuits shall be clearly marked.
 - 2. Lamp and gear coordination: Fixtures equipped with transformers, LED drivers, ballasts, or other components requiring use of specific types of lamps/LEDs shall be plainly marked. Markings must be clear and shall be located to be readily visible to service personnel but invisible from normal viewing angles when lamps are in place.
- C. Timely Purchase: Luminaires, associated lamps and other allied equipment shall be ordered in a timely fashion and securely stored to be available to meet the project schedule.
- D. Storage: Contractor shall store all fixtures in locations where they will be protected against damage due to moisture, dust, extreme temperatures and/or the work of other project construction trades.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. The Owner shall confirm attic stock requirements.
 - 1. Power Supplies: 1 for every 10 of each type and rating installed.
 - 2. LED Luminaires: 1 for every 10 of each type and rating installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, luminaires and related lighting controls requirements are specified in the Luminaire Schedule as basis of Design. General Contractor to provide equivalent or better where substitution may be required.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

- A. Sheet Metal Components: Provide the required dimensional thickness of metal, plastic and composite materials so that all fixtures are rigid, stable and will resist deflection, twisting, warping under normal installation, and relamping procedures.
 - 1. All luminaire housings shall be minimum 0.84mm cold rolled steel, unless a heavier gauge is specified or required by code.
 - 2. All aluminum extrusion housings shall be minimum 5mm thick.
 - 3. All spun, hydro-formed or sheet aluminum reflectors shall be fabricated from #12 aluminum sheets minimum, 1.45mm or heavier. Material shall be 3002 alloy, 99.5% pure aluminum with uniform grain structure.
 - 4. All spun aluminum housings shall be of an alloy of the 5000 series (ANSI/ASTM-B209-1977) or of an alloy that is found to have equal corrosion resistance.
- B. Joints: Provide positive, durable, means of connection at all joints as required. No hollow rivets, unless specifically approved.
- C. Gaskets: Provide neoprene, silicone, rubber, or other appropriate gaskets, stops, and barriers where required to prevent light leak, control sound and vibration, prevent water leaks and, if pertinent, water vapor penetration.
- D. Edges: Provide finished product with the following minimum qualities:
 - 1. Ground and/or burr free metal edges.
 - 2. Tight fitting connections, hinges and closures.
 - 3. Clean neat corners, edges, trims and frames.
- E. Castings: All cast parts, including die-cast members, shall be of uniform quality; free from blow holes, pores, hard spots, shrinkage defects, cracks and or other imperfections that affect strength and appearance, or are indicative of inferior metals or alloys.
- F. Reflecting Surfaces: Minimum reflectance as follows, except as otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
 - 4. Laminated Silver Metallic Film: 90 percent.
- G. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or water-white, annealed crystal glass, except as otherwise indicated. Soda-lime glass lenses are not acceptable. Heat resistant where required: borosilicate or Pyrex glass.
 - 1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 2. Lens Thickness: 0.125 inch (3 mm) minimum; except where greater thickness is indicated.

- H. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

- I. Exposed Hardware Material: Stainless steel.

2.3 FINISHES

- A. Manufacturer's standard, except as otherwise indicated, applied over corrosion-resistant treatment or primer, free of streaks, runs, holidays, stains, blisters, and similar defects.
 - 1. Prior to finishing, all surfaces must be free from foreign materials such as dirt, rust, oil, polishing compounds and mold release agents.
 - 2. Where necessary, surface cleaned by accepted chemical means shall receive corrosion inhibiting phosphating treatment assuring positive paint adhesion.
 - 3. All castings and extrusions shall be machined, sanded or similarly treated, and given minimum one coat of baked-on clear methacrylate lacquer, unless a painted finish is specified.
 - 4. Aluminum surfaces exposed to weather (other than anodized reflectors covered elsewhere) receive a duronodic or polyester powder paint finish as specified for corrosion resistance.
 - 5. Sheet steel fixture housings, iron and steel parts, which have not received phosphating treatment ("Bonderizing" or similar process) or are to be utilized in exterior applications, are to be made corrosion resistant by zinc or cadmium plating or hot-dip galvanizing. All plating or hot-dipping shall be performed after parts are fabricated.
 - 6. Anodized aluminum reflectors required for exterior use shall have a minimum of 0.2 mils anodizing thickness
 - 7. Anodized reflectors for interior use shall have a minimum of .006mm (.25mils) anodizing thickness for clear reflectors. Specular reflectors shall have 86% to 91% reflectivity. All reflectors shall be double sealed, first in Nickel Acetate and then in Sandoz Andal sealant at a minimum of 208 deg. All Specular reflectors shall meet or exceed the specification for the Alzak process.

2.4 LAMPS / LIGHT SOURCES

- A. Solid State Lighting / Light Emitting Diodes (LEDs):
 - 1. All individual LEDs used within a luminaire must be manufactured by a reputable LED manufacturer, such as: Cree, Osram Sylvania, Nichia, Philips (Lumileds) or approved equal. LED modules shall be manufactured by a reputable LED manufacturer such as: Bridgelux, Philips (Fortimo) or Xicato.
 - 2. Testing: All products shall be tested by a Nationally Recognized Testing Laboratory (NRTL) in accordance with IES LM-79 testing methods and shall carry a UL, ETL or CSA label. Fixture manufacturer shall confirm in writing that the LEDs within the fixture will not exceed the maximum temperature to which the LED die was tested using IES LM-80 testing methods.
 - 3. Drive Current, Thermal Management and LED rated Life: Drivers must not over-drive the LEDs beyond LED manufacturer's recommendations and shall adhere to device manufacturer guidelines, certification programs, and test procedures for thermal management of LEDs within their fixtures. Drive current and luminaire thermal design

- must ensure minimum 50,000 hour rated life for the LEDs.
4. Color Consistency: All LEDs from the same manufacturer, both within each luminaire and from luminaire to luminaire, must be batch-sorted for visual color and brightness consistency. All luminaires of the same type shall be supplied at the same time and shall come from the same batch. Spare luminaires shall be provided from the same batch.
5. Dimming: Luminaire manufacturer must provide specific data on the means of dimming for coordination of the proper control device (specified elsewhere). Dimming must provide uniform, smooth, flicker free, full-range dimming. LEDs must maintain consistent brightness and color throughout the dimming range.
6. Technology Upgrades: Supply the newest LED technologies that are available for the specified products when the orders are released, as long as there are no increases in input watts or cost.
7. Warranty: See Part 1.5 C. above for the warranty requirement for LED luminaire systems.
8. Lamp Burn-in Period: LED sources in hard to access locations shall be burned in for a 300-hour (2 week) period prior to removal of scaffolding or other access methods. Where the Owner wishes to avoid “unveiling” of the lighting to the general public, lighting should be burned-in during daylight hours and turned off before sunset.

2.5 TRANSFORMERS

- A. Suitability: Transformers shall be of the best quality and meet the following requirements:
 1. Where possible transformers shall have an integral line voltage switch.
 2. All transformers shall be locally fused or have secondary side breakers.
 3. Provide adequate ventilation to meet code and manufacturers requirements concerning temperature rise.
 4. Remote transformer quantities and sized for low voltage lighting shall be coordinated/ determined according to final loads based on final lighting fixtures and control zones specified for the project. Each fixture shall require a separate feed from the transformer to the lighting fixture. Feed lengths to lighting fixtures within a zone shall be uniform in length, or each run sized accordingly to provide a uniform voltage to all fixtures; excess wiring shall not be coiled. Acceptable voltage supplied at the fixture shall not exceed the rated lamp voltage nor drop more than 5% below that rated voltage. All wiring from transformers to low voltage lighting fixtures shall be sized to compensate for voltage drop, which will be determined by the load, voltage, and length of run, based on the final coordinated accessible location of the remote transformer. All transformers shall be suitable for dimming their primary side, via a remote lighting control system.
 5. When remote transformers are being used to power LED solid state sources, the transformer must be coordinated with its manufacturer based on, but not limited to, the following factors:
 - a. Steady state operating current of the sources controlled must not exceed the rating of the transformer’s overcurrent protection.
 - b. Inrush current of the sources controlled must not exceed the rating of the transformer’s overcurrent protection.
 - c. Transformer shall have multiple secondary-side voltage taps to allow field adjustment of under-voltage or over-voltage conditions to meet the source’s

- secondary-side voltage rating.
- d. Transformers shall be sized up in capacity so that the load does not reduce the source's full range dimming performance. Do not load to capacity. Consult the transformer manufacturer for recommendations on loading based on the sources and dimmer being used.

2.6 LED DRIVERS

A. LED drivers shall meet the following requirements:

1. Drivers shall have a minimum efficiency of 85%
2. Starting Temperature: -40° C
3. Input Voltage: capable of 120 to 480 (±10%) volt, single phase or as required by the site
4. Power supplies can be UL Class I or II output
5. Surge Protection: The system must survive 250 repetitive strikes of "C Low" (C Low – 6kV/1.2 x 50 µs, 10kA/8 x 20 µs) waveforms at 1 minute intervals with less than 10% degradation in clamping voltage. "C Low" waveforms are as defined in IEEE/ASNI C62.41.2-2002, Scenario 1 Location Category C
6. Drivers shall have a Power Factor (PF) of: ≥ 0.90
7. Drivers shall have a Total Harmonic Distortion (THD) of: $\leq 20\%$
8. Drivers shall comply with NEMA 410-2015 standards for inrush current.
9. Drivers shall comply with FCC 47 cfr part 18 non-consumer RFI/EMI standards
10. Where dimming is specified, drivers shall provide smooth, flicker free dimming within the range specified.
11. Drivers shall be Reduction of Hazardous Substances (RoHS) compliant (see <http://www.rohs.eu/english/index.html>)

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's written instructions and approved Shop Drawings. Support fixtures according to requirements of Specification Section on "Basic Electrical Materials and Methods."
- B. Architectural Enclosures for Light Fixtures: Any construction surrounding a light fixture that is not part of the fixture itself.
 1. Cavity not to exceed maximum operating temperature range of fixture as reported by fixture manufacturer.
 2. Cavity to be light tight with no light leaks.

3.2 WIRING

- A. Minimum standards: All wiring shall comply with the following standards:
 1. All wiring within lighting fixtures or from the splice with the building wiring shall be as specified under Division 26 "Wire and Cables".
 2. Exterior jacketed wire leads from fixture shall be concealed behind fixtures, except where the fixture design or mounting dictates otherwise.
 3. Joints in wiring within lighting fixtures and connections of the fixture wiring to the

wiring of the building shall be as specified under "WIRE AND CABLES" with special attention to paragraphs relating to high amperage, low voltage conditions.

4. Wiring channels and wireways shall be free from projections and rough or sharp edges throughout, and at all points or edges over which conductors must pass and may be subject to injury or wear.
5. Insulated bushings shall be installed at points of entrance and exit of flexible wiring.

3.3 GROUNDING

- A. Ground fixtures according to Specification Section on "Grounding." Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components, prior to scheduling punchlist review.
- B. Give advance notice of dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source.
- E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.
- F. Report results of tests.
- G. Replace fixtures that show evidence of corrosion during Project warranty period.

3.5 CLEANING AND ADJUSTING

- A. Clean fixtures after installation: Remove all protective strippable coatings, dust, finger marks, paint spots and any materials deleterious to the appearance or functioning of the fixtures. Use methods and materials recommended by manufacturer. Abrasive cleaners are not permitted.
- B. Lighting interface with dimming controls: Where lighting is being controlled on a dimming system, the system shall be up and running at the time of final nighttime review so that the Lighting Designer may provide input on programming of preset colors and shows.
 1. The Electrical Contractor and technical representative from the dimming manufacturer shall test the dimming system to ensure that all DMX channels are clearly identified, allowing separate control by façade, by floor level, etc. when preset shows are set-up.
 - a. All fixtures must be addressed and DMX channels confirmed to be working properly.
 - b. A means of standing outside and communicating with the system programmer (walkie-talkies, etc.) must be coordinated by the Contractor to facilitate final programming and review of preset colors and shows.

2. The Electrical Contractor and technical representative from the dimming manufacturer shall test every zone to ensure smooth, flicker free dimming from 100% maximum to the minimum extent specified and proper color changing. Where fixtures do not perform correctly in terms of dimming or color-changing, the Electrical Contractor and technical representative must make any necessary adjustments to the system to achieve proper performance.
3. These items shall be confirmed in writing by the Electrical Contractor prior to the final focusing site visit by the Lighting Designer.
4. Technical personnel from the dimming manufacturer shall be on hand at final focusing to review and adjust the preset colors and shows and coordinate with the Lighting Designer. Note that night time work hours will be required per Part 3.5, B. above.
5. If the dimming system is not fully operational and working properly at the time of final focusing, and the Lighting Designer cannot perform the required focusing and punchlisting work and/or set-up the preset light levels during their contracted site visit(s) where required, then the Contractor shall be responsible for covering the Lighting Designer's fee and expenses for a follow-up site visit for this purpose.

3.6 FINAL INSPECTION

- A. Upon completion of the installation, lighting equipment must be in first class operating order and free from defects in condition and finish.
- B. "Final Inspection" and the "Focusing and Adjustment" site visit by the Lighting Designer are one and the same.
 1. At time of final inspection by the Lighting Designer, all fixtures and equipment must be installed and be complete with all necessary components.
 2. Fixtures shall be completely clean and free from finger marks, dust, plaster or paint spots.
 3. Any fixtures or components damaged prior to the final inspection shall be replaced.
 4. Where finish has been scratched or damaged on exterior fixtures, repair finish to match factory color.
 5. Fixtures shall be rigidly installed and aligned to run straight and true within the curtain wall slot.
 6. No light leaks shall be permitted from any visible part or joint.
- C. LED sources shall have been burned-in as required in Part 2.4, G.
- D. After issuance of the Lighting Designer's final punchlist, it is the responsibility of the Contractor to make all adjustments and corrections as noted in the punchlist.

3.7 CONSTRUCTION WASTE MANAGEMENT (LEED)

- A. The contractor, subcontractors, and their personnel shall follow the procedures and practices for waste separation, collection and transport as defined in the contractor's "Waste Management Plan" as required by Division 01 Section "Construction Waste Management."

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP/ELECTRICAL	MANUFACTURER / CATALOG #
LX1	<p>Color-changing + white direct-view strip light, mounted within a 1.5” wide x 2” deep curtain-wall slot with 0.5” of the fixture projecting beyond the façade surface</p> <p><u>Location:</u> Exterior facade</p>	<p><u>Source:</u> High intensity RGB plus 6500K white LEDs <u>Color Range:</u> 16.7 million additive RGB colors; 6500K CCT white <u>Beam Angle:</u> 110-degrees <u>Lumens:</u> 174 per LF <u>Watts:</u> 4.6 per LF <u>Primary Voltage:</u> 277V input to power supplies <u>Secondary Voltage:</u> 48VDC <u>Control Protocol:</u> DMX</p>	<p>TRAXON TECHNOLOGIES Media Tube HO RGBW-Direct View</p> <p>#TU.CS.5115001-MOD (5-ft. length, modified for 3 x 4-in. length pixels per foot, 15 pixels total)</p> <p>#TU.CS.4112001-MOD (4-ft. length, modified for 3 x 4-in. length pixels per foot, 12 pixels total)</p> <p>#TU.CS.3109001-MOD (3-ft. length, modified for 3 x 4-in. length pixels per foot, 9 pixels total)</p>
	<p><u>Type LX1 Notes:</u></p> <p><u>Fixture:</u> Provide with clear, flat “direct-view” lens to maximize intensity. Fixtures are modified in the factory for a 4” pixel module (the smallest increment that can change color or intensity separately). Typical fixtures are 5-ft. length nominal (58.9”), with shorter 4-ft. length nominal (47.1”) or 3-ft. nominal (35.3”) sections at ends of runs only where shown on the lighting layouts. Fixtures will be mounted end-to-end with a minimum gap between units of 0.16” or greater as shown on the lighting layouts. Each group of up to (7) 5-ft. fixtures (35-ft. run length max.) shall interconnect by means of the exterior-grade connectors on the underside of the fixtures and shall then feed to a dedicated power supply unit located inside the building. Each fixture is supplied with two mounting clips. Provide connector end-cap #TU.AC.0600000 for connector at non-feed end of run.</p> <p>Fixtures will mount into a 1.5” width x 2” deep slot within the curtain wall panels. 0.5” of the fixture will extend out of the slot beyond the face of the panel. Contractor shall install the clips tight to the bottom of the slot with the locking-screw side up to insure a consistent and straight mounting of fixtures along the runs.</p> <p>Each fixture shall have separate DMX control channels for red, blue, green and white. Based on a 4-in. pixel spacing, there will be 12 DMX channels per foot, 60 DMX channels per 5-ft. fixture, 48 DMX channels per 4-ft. fixture and 36 DMX channels per 3-ft. fixture, for a maximum of 420 DMX channels per separate run.</p> <p><u>Starter Cable:</u> #TU.AC.0600300 quick-lock starter cable (open wire), 35m (114-ft.) length, 17AWG. Each group of up to (7) fixtures shall feed into the building by means of a starter cable supplied by the fixture manufacturer. Cables are jacketed and have an exterior-grade connector at one end. The portion of the cable that runs inside the building within the ceiling cavities must be run inside conduit because the interior ceilings are plenums and the cable is not plenum rated.</p> <p>(Continued next page)</p>		

Notes: 1. Contractor shall verify all catalog codes with written and drawn descriptions.

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP/ELECTRICAL	MANUFACTURER / CATALOG #
LX1	<p><u>Type LX1 Notes (continued):</u></p> <p><u>WAGO Terminal Block:</u> #TU.AC.0000200 Wago terminal block set (open wire). The end of the starter cable shall wire into a terminal block supplied by the fixture manufacturer. At this point, power and data wiring will split apart and run separately to the electrical panel or controller rack respectively. Terminal block shall be located adjacent to each power supply unit within the same enclosure.</p> <p><u>Wiring between Terminal Block and Power Supply:</u> Power wiring between the terminal block and power supply shall be provided by Contractor as per power supply manufacturer's wiring diagram, included within the cut sheets at the end of this Section. Contractor shall ensure that the voltage at the terminal block is 48VDC (at least) at the terminal block.</p> <p><u>Power Supply Unit:</u> #PS.OB.0011002 LED Engine (Meanwell #HLG-240H Series), 240W capacity, 120-277 multi-volt primary to be supplied with 277V per Electrical Engineer, 48VDC secondary, provided by Traxon. No other power supply shall be used with this lighting system. Power supply is not plenum rated. Because PSUs will be mounted above interior plenum ceilings adjacent to the perimeter curtain wall, each PSU (and an associated terminal block) must be mounted within a metal plenum-rated enclosure, by HEFTI or equal, to be provided by Contractor and sized to meet the following requirements per Meanwell as forwarded by Traxon:</p> <ul style="list-style-type: none"> - The size of the box shall be 2 to 3 times the volume of the HLG-240H-48 power supply unit. - Allow 10-15 cm. minimum clearance around the box. - Nothing should be stacked on top of the box. - Ambient temperature should be maintained with the limits shown on the chart below. <div style="text-align: center;"> <p>■ OUTPUT LOAD vs TEMPERATURE</p> <p>The figure consists of two side-by-side line graphs. Both graphs have 'LOAD (%)' on the y-axis, ranging from 20 to 100 in increments of 20. The left graph's x-axis is 'AMBIENT TEMPERATURE, Ta (°C)' ranging from -40 to 70 in increments of 5. It shows two lines: one for 230VAC and one for 100VAC. Both lines are at 100% load until approximately 60°C, then drop to 60% at 70°C. The right graph's x-axis is 'Tcase (°C)' ranging from -40 to 90 in increments of 5. It shows a single line that remains at 100% load until 90°C, where it drops to 0%.</p> </div> <p>Each power supply unit would be mounted within a separate enclosure with its associated terminal block. See Lighting/Electrical Drawings for locations of power supply units. See Electrical Drawings for power wiring and circuiting between the power supply units and the electrical panel(s).</p> <p>(Continued next page)</p>		

Notes: 1. Contractor shall verify all catalog codes with written and drawn descriptions.

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP/ELECTRICAL	MANUFACTURER / CATALOG #
LX1	<p><u>Type LX1 Notes (continued):</u></p> <p><u>Data Wiring:</u> From the Wago terminal block, each run of up to (7) 5-ft. fixtures will require one data wire home run back to the central processor unit, to be located on the 15th Floor. CAT5 or CAT6 cables shall be supplied by the Contractor. Maximum distance is 834-ft. from the terminal block to the controller. Max. distance is determined based on DMX protocol communication requirements.</p> <p><u>Control Processor Unit:</u> #EN.LC.9400000 Ecue “LCE2 fx” Lighting Control Engine 2 fx, to be mounted in a conditioned space within a rack to be provided by Traxon. Control rack to be located in a dry, accessible and conditioned location. Allow for an internet connection adjacent to the rack to allow remote access to the control system.</p> <p><u>Mounting Rack:</u> Middle Atlantic Products #ERK-4425 Enclosure, 81.125” H x 25” D x 22” W, to be provided by Traxon, assembly and wiring by Contractor.</p> <p><u>Wiring at Rack:</u></p> <ul style="list-style-type: none"> - Control system components are 120VAC. - All Cat5/6 Patch Cables (15 needed at least) to be provided by the Contractor. - All Cat5/6 Cables running to fixtures to be provided by the Contractor. <p><u>Other Rack Mounted Components (Quantities per Traxon):</u></p> <ul style="list-style-type: none"> - Cisco Series 300 network switch (24-port switch used in this setup), the control processor unit and other components listed below will connect to these switches. - (12) Butler Pro DMX. - (1) Butler XT2. - (1) Butler XT Garage. - (1) Rackmount KVM and DVI switch. - (1) Rackmount Console #RM-KB-LCD Series. <p><u>Keypad:</u> Glass Touch User Terminal T12 White wall mounted keypad, for manual control / preset color or light show selection, connects to Butler XT2. Contractor shall provide 2#16 wiring between Butler XT2 and keypad location TBD by Owner, max. distance 1,300-ft.</p> <p>(Continued next page)</p>		

Notes: 1. Contractor shall verify all catalog codes with written and drawn descriptions.

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP/ELECTRICAL	MANUFACTURER / CATALOG #
LX1	<p><u>Type LX1 Notes (continued):</u></p> <p><u>Programming:</u> Traxon shall provide onsite set-up, testing and programming services as required for a complete, functioning system. Site visits shall include at a minimum:</p> <ul style="list-style-type: none">- One site visit for system start-up and testing.- One site visit for nighttime programming review in the presence of the Lighting Designer and Owners.- One follow-up site visit for nighttime review of any programming changes/adjustments proposed at the previous viewing. <p>Programming content shall be provided to Traxon by the Lighting Designer no less than three weeks prior to system start-up. Contractor shall advise the Lighting Designer of the date at least 2 weeks before the content information is due to Traxon.</p>		

END OF SECTION 265600

Notes: 1. Contractor shall verify all catalog codes with written and drawn descriptions.