



REQUEST FOR QUOTATION

Vendor Name and No.:	Collective/Bid # 46138	Bid Due Date 06/21/2016
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Quantity	Description	Unit Price	Total
	<p>This is a Formal Bid Invitation</p> <p>Bid Submission Instructions:</p> <p>Sealed Bids must be submitted to and received at the following address by the due date and time listed on this Request for Quotation, where they will be publicly opened and read:</p> <p>The Port Authority of NY & NJ Attn: Bid Custodian Procurement Department 4 World Trade Center 150 Greenwich Street, 21st Floor New York, NY 10007</p> <p>Clearly mark the outside of your envelope/package with "BID ENCLOSED", the Collective/Bid Number and Due Date, and your complete company name and address.</p> <p>Bids are only accepted Monday through Friday, excluding Port Authority holidays, between the hours of 8 A.M. & 5 P.M., via regular mail, express delivery service or hand delivery. Express carrier deliveries by commercial vehicles can be made via vendors approved by Silverstein Properties, the 4 World Trade Center (4WTC) Property Manager, through the Vehicle Security Center (VSC). Presently, UPS is the only delivery vendor with approved recurring delivery times. There is extensive security at the World Trade Center Site. Individuals must present a valid</p>		
	PLEASE QUOTE FULLY DELIVERED PRICES	PAYMENT TERMS	Total Delivered Price

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We have read the instructions and, if favored with an order, we agree to furnish the items enumerated herein at the prices and under the conditions indicated.

Signed _____

Firm Name _____

Telephone number _____ Date _____

Fax Number _____

Federal Taxpayer ID _____

<p>Bidder Must Sign In Two Places</p>
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	<p>government-issued photo ID to enter 4 WTC. Individuals without packages or carrying small packages or boxes that can be conveyed by hand or on a hand truck may enter through the lobby. All envelopes, packages and boxes may be subject to additional security screening.</p> <p>There is no parking available at 4 WTC/150 Greenwich Street, and parking in the surrounding area is extremely limited. The Port Authority assumes no responsibility for delays, including, but not limited to delays caused by any delivery service, building access procedure or security requirement.</p> <p>A valid government-issued photo ID is required to gain access into the building to attend the bid opening or hand deliver a bid. Bids that are not received by the bid custodian by the scheduled bid opening date will be considered late.</p> <p>If any Addenda are posted or sent as part of this Bid, the Bidder shall complete, sign and include with its Bid the addenda form(s). In the event any Bidder fails to conform to these instructions, its Bid will nevertheless be construed as though the Addenda had been acknowledged. If the Bidder downloaded this solicitation document, it is the responsibility of the Bidder to periodically check the Port Authority website at http://www.panynj.gov/business-opportunities/bid-proposaladvertisements.html and download any addenda that might have been issued in connection with this solicitation.</p>		
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	Quote fully-delivered prices, in United States Dollars, for delivery to the above address at John F. Kennedy International Airport.		
254 EA	BE4000170 LIGHT BASE, BOTTOM SECTION LIGHT BASE, NON LOAD BEARING, HOT-DIPPED GALVANIZED, L-867 CLASS 1A. JAQUITH #AC21182Q45Q332. BOTTOM SECTION BASE CAN, 18" HIGH X 12" ROUND FOR ELEVATED LIGHTING FIXTURES WITHIN ASPHALT PAVEMENT INCLUDING MUDPLATE AND PLYWOOD COVER. IN ADDITION TO THE SPECIFICATIONS: 1) PROVIDE ALL BOTTOM SECTION LIGHT BASES WITH BOLTED CONNECTION GROUND LUG AND GROUND STRAP ON THE INTERIOR WALL OF THE BASE CAN. EXTERIOR WALL TO INCLUDE GROUND STRAP. 2) PROVIDE ALL BOTTOM SECTION LIGHT BASES WITH A 1-1/4" DIAMETER OFFSET DRAIN. 3) PROVIDE FOUR 2" CONDUIT HUB OPENINGS. PER PA SPECIFICATION 16000, 16542.		
137 EA	BE4000171 LIGHT BASE, TOP SECTION, 3-1/2", L-867 CLASS 1A. JAQUITH #AT2009. PER PA SPECIFICATION 16000, 16542.		
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254 EA	BE4000172 LIGHT BASE, TOP SECTION, 3-3/4", L-867 CLASS 1A, JAQUITH #AT2009. PER PA SPECIFICATION 16000, 16542.		
254 EA	BE4000173 LIGHT BASE, TOP SECTION, 4", L-867 CLASS 1A, JAQUITH #AT2009. PER PA SPECIFICATION 16000, 16542.		
254 EA	BE4000174 LIGHT BASE, TOP SECTION, 4-1/4", L-867 CLASS 1A, JAQUITH #AT2009. PER PA SPECIFICATION 16000, 16542.		
137 EA	BE4000175 LIGHT BASE, TOP SECTION 4-1/2", L-867 CLASS 1A, JAQUITH #AT2009. PER PA SPECIFICATION 16000, 16542.		
254 EA	BE4000190 MUD PLATE, 1/8", FOR ELEVATED AND IN-PAVEMENT CANS, L-867 + L-868 BOTTOM SECTION, 12" DIAMETER		
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Quantity	Description	Unit Price	Total
	WITH CENTER DRILL. JAQUITH #AM5417 W/10.25" BC. PER PA SPECIFICATIION 16000, 16542.		
254 EA	BE4000176 PLATE, PANYNJ HEAVY DUTY BASE PLATE, L-867, FOR ELEVATED LIGHT FIXTURES, JAQUITH # AP1602G. BASE PLATE, TOTAL THICKNESS = 3/4", 6 -7/16" DIA. EQUALLY SPACED THRU HOLES WITH 1-1/18" DIA X 1/4" DEEP COUNTER BORE IN ADDITION TO THE SPECIFICATIONS: 1) AVIATION YELLOW POWDER COAT FINISH 2) SHIP WITH NEOPRENE GASKET PER PA SPECIFICATION 16000, 16542.		
896 EA	BE4000180 LIGHT BASE, BOTTOM SECTION, LOAD BEARING, GALVANIZED STEEL, L-868 CLASS 1A, JAQUITH #AC24182Q25Q3P9. BOTTOM SECTION BASE CAN, 18" HIGH X 12" ROUND FOR IN-PAVEMENT LIGHTING FIXTURES WITHIN ASPHALT PAVEMENT INCLUDING MUDPLATE AND PLYWOOD COVER. IN ADDITION TO THE SPECIFICATIONS: 1)PROVIDE ALL BOTTOM SECTION LIGHT BASES WITH		
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	BOLTED CONNECTIN GROUND LUG AND GROUND STRAP ON THE INTERIOR WALL OF THE BASE CAN. EXTERIOR WALL TO INCLUDE GROUND STRAP. 2) PROVIDE ALL BOTTOM SECTION LIGHT BASES WITH A 1-1/4" DIAMETER OFFSET DRAIN. 3) PROVIDE A SIDE WALL THICKNESS OF .130" 4) PROVIDE A BOTTOM WALL THICKNESS OF 1/4" 5) PROVIDE EPOXY HOOKS ON THE EXTERIOR BOTTOM OF THE BASE CAN 6) PROVIDE FOUR 2" THREADED CONDUIT HUB OPENINGS. PER PA SPECIFICATION 16000, 16542.		
449 EA	BE4000181 LIGHT BASE, TOP SECTIONS 3-1/2", L-868 CLASS 1A. JAQUITH #AE2419XPA. PER PA SPECIFICATION 16000, 16542.		
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Quantity	Description	Unit Price	Total
896 EA	BE4000182 LIGHT BASE, TOP SECTION, 3-3/4", L-868 CLASS 1A. JAQUITH #AE2419XPA. PER PA SPECIFICATION 16000, 16542.		
896 EA	BE4000183 LIGHT BASE, TOP SECTION, 4", L-868 CLASS 1A. JAQUITH #AE2419XPA. PER PA SPECIFICATION 16000, 16542.		
896 EA	BE4000184 LIGHT BASE, TOP SECTION, 4-1/4", L-868 CLASS 1A. JAQUITH #AE2419XPA. PER PA SPECIFICATION 16000, 16542.		
449 EA	BE4000185 LIGHT BASE, TOP SECTION, 4-1/2", L-868 CLASS 1A. JAQUITH #AE2419XPA. PER PA SPECIFICATION 16000, 16542.		
896 EA	BE4000186 RING, FLANGE RING, WITH PAVEMENT DAM, 3/4" THICK, HOP DIPPED,		
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	GALVANIZED, L-868. JAQUITH #AF540212Y. PER PA SPECIFICATION 16000, 16542.		
939 EA	BE4000187 RING, SPACER RING, 1/16" THICK, HOT DIPPED, GALVANIZED, L-868. JAQUITH #AR5421-01. PER PA SPECIFICATION 16000, 16542.		
939 EA	BE4000188 RING, SPACER RING, 1/8" THICK, HOT DIPPED, GALVANIZED, L-868. JAQUITH #AR5421-02. PER PA SPECIFICATION 16000, 16542.		
939 EA	BE4000189 RING, SPACER RING, 1/4" THICK, HOT DIPPED, GALVANIZED, L-868. JAQUITH #AR5421-04. PER PA SPECIFICATION 16000, 16542.		
896 EA	BE4000195 MUD PLATE, 1/8", FOR ELEVATED AND IN-PAVEMENT		
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	CANS, L-868, 12" DIAMETER WITH CENTER DRILL. JAQUITH #AM5427 w/11.25" BC. PER PA SPECIFICATIION 16000, 16542.		
770 EA	CU0400150 COVER PLATE, TOTAL THICKNESS = 3/4", 6 -7/16" DIA. EQUALLY SPACED THRU HOLES WITH 1-1/18" DIA X 1/4" DEEP COUNTER BORE, JAQUITH # AK400012.		
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TERMS AND CONDITIONS

1. The Port Authority (PA) reserves the right to request information relating to seller's responsibility, experience and capability to perform the work.
2. Unless otherwise provided, complete shipment of all items must be in one delivery FOB delivery point. Payment will not be made on partial deliveries unless authorized in advance by the party to be charged and the discount, if any, will be taken on the total order.
3. PA payment terms are net 30 days. Cash discounts for prompt payment of invoices may be taken but will not be considered in determining award, except in the case of tie bids.
4. Separate unit and total FOB delivered prices must be shown.
5. Sales to the PA and to PATH are currently exempt from New York and New Jersey State and local taxes and generally from federal taxation. The seller certifies that there are no federal, state, municipal or any other taxes included in the prices shown hereon.
6. The PA shall have the absolute right to reject any or all proposals or to accept any proposal in whole or part and to waive defects in proposals.
7. Unless the phrase "no substitute" is indicated, bidder may offer alternate manufacturer / brands, which shall be subject to Port Authority approval. Please indicate details of product being offered with bid.
8. Acceptance of seller's offer will be only by Purchase Order Form signed by the PA. No change shall be made in the agreement except in writing.
9. If the seller fails to perform in accordance with the terms of this purchase order, the PA may obtain the goods or services from another contractor and charge the seller the difference in price, if any, a reletting cost of \$100, plus any other damages to the PA.
10. Upon request, sellers are encouraged to extend the terms and conditions of any terms agreement with the PA to other government and quasi-government entities by separate agreement.
11. By signing this quotation or bid, the seller certifies to all statements on Form PA 3764A regarding non-collusive bidding; compliance with the PA Code of Ethics; and the existence of investigations, indictments, convictions, suspensions, terminations, debarments and other stated occurrences to assist the PA in determining whether there are integrity issues which would prevent award of the contract to the seller. The PA has adopted a policy set forth in full on PA 3764A, that it will honor a determination by an agency of the State of New York or New Jersey that a bidder is not eligible to bid on or be awarded public contracts because the bidder has been determined to have engaged in illegal or dishonest conduct or to have violated prevailing wage legislation. The Terms and Conditions of PA 3764A apply to this order. A copy can be obtained by calling (212) 435-4600 or at <http://www.panynj.gov/business-opportunities/become-vendor.html>
12. The vendor may subcontract the services or use a supplier for the furnishing of materials required hereunder to such persons or entities as the Manager, Purchasing Services may from time to time expressly approve in writing. All further subcontracting shall also be subject to such approval.
13. The successful bidder (vendor) shall not issue nor permit to be issued any press release, advertisement, or literature of any kind, which refers to the Port Authority or that goods will be, are being or have been provided to it and/or that services will be, are being or have been performed for it in connection with this Agreement, unless the vendor first obtains the written approval of the Port Authority. Such approval may be withheld if for any reason the Port Authority believes that the publication of such information would be harmful to the public interest or is in any way undesirable.
14. Neither the Commissioners of the Port Authority, nor Directors of PATH, nor any of them, nor any officer, agent or employee thereof, shall be charged personally by the Contractor with any liability, or held personally liable to the Contractor under any term or provision of this Agreement, or because of its execution or attempted execution, or because of any breach, or attempted or alleged breach, thereof.

DIVISION 16

SECTION 16000

ELECTRICAL GENERAL REQUIREMENTS

PART 1. GENERAL

1.01 SUMMARY

Unless otherwise shown on the Contract Drawings, or unless otherwise specified in other Sections of these Specifications, the general requirements specified in this Section are applicable to all electrical work of this Contract. Additional requirements applicable to individual Sections of these Specifications are specified in those Sections, or are shown on the Contract Drawings.

1.02 REFERENCES

The following is a listing of publications referenced in this Section:

	<u>American National Standards Institute (ANSI)</u>
ANSI C 2	National Electrical Safety Code.
	<u>American Society of Testing and Materials (ASTM)</u>
ASTM D 178	Standard Specification for Rubber Insulation Matting.
	<u>National Fire Protection Association (NFPA)</u>
NFPA 70	National Electrical Code.
	<u>Occupational Safety and Health Administration (OSHA)</u>

1.03 QUALITY ASSURANCE

- A. Any entity performing Work shall have had experience on at least two projects involving quantities and complexities at least equal to those required under this Division or the applicable Section thereof.
- B. All workmen performing under this Division shall be skilled workers of the trade involved. Where specialty work, such as splicing or welding are required, submit proof of training, experience and work history for each workman, for review by the Engineer. Only approved workmen shall perform specialty work.
- C. All electrical work shall be performed under the supervision of an electrical contractor, licensed in the state (and the city as required) in which the work is to be performed. Submit a copy of the qualifying license for review by the Engineer.
- D. All calculations required by this and other various Sections of these Specifications, or as shown on the Contract Drawings, shall be certified and sealed by a Professional Engineer licensed in the state in which the Work is to be performed, and shall be submitted to the Engineer for review.

- E. Various Sections of these Specifications contain the requirement for the specific material or equipment to be furnished with an experience statement "satisfactorily used for purposes similar to those intended herein" or words of similar intent and a statement that specifies the required experience time. These statements shall mean that the manufacturer of the material or equipment being furnished for the Work specified in this Contract shall have manufactured similar material or equipment to that specified, for at least the time specified.
- F. In various Sections of this Division there is a statement that refers to the length of required experience that must be satisfied.
- G. Polyvinyl Chloride (PVC): PVC conduits, PVC-insulated power wiring, or items containing PVC, except PVC-insulated wiring for communications systems, remote control, signaling, and power limited circuits, shall not be installed in any indoor area. PVC-insulated wiring for communications systems, remote control, signaling, and power-limited circuits shall be furnished and installed in accordance with NFPA 70.
- H. Asbestos
Asbestos or items containing asbestos shall not be furnished or installed.
- I. Conformance Labels
All electrical materials and equipment for which there is a nationally recognized standard shall bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories Inc., Factory Mutual, ETL, or approved equal. Where the phrase "where there are established UL standards, shall bear the UL label", or words of similar intent appear in other Sections, the instructions for the conformance label above shall apply.

1.04 CODES AND STANDARDS

- A. The electrical installation shall conform to all requirements of ANSI C2, NFPA 70, and the codes and standards specified in other Sections, all local codes and the requirements of OSHA, which would be applicable if the Authority were a private corporation.
- B. Standards publications of technical organizations and regulatory agencies are referenced in other Sections, and unless stricter requirements are indicated, materials and equipment so specified shall be manufactured, tested and installed to conform, as a minimum, to the requirements of such reference standards and publications.
- C. Installations for aeronautical markers, lighting, guidance signs, and other work as shown on the Contract Drawings, shall comply with the standards of the Federal Aviation Administration (FAA), where applicable.
- D. In case of conflict between provisions of codes, laws and ordinances, the more stringent requirement shall apply.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver material in manufacturers' original unopened protective packaging.
- B. Store materials in original packaging in a manner to prevent soiling, physical damage, wetting or corrosion prior to installation.

- C. Handle in a manner to prevent damage to finished surfaces.
- D. Where possible maintain protective coverings until installation is complete and remove such covers as part of final cleanup.
- E. Touch up any damage to finishes to match adjacent surfaces to the satisfaction of the Engineer.

1.06 SUBMITTALS

See Appendix "A" for submittal requirements.

1.07 SPECIAL TERMS

Throughout this and other Sections of this Division the term "Authority" is used. In PATH contracts, substitute the term "PATH" is deemed substituted for the term "Authority".

PART 2. PRODUCTS

2.01 MATERIAL AND EQUIPMENT TO BE FURNISHED

Equipment and materials furnished shall be new and unused, prior to this installation, first grade commercial quality and shall be essentially the standard cataloged products of a manufacturer regularly engaged in the manufacture of the products. Only those items specifically shown on the Contract Drawings as existing, relocated or Authority furnished shall be reused in this installation. Rebuilt or remanufactured equipment will not be permitted.

2.02 IDENTIFICATION

- A. All parts of equipment, such as switchboards, panel boards, safety switches, motor starters, circuit breakers, time clocks, contactors and similar items shall be identified by name, function or control with laminated plastic nameplates consisting of two black sheets with one white sheet bonded to and between the two outer sheets and having letters machine engraved in the face sheet to the depth of the white plastic. Nameplates shall not be smaller than 1 inch by 3 inches with characters not less than one-quarter inch. Where letter sizes are not specified, use one-inch high letters for panel boards, switchboards and motor control centers and one quarter inch high elsewhere. Nomenclature shall be according to a schedule approved by the Engineer.
- B. All device plates other than lighting switch plates, telephone and 120 volt, single phase, 15 or 20 ampere receptacles, shall have black or white (as directed) silk-screened lettering Helvetica Medium type face (or other type face as directed by the Engineer) designating:
 - 1. System.
 - 2. Voltage (where applicable).
 - 3. Number of phases (where applicable).
 - 4. Current rating (where applicable).
 - 5. Frequency (where applicable).

- C. Before placing orders for nameplates or silk-screened device plates, submit a typewritten list to the Engineer for review.
- D. The outside of the covers of all junction or pull boxes located above hung ceilings and the inside of the covers of all junction or pull boxes exposed shall be labeled with an indelible marker indicating the operating voltage and the system contained therein.
- E. All device plates of receptacles connected to a standby or emergency power distribution system shall be labeled with an orange plastic nameplate, engraved with the panel board and circuit number to which the receptacle is connected. Nameplate character engraved shall be not less than one-quarter inch in height.
- F. Unless otherwise shown on the Contract Drawings, all panel boards, switchboards, switchgear, circuit breakers, switches and transformers connected to a standby or emergency power distribution system shall be finished Federal Safety Orange in color.

2.03 RUBBER MATTING

- A. Provide continuous insulated rubber matting not less than 36 inches wide and not less than one quarter inch thick in one piece in front of:
 - 1. Substation transformers.
 - 2. Switchgear.
 - 3. Switchboards.
 - 4. Motor control centers.
 - 5. Panel boards.
 - 6. On each side and end of a standby or emergency generator set.
 - 7. Other locations as shown on the Contract Drawings.
- B. Matting shall conform to ASTM D 178, Type 2.

PART 3. EXECUTION

3.01 GENERAL

- A. Work of this Division shall include all labor, material and apparatus necessary for the completion of all electrical work as shown on the Contract Drawings and as hereinafter specified, left ready for satisfactory operation.
- B. Coordinate with Authority operations and construction by other trades.
 - 1. Coordinate with the Work of all trades as necessary to facilitate timely completion, avoid unnecessary cutting and patching and to ensure proper installation and operation of all equipment.
 - 2. Coordinate all components and aspects of the Work, in order to minimize power shutdowns to the power distribution systems. Should any part of the Work require an "off-hours" shutdown in excess of 8 hours, supply temporary services or feeders as required to maintain operation of the existing systems and equipment.

3. Furnish to appropriate trades, shop drawings, catalog cuts and instructions necessary for construction of concrete bases, concrete encasement, anchor bolts, and other construction required to accommodate installations under other Sections.
 4. Obtain all wiring diagrams and other instructions required for proper electrical connection of equipment installed or furnished under other Divisions of these Specifications and coordinate the installation, wiring and connections for equipment furnished under this Division, or other various Divisions.
- C. The arrangement of electrical equipment and conduit runs as shown on the Contract Drawings and described in the Specifications is schematic. Locate and install electrical work in coordination with other trades so that all electrical equipment and material is installed with working clearances in accordance with NFPA 70. Route conduit to avoid interference with existing installation and with work to be performed by other trades.
 - D. The location of equipment and motors shown on the Contract Drawings shall be subject to minor revisions due to field conditions or coordination with other trades without any increase in Contractor's compensation. Prior to roughing-in, verify the exact location of all electrical connections to equipment and motors from reviewed shop drawings and field verification.
 - E. Maintain records of all inspections, testing, overload and overcurrent settings throughout the construction and any corrective actions taken, and submit records to the Engineer for review.
 - F. All electrical work shall be subject to inspection by the Engineer. Correct any deficient work, as required for the approval of the Engineer.
 - G. Any equipment, materials, wiring or labor that are a necessary part of the electrical work and to its proper performance, although not specifically mentioned herein or shown on the Contract Drawings, shall be furnished and installed as if called for in detail, without additional cost to the Authority.

3.02 REMOVALS, RELOCATIONS, RECONNECTIONS, RESTORATIONS

- A. Relocate existing equipment and materials as shown on the Contract Drawings.
- B. Unless otherwise shown on the Contract Drawings, existing equipment and materials that are to be removed and not required to be relocated under this Contract, will become the property of the Contractor and shall be removed from the property of the Authority, and shall be properly disposed of. Disposal of equipment and materials shall comply with all local, state and Federal laws and regulations as if the Authority was a private corporation.
- C. Unless specifically shown on the Contract Drawings, salvaged equipment and materials shall not be reused in the installation.
- D. If existing electrical feeders, wiring, conduit, lighting fixtures or equipment interfere with the installation of new construction of any trade, the existing electrical feeder, wiring and conduit shall be rerouted or the equipment relocated in a manner approved by the Engineer to permit installation of the new construction. Where existing circuits or devices, or portions of the existing wiring system are to remain in service, but are interrupted by the construction, continue the existing wiring to maintain the remainder of the wiring system in operation.

- E. Notify the Engineer immediately of any damage caused by the Contractor to existing wiring, services or feeders that are to remain in service. Repair the damage in a workmanlike manner to restore to service, at no cost to the Authority.
- F. Before shutdown or discontinuation of service on any circuit, system or feeder, coordinate such activities with the Engineer in order to minimize shutdown periods. Provide a minimum of two weeks notice in writing to the Engineer before performing any shutdowns. The minimum period may be reduced with the express written permission of the Engineer.

3.03 LOCATION OF EQUIPMENT

- A. Unless otherwise shown on the Contract Drawings, the location of outlets or devices, from finished floor to center of plate or device, shall be as follows:
 - 1. Lighting switches: 48 inches.
 - 2. Thermal switches: 48 inches.
 - 3. Receptacles: 16 inches.
 - 4. Telephone outlets: 16 inches.
 - 5. Fire alarm stations: 48 inches.
 - 6. Fire alarm horn/light signals: 7 feet 6 inches.
 - 7. Clocks: 7 feet 8 inches.
- B. Unless otherwise shown on the Contract Drawings, the location of equipment, from finished floor to top of enclosures shall not exceed 6 feet, 6 inches, and shall not protrude more than 4 inches if higher than 27 inches.
 - 1. In exposed or public locations, panel boards and cabinets shall generally be flush mounted and all covers shall be identical in layout and size, and shall be installed to maintain a level and straight top and bottom alignment.
 - 2. In concealed locations, or in closets or electrical or mechanical rooms, or non-public locations, panel boards and cabinets shall generally be surface mounted and shall be installed to maintain a level and straight top alignment.

3.04 DISSIMILAR METALS

- A. Dissimilar metals shall mean those metals that are incompatible with one another in the presence of moisture, as determined from their relative positions in the Electrochemical Series, or from test data. Where dissimilar metals come in contact, paint the joint both inside and out with approved coating so as to exclude moisture from the joint, or provide a suitable insulating barrier separating the metals.
- B. Transitions in raceways, from one metal to a dissimilar metal shall only be made at boxes or other enclosures, except where shown on the Contract Drawings.

3.05 NAMEPLATES

Secure nameplates on equipment or walls with stainless steel or brass screws.

3.06 RUBBER MATS

- A. Install rubber mats in front of each panelboard, switchboard, motor control center, switchgear and substation transformers, and along each side and the end of each generator set, or as shown on the Contract Drawings.
- B. Rubber mats, when installed, shall lay flat without curling.

3.07 CUTTING AND PATCHING

- A. Perform all cutting and patching of existing construction required for installation of all materials and equipment as specified in this Division.
- B. Perform all patching to match existing adjacent construction to the satisfaction of the Engineer and using the best possible workmanship of the various trades involved.

3.08 FINAL FIELD TESTS

- A. The entire electrical installation shall be inspected prior to final acceptance testing, thoroughly cleaned, and damaged finishes touched up after final completion and prior to final acceptance testing being performed. Not less than 30 days prior to the testing, furnish a test plan, to the Engineer for review, outlining all aspects of the testing, including tests to be performed and the expected results.
- B. Perform the following field test in the presence of the Engineer to demonstrate the reliability of the electrical installation. Give the Engineer a minimum of one-week advance notice of such tests.
 - 1. Operate all electrical systems and equipment for a period of 24 hours, unless in the opinion of the Engineer, a different test period is required, to prove the operation and performance of a system and its equipment.
 - 2. Should the foregoing test reveal any defects, promptly correct such defects and re-run the tests until the entire installation conforms to the requirements of these Specifications and the Contract Drawings.
- C. Tests requiring certified reports and those requiring factory or field inspection shall be conducted and reported to the Engineer in conformance with standards herein specified.
- D. In addition to the tests outlined above, after completion of the electrical system and prior to occupancy:
 - 1. The following equipment and devices, as a minimum, shall be thermographically inspected utilizing a Hughes Aircraft Probeye infrared detector, or approved equal, with videotaping attachment.
 - a. High voltage cable splices and connections.
 - b. Switchboard.
 - c. Transformer.
 - d. Switchgear.
 - e. Panelboards.
 - f. Motor control centers.

- g. Automatic transfer switch and emergency power system connections.
 - h. Chiller motor and starter connections.
 - i. All 600 volt (nominal) cable connections rated 100 amperes (#3 AWG) or greater.
 - j. Other equipment as shown on the Contract Drawings.
2. The inspection shall be made by an independent inspection company such as Infrared Services, Inc, Montville, N.J., General Electric Apparatus Service Division, or approved equal. The inspection shall be made with all equipment, motors, lighting fixtures, and miscellaneous loads operating and with all equipment covers removed. Inspection reports complete with color photographs of the infrared scan and control photographs indicating the ambient temperature and any hot spots of each item inspected shall be submitted to the Engineer for approval. Any equipment, connections or devices indicated to be operating improperly performing equipment shall be replaced or repaired by the Contractor at no cost to the Authority. The cost of the inspections and necessary repairs shall be included in the Contract.
- E. Demonstrate to the Engineer equipment or systems installed or modified in this Contract.
- 1. After completion of all testing, and prior to placing equipment or systems in operation, demonstrate the features and operation of the equipment or systems to the Engineer, and all other staff or interested parties, as designed by the Engineer, so that operational and maintenance personnel are familiarized with the equipment and systems, as follows:
 - a. Switchboards and panelboards.
 - b. Transformer.
 - c. Switchgear.
 - d. Motor control centers.
 - e. Fire alarm and smoke detection systems.
 - f. Automatic transfer switches.
 - g. Standby/Emergency generator sets.
 - h. Other equipment as shown on the Contract Drawings.
 - 2. Provide the necessary accessories, test equipment, and personnel, for each demonstration.
 - 3. Complete all arrangements for the demonstrations through the Engineer.
 - 4. Upon the completion of each demonstration or instructional session, obtain "sign-off" from the Engineer. The "sign-off" shall state that the demonstration or instructions for use were provided, that they were complete and were given to the designated personnel.

END OF SECTION

SECTION 16000

ELECTRICAL GENERAL REQUIREMENTS

APPENDIX "A"

SUBMITTALS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of Division 1 - GENERAL PROVISIONS:

- A. Shop Drawings
 - 1. Substation and high-voltage transformers.
 - 2. Switchgear.
 - 3. Switchboards.
 - 4. Motor control centers.
 - 5. Emergency lighting battery systems.
 - 6. Working drawings for the installation sequence of medium voltage cables, and other systems where shown on the Contract Drawings, including the reel designations for each leg of the installation. Drawings shall include the calculations for pulling tensions and sidewall pressure of all cable pulls, including identification of manhole locations with splices and manholes that will be "pulled-through" without splicing. Calculations shall be certified and sealed by a Professional Engineer licensed in the State in which the Work is to be performed.

- B. Catalog Cuts
 - 1. Conduit, and fittings.
 - 2. Wire and cable.
 - 3. Wiring devices.
 - 4. Multi-outlet assemblies.
 - 5. "Standard" outlet and junction boxes.
 - 6. Medium voltage cable, splicing and termination kits.
 - 7. Lightning arresters.
 - 8. Capacitors.
 - 9. Panel boards and cabinets.
 - 10. General purpose transformers.
 - 11. Circuit breakers.
 - 12. Lighting fixtures.
 - 13. Pulling devices and end seals.
 - 14. Special pull and junction boxes.

15. Supporting devices.
- C. Certifications
Training, experience and work history for certified splicers and welders.
 - D. Design Calculations
Calculations where required by the Specifications or the Contract Drawings.
 - E. Maintenance Manuals
Operation and maintenance manuals, where required by the Specifications or the Contract Drawings.
 - F. Schedules
Nameplate designations.
 - G. Record Documents
One set of Shop Drawings revised, completed and brought up to date showing the permanent construction as actually made, in accordance with "Shop Drawings, Catalog Cuts and Samples" of Division 1, and showing the exact location of all equipment and conduit runs, as actually installed.
 - H. Site Inspection Reports
A final copy of the records and certified test reports for all tests, to the Engineer for review, for not less than the following:
 - 1. Primary cable and terminators insulation testing.
 - 2. Insulation testing of 600V (nominal) cables rated 100 amperes (#3 AWG) and above.
 - 3. Ground resistance test of each service ground.
 - 4. Ground fault circuit breaker and receptacle testing.
 - 5. Setting of all adjustable overcurrent devices.
 - 6. Setting or size of all overload elements installed, indicating the following:
 - a. Motor designation.
 - b. Nameplate horsepower, full load current, voltage and phases.
 - c. Operating current and voltage.
 - d. Overload element size or setting.
 - 7. Emergency power distribution equipment and system test results.

END OF APPENDIX "A"

SECTION 16542
TAXIWAY / RUNWAY LIGHT FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies requirements for light fixtures, light bases and accessories for Taxiway and Runway Lighting Systems.

1.02 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Taxiway and Runway Lighting Systems shall be furnished and installed in accordance with this Section, and as indicated on the Contract Drawings.
- B. Components of the taxiway / runway lighting systems shall also be manufactured and installed to meet all of the applicable requirements of FAA Advisory Circulars and all local codes.

1.03 RELATED SECTIONS

- A. Section 16450 – Grounding

1.04 REFERENCES

- A. ASTM International (ASTM)
 - 1. A123 / A123 M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 2. A572 / A572 M – Standard Specifications for High-Strength Low-Alloy Columbium-Vanadium Steel
 - 3. D3005 – Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape
 - 4. D6690- Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
- B. Federal Aviation Administration, Advisory Circular (FAA-AC)
 - 1. 150/5340-30 – Design and Installation Details for Airport Visual Aids
 - 2. 150/5345-26 – FAA Specification for L-823 Plug and Receptacle, Cable Connectors (FAA Specification L-823)
 - 3. 150/5345-42 – Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
 - 4. 150/5345-46 – Specification for Runway and Taxiway Light Fixtures

5. 150/5345-47 – Specification for Series to Series Isolation Transformers for Airport Lighting Systems
 6. 150/5370-10 – Standards for Specifying Construction of Airports
- C. Federal Specifications (FS)
1. SS-S-1401 – Sealant, Joint, Non-Jet-Fuel-Resistant, Hot Applied, for Portland Cement and Asphalt Concrete Pavements
- D. Insulated Cable Engineers Association (ICEA)
1. ANSI/ICEA S-96-659/NEMA WC71 – Nonshielded 2001-5kV Cables
- E. Institute of Electrical and Electronics Engineers (IEEE)
1. 383 – IEEE Standard for Qualifying Electric Cables and Splices for Nuclear Facilities
- F. National Fire Protection Association (NFPA)
1. 70 – National Electrical Code
- G. Underwriters Laboratories Inc. (UL)
1. 44 - Thermoset-Insulated Wires and Cables
 2. 83 – Thermoplastic-Insulated Wires and Cables

1.05 QUALITY ASSURANCE

- A. Entities performing the Work of this Section shall have experience on at least two projects involving complexities similar to those required under this Contract.
- B. Before any light fixture type is installed in a permanent installation, it shall meet the requirement of a successful one-year test installation at an Authority airport.

1.06 SUBMITTALS

See Appendix “A” for submittal requirements

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturers’ original, unopened, protective packaging.
- B. Store material in a clean, dry space and protect it from the weather.
- C. Handle in a manner to prevent damage to finished surfaces.
- D. Where possible, maintain protective coverings until installation is complete and remove such coverings as part of final cleanup.

PART 2 - PRODUCTS

2.01 LIGHT FIXTURES

A. General

1. Quantity, type location, beam direction (unidirectional, bidirectional or omnidirectional), and other requirements of light fixtures shall be as shown on the Contract Drawings.
2. Lamp type, wattage, and filter color shall be as shown on Contract Drawings.
3. Light fixtures and components for which there are established UL standards, shall be UL listed and shall bear the Underwriters Laboratories Inc. (UL) label.
4. Light fixtures shall be furnished completely, assembled and, unless otherwise shown on the Contract Drawings, shall be furnished with two 40-inch leads terminated in an FAA Specification L-823 two pole plug, and one color-coded green ground wire.
5. Light fixtures shall comply with environmental, photometric, dimensional and other requirements specified in the latest edition of FAA-AC 150/5345-46.

B. Runway In-pavement Light Fixtures

1. General

- a. Runway in-pavement fixtures shall have a light assembly that produces a beam with color and photometric distribution as specified in FAA-AC 150/5345-46. Unless otherwise noted on the Contract Drawings, the casting that houses the light assembly shall be high strength Nickel-Molybdenum alloy. The casting shall be a single piece construction or an inset type with an adapter ring.
- b. Runway in-pavement fixtures shall be connected to the light bases by means of six threaded bolts (3/8" – 16 Stainless Steel Grade 304 (18-8)) length as required unless otherwise noted on Contract Drawings. Studs or other spacers are not permitted for the runway fixtures.

2. Runway Centerline Light Fixtures; L-850A

- a. Each such fixture shall have a light assembly that produces a narrow bidirectional beam and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings. The lamp life shall be rated at minimum of 5000 hours if operated at brightness Step III.

3. Runway Touchdown Zone Light Fixtures; L-850B

- a. Each such fixture shall have a light assembly that produces a narrow bidirectional beam and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings. The lamp life shall be rated at a minimum of 5000 hours if operated at brightness Step III. Each casting shall have a directional 4° toe-in arrow stamped in window area that denotes a location of the runway centerline.

4. Runway Edge Light Fixtures; L-850C
 - a. Each such fixture shall have a light assembly that produces a bidirectional narrow beam and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings.
 5. Runway Threshold / End Light Fixtures; L-850D
 - a. Each such light fixture shall have light assembly that produces a narrow unidirectional or bidirectional beam and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings. The beam shall be toed-in 32° towards the runway centerline.
 6. Approach Threshold Light Fixture; L-850E
 - a. Each such fixture shall have a light assembly that produces a wide unidirectional beam and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings.
- C. Taxiway In-pavement Light Fixtures
1. General
 - a. Taxiway in-pavement fixture shall have a light assembly that produces a beam with color and photometric distribution as specified in FAA-AC 150/5345-46. Unless otherwise noted on the Contract Drawings, the casting that houses the light assembly shall be high strength Nickel-Molybdenum alloy. The casting shall be a single piece construction or an inset type with an adapter ring.
 2. Taxiway Centerline Light Fixtures, narrow beam fixtures; straight sections; L-852A
 - a. Each such fixture shall be Style III and shall have a light assembly that produces a narrow beam, is uni/bi-directional and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings.
 3. Taxiway Centerline Light Fixtures, wide beam fixtures; curved sections; L-852B
 - a. Each such fixture shall be Style III and shall have a light assembly that produces a wide beam, is uni/bi-directional and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings.
 4. Taxiway Centerline Light Fixtures, narrow beam fixtures; straight sections; L-852C
 - a. Each such fixture shall be Style III and shall have a light assembly that produces a narrow beam, is uni/bi-directional and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings.
 5. Taxiway Centerline Light Fixtures, wide beam fixtures; curved sections, L-852D

- a. Each such fixture shall be Style III and shall have a light assembly that produces a wide beam, is uni/bi-directional and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings
6. Omni-Directional Fixtures; L-852E
 - a. Each such fixture shall have a light assembly that produces an omnidirectional light and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings. The casting that houses the assembly shall be totally flush.
 7. Omni-Directional Fixtures; L-852F
 - a. Each such fixture shall have a light assembly that produces an omnidirectional light and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings. The casting that houses the assembly shall be totally flush.
 8. Omni-Directional Taxiway Edge Light Fixtures; L-852T
 - a. Each such fixture shall have a light assembly that produces an omnidirectional light and utilizes a quartz halogen lamp rated at 6.6 amperes or otherwise indicated on Contract Drawings. The casting that houses the assembly shall be totally flush.
- D. Elevated Light Fixtures
1. Elevated Runway / Taxiway Light Fixtures; L-861
 - a. Each such fixture shall be furnished with breakable couplings and stems to provide for an overall height of 24 inches, or otherwise indicated on Contract Drawings. The light source shall be a 45-watt quartz halogen lamp or otherwise indicated on Contract Drawings; housed in a glass globe with 360 degree, internal blue filter or otherwise indicated on Contract Drawings.
 2. High Intensity Runway Edge Light Fixtures; L-862
 - a. Each such fixture shall be furnished with breakable couplings and stems to provide an overall height of 12 inches above the surface or otherwise indicated on Contract Drawings. The light source shall be a 120-watt quartz halogen lamp or otherwise indicated on Contract Drawings; housed in a glass globe with internal lens assembly 180/360 degree internal color filters.
 3. Runway End / Threshold Light Fixtures; L-862E
 - a. Each such fixture shall be furnished with breakable couplings and stems to provide for an overall height of 12 inches above the surface. The light source shall be a 200-watt quartz halogen lamp or otherwise indicated on Contract Drawings; housed in a glass globe with internal lens assembly and 180/360 degree internal color filters.

E. Accessories

1. Isolation Transformers; L-830
 - a. Isolation transformers shall be rubber encapsulated, 5000-volt rated, series to series, with primary ampere rating as shown on the Contract Drawings, and a 6.6-ampere secondary. The wattage rating shall be as shown on the Contract Drawings. The flanged receptacle on the secondary cable shall conform to FAA Specification L-823, Type II, Class A, and Style 8. Transformers shall comply with FAA-AC 150/5345-47 and shall conform to FAA Specification L-830.
2. Ground Rods
 - a. Ground rods shall be copper bonded with diameters and lengths as specified in Specification Section 16450 or otherwise shown on Contract Drawings.
3. Single Pole Plug and Receptacle Connectors; L-823
 - a. Single pole plug and receptacle connectors for 5000-volt series lighting cable shall comply with FAA-AC 150/5345-26 and shall conform to FAA Specification L-823, Type I, Class B, Style 3 or Style 10.
4. Double Pole Plug and Receptacle Connectors; L-823
 - a. Double pole plug and receptacle connectors for 600-volt secondary system shall comply with FAA-AC 150/5345-26 and shall conform to FAA Specification L-823, Type II, Class B, Style 4 or Style 11.

2.02 Light Bases

A. General

1. Quantity, type, location and other requirements of light bases shall be as shown on the Contract Drawings.
2. All electrical materials and equipment for which there are established UL Standards, shall bear the UL label.

B. Base Cans and Extensions for In-pavement Light Fixtures; L-868

1. Base Cans
 - a. Base cans shall be 12-1/2 inches in outside diameter, of ASTM A 123 / A 123M hot-dipped galvanized steel, with 1/4-thick bottom plate protruding a minimum of 3/16 of an inch outward from the outside face of the cylindrical wall with six, 5/8-inch long, 3/8-inch deep steel ribs welded radially on its underside, as otherwise shown on Contract Drawings.
 - b. A ground lug shall be provided to accept a # 6 AWG grounding cable as shown on the Contract Drawings.

- c. The base can overall depth shall be as shown on Contract Drawings and shall be provided with grommet openings for conduit entrance as shown on the Contract Drawings.
- d. The top flange shall have twelve, 3/8-inch diameter tapped holes, equally spaced on an 11-1/4-inch bolt circle to accept the mounting of top section base can. The base can shall comply with FAA0AC 150/5345-42 and shall conform to FAA Specification L-868.

2. Base Can Extensions

- a. Base can extensions shall be 12-1/2-inches in outside diameter, of ASTM A 123 / A 123M hot-dipped galvanized steel, with provision on the top flange for twelve, 3/8-inch diameter tapped holes, equally spaced on a 11-1/4-inch bolt circle, to accept a taxiway centerline fixture mounting. Or as otherwise shown on Contract Drawings.
- b. The bottom of the can shall be provided with six, 7/16-inch diameter holes equally spaced on a 11-1/4-inch bolt circle and six 3/8-inch with 16 threads per inch (TPI), grade 304 stainless steel bolts (18-8), and two piece 304 stainless steel (18-8) anti-rotational Nord-Lock washers. Bolt shall be of proper length for mounting to the top of the bottom section base can. The exact depth of the top section base can shall be determined from field measurements. Minimum depth shall be 2 inches. The base can shall comply with FAA-AC 150/5345-42 and shall conform to FAA Specification L-868.

C. Base Cans for Elevated Edge Light Fixtures; L-867

- 1. Base cans shall be 12-1/2-inches in outside diameter, of ASTM A123 / A 123M hot-dipped galvanized steel, with a minimum 1/8-inchthick bottom plate protruding a minimum of 3/16 inches outward from the outside face of the cylindrical wall with six, 5/8-inch long, 3/8-inch deep steel ribs welded radially on its underside.
- 2. A 3/8-inch by 2-inch bar shall be welded around the circumference at the top of the can. The top flange shall be provided with six, 3/8-inch diameter tapped holes, equally spaced on a 10-1/4-inch bolt circle for mounting of the base plate.
- 3. The base can overall depth shall be shown on the Contract Drawings and shall be complete with grommet openings for conduit entrance as shown on the Contract Drawings.
- 4. A ground lug shall be provided to accept a # 6 AWG ground cable. Additional requirements shall be as shown Contract Drawings.
- 5. The base can shall comply with FAA-AC 150/5345-42 and shall conform to FAA Specification L-867.

D. Type I Marker Light Boxes; L-867

- 1. Type I boxes shall be of reinforced concrete construction and shall be 15 inches wide by 36 inches long (inside dimensions) with a depth as shown on Contract Drawings.
- 2. The steel cover shall be capable of accepting a base plate for an elevated taxiway, edge light fixture.

3. All ancillary equipment and additional requirements shall be as shown on the Contract Drawings. Precast boxes may be substituted for those shown on the Contract Drawings subject to approval of the Engineer. All precast boxes shall meet the same requirements as specified herein and as shown on the Contract Drawings.

E. Type III Marker Light Boxes; L-867

1. Type III boxes shall be concrete encased ASTM A 123 / A 123M hot-dipped galvanized steel base cans 17-1/4-inches in diameter by 20 inches deep. A 3/8-inch by 2-inch bar shall be welded around the circumference at the top of the can.
2. Boxes shall be provided with 2-inch couplings at 180 degrees at the bottom of the box.
3. A ground lug shall be welded on the inside wall of the box and a 1-3/8-inch diameter hole shall be provided at the bottom of the base for the installation of a ground rod. The hole shall be plugged with a solid neoprene plug.
4. Requirements shall be as shown on the Contract Drawings. Boxes shall comply with FAA-AC 150/5345-42 and shall conform to FAA Specification L-867.

F. Base Plates for Elevated Edge Light Fixtures

1. Base plates shall be ASTM A 572 / A 572M, Grade 50 Steel, 12 inches in diameter and 1/2-inch thick, complete with 1-1/2 or 2-inches threaded conduit hub, gasket, 304 Grade Stainless steel bolts (18-8), and a connector clamp capable of supporting an FAA Specification L-823 flanged secondary receptacle.
2. Base plates shall have six, 7/16-inch holes on a 10-1/4-inch bolt circle, except for Type III marker box, which shall have 14-1/4-inch bolt circle.

G. Flanged Secondary Receptacles; L-823

1. Flanged secondary receptacles shall be clamped to the underside of the taxiway edge light base plate, where required, and have two #14 AWG, 15-inch long pigtails molded, under one jacket, to the receptacle body.
2. Receptacles shall comply with FAA-AC 150/5345-26 and shall conform to FAA Specification L-823, Type II, Class A, and Style 8.

H. Flange Rings for L-868 Cans

1. Flange rings shall be composed of a 12-1/8-inch by 3/4-inch thick ASTM A 123 / A 123M zinc plated steel ring containing six, 7/16-inch diameter holes equally spaced at 60-degree intervals on an 11-1/4-inch bolt circle.
2. Flange rings shall have an indented 'O' ring gasket shall be furnished with the flange ring to render the unit weatherproof.
3. An 1/8-inch thick ASTM A 123 / A 123M zinc plated steel ring shall be continuously welded to the outside edge of the flange ring providing an overall height of 1-1/8-inches and an overall outside diameter of 12-3/8-inches.

I. Temporary Mud Covers for L-867 and L-868 Cans

1. Temporary mud covers shall be 12-3/8 inches in outside diameter containing six, 7/16-inch diameter holes on an 11-1/4-inch bolt circle for L-868 cans and 10-1/4-inch bolt circle for L-867 cans.
2. Mud covers shall be made of a 1/8-inch thick, hot-dipped galvanized steel plate with three raised concentric rings, two one-inch thick knockouts about the center, and an indented center point mounted on a 5/8-inch thick exterior grade plywood cover.

J. Spacer Rings for L-868 Cans

1. Spacer rings shall be 12 inches in outside diameter, 1/8-inch thick zinc coated steel or 1/4-inch thick hot-dipped galvanized steel, or other sizes as required or otherwise indicated on Contract Drawings.
2. Spacer rings shall have a 10-inch diameter hole and six, 7/16-inch diameter holes equally spaced on an 11-1/4-inch bolt circle.

K. Blank Cover Plates for L-867 and L-868 Cans

1. Blank cover plates for FAA L-867 and L-868 cans shall be 12 inches in outside diameter and of 1/2-inch thick ASTM A 572 / A 572M, Grade 50 hot-dipped galvanized steel with six, 7/16-inch diameter holes on a 10-1/4-inch bolt circle for L-867 cans and 11-1/4-inch bolt circle for L-868 cans.

2.03 MISCELLANEOUS MATERIALS

A. Flexible Non-Metallic Conduit

1. Flexible non-metallic conduit shall be made up of polyvinyl chloride smooth inner core, a reinforcing nylon mesh and polyurethane outer jacket.
2. Fittings shall be of a type designated to provide a liquid tight continuation of the conduit system as per manufacturer's recommendations.

B. Hot Rubberized Asphalt Sealer

1. Hot rubberized asphalt sealer shall conform to Federal Specification SS-S-1401C (1) and ASTM D 6690.

C. Adhesive Sealant

1. Adhesive sealant shall be as shown on the Contract Drawings.

D. Cement Compound

1. Cement compound shall be a two-component adhesive compound and shall comply with the requirements of FAA-AC 150/5370-10, P-606

E. Concrete and Grouting

1. Concrete and grouting shall be in accordance with applicable Section(s) of the Specifications or as shown on the Contract Drawings.

F. Mildew and Rot-Proof Rope

1. Rope shall be 1/2-inch in outside diameter, of mildew and rot-proof hemp rope.
- G. Special Materials
1. Special materials, required for proper installations of the Work, shall be as shown on the Contract Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General
1. Employ the services of a Land Surveyor licensed in the state where the Work is performed to establish the locations of lighting fixtures whose general locations are shown on the Contract Drawings.
 2. Mark the locations and alignment for each base can or box. The Engineer shall approve these locations and alignments prior to installation.
- B. Fixtures that have been furnish and installed shall be made operational prior to the end of Work period.
- C. Furnished and Install a sufficient quantity of waterproof tarpaulins or employ other approved means of preventing blown sand, water and other foreign materials from entering the kerfs and cored holes.
- D. Rubberized Asphalt Sealer Preparation and Application
1. Heat rubberized asphalt sealer compound in a double boiler, indirect-fired kettle. The space between the inner and outer shells shall be filled with suitable heat transfer oil having a flash point of not less than 550 degrees F.
 2. The kettle shall be equipped with satisfactory means of agitating the sealer at all times without excessive incorporation of air.
 3. High temperature shall not be necessary to melt the sealer.
 4. The kettle shall be equipped with thermostatic control for automatic regulation of the temperature of the oil bath and sealer and shall have a recording thermometer of the sealer temperature.
 5. A hose shall be directly connected to the melting kettle in such a manner as to permit pumping the melted sealer through the hose to a shoe-type applicator that shall direct and control the filling of the joints.
- E. All lighting system work shall be in conformance with NFPA 70 requirements.
- F. Heat Shrink and Tape Wrap
1. All electrical connections shall be covered with heat shrink tubing. The heat shrink shall cover a minimum of 3" of cable on both sides of the connection. Or otherwise as shown on Contract Drawings.

2. All connections, after application of heat shrink wrapping shall apply tape Scotch (3M) No. 88, conforming to ASTM D3005 (Type II), or approved equal; over the heat shrink wrap starting 1" prior to the edge of the heat shrink wrapping, overlapping the tape wrappings to the opposite side of the heat shrink wrap, going beyond the opposite by 1". The tape wrap shall have three layers or as otherwise shown on Contract Drawings.

G. Flush Runway and Taxiway Light Fixtures

1. Installation of flush taxiway centerline light fixtures shall comply with FAA-AC 150/5340-30 and be done in accordance with fixture manufacturer's installation procedures and as specified herein.
2. Longitudinal and Transverse Spacing
 - a. Space light fixtures longitudinally as shown on the Contract Drawings with a tolerance of plus or minus 10 percent.
 - b. Locate light fixtures laterally not less than one foot from the designated centerline of taxiing paths.
 - c. Displace lights a maximum of two feet from the designated centerline where necessary to avoid undesirable changes in guidance, i.e. no "zigzagging" from one side to the other side of the centerline.
3. Orientation of Light Beam
 - a. On runways and on all straight portions of taxiway centerlines, orient the axis of the centerline light beam parallel to the centerline of the runway or taxiway path, respectively.
 - b. On curved portions of taxiways, excluding long radius exit taxiways, orient the axis of the two beams of bidirectional taxiway centerline lights parallel to the tangent of the nearest point of the curve designated as the true centerline of the taxiway path.
 - c. Orient the axis of a unidirectional light beam so that it is "toed-in" to intersect the centerline at a point approximately equal to four times the spacing of the lights of the lights on the curved portion and such spacing shall be measured along the chord of the curve.
 - d. On runways, orient the edge light beam as specified in FAA-AC 150/5340-30.

H. Installation of Elevated Runway and Taxiway Edge Light Fixtures

1. Installation shall comply with FAA-AC 150/5340-30 and shall be done in accordance with fixture manufacturer's installations procedures.

I. Installation of Semi-Flush Runway Touchdown Zone Light Fixtures (TDZ)

1. Installation shall comply with FAA-AC 150/5340-30 and shall be done in accordance with fixture manufacturer's installation procedures.

J. Light base manufacturer representative shall be present on site on the first day of installing light bases.

3.02 FIELD TESTS

A. General

1. Provide all labor and materials for functional and operational test required and furnish the power for the functional tests. The Authority will furnish power for the operational tests.
2. Should the tests reveal any defects in Taxiway and Runway Lighting System Equipment installed under this Contract promptly correct such defects at no additional cost to the Authority and rerun the tests until the entire installation is satisfactory to the Engineer in all aspects.
3. Report immediately to the Engineer any defect found in portions of the Taxiway and Runway Lighting System not installed under this Contract. Do not attempt to rectify any defect found in a component of the system not installed under this Contract unless specifically instructed to do so by the Engineer.

B. Functional Tests

1. Perform functional test, in the presence of the Engineer, to demonstrate the reliability of the electrical installation for the following:
 - a. Runway and taxiway edge lighting system in accordance with the requirements of FAA-AC 150/5340-30
 - b. Taxiway centerline lighting system in accordance with the requirements of FAA-AC 150/5340-30
 - c. Runway centerline and touchdown zone lighting systems in accordance with the requirements of FAA-AC 150/5340-30.
2. Operational Tests
 - a. After the functional tests have been completed, operate, in the presence of the Engineer, all electrical equipment for a period of twenty-four hours.

END OF SECTION

SECTION 16542
TAXIWAY / RUNWAY LIGHT FIXTURES
APPENDIX A
SUBMITTAL REQUIREMENTS

- A. Submit Catalog Cuts for the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:
1. Station layout for taxiway and runway light fixtures
 2. All light fixtures
 3. Light fixture accessories, including isolation transformers, ground rods, fastener bolts, anti-rotational lock washers, lock-nuts when indicated on Contract Drawings, ground rods and plug connectors
 4. Light bases, including base cans, light boxes, base plates, flange rings, mud covers, spacer ring and cover plates
 5. Setting fixture (jig) and installation method description
 6. Miscellaneous materials, including sealants and the special materials shown on the Contract Drawings.
- B. Submit an itemized list of spare parts, as recommended by the manufacturer, for the electrical equipment supplied under this Contract. The list should include quantities required, current unit prices and sources of supply. The Authority is not obligated to purchase any item on such a list.
- C. Prior to any installation operations at the construction site, submit a listing of the proposed equipment and methods to be used to install base cans and/or boxes in the pavement subject to the approval of the Engineer.
- D. Submit field test reports, including "Megger" readings, with an outline of the method used.

END OF APPENDIX "A"