



CALL NO. 345

CONTRACT ID. 141269

GRAYSON COUNTY

FED/STATE PROJECT NUMBER KY 14-78

DESCRIPTION ROUGH RIVER STATE PARK AIRPORT ELECTRICAL REHAB

WORK TYPE AIRPORT CONSTRUCTION

PRIMARY COMPLETION DATE 30 CALENDAR DAYS

LETTING DATE: September 26,2014

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME September 26,2014. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

NO PLANS ASSOCIATED WITH THIS PROJECT.

REQUIRED BID PROPOSAL GUARANTY: Not less than 5% of the total bid.

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PART I
SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 04

CONTRACT ID - 141269

KY 14-78

COUNTY - GRAYSON

PCN - DE043AIRLIGHT

KY 14-78

ROUGH RIVER STATE PARK AIRPORT ELECTRICAL REHAB ROUGH RIVER STATE PARK AIRPORT (213)
AIRFIELD ELECTRICAL REHABILITATION PROJECTAIRPORT CONSTRUCTION
GEOGRAPHIC COORDINATES LATITUDE 37:36:44.00 LONGITUDE 86:30:25.00

COMPLETION DATE(S):

30 CALENDAR DAYS

APPLIES TO ENTIRE CONTRACT

CONTRACT NOTES

PROPOSAL ADDENDA

All addenda to this proposal must be applied when calculating bid and certified in the bid packet submitted to the Kentucky Department of Highways. Failure to use the correct and most recent addenda may result in the bid being rejected.

BID SUBMITTAL

Bidder must use the Department's Expedite Bidding Program available on the Internet web site of the Department of Highways, Division of Construction Procurement. (www.transportation.ky.gov/construction-procurement)

The Bidder must download the bid file located on the Bid Express website (www.bidx.com) to prepare a bid packet for submission to the Department. The bidder must submit electronically using Bid Express.

JOINT VENTURE BIDDING

Joint venture bidding is permissible. All companies in the joint venture must be prequalified in one of the work types in the Qualifications for Bidders for the project. The bidders must get a vendor ID for the joint venture from the Division of Construction Procurement and register the joint venture as a bidder on the project. Also, the joint venture must obtain a digital ID from Bid Express to submit a bid. A joint bid bond of 5% may be submitted for both companies or each company may submit a separate bond of 5%.

UNDERGROUND FACILITY DAMAGE PROTECTION

The contractor is advised that the Underground Facility Damage Protection Act of 1994, became law January 1, 1995. It is the contractor's responsibility to determine the impact of the act regarding this project, and take all steps necessary to be in compliance with the provision of the act.

SPECIAL NOTE FOR PIPE INSPECTION

Contrary to Section 701.03.08 of the 2012 Standard Specifications for Road and Bridge Construction and Kentucky Method 64-114, certification by the Kentucky Transportation Center for prequalified Contractors to perform laser/video inspection is not required on this contract. It will continue to be a requirement for the Contractor performing any laser/video pipe inspection to be prequalified for this specialized item with the Kentucky Transportation Cabinet-Division of Construction Procurement.

SPECIAL NOTE FOR COMPOSITE OFFSET BLOCKS

Contrary to the Standard Drawings (2012 edition) the Cabinet will allow 6” composite offset blocks in lieu of wooden offset blocks, except as specified on proprietary end treatments and crash cushions. The composite blocks shall be selected from the Cabinet’s List of Approved Materials.

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

Pursuant to KRS 176.085(1)(b), an agency, department, office, or political subdivision of the Commonwealth of Kentucky shall not award a state contract to a person that is a foreign entity required by [KRS 14A.9-010](#) to obtain a certificate of authority to transact business in the Commonwealth (“certificate”) from the Secretary of State under [KRS 14A.9-030](#) unless the person produces the certificate within fourteen (14) days of the bid or proposal opening. If the foreign entity is not required to obtain a certificate as provided in [KRS 14A.9-010](#), the foreign entity should identify the applicable exception. Foreign entity is defined within [KRS 14A.1-070](#).

For all foreign entities required to obtain a certificate of authority to transact business in the Commonwealth, if a copy of the certificate is not received by the contracting agency within the time frame identified above, the foreign entity’s solicitation response shall be deemed non-responsive or the awarded contract shall be cancelled.

Businesses can register with the Secretary of State at <https://secure.kentucky.gov/sos/ftbr/welcome.aspx>.

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

Questions about projects during the advertisement should be submitted in writing to the Division of Construction Procurement. This may be done by fax (502) 564-7299 or email to kytc.projectquestions@ky.gov. The Department will attempt to answer all submitted questions. The Department reserves the right not to answer if the question is not pertinent or does not aid in clarifying the project intent.

The deadline for posting answers will be 3:00 pm Eastern Daylight Time, the day preceding the Letting. Questions may be submitted until this deadline with the understanding that the later a question is submitted, the less likely an answer will be able to be provided.

The questions and answers will be posted for each Letting under the heading “Questions & Answers” on the Construction Procurement website (www.transportation.ky.gov/contract). The answers provided shall be considered part of

this Special Note and, in case of a discrepancy, will govern over all other bidding documents.

HARDWOOD REMOVAL RESTRICTIONS

The US Department of Agriculture has imposed a quarantine in Kentucky and several surrounding states, to prevent the spread of an invasive insect, the emerald ash borer. Hardwood cut in conjunction with the project may not be removed from the state. Chipping or burning on site is the preferred method of disposal.

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

Identification of excess material sites and borrow sites shall be the responsibility of the Contractor. The Contractor shall be responsible for compliance with all applicable state and federal laws and may wish to consult with the US Fish and Wildlife Service to seek protection under Section 10 of the Endangered Species Act for these activities.

ACCESS TO RECORDS

The contractor, as defined in KRS 45A.030 (9) agrees that the contracting agency, the Finance and Administration Cabinet, the Auditor of Public Accounts, and the Legislative Research Commission, or their duly authorized representatives, shall have access to any books, documents, papers, records, or other evidence, which are directly pertinent to this contract for the purpose of financial audit or program review. Records and other prequalification information confidentially disclosed as part of the bid process shall not be deemed as directly pertinent to the contract and shall be exempt from disclosure as provided in KRS 61.878(1)(c). The contractor also recognizes that any books, documents, papers, records, or other evidence, received during a financial audit or program review shall be subject to the Kentucky Open Records Act, KRS 61.870 to 61.884.

In the event of a dispute between the contractor and the contracting agency, Attorney General, or the Auditor of Public Accounts over documents that are eligible for production and review, the Finance and Administration Cabinet shall review the dispute and issue a determination, in accordance with Secretary's Order 11-004. (See attachment)

10/29/12



Steven L. Beshear
Governor

Commonwealth of Kentucky
Finance and Administration Cabinet
OFFICE OF THE SECRETARY
Room 383, Capitol Annex
702 Capital Avenue
Frankfort, KY 40601-3462
(502) 564-4240
Fax (502) 564-6785

Lori H. Flanery
Secretary

SECRETARY'S ORDER 11-004

FINANCE AND ADMINISTRATION CABINET

Vendor Document Disclosure

WHEREAS, in order to promote accountability and transparency in governmental operations, the Finance and Administration Cabinet believes that a mechanism should be created which would provide for review and assistance to an Executive Branch agency if said agency cannot obtain access to documents that it deems necessary to conduct a review of the records of a private vendor that holds a contract to provide goods and/or services to the Commonwealth; and

WHEREAS, in order to promote accountability and transparency in governmental operations, the Finance and Administration Cabinet believes that a mechanism should be created which would provide for review and assistance to an Executive Branch agency if said agency cannot obtain access to documents that it deems necessary during the course of an audit, investigation or any other inquiry by an Executive Branch agency that involves the review of documents; and

WHEREAS, KRS 42.014 and KRS 12.270 authorizes the Secretary of the Finance and Administration Cabinet to establish the internal organization and assignment of functions which are not established by statute relating to the Finance and Administration Cabinet; further, KRS Chapter 45A.050 and 45A.230 authorizes the Secretary of the Finance and Administration Cabinet to procure, manage and control all supplies and services that are procured by the Commonwealth and to intervene in controversies among vendors and state agencies; and

NOW, THEREFORE, pursuant to the authority vested in me by KRS 42.014, KRS 12.270, KRS 45A.050, and 45A.230, I, Lori H. Flanery, Secretary of the Finance and Administration Cabinet, do hereby order and direct the following:

- I. Upon the request of an Executive Branch agency, the Finance and Administration Cabinet ("FAC") shall formally review any dispute arising where the agency has requested documents from a private vendor that holds a state contract and the vendor has refused access to said documents under a claim that said documents are not directly pertinent or relevant to the agency's inquiry upon which the document request was predicated.
- II. Upon the request of an Executive Branch agency, the FAC shall formally review any situation where the agency has requested documents that the agency deems necessary to

conduct audits, investigations or any other formal inquiry where a dispute has arisen as to what documents are necessary to conclude the inquiry.

- III. Upon receipt of a request by a state agency pursuant to Sections I & II, the FAC shall consider the request from the Executive Branch agency and the position of the vendor or party opposing the disclosure of the documents, applying any and all relevant law to the facts and circumstances of the matter in controversy. After FAC's review is complete, FAC shall issue a Determination which sets out FAC's position as to what documents and/or records, if any, should be disclosed to the requesting agency. The Determination shall be issued within 30 days of receipt of the request from the agency. This time period may be extended for good cause.
- IV. If the Determination concludes that documents are being wrongfully withheld by the private vendor or other party opposing the disclosure from the state agency, the private vendor shall immediately comply with the FAC's Determination. Should the private vendor or other party refuse to comply with FAC's Determination, then the FAC, in concert with the requesting agency, shall effectuate any and all options that it possesses to obtain the documents in question, including, but not limited to, jointly initiating an action in the appropriate court for relief.
- V. Any provisions of any prior Order that conflicts with the provisions of this Order shall be deemed null and void.

SPECIAL NOTE FOR RECIPROCAL PREFERENCE

Reciprocal preference to be given by public agencies to resident bidders

By reference, KRS 45A.490 to 45A.494 are incorporated herein and in compliance regarding the bidders residency. Bidders who want to claim resident bidder status should complete the Affidavit for Claiming Resident Bidder Status along with their bid in the Expedite Bidding Program. Submittal of the Affidavit should be done along with the bid in Bid Express.

03/01/2011

SPECIFICATIONS AND CONTRACT DOCUMENTS



ROUGH RIVER STATE PARK AIRPORT (2I3)
FALLS OF ROUGH , KENTUCKY

AIRFIELD ELECTRICAL REHABILITATION PROJECT

KDA PROJECT NO. KY14-78

ISSUED FOR BIDDING



Digitally Signed 8-18-2014

Prepared For:

**Kentucky Transportation Cabinet
Department of Aviation**

August 2014



**ROUGH RIVER STATE PARK AIRPORT
 AIRFIELD ELECTRICAL REHABILITATION PROJECT**

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SPECIAL PROVISIONS

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NOT APPLICABLE

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SECTION A – FEDERAL AVIATION ADMINISTRATION REQUIREMENTS

NOT APPLICABLE.

SECTION B – STATE TERMS AND CONDITIONS

B-01 GENERAL

The intent of these specifications is to outline the requirements set forth by the FAA and the State of Kentucky; however, this document does not include all applicable State laws. All requirements set forth by the State of Kentucky for bidding, bonding and wages shall be included by reference herein. If for any reason that the Federal and/or State requirements conflict with the requirements set forth in this contract, the more stringent of the requirements shall govern.

B-02 PERMITS

In accordance with 602 KAR 50:030 relating to KRS 183.861, 183.865, 183.867 and 183.870, the Kentucky Airport Zoning Commission (KAZC) has jurisdiction over zoning for all public use and military airports. A permit from the KAZC to construct or alter a structure is required. The Contractor is responsible for completing the required application (TC 56-50e) and obtaining the required permit for construction practices and activities. The Engineer shall assist in the completion of this application at the request of the Contractor. The Contractor shall be responsible for any fines or imprisonment for failing to comply with the KAZC statutes and regulations as set forth in KRS 183.990(3).

In addition, applications and permits required by the State of Kentucky for individual trades shall be the responsibility of the Contractor and his/her Subcontractors. The Engineer shall not be held responsible for failure to comply with Kentucky trade specific requirements.

END OF SPECIAL PROVISIONS

ITEM SS-101 SAFETY PLAN COMPLIANCE DOCUMENT (SPCD)

DESCRIPTION

101-1.1 The Contractor shall thoroughly review the approved Construction Safety and Phasing Plan (CSPP) and shall comply with approved CSPP. The Contractor shall certify such compliance by completing the attached SPCD and submitting to the Engineer for approval.

Contractor Safety Plan Compliance Documents

Owner Name: Kentucky Commonwealth

Airport: Rough River State Park Airport

Project Description: Airfield Electrical Rehabilitation

Contractor: _____

Each item listed below corresponds to a specific section of the approved CSPP. The Contractor shall certify that he/she will comply with each section of the approved CSPP. Each certified section with a "no" response must be fully explained in an attachment to the SPCD. The document shall be signed and dated by a principle or owner in the Contractor's company. All other requested information shall be completed by the Contractor and submitted to the Engineer for approval as part of the SPCD.

1. **Section 1 - Correspondence:** This project shall be completed in accordance with Section 1 "Coordination" of the approved Construction Safety Plan Compliance Document.

Owner:	
Contact: Michael Ricks, Park Manager	Phone: 270-257-2311
Engineer:	
Project Manager: Wesley E. Mittlesteadt, P.E., ENV SP	Phone: 859-219-0659
Project Engineer: Ryan G. Patton, P.E., LEED AP BD+C	Phone: 256-534-5512
Construction Observer: KYTC District 4	Phone:
Materials Testing: N/A	Phone:
Contractor:	
Project Manager:	Phone:
Superintendent:	Phone:
Subcontractors:	Phone:

Yes _____ No *

2. **Section 2 - Phasing:** This project shall be completed in accordance with Section 2 "Phasing" of the approved Construction Safety Plan Compliance Document.

Yes _____ No *

3. **Section 3 – Areas of Operations Affected by Construction Activity:** This project shall be completed in accordance with Section 3 "Areas of Operations Affected by Construction Activity" of the approved Construction Safety Plan Compliance Document.

Yes _____ No *

4. **Section 4 – Protection of Navigational Aids (NAVAIDS):** This project shall be completed in accordance with Section 4 “Protection of Navigational Aids (NAVAIDS)” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

5. **Section 5 – Contractor Access:** This project shall be completed in accordance with Section 5 “Contractor Access” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

6. **Section 6 – Wildlife Management:** This project shall be completed in accordance with Section 6 “Wildlife Management” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

7. **Section 7 – Foreign Object Debris (FOD) Management:** This project shall be completed in accordance with Section 7 “Foreign Object Debris (FOD) Management” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

8. **Section 8 – Hazardous Materials (HAZMAT) Management:** This project shall be completed in accordance with Section 8 “Hazardous Materials (HAZMAT) Management” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

9. **Section 9 – Notification of Construction Activities:** This project shall be completed in accordance with Section 9 “Notification of Construction Activities” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

10. **Section 10 – Inspection Requirements:** This project shall be completed in accordance with Section 10 “Inspection Requirements” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

11. **Section 11 – Underground Utilities:** This project shall be completed in accordance with Section 11 “Underground Utilities” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

12. **Section 12 – Penalties:** This project shall be completed in accordance with Section 12 “Penalties” of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

13. **Section 13 – Special Conditions:** This project shall be completed in accordance with Section

13 "Special Conditions" of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

14. **Section 14 – Runway and Taxiway Visual Aids:** This project shall be completed in accordance with 14 "Runway and Taxiway Visual Aids" of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

15. **Section 15 – Marking and Signs for Access Routes:** This project shall be completed in accordance with Section 15 "Marking and Signs for Access Routes" of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

16. **Section 16 – Hazard Marking and Lighting:** This project shall be completed in accordance with Section 16 "Hazard Marking and Lighting" of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

17. **Section 17 – Protection of Safety Areas, Object Free Areas, Object Free Zones, and Approach / Departure Surfaces:** This project shall be completed in accordance with Section 17 "Protection of Safety Areas, Object Free Areas, Object Free Zones, and Approach / Departure Surfaces" of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

18. **Section 18 – Other Limitations on Construction:** This project shall be completed in accordance with Section 18 "Other Limitations on Construction" of the approved Construction Safety Plan Compliance Document.

Yes _____ No_*

I certify that, for the project identified herein, the responses to the foregoing items are correct as marked, and that I shall comply with the approved Construction Safety and Plan.

Signed: _____
Contractor's Authorized Representative

Date: _____

Print Name and Title of Contractor's Representative

END OF ITEM SS-101

ITEM SS-110 STANDARD SPECIFICATIONS

GENERAL

110-1.1 The standard specifications of the Kentucky Transportation Cabinet (KYTC) are bound in a book titled Standard Specifications for Road and Bridge Construction. These specifications are referred to herein as "Standard Specifications." The latest edition shall apply. A copy of these "Standard Specifications" may be obtained from the KYTC at their customary charge.

INCORPORATION AND MODIFICATION

110-2.1 Certain parts of the Standard Specifications are appropriate for inclusion in these Technical Specifications. Such parts are incorporated herein by reference to the proper section or paragraph number. The individual specification numbers noted herein may be different from those in the latest edition of the "Standard Specifications." The most current specification number shall apply. Each such referenced part shall be considered to be a part of these Contract Documents as though copied herein in full.

110-2.2 Certain referenced parts of the Standard Specifications are modified in the Specifications that follow. In case of conflict between the Standard Specifications and the Specifications that follow, the Specifications that follow shall govern.

110-2.3 Individual material test numbers change from time to time. Use the latest applicable test.

110-2.4 Reference in the Standard Specifications to the "Department" is herein changed to the "Owner".

END OF ITEM SS-110

ITEM SS-120 SITE PREPARATION

DESCRIPTION

120-1.1 This item covers the preparation of the site for construction of the proposed improvements. The attention of the bidder is directed to the necessity for careful examination of the entire project site to determine, at the time of bid preparation, the full extent of work to be done under the item "Site Preparation." The entire job site shall be cleared of all man-made obstructions and debris, of whatever nature, and made ready in all respects for the construction of the proposed improvements.

The item "Site Preparation" shall include:

1. Mobilization
2. Lighted Barricades and Closed Taxiway and Runway Markings
3. Contractor's Access/Haul Road
4. Contractor's Staging/Parking Areas
5. Airport Security Requirements
6. Airport Safety Requirements
7. Instrument Control
8. Clean Up

The item "Demobilization" shall include:

1. Final clean-up
2. Costs incurred after acceptable completion of construction operations on the project

CONSTRUCTION METHODS

120-2.1 MOBILIZATION. The Contractor shall consider and include his cost for providing personnel, equipment, materials, bonds, etc. required for the prosecution of the work under this item.

120-2.2 LIGHTED BARRICADES AND CLOSED TAXIWAY AND RUNWAY MARKERS. The Contractor shall furnish, install, maintain, and remove closed taxiway and runway markings and lighted barricades in accordance with details on the plans and as directed by the Engineer. **These markers will become the property of the airport upon the completion of the project.** The temporary runway closure markers shall be commercially available yellow polyester fabric material as manufactured by Neubert Aero Company (part no. 319000XB) or Sherwin Industries inc. or approved equal. The contractor must acquire and submit the product specifications from the manufacturer to the engineer for approval before ordering to insure these meet FAA guidance. The markers shall be secured to the pavement/ground as shown on the plans and as directed by the Engineer. Bags filled with either sand or gravel for weight of markers shall be of same aviation yellow color as marker and of sufficient quantity to secure to pavement under all weather conditions. The lighted barricades shall be constructed and installed as shown on the plans. All lighted barricades and closed taxiway and runway markings shall be constructed in accordance with AC 150/5370-2F Operational Safety on Airports During Construction.

All work involved in the furnishing, installation, maintenance, and removal of lighted barricades, barrels and closed runway markings will not be measured for separate payment, but will be considered subsidiary to the bid item "Site Preparation."

120-2.3 CONTRACTOR'S ACCESS/HAUL ROAD. The Contractor shall layout, construct, maintain, and repair all access/haul roads needed to construct the work. The existing access roads shown on the plans shall be repaired, as determined necessary by the Engineer, at the close of the project. All such work,

including all materials and labor, involved in the layout, construction, maintenance, and repair of the Contractor's access/haul roads will not be measured for separate payment but will be considered subsidiary to the bid item "Site Preparation." Temporary pipe culverts shall be installed and maintained as required and shall be of the size as directed by the Engineer. The type of pipe used for temporary pipe shall be at the option of the Contractor. Temporary pipe culverts will not be measured for separate payment, but will be considered subsidiary to the access/haul road. All temporary pipe culverts shall be removed by the Contractor and shall remain his property at the close of the project.

120-2.4 CONTRACTOR'S STAGING/PARKING AREAS. The areas designated in the plans or by the Engineer as the Contractor's staging or parking area shall be cleared and graded by the Contractor as needed for use by the Contractor in constructing the work on this project. All areas used or otherwise occupied by the Contractor for his operations shall be cleaned, re-graded, and seeded with mulch, as directed by the Engineer, prior to the final acceptance of the project by the Airport. All work involved in the preparation and restoration of areas used or occupied by the Contractor, including clearing, grubbing, subgrade stabilization, re-grading, seeding, mulching and installing and removing fence, will not be measured for separate payment but will be considered subsidiary to the bid item "Site Preparation."

120-2.5 AIRPORT SECURITY REQUIREMENTS. The Contractor shall abide by the Airport Security requirements that are outlined in the Construction Safety and Phasing Plan (CSPP) of the plans. Any costs associated with the Airport Security requirements will not be measured for separate payment but will be considered subsidiary to the bid item "Site Preparation."

120-2.6 AIRPORT SAFETY REQUIREMENTS. The Contractor shall abide by the Airport Safety requirements that are outlined in the Construction Safety and Phasing Plan (CSPP) of the plans. All costs associated with the Airport Safety requirements will not be measured for separate payment but will be considered subsidiary to the bid item "Site Preparation."

120-2.7 INSTRUMENT CONTROL. The Contractor will be furnished survey baselines and benchmarks to control the work as shown on the Plans. The Contractor shall be responsible for the additional instrument control necessary to layout and construct the work. The Contractor shall provide the instrument control as provided for in Section 50 of the General Provisions. The Contractor's instrument control of the work shall not be measured for separate payment, but will be considered subsidiary to the bid item "Site Preparation".

120-2.8 CLEAN UP. From time to time, the Contractor shall clean up the site in order that the site presents a neat appearance and that the progress of work will not be impeded. One such clean up shall immediately precede final inspection.

Immediately following acceptance of the work by the Owner, the Contractor shall remove all temporary equipment, surplus materials, and debris resulting from his operations, and leave the site in a condition fully acceptable to the Owner.

120-2.9 DEMOBILIZATION. Includes all work and operations necessary to accomplish final clean-up to move personnel, equipment, supplies and incidentals from the project site; to remove all offices, buildings, and other facilities that were necessary for performing the work; to cultivate, seed and mulch areas disturbed during construction that shall be returned to original condition upon completion of the project; and to accomplish all other work that must be performed, including costs that must be incurred, after acceptable completion of construction operations on the project.

It shall be set at minimum of \$1,000 or 1.5 percent of the sum of the total amounts bid for all other items in the Bid Proposal, excluding "Site Preparation", "Demobilization" and contingent amounts established for adjustments and incentives.

Payment for this item will not be released to the Contractor until all work performed has been Accepted by the Owner, Engineer and KDA and shall follow all other requirements referenced in various sections

of these specifications where "retainage" is referenced.

MEASUREMENT AND PAYMENT

120-3.1 Site preparation will be measured as a lump sum complete item. Work completed and accepted under this item will be paid for at the contract lump sum price bid for "Site Preparation," which price shall be full compensation for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

Periodic payments will be made under this item in proportion to the amount of work accomplished, as determined by the Engineer.

Payment will be made under:

Item SS-120-3.1	Site Preparation - per Lump Sum
Item SS-120-3.2	Demobilization – per Lump Sum

END OF ITEM SS-120

ITEM SS-300 BASIC ELECTRICAL REQUIREMENTS

DESCRIPTION

300-1.1 This item shall consist of furnishing and installing complete electrical systems as defined in the plans and in these specifications. The work includes the installation, connection and testing of new electrical systems, equipment and all required appurtenances to construct and demonstrate proper operation of the completed electrical systems.

300-1.2 The Contractor shall maintain current copies of all referenced and applicable advisory circulars and standards on the job site. The Contractor is responsible to make known to the Engineer any conflict between plans and specifications that he observes or of which he is made aware.

300-1.3 This work shall consist of lockout/tagout and constant current regulator calibration procedures at the airport electrical transclosure in accordance with the design and details shown in the plans and in compliance with these specification documents.

EQUIPMENT AND MATERIALS

300-2.1 STANDARDS.

- a. Applicable National Fire Protection Association (NFPA) codes, including but not limited to:
 - (1) NFPA 70 - National Electrical Code.
 - (2) NFPA 70E - Standard for Electrical Safety in the Workplace.
 - (3) NFPA 72 - National Fire Alarm Code.
 - (4) NFPA 101 - Life Safety Code.
 - (5) Internet Website: <http://www.nfpa.org>
- b. Applicable Code of Federal Regulations (CFR) codes, including but not limited to:
 - (1) 29 CFR 1910 - Occupational Safety and Health Standards (OSHA)
 - (2) 29 CFR 1926 - Safety and Health Regulations for Construction.
 - (3) Internet Website: <http://www.gpoaccess.gov/cfr/index.html>
- c. ANSI/IEEE C2 - National Electrical Safety Code.
- d. NECA 1 – Standard for Good Workmanship in Electrical Construction.
- e. Applicable Federal, State and Local Electrical Codes.
- f. Applicable City Electrical Codes.
- g. Applicable City Ordinances pertaining to electrical work.
- h. Applicable Federal, State and Local Fire Codes.
- i. Applicable Federal, State and Local Energy Codes.
- j. Applicable Federal, State and Local Building Codes.
- k. Applicable Federal, State and Local - Environmental, Health and Safety Laws and Regulations.

Contractor shall utilize the most current editions of standards, which are current at time of bid and as recognized by the Authority Having Jurisdiction for the respective standard.

300-2.2 GENERAL.

a. Airport lighting equipment and materials shall meet the Buy American Preference requirements in 49 USC 50101 and the Aviation Safety and Capacity Expansion Act. The equipment shall be approved and listed on the FAA "Equipment Meeting Buy American Requirements" list located at www.faa.gov/airports/aip/procurement/federal_contract_provisions/, current version on the date that the submittals are received by the Engineer, or the Contractor may submit a signed formal letter from the manufacturer that clearly lists the specific equipment, model number, location where it is manufactured,

and statement certifying that the equipment and/or materials meet the Buy American Preference requirements.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. All equipment and materials shall be new and meet applicable manufacturer's standards. All other electrical components and products, not covered under the FAA equipment certification program, shall be tested and listed by an OSHA accepted, nationally recognized testing laboratory (NRTL) to conform to the standards indicated in these contract documents and to the industry standards required in the NEC, NEMA, IEEE, and applicable FAA advisory circulars.

c. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components or electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the Contract Documents plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

- (1) All LED light fixtures, with the exception of obstruction lighting, shall be warranted by the manufacturer for a minimum of 4 years after date of installation, final acceptance testing by the Engineer, and Owner's beneficial use of the equipment, inclusive of all electronics.

g. Refer to the KYTC Special Provisions for electronic or paper submittal requirements for Engineer's review.

h. After approval of submitted equipment, the Contractor shall supply the following Operation and Maintenance Manual documentation to the Owner. Two (2) complete sets of documentation shall be supplied for each model of equipment. The documentation shall be securely bound in heavy-duty 3-ring binders. The information for each piece of equipment shall be indexed using typewritten label tabs. The spine of each binder shall have a typewritten label, which indicates the included equipment types. The documentation shall include:

- (1) Approved Submittal and Shop Drawings
- (2) Cable Splicer Qualifications, Type and Voltage

- (3) State Contractors License with Electrical Classification
- (4) Master, Journeyman and Apprentice Electrician Licenses and Certifications
- (5) Lockout/Tagout Program
- (6) Regulator Load and Calibration Reports for testing, checking and adjusting all regulators in the electrical vault
- (7) Megger Test Reports
- (8) Ground Rod Test Reports
- (9) Installation Manuals
- (10) Operation Manuals
- (11) Maintenance Manuals
- (12) Parts Lists, including recommended spare parts. Recommended spare parts shall be furnished with the respective equipment.

i. After approval of the O&M Manuals, the Contractor shall provide three (3) complete electronic copies of all documentation in Adobe PDF file format on CD-R (non-rewriteable) discs storage media. The electronic files shall contain searchable text and include a hyperlink index for ease in locating information with the PDF file.

j. All requirements herein Item SS-300 shall be applicable to all referenced sections in these contract documents and applicable to all sections which reference Item SS-300.

k. The Contractor is the single source of responsibility for the installation and integration of the airport's lighting, power, and control systems. New airport lighting equipment and materials shall be fully compatible with all other new and existing airport lighting equipment and systems. Any non-compatible components furnished by the Contractor shall be replaced at no additional cost to the Owner with a similar unit that is approved by the Engineer and compatible with the remainder of the airport lighting system.

300-2.3 OPERATION AND MAINTENANCE DATA.

a. Installation manual: Description of function, installation and calibration manuals, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.

b. Operations manual: Manufacturer's printed operating instructions and procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; summer and winter operating instructions; and all programming and equipment settings.

c. Maintenance manual: Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

d. Service manual: Servicing instructions and lubrication charts and schedules, including the names and telephone numbers of personnel to contact for both routine periodic and warranty service for equipment and materials provided under this Specification.

e. Final approved equipment shop drawings, clearly labeled.

f. Final test reports, clearly labeled, including motor certification tests.

g. Final certified calibration sheets for all equipment and instruments.

300-2.4 WIRE. Wire in conduit rated up to 5,000 volts shall conform to AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits for Rubber Insulated Neoprene Covered Wire, or Fed. Spec. J-C-30, Type RHW, for rubber insulated fibrous covered wire. For ratings up to 600

volts, thermoplastic wire conforming to Fed. Spec. J-C-30, Types TW, THW, and THWN shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

Unless otherwise indicated, conductors No. 10 AWG and smaller shall be solid, and conductors No. 8 AWG and larger shall be stranded.

Service, underground feeder, and underground branch circuit wiring shall be minimum Type THHN/THWN-2 unless otherwise noted.

Indoor feeder and indoor branch circuit wiring shall be minimum Type THHN/THWN-2 unless otherwise noted.

Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway. Pull ropes and pull wires shall have sufficient tensile strength for the cable(s) to be pulled and installed. Damaged cable or raceway shall be replaced at no additional cost to the Owner.

Install pull wires in empty raceways. Use a polypropylene plastic line with not less than 200 pound tensile strength. Secure and leave at least 12 inches of slack at each end of pull wire to prevent it from slipping back into the conduit. Cap spare raceways with removable tapered plugs, designed for this purpose.

300-2.5 CONDUIT. Rigid steel conduit and fittings shall conform to the requirements of Underwriters Laboratories Standard 6, 514, and 1242.

300-2.6 PLASTIC CONDUIT (for use below grade only). Plastic conduit and fittings shall conform to the requirements of Fed Spec. W-C-1094 and Underwriters Laboratories Standards UL-651 and shall be one of the following, as shown in the plans:

- a. Type I - Schedule 40 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II - Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III - Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in conduit.

Plastic conduit adhesive shall be a solvent cement manufactured specifically for the purpose of gluing the specific type of plastic conduit and fitting.

300-2.7 TAPE. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88, respectively, as manufactured by the Minnesota Mining and Manufacturing Company, or an approved equal.

The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electrical Code.

Copies of the National Electrical Code may be obtained from the National Fire Protection Associations, Inc., One Batterymarch Park, Quincy, Massachusetts 02269.

300-2.8 CONCRETE. Concrete shall be a commercial grade ready mix with a minimum 28-day compressive strength of 3500 PSI using 1-inch (25-mm) maximum size coarse aggregate, as determined by test cylinders made in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Concrete located within one foot of the proposed ground surface shall contain 4 to 6 percent air content.

Mixing Conditions: Concrete shall not be mixed while the air temperature is below 40°F (4°C) without permission of the Engineer. If permission is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F

(10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his/her expense.

Placing Concrete: All concrete shall be placed during daylight, unless otherwise approved by the Engineer.

Cold Weather Protection: When concrete is placed at temperatures below 40°F (4°C), the Contractor shall provide satisfactory methods and means to protect the mix from injury by freezing. The aggregates, or water, or both, shall be heated in order to place the concrete at temperatures between 50°F and 100°F (10°C and 38°C). After the concrete has been placed, the Contractor shall provide sufficient protection such as cover, canvas, framework, heating apparatus, etc., to enclose and protect the structure and maintain the temperature of the mix at not less than 50°F (10°C) until at least 60% of the designed strength has been attained.

300-2.9 CONTROL AND TIMING RELAYS. All relays shall be plug-in type relays and shall be furnished with socket base and all required mounting accessories; provide Allen-Bradley Bulletin 700 Type or approved equal. Provide relays with contacts meeting the ampacity rating requirements as indicated in the plans and as required for the equipment load to be connected and controlled.

300-2.10 SWITCHES. Main disconnect switches 600 volt or less shall be UL service entrance rated, industrial circuit breaker type, pad-lockable, heavy duty type with neutral and ground kits and poles and ratings as indicated on the drawings and suitable for the application indicated. Exterior switches shall be NEMA 3R rated.

300-2.11 OVERCURRENT PROTECTIVE DEVICES.

Circuit Breakers: Circuit breakers shall be the molded-case type, as indicated, with each pole equipped with inverse time and instantaneous overcurrent tripping devices. Circuit breakers shall be UL listed. Single pole breakers shall be full module size; two poles shall not be installed in a single module. Multi-pole breakers shall be of the common-trip type having a single operating handle, and for sizes of 50 amperes or less may consist of single pole breakers permanently assembled at the factory into a multi-pole unit. Circuit breakers used for motor disconnects and not in sight of the motor controller shall be capable of being locked in the open position. Minimum interrupting rating shall be as shown.

Fuses: All fuses shall be Bussman; Gould-Shawmut, or equal. Plug fuses are not acceptable. Cartridge fuses shall be rated at 250 or 600 volts, as applicable, and shall conform to the requirements of UL 198 and NEMA Standard FU-1. 600 volt or less fuses shall be rated at 200,000 Amperes Interrupting Capacity.

300-2.12 PANELBOARDS. Furnish and install panelboards as indicated on the Drawings. Breakers shall be bolted type and have available fault current interrupting capacity as scheduled. Single pole breakers shall be full module size; two poles shall not be installed in a single module. All multi-pole breakers shall be common trip.

The panels shall be load balanced by measuring the loads and making circuit changes. Record the load readings before and after changes and submit test records. Differences exceeding 20 percent between phase loads, within a panelboard, are not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

The panel shall be UL listed, service entrance rated, and fully bussed with copper bussing, copper neutral bussing, and copper ground bar. All bolts used to connect current carrying parts together shall be front accessible. The panel shall have a securely attached metal nameplate listing the manufacturer, shop order number, panel type, voltage, ampacity and short circuit withstand rating. An individual terminal or lug shall be provided for each neutral allowing one wire per terminal.

The panel shall be surface mounted with semi-flush locking doors and matching keys. The Contractor shall provide a typed directory and install the same in the holder behind the transparent protective covering in the panels. Provide an exterior nameplate with panel and name, mounted at the top of the panel above the door. Doors shall match enclosures. Indoor surface mounted enclosures shall have pre-punched knockouts. The panels shall be General Electric, Square D, Cutler Hammer, or approved equal.

Panelboards and breakers shall conform to the requirements of Fed. Spec. W-P-115.

300-2.13 SURGE PROTECTIVE DEVICES. Provide a surge protective device at the main disconnect switch and at the lighting panelboard as indicated in the plans and make all final connections. Lead lengths shall not exceed 18 inches.

SPD Type1 (building exterior mounted adjacent to disconnect):

- a. UL 1449 Third Edition Type 2 Listed
- b. UL 1283 Listed for Type 2
- c. Voltage protection rating 1200V L-N
- d. Surge rating 300,000 amps per phase minimum
- e. SCCR: Equal or exceed 200 kA
- f. Inominal Rating: 20 kA
- g. 240/120-volt, 1-phase, 3-wire; with integral fused disconnect switch.
- h. Undervoltage detection, phase and power loss monitoring
- i. LED status indicator lights, audible alarm, transient counter, dry contacts
- j. NEMA 3R enclosure, 5 year warranty

SPD Type 2 (building interior mounted adjacent to panelboard):

- a. UL 1449 Third Edition Type 2 Listed
- b. UL 1283 Listed for Type 2
- c. Voltage protection rating 1200V L-N
- d. Surge rating 150,000 amps per phase minimum
- e. SCCR: Equal or exceed 200 kA
- f. Nominal Rating: 20 kA
- g. 240/120-volt, 1-phase, 3-wire; connected via dedicated circuit breaker to panelboard.
- h. Undervoltage detection, phase and power loss monitoring
- i. LED status indicator lights, audible alarm, transient counter, dry contacts
- j. NEMA 1 enclosure, 5 year warranty

Provide surge protective devices to protect incoming voltage power circuits from field equipment.

300-2.14 CONSTANT CURRENT REGULATORS. Constant current regulators shall be:

- a. L-828, regulator without monitoring, Ferroresonant type
- b. Class 1, (6.6 amps)
- c. Style 1, (3 brightness steps)
- d. 240 VAC, 1-phase, 60 Hz
- e. Integral S-1 Cutout

The output power rating of the regulators shall be as noted on plans and meet the criteria set forth in the most current version of AC 150/5345-10, Specification for Constant Current Regulators and Regulator Monitors. The output power rating of all new regulators within the electrical transclosure shall be tested, checked and adjusted to meet the AC criteria prior to placing the airfield lighting circuits into service.

Each regulator shall be equipped with the following options:

- a. Internal 120 VAC control power transformer
- b. Remote/Local and Intensity control selector switches
- c. Output ammeter
- d. Input and output current surge limitation
- e. Circuit isolation
- f. Open circuit protection
- g. Overcurrent protection
- h. Lightning arresters across the output terminals

The regulators shall be supplied with all features and accessories required for a complete installation as defined in these Specifications and as shown on the plans.

The trip rating of all circuit breakers which are used to protect constant current lighting circuit regulators shall be coordinated with the approved regulator manufacturer. The manufacturer's recommended circuit breaker size shall be submitted to the Engineer for approval.

The Contractor shall calibrate all new regulators following construction and prior to final acceptance testing in accordance with FAA AC 150/5340-26 "Maintenance of Airport Visual Aid Facilities" and manufacturer's recommendations. Contractor shall submit calibration report to Engineer.

After final acceptance testing has been completed, the Contractor shall complete and submit his final regulator load test reports to the Engineer for all regulators and insert copies of the final regulator load test reports in the Operation and Maintenance Manuals.

300-2.15 LIGHTING CIRCUIT SELECTOR SWITCHES. Lighting circuit selector switches shall be furnished in accordance with the most current version of advisory circular AC 150/5345-5 and these plans and specifications. The units shall be:

- a. 120 VAC control power
- b. Type L-847-2 (2 circuit control)
- c. Class A (Indoor use)
- d. Rating 1 (6.6 ampere, 5000 volts)
- e. Off/Remote/Local selector switch for the entire unit
- f. On/Off selector switches for each switched circuit.

300-2.16 AIRPORT LIGHTING CONTROL PANEL. The airport lighting control panel shall be furnished in accordance with the most current version of advisory circular AC 150/5345-3 and these plans and specifications. The panel shall be:

- a. 120 VAC control power
- b. Type L-821
- c. NEMA 12 enclosure (Indoor use), hinged gasketed cover, padlockable.
- d. Lightning and surge protection for the panel control power and all incoming field circuits using equipment level panel surge arresters. These surge arresters shall be mounted within the panel and clearly shown on the shop drawing submittals.
- e. Oversized to provide adequate space for spare and future control devices indicated.
- f. Complete overall schematic control wiring diagram inside plastic protective cover mounted within panel on door.
- g. Spare parts for future addition of a taxiway circuit

It is the intent to provide the Owner with an all-inclusive panel that houses the controls, timers, relays, switches for local control, terminal strips, and all components making a neat installation package that negates the necessity of having to add external relays, etc. to provide the desired control functions for the airport lighting system. The required control functions shall be built into the controller with the provision of terminal-to-terminal connections to the regulators, radio controller and other equipment.

300-2.17 FIRE EXTINGUISHERS. Install a fire extinguisher, wall bracket, and accessories within the electrical transclosure in a location approved by the Engineer.

a. Each installation shall be in accordance with NFPA 10, Standard for Portable Fire Extinguishers. The extinguisher shall be mounted so that the handle is 48" above finished floor.

b. Extinguisher: UL Rating 80B:C, minimum 10 lb. capacity, for electrical vault, the fire-fighting agent shall be Purple K dry chemical. Provide outdoor rated steel wall bracket sized for unit.

CONSTRUCTION METHODS

300-3.1 LOCKOUT/TAGOUT PROGRAM. The Contractor shall provide a complete copy of an electrical energy source Lockout/Tagout Program to the Owner, with copy to the Engineer. The document shall clearly identify the on-site master electricians and their contact information, including office and mobile telephone numbers.

The Lockout/Tagout Program shall comply with Part 1910 – Occupational Safety and Health Standards (OSHA) Subpart S – Electrical, and meet the requirements of 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout), including requirements listed in 1910.331 through 1910.335.

Implementation of the Lockout/Tagout Program and all other related safety requirements are the sole responsibility of the Contractor.

300-3.2 SAFETY PROGRAM. The Contractor shall implement an electrical safety program that complies with NFPA 70E and 29 CFR 1926.

Implementation of the Electrical Safety Program, determining and providing proper Personal Protective Equipment (PPE), training and enforcing personnel to wear the prescribed PPE, conducting work area safety inspections (including correcting deficiencies), and all other related safety requirements are the sole responsibility of the Contractor.

All work involved in the preparation and implementation of the safety program will not be measured for separate payment, but will be considered subsidiary to the lockout/tagout bid item.

300-3.3 GENERAL. The Contractor shall be responsible for coordinating all electrical work with the Utility. The Contractor shall provide temporary service conductors and raceway system. The Contractor shall then provide and connect permanent service conductors and raceway system after the completion.

All secondary conductors and controls, signaling and lighting shown in or on buildings are included in this project. Electrical service shall be extended from the service equipment as indicated.

In general, the various electrical equipment and material to be installed by the various trades under this specification shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards so as to complete the work in a neat and satisfactory manner. The following is a general outline concerning the running of various systems and is to be excepted where the drawings or conditions at the buildings necessitate deviating from these standards.

The Contractor shall perform megger testing on each existing regulator circuit prior to any work on the electrical system. This information shall be recorded and documented by the Contractor and submitted to the Engineer. The Contractor shall perform megger tests on each regulator circuit after the acceptance test period. This acceptance test information shall be recorded and documented by the Contractor and

submitted to the Engineer. Megger test shall be performed in accordance with the requirements of Item L-108.

The drawings and specifications are complementary; any work required by one, but not by the other, shall be performed as though required by both.

All conduits shall be run exposed in the equipment rooms, or run concealed as indicated.

The construction details of the building are illustrated on the drawings. Each Contractor shall thoroughly acquaint himself with the details before submitting his bid as no allowances will be made because of the Contractor's unfamiliarity with these details.

The electrical plans do not give exact locations, etc., and do not show all the offsets, control lines, junction boxes, and other installation details. Each Contractor shall carefully lay out his work at the site to conform to the job conditions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide complete operating systems.

The electrical plans show diagrammatically the locations of the various electrical outlets and apparatus and the method of circulating and controlling them. Exact locations of these outlets and apparatus shall be determined by reference to the general plans and to all detail drawings, etc., by measurements at the buildings, and in cooperation with other crafts, and in all cases shall be subject to the approval of the Engineer. The Engineer reserves the right to make any reasonable change in location of any outlet or apparatus before installation, without additional cost to the Owner.

These Specifications and the accompanying Drawings are intended to cover systems which will not interfere with the structure of the buildings, which will fit into the several available spaces, and which will insure complete and satisfactory systems. Each bidder shall be responsible for the proper fitting of his material and apparatus into the buildings.

Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the Drawings, he shall arrange for such space with the Engineer before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such changes at the Contractor's expense.

The Contractor shall be responsible to see that each party furnishes electrical equipment which meets the electrical requirements specified herein and that all systems work together to produce the specified operation.

Where two or more units of the same kind or class of equipment are required, these shall be products of a single manufacturer; however, the component parts need not be the products of one manufacturer.

Each Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these Specifications and Plans, which shall be checked by the Engineer and approved before the work is started, and interferences with the structural conditions shall be corrected by the Contractor before the work proceeds.

Electrical equipment, such as switchgear, switchboards, panelboards, load centers and other power supply equipment, shall not be used as a common enclosure, pull box or junction box for routing conductors of different systems, unless the equipment is specifically designed for this purpose and indicated as such on the Plans.

All electrical equipment shall be securely mounted as indicated in the plans, as required by the contract specifications, as required by guidelines and codes, and as required by the manufacturer using hardware compliant with the environmental conditions.

Interior components of electrical enclosures shall be securely mounted using appropriate hardware within the enclosure. Adhesives or adhesive tapes/strips are not allowed and are prohibited.

Electrical components, including but not limited to, relays, circuit boards, electronics, etc, shall be installed within approved enclosures.

The Contractor shall keep ends of conduits, including those extending through roofs, equipment and fixtures covered or closed with caps or plugs to prevent foreign material from entering during construction.

Where portions of raceways are known to be subjected to different temperatures, where condensation is a problem, and where passing from interior to exterior of a building, the portion of raceway or sleeve shall be filled with an approved material to prevent the circulation of air, prevent condensation, and prevent moisture entry. Sealing of raceways shall not occur until after the conductors and cables have been installed, tested and accepted by the Engineer.

The Contractor shall install any temporary lines and connections required to maintain electric services and safely remove and dispose of them when complete.

All temporary wiring shall conform to OSHA standards. Remove temporary services when work is complete. Any damage to electrical equipment caused by the Contractor shall be repaired at no cost to the Owner.

All non-current carrying parts and neutrals shall be grounded as indicated on the Drawings or as required by the Codes.

White and/or gray outer finish conductors may only be used as grounded conductors or neutral conductors in accordance with NEC.

Install insulated green equipment grounding conductors with all feeder and branch circuits.

Provide separate insulated equipment grounding conductors from grounding system to each electrical equipment, telecommunication equipment, other special electrical system equipment, and appurtenance item location in accordance with NFPA 70 and other applicable standard requirements.

The bidder shall inspect the site, thoroughly acquaint himself with conditions to be met and work to be accomplished. Failure to comply with this shall not constitute grounds for any additional payments.

Where electrical equipment is installed that causes electrical noise interference with other systems either existing or installed under this contract, the offending equipment shall be equipped with isolating transformers, filters, reactors, shielding, or any other means as required for the satisfactory suppression of the interferences, as determined by the Engineer.

All junction boxes, expansion joints, flexible connections, instruments and similar items requiring servicing or repairs shall be installed in an accessible location.

All salvage and equipment removed by the work shall remain the property of the Owner. Material removed from the project shall be stored on the project site where and as directed. Debris shall be removed from the job site and disposed of by the Contractor.

The Contractor shall maintain his work area clean and orderly at all times. Debris shall be removed promptly. The electrical system shall be thoroughly cleaned inside and outside of all enclosures to remove all dust, concrete splatter, plaster, paint and lint.

The Contractor shall do all excavating and backfilling made necessary by electrical work and shall remove all surplus or supply any earth required to establish the proper finished grade.

The Contractor shall do all cutting and patching made necessary by electrical work, but in no case shall he cut through or into any structural member without written permission of the Engineer.

All steel conduits, supports, channels, fittings, nuts, bolts, etc. shall be galvanized, corrosion-resistant type unless otherwise noted.

An approved anti-seize compound shall be used on all threads to prevent equipment and thread damage.

300-3.4 POWER SUPPLY EQUIPMENT. Electrical equipment, such as switchgear, switchboards, panelboards, load centers, and other power supply equipment, shall not be used as a common enclosure, pull box or junction box for routing conductors of different systems, unless the equipment is specifically designed for this purpose and indicated as such on the Plans.

If shown, the power supply equipment shall be set on concrete housekeeping pads to provide a minimum space of 3-1/2 inches between the equipment and the floor. All equipment shall be secured to the floor or wall in accordance with the manufacturer's recommendations and these contract document requirements.

300-3.5 DUCT AND CONDUIT. Conduits shall be galvanized rigid steel unless otherwise indicated or specified. Refer to one-line diagram conduit notes for specific requirements.

For underground service entrance, feeder and branch circuit raceways, offsets and bends over 30 degrees and elbows in Schedule 40 PVC conduit runs shall be Schedule 80 PVC conduit. Underground service entrance PVC conduits shall be concrete encased unless otherwise noted. Underground PVC conduits shall be concrete encased under driveways, roadways, parking lots and other paved areas.

PVC shall convert to coated galvanized rigid steel conduit prior to its emergence; no PVC shall emerge from the ground or concrete slab or encasement. Use manufactured long sweep coated galvanized rigid steel conduit elbows for stub-up risers. Coated galvanized rigid steel conduit shall transition to non-coated galvanized rigid steel conduit no sooner than 3" above finished grade.

Trenches shall be backfilled and compacted in 6" layers to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D6938.

Backfilling from two directions will not be allowed. No backfilling will be accomplished without the approval of the Engineer. The Construction Observer will coordinate with the Contractor for advance scheduling of trench inspection.

Install grounding-and-bonding type bushings and bonding jumpers on all service entrance conduits and on all feeder and branch circuit conduits.

Use conduit bushings at each conduit termination. Where No. 4 AWG or larger ungrounded wire is installed, use insulated bushings.

When EMT is allowed, utilize only steel compression fittings. Die-cast and set-screw fittings shall not be used.

Use double lock nuts at each conduit termination. Use weather tight hubs in damp and wet locations. Sealing lock nuts shall not be used.

Grounding continuity to rigid metal conduit shall be accomplished by grounding bushings/adapters with lugs for connection to grounding counterpoise and/or grounding electrode conductor as defined by NEC.

All exposed wiring shall be run in not less than 1/2 inch (12 mm) galvanized rigid steel conduit. All conduits shall be installed to provide for drainage. Conduit shall be attached to wooden structures with galvanized

pipe straps and fastened with galvanized wood screws not less than No. 8 nor less than 1-1/4 inches (31 mm) long. There shall be at least two fastenings for each 10-foot (3 m) length.

300-3.6 WIRING. The Contractor shall furnish all labor and materials and shall make complete electrical connections in accordance with the wiring diagram furnished with the project plans. The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electrical Code.

300-3.7 MARKING AND LABELING. Properly identify all electrical equipment.

Wire/Cable Designation Tape Markers:

a. Indoor Dry Locations: UL Recognized Materials, vinyl or vinyl-cloth, self-adhesive, wraparound, self-laminating, cable/conductor markers with computer printer-generated numbers and letters, minimum 1" width. Provide Brady B-427 with thermal transfer print type, or approved equal.

b. Outdoor Locations and Indoor Wet and Damp Locations: White polyolefin, non-adhesive, full circle, heat-shrinkable sleeve, cable/conductor markers with computer printer-generated numbers and letters, minimum 1" width. Provide Brady B-342 with thermal transfer print type, or approved equal.

Properly identify all electrical equipment, including but not limited to the following:

- a. Switchgear, switchboards, and control panels.
- b. Main distribution panel and individual devices within it.
- c. Panelboards and individual devices within it.
- d. Safety switches and disconnects.
- e. Contactors and lighting control center, including all branch circuits.
- f. Individually mounted circuit breakers.
- g. Starters and relays.
- h. Transformers.

Use permanently attached black phenolic plates with 3/8" white engraved lettering on the face of each, attached with minimum two sheet metal screws. Starters and relays connected under this Specification shall be identified whether furnished under this Specification or under other Specifications of this contract. Plates shall be indoor or outdoor rated as required by installation location.

Panelboard identification plates shall indicate panel by identification name, voltage system, ampacity rating and type, AIC rating, and feeder source description.

Identify each receptacle, light switch, junction box, etc. with panelboard identification and circuit number. For all wiring device covers, use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

Identify fire alarm junction boxes with red covers and mechanical control junction boxes with blue covers.

Install all identification as required by current adopted editions of the NFPA 70 - National Electrical Code and NFPA 70E - Standard for Electrical Safety in the Workplace.

300-3.8 L-821 PANEL CONTROLS. The Contractor shall install the L-821 control panel as close as possible to the regulators and the power supply for the airfield lighting equipment.

The L-821 control panel shall be securely attached to the wall of the building in which it is to be located. Commonly used lead anchors, toggle bolts or other fasteners suitable for securing the load are acceptable. Where necessary to make a more secure installation, auxiliary brackets of unistrut or other approved material may be used. All mountings must be done in a neat and workmanlike manner. Stainless steel bolts, nuts, washers, etc. shall be used. Where required to provide a neat installation,

junction boxes shall be supplied for the routing of the cables to the conduits containing the wires from the field to the control panel.

The L-821 control panel shall be factory painted with two coats of metal primer and two coats (min) of high-gloss aviation orange paint in accordance with the applicable FAA paint specification.

The L-821 control panel shall contain 3-position selector switches, interfaces, etc. as required, to provide the "OFF", "ON" and "AUTOMATIC" control of all functions, mounted in a neat and workmanlike manner on its cover.

Manual external selector switches shall be provided to by-pass the photoelectric cell for testing purposes. Manual brightness control of the regulator(s) shall be provided on the control panel cover. All switches must be labeled with permanent nameplates, white lettering on black background. No label-maker labels are allowed.

The weatherproof photoelectric controller shall be provided meeting FAA advisory circular requirements for sunset ON (35 foot-candles) and sunrise OFF (60 foot-candles) lighting levels.

The timer shall be a 7-day programmable electronic timer with display and battery back-up function in the event of power loss. The timer shall be mounted within the L-821 control panel and be programmed for automatic daylight savings time adjustment. The timer shall be used for preset weekly schedules as required in these contract documents. Astronomic functions are not required as sunset ON and sunrise OFF functions shall be performed by the photoelectric controller.

The following functions of the integrated control system shall be as a minimum requirement, but not limited to the following:

- a. The entire airfield lighting system shall come on at dusk via photoelectric cell (PEC).
- b. At a pre-determined time, the timer in the control panel shall be capable of turning off lighting (see notes 1 and 2 below the control table for partial electrical energy savings).
- c. Provide jumpers in the control panel to allow the timer to turn the lights off at 10 p.m. and on at 5 a.m.
- d. Upon 3 clicks of the mic button, the runway and taxiway brightness setting comes on at 10%.
- e. Upon 5 clicks of the mic button, the runway and taxiway brightness setting increases to 30%.
- f. Upon 7 clicks of the mic button, the runway and taxiway brightness setting increases to 100%. The REIL units, not already on, come on.
- g. The PEC controls incandescent PAPI intensity; High during the Day, Low during the Night.
- h. Upon 3 clicks of the mic button, the LED PAPI comes on High during the Day, Low during the Night. Brightness level is maintained for 15 minutes.
- i. The PEC controls the Windcone and Beacon on/off functions.
- j. The functions in the tables shall be tailored by the Owner and Engineer during the submittal review and installation to meet the individual needs of the Airport.

Day Operations - See table below:

Day Operations	Runway	REIL	PAPI	LED PAPI	Taxiway	Windcone	Beacon
Default	Off (Switchable)	Off	On High	Off	Off (Switchable)	Off	Off
3 Clicks	10% On (Low)	Off	On High	On High	10% On (Low)	Off	Off
5 Clicks	30% On (Medium)	Off	On High	On High	30% On (Medium)	Off	Off
7 Clicks	100% On (High)	On	On High	On High	100% On (High)	Off	Off

Night Operations – See table below:

Night Operations	Runway	REIL	PAPI	LED PAPI	Taxiway	Windcone	Beacon
Default	10% On at Dusk, Timer Switchable	Off	On Low	Off	10% On at Dusk, Timer Switchable	On	On
3 Clicks	10% On (Low)	Off	On Low	On Low	10% On (Low)	On	On
5 Clicks	30% On (Medium)	Off	On Low	On Low	30% On (Medium)	On	On
7 Clicks	100% On (High)	On	On Low	On Low	100% On (High)	On	On

300-3.9 L-854 RADIO CONTROLLER The Contractor shall install the L-854 radio controller as close as possible to the lighting control equipment.

The L-854 radio controller shall be securely attached to the wall of the building in which it is to be located. Commonly used lead anchors, toggle bolts or other fasteners suitable for securing the load are acceptable. Where necessary to make a more secure installation, auxiliary brackets of unistrut or other approved material may be used. All mountings must be done in a neat and workmanlike manner. Stainless steel bolts, nuts, washers, etc. shall be used. Where required to provide a neat installation, junction boxes shall be supplied for the routing of the cables to the conduits containing the wires from the field to the control panel.

The antenna for the L-854 radio controller shall be mounted on a 1" galvanized steel conduit mast at a height for optimal performance and to be above any line-of-sight obstructions between incoming aircraft and the antenna insofar as possible. The antenna wire shall be run through this same conduit, exiting the conduit immediately below the antenna through a 1" "T" conduit fitting through a properly sized squeeze connector. Provide wall mounting brackets to secure the mast and #6 AWG copper wire to ground the mast to the arrester junction box. Install a weatherproof junction box with lightning arrester high on the wall near the mast. Install a drip loop in the cable and enter the box from the bottom through watertight connector. Make all grounding connections to the lightning arrester. Install a dedicated #6 copper ground conductor in 1/2" conduit to a dedicated 3/4" x 10' copperclad ground rod directly below the antenna location. Bond the rod to building steel and to the ground ring system. The antenna cable shall be installed in 3/4" conduit from the junction box to the radio controller using proper mechanical coaxial connector. Conduit

shall be arranged and provided with a drain to prevent water entry into the controller. All bolts, nuts, washers, etc. shall be stainless steel.

The L-854 enclosure shall be factory painted with two coats of metal primer and two coats (min) of high-gloss aviation orange paint in accordance with the applicable FAA paint specification.

The frequency of the L-854 radio controller shall be provided by the Engineer or the Owner.

Any required permits from the FAA and FCC to operate the L-854 radio controller shall be provided by the Engineer or Owner. The system shall not be placed into service prior to the procurement of such permits unless a waiver of this requirement is provided in writing by the Engineer or Owner.

300-3.10 REMOVAL AND RELOCATION OF EXISTING EQUIPMENT. The Contractor shall carefully remove all salvageable equipment as indicated on the Plans. Any equipment which is damaged during the removal operation shall be subject to a reduction in payment for removal of the equipment. All equipment which is removed during this project shall be transported to a site on the Airfield or removed from the Airfield and properly disposed of as directed by the Owner and the Engineer.

Any existing electrical equipment, conduit, cables, etc. that is damaged during construction shall be replaced at no additional cost to the Owner to the satisfaction of the Owner and the Engineer.

300-3.11 TESTING. All installations shall be fully tested by continuous operation for not less than 24 hours as completed systems prior to acceptance. These tests shall include the functioning of each control not less than 10 times.

The completed circuits shall be tested in accordance with the applicable provisions of Item L-108.

The installations shall be tested in operation as a completed unit prior to acceptance. Tests shall include taking megger and voltage readings in accordance with manufacturer's requirements. Testing equipment shall be furnished by the Contractor. The insulation resistance to ground for 600V rated cables shall be not less than 100 megohms when measured per NETA standards.

Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification and certify compliance with test parameters. Tests shall be conducted in the presence of the Engineer and shall be to his/her satisfaction. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest. Perform infrared scan tests and inspections of service and power distribution equipment at the respective hangars and provide reports. Electrical equipment will be considered defective if it does not pass tests and inspections. Reports shall include notations of deficiencies, remedial action taken and observations after remedial action.

The Contractor shall ascertain that all lighting system components furnished (including FAA certified and approved equipment) are compatible in all respects with each other and the remainder of the new and existing systems. Any non-compatible components furnished by the Contractor shall be replaced at no additional cost to the Owner with a similar unit that is approved by the Engineer and compatible with the remainder of the airport lighting system.

300-3.12 INSPECTION FEES AND PERMITS. Obtain and pay for all necessary permits and inspection fees required for electrical installation.

WORK SUPERVISION. The electrical contractor (whether the general contractor or a subcontractor) shall be a licensed contractor in the state of Alabama having an electrical classification suitable for performing the work required in these contract documents.

The Contractor shall designate in writing the qualified electrical supervisor who shall provide supervision to all electrical work on this project. The minimum qualifications for the electrical supervisor shall be an

electrical contractor as defined by Alabama Electrical Contractors Board. The supervisor or his appointed alternate possessing at least a journeyman electrician license shall be on site whenever electrical work is being performed. The qualifications of the electrical supervisor shall be subject to approval of the Owner and the Engineer.

All electrical contractors and journeyman electricians shall be licensed in accordance with the Alabama Board of Electrical Contractors Administrative Code, Chapter 303-X-2. The website located at <http://www.aecb.state.al.us/> publishes the text of this statutory requirement. No unlicensed electrical workers shall perform electrical work on this project. Apprentice electricians in a ratio of not more than one apprentice per journeyman electrician will be allowed if the apprentices are licensed and actively participating in an apprenticeship program recognized and approved by the Alabama Electrical Contractors Board.

Refer to specification section L-108-2.5 "Splicer Qualifications" for additional requirements.

300-3.13 TRAINING. The training classes shall be coordinated with the Owner and Engineer in advance of the final acceptance testing. Comprehensive operational and maintenance training materials shall be provided by the equipment manufacturer and the Contractor (see section 2.3 OPERATION AND MAINTENANCE DATA).

- a. Operations and Maintenance
 - (1) Minimum Training length: 1 hour
 - (2) Location: Terminal and Transclosure
 - (3) Equipment: L-828 Constant Current Regulator, L-821 Lighting Control Panel, L-854 Radio, Runway and Taxiway lights, PAPI, REIL, Windcone, Beacon, Guidance Sign
 - (4) Training materials: User and maintenance manuals
- b. Preventive Maintenance Program Recommendations
 - (1) Equipment: L-828 Constant Current Regulator, L-821 Lighting Control Panel, L-854 Radio, Runway and Taxiway lights, PAPI, REIL, Windcone, Beacon, Guidance Sign
 - (2) Failure scenarios and what to do.
 - (3) Technical assistance points of contact and phone numbers.

Schedule the training with the Owner at least 10 days in advance and notify the Engineer.

Provide hands-on demonstrations and training of equipment components and functions, including adjusting, operating and maintaining the lighting equipment and systems. Coordinate the training schedule with the Owner in advance, so that the Owner may record the training if desired. Provide 4-hours training for the operations and maintenance personnel.

METHOD OF MEASUREMENT

300-4.1 The quantity of lockout/tagout and constant current regulator calibration procedures to be paid for shall consist of all lockout/tagout procedure work and all constant current regulator calibration work completed in place, accepted and ready for operation. This item does not include measurement for constant current regulator equipment.

300-4.2 Electrical equipment, power and controls shall not be paid for under this section but shall be paid for under Item L-109 "Airport Transformer Vault and Vault Equipment".

BASIS OF PAYMENT

300-5.1 Payment will be made at the contract lump sum price for each completed and accepted lockout/tagout and constant current regulator calibration procedures. This price shall be full compensation for furnishing all materials and for all preparation, testing, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item SS-300-5.1

Lockout/Tagout and Constant Current Regulator
Calibration Procedures – per Lump Sum

MATERIAL REQUIREMENTS

CFR 1910	Occupational Safety and Health Regulations
CFR 1926	Safety and Health Regulations for Construction
ANSI/IEEE C2	National Electrical Safety Code
NFPA-70	National Electrical Code (NEC)
NFPA-70E	Standard for Electrical Safety in the Workplace
NFPA-101	Life Safety Code
29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Safety and Health Regulations for Construction

END OF ITEM SS-300

CONSTANT CURRENT REGULATOR CALIBRATION REPORT

Standard Requirements: FAA AC 150/5340-26 (latest edition) Maintenance of Airport Visual Aid Facilities

Owner/Sponsor: Kentucky Department of Aviation Engineer: Garver, LLC

Airport: Rough River State Park Airport Contractor: _____

Project Title: Airfield Electrical Rehabilitaion Garver Project Number: 14151080

Vault ID / Location: _____ Date: _____

Weather / Site Conditions: _____ Last Two Weeks of Rain: _____ inches

Constant Current Regulator #: _____ Serves: _____

	<u>Completed</u>	<u>Comments</u>
1. Check all control equipment for proper operation.	<input type="checkbox"/>	_____
2. Perform short-circuit test. Record results and recalibrate if necessary.	<input type="checkbox"/>	_____
3. Perform open-circuit test on regulators with open circuit protection. Open circuit protective device should de-energize the regulator. Record results.	<input type="checkbox"/>	_____
4. Check and record regulator input voltage and current. Input Voltage: _____ Input Current: _____	<input type="checkbox"/>	_____
5. Check and record regulator output load. (ONLY if regulator has monitoring package) Volt-Amperes: _____	<input type="checkbox"/>	_____
6. Check and record output current on each brightness step. If output current is outside of the allowable range as defined by the FAA, adjust the regulator's on-board potentiometer to re-calibrate the output current within the allowable range. Re-record the new output current on this form.	<input type="checkbox"/>	_____

3-Step CCR

5-Step CCR

B10: _____ B30: _____ B100: _____ 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Nominal: 4.8A 5.5A 6.6A 2.8A 3.4A 4.1A 5.2A 6.6A

Tested By: _____ (Signature and Date)

Test Equipment: _____ (Manufacturer and Model No.)

Engineer Witness: _____ (Signature and Date)

Owner / Sponsor Witness: _____ (Signature and Date)

ITEM SS-310 AIRPORT LIGHTING SYSTEMS

DESCRIPTION

310-1.1 This item shall consist of furnishing and installing airport runway and taxiway pavement edge lighting systems and guidance signs; and removing existing runway and taxiway edge lights, and guidance signs, in accordance with this specification, the referenced specifications and drawings, and applicable advisory circulars. The system shall be installed at the locations and in accordance with the dimensions, design and details shown on the plans. This work shall include the furnishing of all equipment, materials, services and incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

310-1.2 Additional details pertaining to the lighting system covered in this item are contained in the advisory circular, AC 150/5340-30, Design and Installation Details for Airport Visual Aids. Additional details pertaining to the PAPI system covered in this item are contained in the advisory circular, AC 150/5345-28, Standard for Precision Approach Path Indicator (PAPI) Systems. Additional details pertaining to the REIL system covered in this item are contained in the advisory circular, AC 150/5345-51, Specification for Discharge-Type Flasher Equipment. The Contractor shall maintain current copies of all referenced and applicable advisory circulars on the job site. The Contractor is responsible to make known to the Engineer any conflict between plans and specifications that he observes or of which he is made aware.

310-1.3 This item shall consist of furnishing and installing Precision Approach Path Indicators (PAPIs) and Runway End Identifier Lights (REILs) in accordance with these specifications. This work shall include the mounting, leveling, wiring, and testing of the lighting equipment and all materials and incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer. This item shall include mounting accessories, controls, relays, circuit breakers, transformers, inter-unit wiring, disconnect switches and concrete pads specified in the plans.

EQUIPMENT AND MATERIALS

310-2.1 GENERAL.

a. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

b. For pre-cast or prefabricated concrete encased light base installations, the Contractor shall submit and coordinate the construction of the proposed pre-cast units with the Engineer onsite to review and approve the construction process. The Contractor shall submit his proposed installation process for review and approval by the Engineer. The Contractor shall provide additional items and work if required and requested by the Engineer for the construction and installation of the pre-cast units at no additional cost to the Owner.

310-2.2 PAPI. The PAPI systems shall be furnished and installed in accordance with AC 150/5345-28, Specification for Precision Approach Path Indicator, the manufacturer's installation requirements and these contract documents.

The Contractor shall provide the services of a licensed professional land surveyor to perform the site survey and obstacle clearance surface check for the PAPI systems in accordance with AC 150/5340-30. The survey check shall be coordinated with the Engineer to witness the work. The surveyor shall provide a written/stamped letter to the Engineer with description on how he performed the obstacle clearance surface check with disposition on his findings. Upon verification letter acceptance that no obstacles are present, the Engineer will provide instruction to the Contractor to proceed with construction work in the field.

If the surveyor determines that obstacles exist within the obstruction clearance surface, then he shall note the location of those obstacles in his report. The report must state the locations and heights of obstacle(s) above the obstruction clearance surface. The Engineer will then consult with the Owner and FAA on making siting adjustments of the PAPI installation in order to comply with the Advisory Circular requirements.

The PAPI system shall consist of the following:

- a. L-881 (system consisting of 2 light units)
- b. Style B (current powered from a dedicated PAPI series circuit regulator system)
- c. Class I (system that operates down to -35°C)

Utilize and install three-leg version if available (for ease of alignment), two-lamp light units and provide consolidating harness equipment and all other appurtenances as required for a complete and operable system.

The Contractor shall obtain complete installation instructions including wiring diagrams and schematics from the manufacturer prior to any work and maintain copies of these manuals on site for use during installation work. The unit shall be mounted on a frangible support system as detailed on the plans.

All PAPI light boxes shall have a tilt switch and provision for grounding. All wiring which enters the PAPI box shall be through plugs and receptacles which will separate if struck by an aircraft.

Each light unit shall be aimed outward into the approach zone on a line parallel to the runway centerline within a tolerance of $\pm 1/2$ degree.

The beam centers of all light units shall be within ± 1 inch of a horizontal plane. This horizontal plane shall be within ± 1 foot of the elevation of the runway centerline at the intercept point of the visual glidepath with the runway.

The front face of each light unit in the bar shall be located on a line perpendicular to the runway centerline within ± 6 inches.

If current powered and incandescent, the lighting control panel and photocell controls at the vault will automatically control the brightness of the beam via the dedicated PAPI regulator. If current powered and LED, the PAPI will be controlled with the Runway circuit on the runway lighting regulator.

The manufacturer shall furnish his recommended spare parts, instruction manual, and input voltage surge protection. The system shall be warranted for one year from acceptance of this project. Any failure which occurs in this warranty period shall be replaced by new factory tested assemblies at no additional cost to the Owner. At the end of the warranty period, the Contractor shall replace all of the PAPI lamps and return useable lamps to the Owner.

The Contractor shall conduct an operating test for one week of continuous duty before acceptance. Failure to complete the test will require restarting the test without use of any spare parts. Two failures will be reason to reject the entire PAPI system at no cost to the Owner.

310-2.3 REIL. The Runway End Identifier Light shall be furnished in accordance with AC 150/5345-51, Specification for Discharge-Type Flashing Light Equipment. The REIL system shall be Style L-849A(L) High Intensity/Single Step with 1-step current sensing. The REIL lights shall flash simultaneously on both sides of the runway.

The Contractor shall obtain complete installation instructions including wiring diagrams and schematics from the manufacturer prior to any work and maintain copies of these manuals on site for use during installation work. The unit shall be mounted on a frangible support system as detailed on the plans.

The equipment shall be powered from the runway series lighting circuit with built-in current sensing transformer. Consult with the regulator and REIL system manufacturers prior to installation, since the REIL systems will be powered by the regulator series circuit.

The REIL units shall be furnished with factory-installed remote current sensing to facilitate operation when the runway lighting circuit is energized at the appropriate brightness step. This sensing shall be accomplished by the installation of a new L-830 isolation transformer in the runway series circuit and associated conductors and termination required for a complete and functional system. The amount of sensed current required to operate the REILs shall be adjustable by the use of a precision potentiometer. One step is required (On/Off).

The manufacturer shall furnish his recommended spare parts, instruction manual, and input voltage surge protection. The system shall be warranted for one year from acceptance of the project. Any failure which occurs in the warranty period shall be replaced by new factory tested assemblies at no additional cost to the Owner. At the end of the warranty period, the Contractor shall replace all of the REIL lamps and return useable lamps to the Owner.

The Contractor shall conduct an operating test for a one week of continuous duty before acceptance. Failure will be judged by the absence of a synchronous flash at the correct brilliance and frequency. Failure to complete the test will require restarting the test without use of any spare parts. Two failures will be reason to reject the entire REIL system at no cost to the Owner.

310-2.4 LIGHT FIXTURES. Airfield lights shall be supplied with all features and accessories including isolation transformers, light bases, base covers, safety ground rods, concrete pads and incidentals required for a complete installation as defined in these Specifications and as shown on the plans.

- a. Medium Intensity Taxiway Lights (MITL):
 - (1) Taxiway edge elevated lights shall be L-861T(L), LED lamp, Omnidirectional blue lens.
- b. Medium Intensity Runway Lights (MIRL):
 - (1) Runway edge elevated lights shall be L-861(L), LED lamp, Omnidirectional lens or BiDirectional lens as shown on Plans and as approved.
 - (2) Runway threshold and end elevated lights shall be L-861E(L), LED Lamp, Bidirectional lens as shown on Plans and as approved.

310-2.5 LAMPS. Lamps for elevated edge lights shall be LED type as specified.

310-2.6 SPARE EQUIPMENT INCLUDING LAMPS, FIXTURES, AND SPARE SIGN REPLACEMENT COMPONENTS. Provide 10 percent spare lamps of each type installed for lights and signs, minimum quantity of 6 required. Spare lamps shall not be measured for separate payment but shall be considered subsidiary to the light fixture and guidance sign pay items.

Provide one complete spare lamp set for each PAPI and REIL system. PAPI and REIL spare lamps shall not be measured for separate payment but shall be considered subsidiary to the respective system pay items.

Provide 10 percent spare fixtures of each type installed for lights. Provide one spare sign replacement components. Spare fixtures and spare sign replacement components shall not be measured for separate payment but shall be considered subsidiary to the respective light fixture or sign pay items.

- a. A spare elevated LED fixture unit shall be one complete, ready-to-install fixture, including the coupling, column, head housing assembly, cordset, LED power supply assembly, LED assembly, and lens

assembly.

b. A spare sign replacement component unit shall include the LED light tube assembly and LED power supply assembly.

The spare lamps, spare fixtures and spare sign replacement components shall be delivered and stored as directed by the Owner, with transmittal receipt signed by Owner's representative. A signed copy shall be forwarded to the Engineer with an additional signed copy placed in the O&M manuals.

310-2.7 GUIDANCE SIGNS. Guidance signs shall be L-858, meeting the criteria set forth in AC 150/5345-44, Specification for Taxiway and Runway Signs, and suitable for base mounting. Each unit shall be furnished with the required panels, mounting assemblies, frangible couplings, transformer, intensity control, identification tag, metal tethers, fasteners and safety ground rods.

Style 2 and Style 3 signs shall meet the luminance requirements in AC 150/5345-44 throughout the current ranges of the associated series circuit.

Guidance signs shall utilize LED lighting technology that results in a low VA load and high power factor. Guidance signs shall have an integral on/off switch for airport maintenance use while changing lamps.

Signs shall be furnished with permanent type nameplates that are both weather and sunlight resistant. Nameplates which are completed with ink markers or similar methods will not be accepted.

The complete sign installation shall be designed to withstand a 200-mph wind load.

Guidance signs shall be constructed using a technology having a proven record of performance for a period of at least five years.

Guidance signs shall be Size 2 (15" Legend), Style 2 (3-step circuit), Class 2 (operation range from -40 degrees F to 131 degrees F), Mode 2 (withstand wind loads of 200 mph).

310-2.8 ISOLATION TRANSFORMERS. New isolation transformers shall be Type L-830 and have a wattage rating suitable for the wattage of the fixture and sign lamps. The transformer shall be listed in FAA Circular AC 150/5345-47.

Provide 10 percent spare isolation transformers of each type installed for lights and other equipment. Provide one spare isolation transformer for signs. Spare transformers shall not be measured for separate payment but shall be considered subsidiary to the respective light fixture or sign pay items.

CONSTRUCTION METHODS

310-3.1 GENERAL. The installation and testing details for the lighting system shall be as specified in the applicable advisory circulars.

310-3.2 PLACING THE EQUIPMENT. The PAPI, REIL and associated equipment shall be mounted on concrete pads as shown in the plans. Secure the equipment and make all final connections.

310-3.3 MOUNTING AND LEVELING. The concrete support to which the equipment is fastened shall be accurately leveled before mounting the equipment. The PAPI and REIL units shall be properly aimed, as recommended by the manufacturer of the supplied equipment. This adjustment shall be accomplished using factory-approved aiming devices and techniques. The Contractor is responsible for all surveying and measurement which is required to accurately position and aim these devices.

310-3.4 PLACING LIGHTS. All equipment shall be installed at locations indicated in the plans. Lights shall

be laid out by locating the two control points by station as indicated on the plans and measuring the indicated individual separation distances. Light bases shall be located within 1 inch +/- longitudinally and 0.5 inches +/- transversely of the location indicated unless deviation is approved by the Engineer. The Contractor is responsible for all surveying and measurement which is required to accurately position and aim the light fixtures. Excavation for installation of light bases shall be backfilled with at least 4 inches of granular leveling course, as approved by the Engineer. Fixture height shall be as indicated on the Drawings.

For pre-cast or prefabricated concrete encased light base installations, a leveling course of sand shall be placed in the bottom of the excavated hole, sufficient for accurately installing, leveling and placing the lights in accordance with the requirements in this specification and AC 150/5340-30.

310-3.5 PLACING SIGNS. All signs shall be installed at the approximate location indicated in the plans. The specific requirements for sign location are specified in AC 150/5340-18, Standards For Airport Sign Systems. Specific requirements of this AC are also shown on the Plans. Signs shall be located within 1 inch +/- longitudinally or 0.5 inches +/- transversely of the required location unless deviation is approved by the Engineer. The locations for the signs shall be staked by the Contractor and approved by the Engineer before installation begins.

310-3.6 TRANSFORMER INSTALLATION. The transformer for base mounted fixtures shall be placed inside the base on top of a vitrified brick. The transformer for stake mounted fixtures shall be located uniformly as shown on the plans. The primary cable connections shall be made with L-823 connectors as described in Item L-108 and have 3 feet of slack cable. The secondary leads connected to the lamp leads by means of a disconnecting plug and receptacle provided with the unit, and this joint shall not be taped. The secondary joint shall be fastened with a holding ring provided for this purpose.

310-3.7 UNIT ASSEMBLY. All electrical equipment, including edge lights, guidance signs and other visual aid units shall be assembled in accordance with the manufacturer's installation procedures. Anti-seize compound shall be used on all threads.

Coordinate recommended torque values with the light fixture manufacturer, light base can manufacturer, stainless steel bolts and hardware used, and exact anti-seize compound used, in order to prevent light base thread damage. Utilize a dial-type torque wrench for accuracy and to prevent over-tightening bolts.

310-3.8 IDENTIFICATION NUMBERS. An identifying number shall be assigned to each light and sign in accordance with the plans or as approved by the Engineer and Owner. This number shall be imprinted with reflective black with 1/2" letters on a non-corrosive metal disc 2" minimum diameter and attached to the pavement side of the fixture with a metal screw.

310-3.9 REMOVAL OF LIGHT FIXTURES AND EQUIPMENT. Light fixtures and other equipment which are to be removed shall be carefully excavated. All concrete bases and concrete anchors shall be removed by the Contractor. The removed lights, guidance signs, isolation transformers and wiring harnesses shall then be given to the Owner, or properly disposed of if so directed by the Owner. The ground in the area of the removed lighting equipment shall be backfilled and properly compacted. .

310-3.10 REMOVAL OF EXISTING EQUIPMENT. The Contractor shall carefully remove all salvageable equipment as indicated in the plans. Any equipment that is damaged during the removal and/or relocation operation shall be subject to a reduction in payment for removal and/or relocation of the equipment. All equipment that is removed during this project shall be transported to a site on the Airfield or removed from the Airfield and properly disposed of as directed by the Owner and the Engineer.

310-3.11 TESTING. The installation shall be tested in operation as a completed unit prior to acceptance. Tests shall include taking megger and voltage readings as outlined in Item SS-300 and Item L-108. Testing equipment shall be furnished by the Contractor. Refer to Item L-108 for additional test requirements.

Tests shall be conducted in the presence of the Engineer and shall be to his/her satisfaction.

All installations shall be fully tested by continuous operation for not less than 24 hours as completed systems prior to acceptance. These tests shall include the functioning of each control not less than 10 times.

The Contractor shall ascertain that all lighting system components furnished (including FAA certified and approved equipment) are compatible in all respects with each other and the remainder of the new and existing systems. Any non-compatible components furnished by the Contractor shall be replaced at no additional cost to the Owner with a similar unit that is approved by the Engineer and compatible with the remainder of the airport lighting system.

METHOD OF MEASUREMENT

310-4.1 The quantity of existing lights, removed, to be measured under this item shall be the number of each complete unit removed, and accepted by the Engineer.

310-4.2 The quantity of lights, complete with isolation transformers, bases or stakes, connectors, safety grounds rods, and appurtenances, to be measured under this item shall be the number of each purchased, installed, as completed units in place, ready for operation, and accepted by the Engineer. See section on Spare Equipment for information on spare fixture requirements.

310-4.3 The quantity of guidance signs of each type to be measured for under this item shall be the number of signs purchased, installed, complete with isolation transformers, bases, safety ground rods, tether and all other required appurtenances, as completed units in place, ready for operation, and accepted by the Engineer. See section on Spare Equipment for information on spare sign component requirements.

310-4.4 Measurement for the installation of the PAPI or REIL system shall be the number of each purchased and installed for a completed and accepted installation of a complete PAPI or REIL system. All concrete and bases, isolation transformers, power adapters/converters, cans, trenching, conduit, and wiring required beyond the initial power connection to the first item shall be considered subsidiary to the item and will not be measured for separate payment. Trenching and wiring from the new circuit to the PAPI or REIL master unit will be measured separately.

BASIS OF PAYMENT

310-5.1 Payment will be made at the contract unit price for each complete item, measured as provided above, and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

310-5.2 Payment will be made at the contract lump sum price for each lump sum complete item, measured as provided above, and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item SS-310-5.1	Existing Edge Light, Removed -- per Each
Item SS-310-5.2	L-849A(L) Runway End Identifier Light System -- per Each
Item SS-310-5.3	L-858(L) Base Mounted, 2-Module Guidance Sign -- per

SS-310-6

	Each
Item SS-310-5.4	L-861(L) Stake Mounted Runway Edge Light -- per Each
Item SS-310-5.5	L-861(L) Base Mounted Runway Edge Light -- per Each
Item SS-310-5.6	L-861E(L) Stake Mounted Runway Edge Light -- per Each
Item SS-310-5.7	L-861E(L) Base Mounted Runway Edge Light -- per Each
Item SS-310-5.8	L-861T(L) Stake Mounted Taxiway Edge Light -- per Each
Item SS-310-5.9	L-861T(L) Base Mounted Taxiway Edge Light -- per Each
Item SS-310-5.10	L-881 Precision Approach Path Indicator System -- per Each
Item SS-310-5.11	L-881 Precision Approach Path Indicator Aiming Bar -- per Each
Item SS-310-5.12	L-881(L) Precision Approach Path Indicator System -- per Each

MATERIAL REQUIREMENTS

Fed.Spec.J-C-30	Cable and Wire, Electrical (Power, Fixed Installation)
Fed. Spec. W-C-1094	Conduit and Conduit Fittings; Plastic, Rigid
Fed. Spec. W-P-115	Panel, Power Distribution
Fed. Std. 595	Colors
AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-3	Specification for L-821 Panels for Control of Airport Lighting
AC 150/5345-7	Specification for L-824 for Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Standard for Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853 Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Base and Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Taxiway and Runway Signs

AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Isolation Transformers for Airport Lighting Systems
AC 150/5346-49	Specification L-854, Radio Control Equipment
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program
Underwriters Laboratories Standard 6	Rigid Metal Conduit
Underwriters Laboratories Standard 514	Fittings for Conduit and Outlet Boxes
Underwriters Laboratories Standard 1242	Intermediate Metal Conduit
Underwriters Laboratories Laboratories Standard 651	Schedule 40 and 80 Rigid PVC Conduit (for Direct Burial)
NFPA-70	National Electrical Code (NEC)

END OF ITEM SS-310

ITEM L-101 AIRPORT ROTATING BEACONS

DESCRIPTION

101-1.1 This item shall consist of furnishing and installing airport rotating beacons. This work shall include the mounting, leveling, wiring, painting, servicing, and testing of the beacon and all materials and incidentals necessary to place the beacons in operating condition as a completed unit to the satisfaction of the Engineer. This item shall include a mounting platform if specified in the plans.

EQUIPMENT AND MATERIALS

101-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified and listed under Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

c. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components or electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the Contract Documents plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

g. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

101-2.2 BEACON. The beacon shall meet the requirements of AC 150/5345-12, Specification for Airport and Heliport Beacons.

The beacon shall be an L-801A, standard medium intensity rotating beacon, installed at airports having medium intensity lighting systems.

The beacon shall be Class 1 (temperature operation range -22 to 131 degrees F), with lamp monitor option.

The beacon shall be manufactured by Hali-Brite or Manairco.

Provide four new lamps. Install two lamps. Provide other two lamps as spares.

101-2.3 PANEL BOARDS AND BREAKERS. Panel boards and breakers shall conform to the requirements of Fed. Spec. W-P-115.

101-2.4 WEATHERPROOF CABINETS. The weatherproof cabinets shall conform to National Electrical Manufacturers Association Standards and shall be constructed of steel not less than No. 16 USS gauge.

101-2.5 WIRE. Wire in conduit rated up to 5,000 volts shall conform to AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits for Rubber Insulated Neoprene Covered Wire, or Fed. Spec. J-C-30, Type RHW, for rubber insulated fibrous covered wire. For ratings up to 600 volts, the thermoplastic wire conforming to Fed. Spec. J-C-30, Types TW, THW, and THWN, shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

101-2.6 CONDUIT. Rigid steel conduit and fittings shall conform to the requirements of Underwriters Laboratories Standard 6, 514, and 1242.

101-2.7 PAINT.

a. Priming paint for ungalvanized metal surfaces shall be a high solids alkyd primer conforming to TT-P-664D.

b. Priming paint for galvanized metal surfaces shall be zinc dust-zinc oxide primer paint conforming to MIL-DTL-24441/19B. If necessary, add not more than ½ pint (0.06 liter) of turpentine to each gallon (liter).

c. Orange paint for the body and the finish coats on metal and wood surfaces shall consist of a ready-mixed non-fading paint meeting the requirements of Fed. Spec. TT-E-489. The color shall be in accordance with Federal Standard 595, Aviation Gloss Orange Number 12197.

d. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the Master Painter's Institute, Reference #9, Exterior Alkyd, Gloss, VOC Range E2.

e. Priming paint for wood surfaces shall be mixed on the job by thinning the above-specified orange or white paint with ½ pint (0.06 mm) of raw linseed oil to each gallon (liter).

CONSTRUCTION METHODS

101-3.1. PLACING THE BEACON. The beacon shall be mounted on a beacon tower as shown in the plans.

101-3.2 HOISTING AND MOUNTING. The beacon shall be hoisted to the mounting platform by using suitable slings and hoisting tackle. Before fastening the beacon to the mounting platform, the mounting holes shall be checked for correct spacing. Beacon base or mounting legs shall not be strained or forced

out of position to fit incorrect spacing of mounting holes. The beacon base shall be raised first, set in position, and bolted in place. The drum shall then be raised and assembled to the base.

101-3.3 LEVELING. After the beacon has been mounted in place, it shall be accurately leveled following manufacturer's instructions. The leveling shall be checked in the presence of the Engineer and shall be to the Engineer's satisfaction.

101-3.4 SERVICING. Before placing the beacon in operation, the Contractor shall check the manufacturer's manual for proper servicing requirements. Follow the manufacturer's servicing requirements for each size beacon.

101-3.5 BEAM ADJUSTMENT. After the beacon has been mounted and leveled, the elevation of the beams shall be adjusted. The final beam adjustments shall be made at night so that results can be readily observed. The beams shall be adjusted to the elevation directed by the Engineer or as shown in the plans, except that, in no case shall the elevation of the beams be less than 2 degrees above the horizontal.

101-3.6 WIRING. The Contractor shall furnish all necessary labor and materials and shall make complete above ground electrical connections in accordance with the wiring diagram furnished with the project plans. The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electric Code.

Copies of the National Electric Code may be obtained from the National Fire Protection Associations, Inc., One Batterymarch Park, Quincy, Massachusetts 02269.

If underground cable for the power feed from the transformer transclosure to the beacon site and duct for this cable installation is required, the cable, ground rods and duct shall be installed in accordance with and paid for as described in Item L-108, Underground Power Cable for Airports, and Item L-110, Airport Underground Electrical Duct Banks and Conduit.

Unless otherwise specified, the Contractor shall connect the tell-tale relay mechanism in the beacon to energize the tower obstruction light circuit when failure of the beacon service (primary) lamp occurs.

If lightning protection is specified in the plans or proposal as a part of this item, it shall be installed in accordance with 103-2.3 in Item L-103, Airport Beacon Towers.

101-3.8 CONDUIT. All exposed wiring shall be run in not less than ¾ inch (19 mm) galvanized rigid steel conduit. No conduit shall be installed on top of a beacon platform floor. All conduit shall be installed to provide for drainage. If mounted on a steel beacon tower, the conduit shall be fastened to the tower members with "wraplock" straps, clamps, or approved fasteners, spaced approximately 5 feet (150 cm) apart. The conduit shall be fastened to wooden structures with galvanized pipe straps and with galvanized wood screws not less than No. 8 or less than 1-¼ inches (31 mm) long. There shall be at least two fastenings for each 10-foot (3 m) length.

101-3.9 PHOTOELECTRIC CONTROL. If shown in the plans or specified in job specifications, the Contractor shall furnish and install an automatic control switch at the location indicated in the plans. The switch shall be a photoelectric type. It shall be a standard commercially available unit that will energize when the northern sky illuminance falls below 60 footcandles (645.8 lux) but before reaching a level of 35 footcandles (367.7 lux). The photoelectric switch should de-energize when the northern sky illuminance rises to a level of not more than 60 footcandles (645.9 lux). It shall be installed, connected, and adjusted in accordance with the manufacturer's instructions.

101-3.10 OBSTRUCTION LIGHTS. Unless otherwise specified, the Contractor shall install on the top of the beacon tower a dual L-810 obstruction light. These lights shall be mounted on conduit extensions to a height of not less than 4 inches (100 mm) above the top of the beacon. They shall be connected in series into the tell-tale circuit with the necessary relay and wiring connections.

101-3.11 PAINTING. Steel mounting platforms shall be given one priming coat of corrosion-inhibiting primer before erection and one body and one finish coat of aviation-orange paint after erection. All equipment installed under this contract and exposed to the weather shall be given one body and one finish coat of aviation-orange or white paint as required. This shall include beacon (except glass surfaces), beacon base, breaker cabinet, all conduit, and transformer cases. It shall not include air terminals or obstruction light globes.

The paint shall be applied uniformly in the proper consistency by skilled painters. The finished paint shall be free from sags, holidays, and smears. Each coat of paint shall be given ample time to dry and harden before the next coat of paint is applied. A minimum of 3 days shall be allowed for drying on wood surfaces, and a minimum of 4 days shall be allowed for drying on metal surfaces. Painting shall not be done in cold, damp, foggy, dusty, or frosty atmospheres, or when air temperature is below 40° F (4° C), nor started when the weather forecast indicates such conditions for the day.

All surfaces shall be cleaned before painting. The surfaces shall be dry and free from scale, grease, rust, dust, and dirt when paint is applied. All knots in wood surfaces shall be covered with shellac immediately before applying the priming coat of paint. Nail holes and permissible imperfections shall be filled with putty. The ready-mixed paint shall be thinned for the priming and body coats in accordance with the manufacturer's recommendations. In the absence of such recommendations, the following shall apply:

a. Body coats (for both wood and steel surfaces) - add ½ pint (0.06 liter) of turpentine to each gallon (liter) of ready-mixed paint for body coats.

b. Finish coats (for both wood and steel surfaces) the ready-mixed paint shall be used as it comes from the container for finish coats.

101-3.12 TESTING. The installation shall be fully tested in operation as a completed unit prior to acceptance. These tests shall include operation of the lamp-changer operation and taking megger and voltage readings. The insulation resistance to ground of the beacon supply circuit shall be not less than 50 megohms when measured ungrounded. Testing equipment shall be furnished by the Contractor. Tests shall be conducted in the presence of the Engineer and shall be to the Engineer's satisfaction.

Test the completed beacon installation using approved photometric testing equipment. Beacons that require an additional shield or other device to prevent light spillage and thus affect photometric performance shall not be used.

Testing shall be performed in accordance with Item SS-300.

METHOD OF MEASUREMENT

101-4.1 The quantity to be paid for shall be the number of beacons purchased, installed as completed units in place, accepted, and ready for operation.

101-4.2 The quantity to be paid for shall be the number of beacons removed as completed units in place, accepted, and ready for operation. This item shall include removing the beacon and its accessories, removing existing conduits, conductors and appurtenances from the existing wood pole, removal of conduit to below grade, removal of existing circuits back to source, and removal of existing wood pole and foundation.

BASIS OF PAYMENT

101-5.1 Payment will be made at the contract unit price for each completed and accepted job. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

AC 150/5370-10F

9/30/2011

Payment will be made under:

Item L-101-5.1	L-801A, Airport Rotating Beacon — per Each
Item L-101-5.2	Existing Airport Rotating Beacon and Pole, Removed -- per Each

MATERIAL REQUIREMENTS

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Cable for Airport Lighting Circuits
AC 150/5345-12	Specification for Airport and Heliport Beacons
AC 150/5345-53	Airport Lighting Equipment Certification Program
FED SPEC J-C-30	Cable and Wire, Electrical (Power, Fixed Installation) (cancelled; replaced by A-A-59544 Cable and Wire, Electrical (Power, Fixed Installation))
FED SPEC TT-E-489	Enamel, Alkyd, Gloss, Low VOC Content
FED SPEC TT-P-664D	Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant
FED SPEC W-P-115	Panel, Power Distribution
FED STD 595	Colors Used in Government Procurement
MIL-P-24441/19B Type III	Paint, Epoxy-Polyamide, Zinc Primer, Formula 159,
Underwriters Laboratories Standard 6	Rigid Metal Conduit
Underwriters Laboratories Standard 514	Fittings for Conduit and Outlet Boxes
Underwriters Laboratories Standard 1242	Intermediate Metal Conduit
NFPA-70	National Electric Code
NFPA-780	Standard for the Installation of Lightning Protection Systems
Master Painter's Institute	

END OF ITEM L-101

ITEM L-103 AIRPORT BEACON TOWERS

DESCRIPTION

103-1.1 This item shall consist of furnishing and installing an airport beacon tower of the type shown in the plans, in accordance with these specifications. This work shall include the clearing of the site, erection of the tower, installation of lightning protection, painting, and all incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

103-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

b. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

f. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

103-2.2 TOWER. The beacon tower shall conform to the requirements of Advisory Circular (AC) 150/5340-30, Design and Installation Details for Airport Visual Aids, Chapter 6.

103-2.3 LIGHTNING PROTECTION. Lightning protection shall comply with NFPA-780, Standard for the Installation of Lightning Protection Systems. All materials shall comply with Class II requirements regardless of tower height. Ground rods and underground cables shall be installed in accordance with and paid for as described in Item L-108, Underground Power Cable for Airports.

103-2.4 PAINT.

a. Priming paint for galvanized steel towers shall be zinc dust-zinc oxide primer paint conforming to MIL-DTL-24441/19B. If necessary, add not more than 1/2 pint (0.06 liter) of turpentine to each gallon (liter).

b. Priming paint for ungalvanized steel towers shall be a high solids alkyd primer conforming to the Master Painter's Institute, Reference #9, Exterior Alkyd, Gloss, VOC Range E2.

c. Orange paint for the body and finished coats on metal and wood surfaces shall consist of a ready-mixed non-fading paint meeting the requirements of Fed. Spec. TT-E-489. The color shall be in accordance with Federal Standard 595, Aviation Gloss Orange Number 12197.

d. White paint for steel tower shall be ready-mixed paint conforming to Commercial Item Description A-A-3067.

CONSTRUCTION METHODS

103-3.1 CLEARING AND GRADING. The site on which the beacon tower is to be erected shall be cleared and leveled. All trees and brush shall be removed from the area within a distance of 25 feet (7.5 m) from the tower or as called for in the plans. Stumps shall be removed to a depth of 18 inches (45 cm) below finished grade and the excavation filled with earth and tamped. If a transformer transclosure or other structure is included as part of the installation, the area shall be cleared to a distance of 25 feet (7.5 m) from these structures. The ground near the tower shall be leveled to permit the operation of mowing machines. The leveling shall extend at least 2 feet (60 cm) outside the tower legs. All debris removed from the tower site shall be disposed of by the Contractor to the satisfaction of the Engineer and in accordance with Federal, state, or local regulations.

103-3.2 EXCAVATION AND FILL. Excavation for the tower footings shall be carried to a minimum of 4 inches (100 mm) below the footing depth. The excess excavation below the footing depth shall then be backfilled with gravel or crushed stone and compacted to the required level. The footing plates shall be installed, and a thickness of not less than 18 inches (45 cm) of the same gravel or crushed stone shall be placed immediately above the footing plates in layers of not over 6 inches (150 mm). Each layer above the footing plates shall be thoroughly tamped in place. The remainder of the backfill may be of excavated earth placed in layers not to exceed 6 inches (150 mm). Each layer shall be thoroughly compacted by tamping.

Where solid rock is encountered, which prevents the carrying of the foundation legs to the required depth but which is of sufficient strength to use holddown bolts, the tower anchor posts shall be cut off at the required length and the holddown bolts shall be installed as indicated in the plans with the approval of the Engineer. Each tower leg shall be anchored to the rock by means of two 7/8-inch (21 mm) diameter by 3-foot (90 cm) long expansion or split bolts and shall be grouted with neat portland cement into holes drilled into the natural rock. Except as required for rock foundations, the footing members shall not be cut off or shortened. If excavated material is of such character that it will not readily compact when backfilled, the Engineer may order the excavation backfilled with concrete or other suitable material.

The concrete footing for tubular beacon towers shall be installed in accordance with the manufacturer's recommendations and as detailed in the plans. Portions of the footing in the topsoil layer shall not be included in the footing height.

103-3.3 ERECTION. Detail erection drawings furnished by the manufacturer shall be strictly followed during construction. All towers shall be erected in sections from the ground up unless otherwise specified. In final assembly, all bolts and fastenings shall be installed, and the structure shall be plumb, true, square, and level. Nuts shall be taken up to a firm bearing after which the bolts shall, if necessary, be cut to proper length to protrude three full threads. Approved locknuts shall be placed on each bolt

over the regular nut. Ladder bolts shall be inserted with the head to the outer face of the tower. Diagonal, leg, and handrail bolts shall be installed with nuts on the outer face of the tower, unless otherwise specified. Bent parts shall be straightened before erection without damage to the protective coating. Surfaces abraded or bared of protective coating shall be painted with the proper priming paint as specified in these specifications.

Tubular beacon towers shall be erected in accordance with the manufacturer's recommendations. The safety cable shall be located on the side of the tower adjacent to the driveway or most accessible approach to the tower.

103-3.4 LIGHTNING PROTECTION. The Contractor shall furnish and install an air terminal, down conductor, and at least one ground plate or rod for each beacon tower or as indicated in the plans. The air terminal shall be installed at the top of the tower with the tip of the rod extending not less than 6 inches (150 mm) above the top of the beacon.

Down-conductor cables shall be securely fastened to the surface of the tower leg at 5-foot (150 cm) intervals with suitable bronze fasteners having bronze or noncorrosive metal bolts. Sharp turns or bends in the down conductor will not be permitted.

All connections of cable to cable, cable to air terminals, and cable to ground plates or rods shall be made with solderless connectors or noncorrosive metal approved by the engineer and shall be of substantial construction.

The down-conductor cable shall be securely attached to ground rods or plates placed at least 2 feet (60 cm) away from the tower foundations. The ground rod shall be driven into the ground so that the top is at least 6 inches (150 mm) below grade. The down-conductor shall be firmly attached to the ground plate or rod by means of a ground connector or clamp. Plates shall be embedded in the area of permanent moisture.

The complete lightning protection installation shall be accomplished to the satisfaction of the Engineer. The resistance to ground of any part of the lightning protection system shall not exceed 25 ohms.

103-3.5 PAINTING. The Contractor shall furnish all materials and labor for painting the beacon tower. The color scheme for the steel tower shall be as shown in the plans.

a. Parts to be Painted. Tower parts (except those parts to be exposed to earth) shall not be treated or primed before erection. All tower parts placed below ground level or within 12 inches (300 mm) above ground level shall be given two coats of approved bituminous paint.

The paint shall be applied uniformly in the proper consistency by skilled painters. The finished paint shall be free from sags, holidays, and smears. Division lines between colors shall be sharply defined. Each coat of paint shall be given ample time to dry and harden before the next coat is applied. A minimum of 4 days shall be allowed for drying on metal surfaces. Painting shall not be done in cold, damp, foggy, dusty, or frosty atmospheres, or when air temperature is below 40° F (4° C), nor started when the weather forecast indicates such conditions for the day.

All surfaces shall be cleaned before painting. The surfaces shall be dry and free from scale, grease, rust, dust, and dirt when paint is applied.

The number of coats of paint applied shall be in accordance with the following instructions:

b. Steel Towers, Galvanized. One priming coat of zinc dust-zinc oxide primer after erection and one body and one finish of white or orange paint (as required by the color scheme) shall be applied after erection.

c. Steel Towers, Not Galvanized. One priming coat of corrosion-inhibiting primer and one body and one finish coat of white or orange paint (as required by the color scheme) shall be applied after erection.

The above specified orange and white ready-mixed paints shall be thinned for the body coats in accordance with the manufacturer's recommendations. In the absence of such recommendations, the following shall apply:

d. Body Coats. Add not more than 1/2 pint (0.06 liters) of turpentine to each gallon (liter) of ready-mixed paint for body coats.

e. Finish Coats. The ready-mixed paint shall be used as it comes from the container for finish coats.

METHOD OF MEASUREMENT

103-4.1 The quantity to be paid for under this item shall be the number of airport beacon towers purchased, installed as completed units in place, accepted, and ready for operation.

BASIS OF PAYMENT

103-5.1 Payment will be made at the contract unit price for each completed and accepted job. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item L-103-5.1	Beacon Tip-Down Pole Tower and Foundation -- per Each
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MATERIAL REQUIREMENTS

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program
FED SPEC TT-E-489	Enamel, Alkyd, Gloss, Low VOC Content
Fed. Spec. TT-P-664D	Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant
FED STD 595	Colors Used in Government Procurement
MIL-DTL-24441/19B	Paint, Epoxy-Polyamide, Zinc Primer, Formula 159, Type III
NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems
Master Painter's Institute	
Commercial Item Description.	Paint: Alkyd, Exterior, Low VOC
	L-103-4

AC 150/5370-10F

9/30/2011

Spec A-A-3067

END OF ITEM L-103

ITEM L-107 AIRPORT 8-FOOT AND 12-FOOT WIND CONES

DESCRIPTION

107-1.1 This item shall consist of furnishing and installing an airport wind cone sock, light kit, and accessories in accordance with these specifications and in accordance with the dimensions, design, and details shown in the plans.

The work shall include all cable, cable connections, conduit and conduit fittings, the furnishing and installation of all lamps, , the testing of the installation, and all incidentals necessary to place the wind cone in operation as a completed unit to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

107-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified and listed under Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

c. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

g. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

107-2.2 WIND CONES. The 12-foot (3.5 m) wind cones and assemblies shall conform to the requirements of AC 150/5345-27, Specification for Wind Cone Assemblies.

The existing Type L-907 primary wind cone shall be converted from an incandescent Style 1-A (externally lit) to an LED Style 1-B (internally lit). The wind sock, Size 2 (36" Diameter by 12' Long), shall be replaced as indicated in the plans and in accordance with the manufacturer's recommendations.

The series lighting circuit shall be used as the power source for the wind cone. The windcone shall be current driven, and a power adapter will not be required.

The existing segmented circle airport marker system shall remain and be repainted.

107-2.3 WIRE. Wire in conduit rated up to 5,000 volts shall conform to AC 150/5345-7, Specification for L-824 Underground Cable for Airport Lighting Circuits for Rubber Insulated Neoprene Covered Wire, or Fed. Spec. J-C-30, Type RHW, for rubber insulated fibrous covered wire. For ratings up to 600 volts, thermoplastic wire conforming to Fed. Spec. J-C-30, Types TW, THW, and THWN, shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

107-2.4 CONDUIT. Rigid steel conduit and fittings shall conform to the requirements of Underwriters Laboratories Standard 6, 514, and 1242.

107-2.5 PLASTIC CONDUIT (for use below grade only). Plastic conduit and fittings shall conform to the requirements of Fed. Spec. W--C-1094 and Underwriters Laboratories Standards UL-651 and shall be one of the following, as shown in the plans:

- a. Type I--Schedule 40 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II--Schedule 40 PVC suitable for either above ground or underground use.

Plastic conduit adhesive shall be a solvent cement manufactured specifically for the purpose of gluing the specific type of plastic conduit and fitting.

107-2.6 CONCRETE. Refer to Item SS-300 for Concrete requirements.

107-2.7 PAINT.

- a. Priming paint for ungalvanized metal surfaces shall be a high solids alkyd primer conforming to TT-P-664D.
- b. Priming paint for galvanized metal surfaces shall be zinc dust-zinc oxide primer paint conforming to MIL-DTL-24441/19B. If necessary, add not more than ½ pint (0.06 liter) of turpentine to each gallon (liter).
- c. Orange paint for the body and the finish coats on metal and wood surfaces shall consist of a ready-mixed non-fading paint meeting the requirements of Fed. Spec. TT-E-489. The color shall be in accordance with Federal Standards 595, Aviation Gloss Orange Number 12197.
- d. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the Master Painter's Institute, Reference #9, Exterior Alkyd, Gloss, VOC Range E2.
- e. Priming paint for wood surfaces shall be mixed on the job by thinning the above specified aviation-orange or white paint by adding ½ pint (0.06 liter) of raw linseed oil to each gallon (liter).

CONSTRUCTION METHODS

107-3.1 INSTALLATION. The hinged support or hinged pole shall be installed on a concrete foundation as shown in the plans.

107-3.2 POLE ERECTION. The Contractor shall erect the pole on the foundation following the manufacturer's requirements and erection details. The pole shall be level and secure.

107-3.3 ELECTRICAL CONNECTION. The Contractor shall furnish all labor and materials and shall make complete electrical connections in accordance with the wiring diagram furnished with the project plans. The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electric Code.

If underground cable from the transformer vault to the wind cone site and duct for this cable installation is required, the cable and duct shall be installed in accordance with and paid for as described in Item L-108, Underground Power Cables for Airports, and Item L-110, Airport Underground Electrical Duct Banks and Conduits.

107-3.4 BOOSTER TRANSFORMER. If shown in plans or specified in job specifications, a booster transformer to compensate for voltage drop to the lamps shall be installed in a suitable weatherproof housing. The booster transformer shall be installed as indicated in the plans and described in the proposal. If the booster transformer is required for installation remotely from the windcone, it shall be installed in accordance with and paid for as described in Item L-109, Airport Transformer Transclosure and Transclosure Equipment.

107-3.5 PAINTING. Three coats of paint shall be applied (one prime, one body, and one finish) to the segmented circle. The paint shall meet the requirements of Fed. Spec. TT-E-489.

107-3.6 LAMPS. The Contractor shall furnish and install lamps as specified by the manufacturer.

107-3.7 TESTING. Testing shall be performed in accordance with Item SS-300.

METHOD OF MEASUREMENT

107-4.1 The quantity to be paid for shall be the number of wind cone socks purchased, installed as completed units in place, accepted, and ready for operation.

107-4.2 The quantity to be paid for shall be the number of wind cone light kits purchased, installed as completed units in place, accepted, and ready for operation.

107-4.3 The quantity to be paid for shall include paint and the number of segmented circles painted, accepted, and ready for operation.

107-4.4 The quantity of existing wind cone sock and lighting removals to be paid for shall be the number of wind cone sock, lighting, and all associated accessories removed as completed units.

BASIS OF PAYMENT

107-5.1 Payment will be made at the contract unit price for each completed and accepted job. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

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Item L-107-5.1	36" Wind Sock — per Each
Item L-107-5.2	L-807, LED Internal Light Kit – per Each
Item L-107-5.3	Segmented Circle Airport Marker, Painted -- per Each
Item L-107-5.4	Existing Wind Cone Sock and Light Kit, Removed -- per Each

MATERIAL REQUIREMENTS

AC 150/5340-5	Segmented Circle Airport Marker System
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Cable for Airport Lighting Circuits
AC 150/5345-27	Specification for Wind Cone Assemblies
AC 150/5345-53	Airport Lighting Equipment Certification Program
Commercial Item Description. Spec A-A-3067	Paint: Alkyd, Exterior, Low VOC
FED SPEC TT-E-489	Enamel, Alkyd, Gloss, Low VOC Content
Fed. Spec. TT-P-664D	Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant
FED SPEC J-C-30	Cable and Wire, Electrical (Power, Fixed Installation) (cancelled; replaced by AA-59544 Cable and Wire, Electrical (Power, Fixed Installation))
Fed. Spec. W-C-1094	Conduit and Conduit Fittings; Plastic, Rigid
FED SPEC W-P-115	Panel, Power Distribution
FED STD 595	Colors Used in Government Procurement
MIL-DTL-24441/20	Paint, Epoxy-Polyamide, Green Primer, Formula 150, Type III
MIL-P-24441/19B	Paint, Epoxy-Polyamide, Zinc Primer, Formula 159, Type III
Underwriters Laboratories Standard 6	Rigid Metal Conduit
Underwriters Laboratories Standard 514	Fittings For Conduit and Outlet Boxes
Underwriters Laboratories Standard 651	Schedule 40 and 80 Rigid PVC Conduit (for Direct Burial)
Underwriters Laboratories	Intermediate Metal Conduit
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Standard 1242

NFPA-70

National Electric Code

Master Painter's Institute

END OF ITEM L-107

ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS**DESCRIPTION**

108-1.1 This item shall consist of furnishing and installing power cables direct buried and furnishing and/or installing power cables within conduit or duct banks in accordance with these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the Engineer. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of any cable for FAA facilities. Requirements and payment for trenching and backfilling for the installation of underground conduit and duct banks is covered under Item L-110 "Airport Underground Electrical Duct Banks and Conduits."

EQUIPMENT AND MATERIALS**108-2.1 GENERAL.**

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be approved under the Airport Lighting Equipment Certification Program described in Advisory Circular (AC) 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the Engineer.

c. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall be responsible to maintain

an insulation resistance of 50 megohms minima, (1000V megger) with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period.

- g.** Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

108-2.2 CABLE. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Federal Specification J-C-30 and shall be type THWN-2.

Cable type, size, number of conductors, strand and service voltage shall be as specified on the plans.

108-2.3 BARE COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE AND GROUND RODS). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG solid for counterpoise and or No. 6 AWG stranded for ground wire conforming to ASTM B 3 and ASTM B 8, and shall be bare copper wire conforming to the requirements of ASTM D 33.

For voltage powered circuits, the equipment ground conductor shall be minimum No. 6 AWG, 600V rated, Type XHHW insulated, green color, stranded copper equipment ground conductor.

Ground rods shall be copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8-feet (240 cm) long nor less than 5/8 inch (15 mm) in diameter.

108-2.4 CABLE CONNECTIONS. In-line connections of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. The Cast Splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by Minnesota Mining and Manufacturing Company, "Scotchcast" Kit No. 82--B, or as manufactured by Hysol Corporation, "Hyseal Epoxy Splice" Kit No. E1135, or equivalent, is used for potting the splice is acceptable.

b. The Field-attached Plug-in Splice. Figure 3 of AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors, employing connector kits, is acceptable for field attachment to single conductor cable. It shall be the Contractor's responsibility to determine the outside diameter of the cable to be spliced and to furnish appropriately sized connector kits and/or adapters and heat shrink tubing with integral sealant.

c. The Factory-Molded Plug-in Splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The Taped or Heat-Shrunked Splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D 4388 and the plastic tape should comply with Mil Spec. MIL-I-24391 or Fed. Spec. A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

e. In all the above cases, connections of cable conductors shall be made using crimp connectors utilizing a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made in accordance with the manufacturer's recommendations and listings.

f. All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except the base can ground clamp connector shall be used for attachment to the base can. All exothermic connections shall be made in accordance with the manufacturer's recommendations and listings.

108-2.5 SPLICER QUALIFICATIONS. Every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated above 5,000 volts AC. The Contractor shall submit to the Engineer proof of the qualifications of each proposed cable splicer for the cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 CONCRETE. Refer to Item SS-300 for Concrete requirements.

108-2.7 FLOWABLE BACKFILL. Flowable backfill shall not be used.

108-2.8 CABLE IDENTIFICATION TAGS. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 TAPE. Electrical tapes shall be Scotch Electrical Tapes – number Scotch 88 (1-1/2" wide) and Scotch 130C linerless rubber splicing tape (2" wide), as manufactured by the Minnesota Mining and Manufacturing Company, or approved equivalent.

108-2.10 ELECTRICAL COATING. Scotchkote shall be as manufactured by Minnesota Mining and Manufacturing Company, or approved equivalent.

CONSTRUCTION METHODS

108-3.1 GENERAL. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Wherever possible, cable shall be run without splices, from connection to connection.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections, unless otherwise authorized in writing by the Engineer or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed or at least once in each access point where L-823 connectors are not installed.

Provide not less than 3 feet of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot vertically above the top of the access structure. This requirement also applies where primary cable passes through empty base cans, junction and access structures to allow for future connections, or as designated by the Engineer.

The existing and the proposed locations of lighting cable are approximate. The Contractor shall be responsible for field locating and identifying the existing lighting circuits to determine their exact routing. The Contractor shall also be responsible for maintaining the lighting systems in a working condition until the new lighting circuits have been installed and tested. The Contractor shall proactively and expeditiously accomplish this cable identification work prior to performing any modifications to the lighting circuits. Coordinate identification work with the Owner and Engineer and make all corrections, additions, etc. on the as-built drawings.

Underground cable and utilities exist within and adjacent to the limits of construction. An attempt has been made to locate these cables and utilities on the Plans. All existing cable and utilities may not be shown on the Plans and the location of the cables and utilities shown may vary from the location shown on the Plans. Prior to beginning of any type of excavation, the Contractor shall contact the utilities, the airport maintenance staff, FAA field personnel and other organizations as required and make arrangements for the location of the utilities on the ground. The Contractor shall maintain the cable and utility location markings until they are no longer required.

The Contractor shall replace or repair any underground cable or utility that has been damaged by the Contractor during excavation to the satisfaction of the owner of the cable or utility at no additional cost to the Owner.

All new lighting cable shall be marked using color-coded plastic electrical tape which is specifically designed for application on polyethylene-jacketed cable. The tape shall be applied as detailed on the Plans. Marking tape shall be Scotch 35 Vinyl Plastic tape or approved equal.

108-3.2 INSTALLATION IN DUCT BANKS OR CONDUITS. This item includes the installation of the cable in duct banks or conduit as described below. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be in accordance with the latest National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and interferences are avoided.

Duct banks or conduits shall be installed as a separate item in accordance with Item L-110, "Airport Underground Electrical Duct Banks and Conduit." The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to insure that the duct bank or conduit is open, continuous and clear of debris. Mandrel size shall be compatible with conduit size. The Contractor shall swab out all conduits/ducts and clean base can, manhole, etc. interiors IMMEDIATELY prior to pulling cable. Once cleaned and swabbed the base cans and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc. is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the Engineer of any blockage in the existing ducts. The cable shall be installed in a manner to prevent harmful stretching of the conductor, injury to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by handwinch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall be governed by cable manufacturer's

recommendations. A non-hardening lubricant recommended for the type of cable being installed shall be used where pulling lubricant is required.

Contractor shall submit pulling tension values to the Engineer prior to any cable installation. If required by the Engineer, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the Engineer. Cable pull tensions shall be recorded by the Contractor and reviewed by the Engineer. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or the NEC requirements whichever is more restrictive shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the Engineer, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or utilize other appropriate means to prevent abrasion to the cable jacket.

Existing ducts may require clearing before use. It is the responsibility of the Contractor to locate the existing ducts, identify empty or partially empty conduits and clear the conduits as required.

108-3.3 INSTALLATION OF DIRECT-BURIED CABLE IN TRENCHES. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable(s) shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable(s) shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3-inch vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, handholes, pullboxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than ¼ inch in size. The cable circuit identification shall match the circuits noted on the construction plans.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches below finished grade, except as follows:

(1) When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches unless otherwise specified.

(2) Minimum cable depth when crossing under a railroad track, shall be 42 inches unless otherwise specified.

Dewatering necessary for cable installation, erosion and turbidity control, in accordance with Federal, State, and Local requirements is incidental to its respective pay items as part of Item L-108. The cost of

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all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-108 Item.

The Contractor shall excavate all cable trenches to a width not less than 6 inches. Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

A string line or other approved method shall be used as a guide for excavation of straight trenches. A divergence greater than 12" from this line will not be acceptable and will require re-trenching and installation of new cables at no additional cost to the Owner.

The width of the trench shall be increased so that there is 1 inch of space between cables and 2 inches of space between the outside cables and the wall of the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All such rock removal shall be performed and paid for under the respective trenching or conduit or duct bank pay item.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cable(s) cross proposed installations, the Contractor shall insure that these cable(s) are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the Engineer, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall be 3 inches deep, loose measurement, and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. This layer shall not be compacted. The second layer shall be 5 inches deep, loose measurement, and shall contain no particles that would be retained on a 1-inch sieve. The remaining 3rd and subsequent layers of backfill shall not exceed 8 inches of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent undisturbed soil, and to the satisfaction of the Engineer. If necessary to obtain the desired compaction, the backfill material shall be moistened or aerated as required.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of in accordance with the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the Engineer. If not shown on the plans, the warning tape shall be located six inches above the direct-buried cable or the counterpoise wire if present. A 4-6 inch wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches minimum below finished grade.

Trenches shall be backfilled and compacted in 6" layers to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D6938.

Backfilling from two directions will not be allowed. No backfilling will be accomplished without the approval of the Engineer. The Construction Observer will coordinate with the Contractor for advance scheduling of trench inspection.

c. Restoration. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the topsoiling and seeding as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions and compaction shall meet the requirements of this section. Restoration shall be considered incidental to the pay item of which it is a component part.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

108-3.4 CABLE MARKERS FOR DIRECT-BURIED CABLE. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inches (100-150 mm) thick, extending approximately 1 inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (60 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep.

The location of each underground cable connection, except at lighting units, or isolation transformers, or power adapters shall be marked by a concrete marker slab placed above the connection. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the Engineer. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. Furnishing and installation of cable markers is incidental to the respective cable pay item.

After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint, as approved by the Engineer.

108-3.5 SPLICING. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast Splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured in accordance with manufacturer's instructions and to the satisfaction of the Engineer.

b. Field-attached Plug-in Splices. These shall be assembled in accordance with manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. In all cases the joint where the connectors come together shall be wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (37 mm) on each side of the joint.

c. Factory-Molded Plug-in Splices. These shall be made by plugging directly into mating connectors. In all cases, the joint where the connectors come together shall be wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (37 mm) on each side of the joint.

d. Taped or Heat-Shrunked Splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. Throughout the rest of the splice less tension should be used. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately 1 inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

108-3.6 BARE COUNTERPOISE WIRE INSTALLATION FOR LIGHTNING PROTECTION AND GROUNDING. If shown on the plans or included in the job specifications, bare counterpoise copper wire shall be installed for lightning protection of the underground cables. Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. Where the cable or duct/conduit trench runs parallel to the edge of pavement, the counterpoise shall be installed in a separate trench located half the distance between the pavement edge and the cable or duct/conduit trench. In trenches not parallel to pavement edges, counterpoise wire shall be installed continuously a minimum of 4 inches above the cable, conduit or duct bank, or as shown on the plans if greater. Additionally, counterpoise wire shall be installed at least 8 inches below the top of subgrade in paved areas or 10 inches below finished grade in un-paved areas. This dimension may be less than 4 inches where conduit is to be embedded in existing pavement. Counterpoise wire shall not be installed in conduit.

The counterpoise wire shall be routed around to each light fixture base, mounting stake, or junction/access structures. The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500feet (150 m) apart around the entire circuit.

The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made

electrode grounding system. The connections shall be made as shown on the plans and in the specifications.

If shown on the plans or in the specifications, a separate equipment (safety) ground system shall be provided in addition to the counterpoise wire using one of the following methods:

(1) A ground rod installed at and securely attached to each light fixture base, mounting stake if painted, and to all metal surfaces at junction/access structures.

(2) Install an insulated equipment ground conductor internal to the conduit system and securely attached it to each light fixture base and to all metal surfaces at junction/access structures. This equipment ground conductor shall also be exothermically welded to ground rods installed not more than 500 feet (150 m) apart around the circuit.

The counterpoise wire is not connected to the light fixture or sign base cans or mounting stakes.

a. Counterpoise Installation Above Multiple Conduits and Duct Banks. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete cone of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete cone of protection measured 22 ½ degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

Dedicated ground rods shall be installed and exothermically welded to the counterpoise wire at each end of a duct bank crossing under pavement.

b. Counterpoise Installation at Existing Duct Banks. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.7 EXOTHERMIC BONDING. Bonding of counterpoise wire shall be by the exothermic welding process. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the Engineer, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

All slag shall be removed from welds.

For welds at light fixture base cans, all galvanized coated surface areas and "melt" areas, both inside and outside of base cans, damaged by exothermic bond process shall be restored by coating with a liquid cold-galvanizing compound conforming to U.S. Navy galvanized repair coating meeting Mil. Spec. MIL-P-21035. Surfaces to be coated shall be prepared and compound applied in accordance with manufacturer's recommendations.

All buried copper and weld material at weld connections shall be thoroughly coated 6 mil of 3M "Scotchkote," or approved equivalent, or coated with coal tar bitumastic material to prevent surface exposure to corrosive soil or moisture."

108-3.8 TESTING. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the Engineer. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the Engineer. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase and results meeting the specifications below must be maintained by the Contractor throughout the entire project as well as during the ensuing warranty period.

Earth resistance testing methods shall be submitted to the Engineer for approval. Earth resistance testing results shall be recorded on the enclosed "Ground Rod Impedance Test Report" form and testing shall be performed in the presence of the Engineer. All such testing shall be at the sole expense of the Contractor. The Contractor shall coordinate with the resident Engineer to approve tests daily before proceeding. The Contractor shall fill out a separate test report for each date. Test reports shall be submitted weekly to the Engineer.

Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The Engineer shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

The installation shall be fully tested by continuous operation for not less than 24 hours as a completed unit prior to acceptance. These tests shall include the functioning of each control not less than 10 times.

After installation, the Contractor shall test and demonstrate to the satisfaction of the Engineer the following:

a. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

b. That all affected circuits (existing and new) are free from unspecified grounds.

c. That the insulation resistance to ground of all new non-grounded series circuits or cable segments is not less than 500 megohms using an insulation tester, such as a Fluke 1587 Insulation Multimeter.

(1) Refer to the minimum guaranteed insulation resistance requirements through the end of the contract warranty period as listed in section L-108-2.1 item f.

(2) For existing circuit insulation resistance requirements, refer to section L-108-2.11.

d. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms using an insulation tester, such as a Fluke 1587 Insulation Multimeter.

e. That all affected circuits (existing and new) are properly connected in accordance with applicable wiring diagrams.

f. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

g. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be utilized, as described by ANSI/IEEE Standard 81, to verify this requirement. Three-pole fall-of-potential testers that can measure the ground resistance of a ground rod using auxiliary electrodes (staked testing), such as a Fluke 1621 Earth Ground Tester, shall be used for testing individual dedicated

equipment ground rods at fixtures and equipment, or for testing isolated counterpoise ground rods not yet connected to the counterpoise wire.

As an alternative, clamp-on style ground impedance test meters may be used to satisfy this impedance testing requirement. Clamp-on testers that can measure the ground resistance of a ground rod without using auxiliary ground rods (stakeless testing), such as a Fluke 1630 Earth Ground Clamp Meter, shall be used for testing counterpoise ground rods which have already been connected to the counterpoise wire, or ground ring ground rods which have already been connected to the established ground ring system.

Insulation resistance testers for 5kV series circuits shall utilize the 1000V DC source output for testing. The test equipment shall be submitted for review and approval by the Engineer prior to performing the tests.

Ground impedance test equipment shall be submitted for review and approval by the Engineer prior to performing the tests.

If the ground rod's impedance exceeds 25 ohms, an additional rod shall be driven in a location suitable and approved by the Engineer. However, the additional rod must satisfy the requirements of NEC 250.53 and not be less than 6 feet away from any other ground rod electrode. Additional ground rods shall not be measured for separate payment but shall be considered subsidiary to the counterpoise or respective equipment pay item.

h. As-Built drawings shall indicate the location of all installed ground rods. Each ground rod shall have a unique identifier that corresponds with its submitted ground impedance test report.

After final acceptance testing has been completed, the Contractor shall complete and submit his final megger test reports to the Engineer and insert copies of the initial and final megger test reports in the Operation and Maintenance Manuals.

The Contractor shall perform additional tests if required and requested by the Engineer at no additional cost.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the Engineer. Where connecting new cable to existing cable, ground resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 Trenching shall be measured by the linear feet (meters) of trench, including the excavation, backfill, and restoration, completed, measured as excavated, and accepted as satisfactory.

When specified, separate measurement shall be made for trenches of various specified widths.

The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

108-4.2 Cable or counterpoise wire purchased and installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) of cable or counterpoise wire installed in trenches, duct bank or conduit, including ground rods and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall include additional quantities required for slack.

AC 150/5370-10F**9/30/2011****BASIS OF PAYMENT**

108-5.1 Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, ground rod and megger testing with reports, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108-5.1	Trenching for Direct-Buried Cable, 18" Minimum Depth -- per Linear Foot
Item L-108-5.2	No. 8 AWG 5kV, L-824C Cable in Trench, Duct Bank or Conduit -- per Linear Foot
Item L-108-5.3	No. 6 AWG Solid, Bare Counterpoise Wire in Trench, Above the Duct Bank or Conduit, Including Ground Rods and Ground Connectors -- per Linear Foot
Item L-108-5.4	No. 6 AWG Stranded, 600V Rated, Type XHHW, Green Insulated Equipment Ground in Duct Bank or Conduit, Including Ground Rods and Ground Connectors -- per Linear Foot
Item L-108-5.5	Trenching for Direct-Buried Bare Counterpoise Wire, 8" Minimum Depth -- per Linear Foot

MATERIAL REQUIREMENTS

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program
FED SPEC J-C-30	Cable and Wire, Electrical Power, Fixed Installation (cancelled; replaced by A-A-59544 Cable and Wire, Electrical (Power, Fixed Installation))
FED SPEC A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic
ASTM B 3	Soft or Annealed Copper Wire
ASTM B 8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

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ASTM D 33	Tinned Soft or Annealed Copper Wire for Electrical Purposes
ASTM D 4388	Rubber tapes, Nonmetallic Semiconducting and Electrically Insulating
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive
MIL-P-21035	Paint High Zinc Duct Content, Galvanizing Repair

REFERENCE DOCUMENTS

NFPA No. 70	National Electrical Code (NEC)
MIL-S-23586C	Sealing Compound, Electrical, Silicone Rubber
NN	Building Industry Consulting Service International (BICSI)
ANSI/IEEE Std 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

END OF ITEM L-108

AC 150/5370-10F

9/30/2011

AIRPORT LIGHTING CIRCUIT INSULATION RESISTANCE TEST REPORT

Owner/Sponsor: Kentucky Department of Aviation Engineer: Garver, LLC

Airport: Rough River State Park Airport Contractor: _____

Project Title: Airfield Electrical Rehabilitaion Garver Project Number: 14151080

Vault ID / Location: _____ Date Initial / Final Tests: _____

Weather / Site Conditions (Initial Test): _____ Last Two Weeks of Rain: _____ inches

Weather / Site Conditions (Final Test): _____ Last Two Weeks of Rain: _____ inches

	Circuit Designation and Color Code	Initial Test Results		Final Test Results	
		Regulator Size (kW)	Megger Reading Before Field Work (Megohms)	Regulator Size (kW)	Megger Reading After Field Work (Megohms)
1					
2					
3					
4					
5					
6					
Tested By:					
Test Equipment:					
Engineer Witness:					
Owner/Sponsor Witness:					

Provide signature/date and manufacturer/model no. as required in the fields above.

Initial Test Record – Owner Disposition

Owner / Sponsor: _____ (Signature and Date)

Check one only: Proceed with Installation Hold

ITEM L-109 AIRPORT TRANSFORMER TRANSCLOSURE AND TRANSCLOSURE EQUIPMENT

DESCRIPTION

109-1.1 This item shall consist of constructing an airport transformer transclosure in accordance with these specifications and the design and dimensions shown in the plans. This work shall also include earthwork, the installation of conduits in floor and foundation, painting and lighting of the transclosure, and the furnishing of all incidentals necessary to produce a completed unit. This work shall also include the painting of equipment and conduit; the marking and labeling of equipment and the labeling or tagging of wires; the testing of the installation; and the furnishing of all incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

New equipment work shall also include all electrical service and power distribution work including all supporting structures and apparatuses.

EQUIPMENT AND MATERIALS

109-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified and listed under Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

c. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final

acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

- g. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

CONSTRUCTION OF TRANSCLOSURE

109-2.1 CONCRETE. Refer to item SS-300 for Concrete requirements.

109-2.2 REINFORCING STEEL. Reinforcing steel bars shall be intermediate or structural grade deformed-type bars and shall meet the requirements of ASTM A 615.

109-2.3 RIGID STEEL CONDUIT. Rigid steel conduit and fittings shall be in accordance with Underwriters Laboratories Standard 6, 514, and 1242.

109-2.4 LIGHTING. Transclosure light fixtures shall be of a vaporproof type.

109-2.5 OUTLETS. Convenience outlets shall be heavy-duty duplex units designed for industrial service.

109-2.6 SWITCHES. Transclosure or metal-housing light switches shall be single-pole switches.

109-2.7 PAINT.

a. Priming paint for ungalvanized metal surfaces shall be a high solids alkyd primer conforming to TT-P-664D.

b. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the Master Painter's Institute, Reference #9, Exterior Alkyd, Gloss, VOC Range E2.

c. Priming paint for wood surfaces shall be mixed on the job by thinning the above specified white paint by adding 1/2 pint (0.06 liter) of raw linseed oil to each gallon (liter).

d. Paint for the floor, ceiling, and inside walls shall be in accordance with Fed. Spec. TT-E-487. Walls and ceiling shall be light gray and the floor shall be medium gray.

109-2.8 BUS CONNECTORS. Connectors shall be similar to Burndy Type NT (or equivalent) for copper tubing. Connectors for insulated bus cable shall be of the proper size and type for the service intended.

109-2.9 BUS SUPPORTS. Bus supports shall be similar to Westinghouse No. 527892 (or equivalent), insulated for 7,500 volts, single clamp type for 2-bolt flat mounting.

109-2.10 GROUND BUS. Ground bus shall be 1/8 - x 3/4-inch (3 x 18 mm) minimum copper bus bar.

109-2.11 SQUARE DUCT. Duct shall be square similar to that manufactured by the Square D Company (or equivalent), or the Trumbull Electric Manufacturing Company (or equivalent). The entire front of the duct on each section shall consist of hinged or removable cover for ready access to the interior. The cross section of the duct shall be not less than 4 x 4 inches (100 x 100 mm) except where otherwise shown in the plans.

109-2.12 GROUND RODS. Ground rods shall be copper or copper-clad of the length and diameter specified in the plans.

109-2.13 POTHEADS. Potheads shall be similar to G&W Type N, Shape C (or equivalent), unless otherwise specified. Potheads shall be furnished with plain insulator bushings and conduit couplings. Potheads shall have a rating not less than the circuit voltage.

109-2.14 PREFABRICATED TRANSCLOSURE. The prefabricated transclosure shall be a commercially available unit.

109-2.15 FAA-APPROVED EQUIPMENT. Certain items of airport lighting equipment installed in transclosures are covered by individual FAA equipment specifications. The specifications are listed below:

AC 150/5345-3	Specification for L-821 Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits.
AC 150/5345-49	Specification for L-854, Radio Control Equipment

109-2.16 OTHER ELECTRICAL EQUIPMENT. Constant-current regulators, distribution transformers, oil switches, cutouts, relays, terminal blocks, transfer relays, circuit breakers, and all other regularly used commercial items of electrical equipment not covered by FAA equipment specifications shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers or the National Electrical Manufacturers Association. When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and plans.

109-2.17 WIRE. Wire in conduit rated up to 5,000 volts shall conform to AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits, for rubber insulated neoprene-covered wire, or Fed. Spec. J-C-30, Type RHW, for rubber insulated fibrous-covered wire. For ratings up to 600 volts, thermoplastic wire conforming to Fed. Spec. J-C-30, Types TW, THW, and THWN, shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

a. Control Circuits. Unless otherwise indicated on the plans, wire shall be not less than No. 12 AWG and shall be insulated for 600 volts. If telephone control cable is specified, No. 19 AWG telephone cable conforming to ICEA S-85-625-1996 specifications shall be used.

b. Power Circuits.

- (1) 600 volts maximum-Wire shall be No. 6 AWG or larger and insulated for at least 600 volts.
- (2) 3,000 volts maximum-Wire shall be No. 6 AWG or larger and insulated for at least 3,000 volts.
- (3) Over 3,000 volts-Wire shall be No. 6 AWG or larger and insulated for at least the circuit voltage.

CONSTRUCTION METHODS

CONSTRUCTION OF TRANSCLOSURE

109-3.1 GENERAL. The Contractor shall construct the transformer transclosure at the location indicated in the plans. The transclosure shall be prefabricated equipment enclosure to be supplied in the size specified. The mounting pad or floor details, installation methods, and equipment placement are shown in the plans.

The Contractor shall clear, grade, and seed the area around the transclosure for a minimum distance of 10 feet (3 m) on all sides. The slope shall be not less than ½-inch per foot (40 mm per m) away from the transclosure in all directions.

The transclosure shall provide adequate protection against weather elements, including rain, wind-driven dust, snow, ice and excessive heat. The transclosure shall have sufficient filtered ventilation, to assure that the interior room temperatures and conditions do not exceed the recommended limits of the electrical equipment to be installed in the transclosure. Contractor is responsible for contacting the manufacturer of the equipment to be installed to obtain environmental limitations of the equipment to be installed.

Refer to the new electrical transclosure detail plan sheets for construction requirements. The prefabricated transclosure building shall include roof, walls and floor in accordance with the details and these specifications.

109-3.2 FOUNDATION AND WALLS.

The vault transclosure walls shall be constructed to be tamper resistant and weather resistant. Walls shall be a minimum 11 gauge mild steel. Transclosure shall be of bolted construction. All external fasteners shall be stainless steel.

The vault transclosure shall be manufactured so that it can adequately support the wall mounted equipment for the life of the enclosure without bowing, bending, rippling, or deformation of any type to the transclosure. It is the Contractor's responsibility to coordinate with the transclosure manufacturer prior to construction for adequate transclosure fabrication.

Contractor shall coordinate with the vault transclosure manufacturer prior to foundation fabrication to obtain transclosure mounting and securing methods and dimensions. Contractor shall make provisions during the construction of the vault transclosure foundation for installing the transclosure mounting means required by the manufacturer. Contractor shall indicate mounting means, dimensions, and bolt patterns on the on-site as-built drawings.

The vault transclosure shall be furnished with a ventilation fan panel with integral thermostat as indicated on the drawings.

The area under the building floor or concrete foundation shall be compacted to 95% standard proctor. Compaction testing shall be completed by the Contractor if directed by the Engineer. **This testing shall be considered subsidiary to the transclosure building installation pay item.**

Building Site Preparation with Concrete Foundation

The site shall be prepared so that the building will bear fully on a concrete slab foundation. The slab shall be constructed to support the anticipated load of the building and its contents. The building shall be leveled, shimmed as required, and set in a grout bed sufficient to fill all cavities between the foundation slab and the building floor slab.

The turf shall be removed. Where unacceptable material occurs, excavate and replace with an approved compacted fill material prior to slab construction.

All slabs shall be level to within a ½ inch differential across the entire building area.

The building finished floor elevation shall be 3" above the exterior grade. The surrounding grade shall have positive slope to drain away from the building at all points.

Slab foundation shall be a minimum 12" larger in length and width of the building. The building shall be anchored to the slab foundation in accordance with the manufacturer's installation instructions and guidelines for the seismic zone location. Submit shop drawings detailing these anchor requirements.

Coordinate exact building site location with the Engineer prior to the work.

109-3.3 CONDUITS IN FLOOR AND FOUNDATION. Conduits shall be installed in the floor and through the foundation walls in accordance with the details shown in the plans. All underground conduit shall be painted with a bituminous compound. Conduit shall be installed with a coupling or metal conduit adapter flush with the top of the floor. All incoming conduit shall be closed with a pipe plug to prevent the entrance of foreign material during construction. Spare conduit entrances shall be left closed.

109-3.4 DOORS. Refer to the new electrical transclosure detail plan sheets for construction requirements. All panels and doors shall have formed edges. All doors shall be constructed of a minimum of 11 gauge mild steel.

All door openings shall be a minimum of 40" square, unless otherwise shown on the plans.

Door hinge shall have a minimum of 0.375" diameter stainless steel.

Doors shall have a positive 3-point latching mechanism.

Door handles shall be capable of accepting a padlock handle to have 0.312" square shaft.

109-3.5 PAINTING. The foundation flood and housekeeping pad shall first be given a hardening treatment, after which the Contractor shall apply two coats of paint as specified below. The hardening treatment shall consist of applying two coats of either a commercial floor hardener or a solution made by dissolving 2 pounds (0.9 kg) of magnesium fluosilicate or zinc sulphate crystals in 1 gallon (liter) of water. Each coat shall be allowed to dry at least 48 hours before the next application. After the second treating coat has dried, the surfaces shall be brushed clean of all crystals and thoroughly washed with clear water. Paint for walls and ceiling shall be a light gray color approved by the Engineer. The floor paint shall be a medium gray color approved by the Engineer. Before painting, the surfaces shall be dry and clean. The first coat shall be thinned by adding 2/3-quart (0.166 liters) of spar varnish and 1/3-quart (0.083 liters) of turpentine to each gallon (liter) of paint. The second coat shall be applied without thinning. All doors, lintels, and windows shall be cleaned to remove any rust or foreign material and shall be given one body and one finish coat of white paint. Bare metal surfaces shall be given a prime coat of corrosion-inhibiting primer prior to the body and finish coats.

Exterior walls and roof shall be white in color as approved by the Engineer. A color sample shall be submitted to the Engineer before vault transclosure fabrication. Wall and ceiling paint shall be factory applied and shall be silicone enamel. Vault transclosure paint shall be 3.0 mils thick, minimum, after drying.

109-3.6 LIGHTS AND SWITCHES. The Contractor shall furnish and install a minimum of two duplex convenience outlets in the transclosure room.

INSTALLATION OF EQUIPMENT IN TRANSCLOSURE

109-3.7 GENERAL. The Contractor shall furnish, install, and connect all equipment, equipment accessories, conduit, cables, wires, buses, grounds, and support necessary to insure a complete and

operable electrical distribution center for the airport lighting system as specified herein and shown in the plans. When specified, an emergency power supply and transfer switch shall be provided and installed.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction.

109-3.8 POWER SUPPLY EQUIPMENT. Transformers, regulators, booster transformers, and other power supply equipment items shall be furnished and installed at the location shown in the plans or as directed by the Engineer. The floor mounted power supply equipment shall be anchored and secured to concrete housekeeping pads as indicated in the plans to provide a minimum space of 3-1/2 inches between the equipment and the floor. Name-plates shall, so far as possible, not be obscured.

109-3.9 SWITCHGEAR AND PANELS. Oil switches, fused cutouts, relays, transfer switches, panels, panel boards, and other similar items shall be furnished and installed at the location shown in the plans or as directed by the Engineer. Wall or ceiling mounted items shall be attached to the wall or ceiling with galvanized bolts of not less than 3/8-inch (9 mm) diameter engaging metal expansion shields or anchors in masonry or concrete translosures.

109-3.10 DUCT AND CONDUIT. The Contractor shall furnish and install square-type exposed metallic ducts with hinged covers for the control circuits in the transclosure. These shall be mounted along the walls behind all floor-mounted equipment and immediately below all wall-mounted equipment. The hinged covers shall be placed to open from the front side with the hinges at the front bottom.

Wall brackets for square ducts shall be installed at all joints 2 feet (60 cm) or more apart with intermediate brackets as specified. Conduit shall be used between square ducts and equipment or between different items of equipment when the equipment is designed for conduit connection. When the equipment is not designed for conduit connection, conductors shall enter the square-type control duct through insulating bushings in the duct or on the conduit risers.

Install all conduit and wiring in the electrical transclosure in accordance with NEC and local electrical code requirements.

Install all power and control cables in conduit or enclosed wire ways. The standard L-824 airfield lighting primary series circuit cable does not comply with NEC for installation in open cable trays. High voltage conductors (exceeding 600 volts) shall be installed within rigid steel galvanized conduit, intermediate metal conduit, flexible metal conduit, liquid tight flexible metal conduit, metal wire ways, or PVC conduit. Low voltage feeders and control wires shall be installed within rigid steel galvanized conduit, intermediate metal conduit, or electrical metallic tubing (EMT) when run on the walls or ceiling; and in cable trays supported from the ceiling or walls when there are many cables and the possibility of future expansion. Do not install conduit in concrete slabs on grade.

Install the primary series cables from the regulators and various other feeders out of the transclosure in coated rigid steel galvanized conduit or PVC conduit, a minimum of 2 feet below grade.

Do not use PVC above the ground-level slab of buildings, translosures or shelters. PVC shall convert to coated galvanized rigid steel conduit prior to its emergence; no PVC shall emerge from the ground or concrete slab or encasement. Coated galvanized rigid steel conduit shall transition to non-coated galvanized rigid steel conduit no sooner than 3" above finished grade.

109-3.11 CABLE ENTRANCE AND HIGH-VOLTAGE BUS SYSTEM. Incoming underground cable from field circuits and supply circuits will be installed outside the walls of the transformer transclosure as a separate item under Item L-108. The Contractor installing the transclosure equipment shall bring the cables from the trench or duct through the entrance conduits into the transclosure and make the necessary electrical connections. For the incoming and outgoing high voltage load circuits, the Contractor shall furnish and install rigid metallic conduit risers, surmounted by potheads, from floor level to the level as shown in the plans.

The incoming high-voltage power supply service to the transclosure shall enter below the floor of the transclosure and shall rise from the floor level in a rigid metallic conduit riser, surmounted by a pothead, as described above. Using insulated high-voltage cable, the incoming power service shall be connected from the pothead to the oil-fused cutouts or to the specified disconnecting switch or equipment. From the oil-fused cutouts or disconnecting device, the insulated service conductors shall be connected to the overhead voltage bus system of the transclosure. The high-voltage bus system shall utilize the materials specified and shall be mounted and installed in accordance with the requirements of the National Electrical Code or the local code agency having jurisdiction.

109-3.12 WIRING AND CONNECTIONS. The Contractor shall make all necessary electrical connections in the transclosure in accordance with the wiring diagrams furnished and as directed by the Engineer. In wiring to the terminal blocks, the Contractor shall leave sufficient extra length on each control lead to make future changes in connections at the terminal block. This shall be accomplished by running each control lead the longest way around the box to the proper terminal. Leads shall be neatly laced in place.

109-3.13 MARKING AND LABELING. All equipment, control wires, terminal blocks, etc., shall be tagged, marked, or labeled as specified below:

a. Wire Identification. The Contractor shall furnish and install self-sticking wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks. Wire labels, if used, shall be of the self-sticking preprinted type and of the manufacturer's recommended size for the wire involved. Identification -markings designated in the plans shall be followed. Tags, if used, shall be of fiber not less than 3/4-inch (13 mm) in diameter and not less than 1/32-inch (1 mm) thick. Identification markings designated in the plans shall be stamped on tags by means of smalltool dies. Each tag shall be securely tied to the proper wire by a nonmetallic cord.

b. Labels. The Contractor shall stencil identifying labels on the cases of regulators, breakers, and distribution and control relay cases with white oil paint as designated by the Engineer. The letters and numerals shall be not less than 1 inch (25 mm) in height and shall be of proportionate width. The Contractor shall also mark the correct circuit designations in accordance with the wiring diagram on the terminal marking strips, which are a part of each terminal block.

109-3.14 WALL-MOUNTED EQUIPMENT. Equipment to be mounted on the vault transclosure's metal walls shall be attached as shown on the plans and as recommended by equipment and vault transclosure manufacturer. Equipment shall be mounted in a fashion as to not allow for bowing, bending, rippling, or deformation of any type to the transclosure. Any damage to the transclosure due to improperly mounted equipment shall result in the Contractor replacing the entire transclosure at his/her expense.

METHOD OF MEASUREMENT

109-4.1 The quantity of transclosures to be paid for under this item shall consist of the number of transclosures purchased, constructed in place and accepted as a complete unit. This transclosure area work shall include, but not be limited to, all concrete foundation and reinforcing work, foundation encased handhole, all concrete removal and repair work, all supports and other items for securing the transclosure to the concrete pad, and the concrete pad and other utility required appurtenances for the utility transformer.

109-4.2 The quantity of transclosure equipment to be paid for under this item shall consist of all equipment purchased, installed, connected, and accepted as a complete unit ready for operation. This work consists of all work in the vicinity of the electrical transclosures which is not paid separately by other items, including but not limited to all electrical service and power distribution work including all supporting structures and apparatuses, conduits, wires, switches, breakers, panelboards, controllers, transformers, booster transformers, connections, connectors, grounding, control system modifications and additions,

testing and methods required to complete the work to the satisfaction of the Owner and the Engineer. This item shall also include the preparation and reproduction of the required Control System drawings.

109-4.3 The quantity of electrical power and control rack demolition to be paid for under this item shall consist of the number of electrical power and control racks demolished in place, equipment removed from the Airfield, foundations removed, area restored, holes filled, area cleared and leveled, and accepted as a complete removed unit to the satisfaction of the Engineer.

109-4.4 The quantity of regulators to be paid for shall be the number of regulators, purchased and installed as completed units, in place, accepted and ready for operation. The quantity of regulators to be paid for shall be the number of regulators, removed and stored as completed units, in place, and accepted.

109-4.5 The quantity of L-821 Airport Lighting Remote Control Panels to be paid for shall be the number of panels, purchased and installed as completed units, in place, accepted and ready for operation.

109-4.6 The quantity of L-854 Radios to be paid for shall be the number of panels, purchased and installed as completed units, in place, accepted and ready for operation.

BASIS OF PAYMENT

109-5.1 Payment will be made at the contract unit price for each completed and accepted transclosure equipment installation. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item L-109-5.1	Construction of Airport Transformer Transclosure and Foundation in Place -- per Lump Sum
Item L-109-5.2	Airport Transformer Transclosure Equipment -- per Lump Sum
Item L-109-5.3	Existing Airfield Lighting Power and Control Rack, Removed -- per Each
Item L-109-5.4	L-828, 4 kW, Lighting Regulator -- per Each
Item L-109-5.5	L-828, 2.5 kW, Lighting Regulator -- per Each

MATERIAL REQUIREMENTS

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-3	Specification for L-821 Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
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AC 150/5345-13A	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport
AC 150/5345-49	Specification for L-854, Radio Control Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program
ANSI/ICEA S-85-625-1996	Aircore, Polyethylene Insulated, Copper Conductor, Telecommunications Cable
ANSI/IEEE C2	National Electrical Safety Code
ASTM A 615	Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement
ASTM C 62	Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 90	Concrete Masonry Units, Loadbearing
ASTM D 2823	Asphalt Roof-Coating
29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Safety and Health Regulations for Construction
CFR 1910	Occupational Safety and Health Regulations
CFR 1926	Safety and Health Regulations for Construction
Commercial Item Description A-A-3067	Paint: Alkyd, Exterior, Low VOC
FED SPEC J-C-30	Cable and Wire, Electrical (Power, Fixed Installation) (cancelled; replaced by AA-59544 Cable and Wire, Electrical (Power, Fixed Installation))
FED SPEC TT-E-487	Enamel, Floor and Deck
Fed. Spec. TT-P-664D	Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant
Fed. Spec. W-C-1094	Conduit and Conduit Fittings; Plastic, Rigid
Fed. Spec. W-P-115	Panel, Power Distribution
Master Painter's Institute	
NFPA-70	National Electrical Code (NEC)
NFPA-70E	Standard for Electrical Safety in the Workplace
NFPA-101	Life Safety Code

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Underwriters Laboratories
Standard 6

Rigid Metal Conduit

Underwriters Laboratories
Standard 514

Fittings for Conduit and Outlet Boxes

Underwriters Laboratories
Standard 651

Schedule 40 and 80 Rigid PVC Conduit (for Direct
Burial)

Underwriters Laboratories
Standard 1242

Intermediate Metal Conduit

END OF ITEM L-109

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS**DESCRIPTION**

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete) installed in accordance with this specification at the locations and in accordance with the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandreling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables in accordance with the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS**110-2.1 GENERAL.**

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer.

b. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

f. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

110-2.2 STEEL CONDUIT. Rigid galvanized steel conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standard 6, 514B, and 1242.

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings shall conform to the requirements of Fed. Spec. W-C-1094, Underwriters Laboratories Standards UL-651 and Article 347.352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I—Schedule 40 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II—Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

The type of adhesive shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads, They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Refer to Item SS-300 for Concrete requirements. Where reinforced duct banks are specified, reinforcing steel shall conform to ASTM A 615 Grade 60. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part.

110-2.7 FLOWABLE BACKFILL. Flowable backfill shall not be used.

110-2.8 DETECTABLE WARNING TAPE Plastic, detectable, color as noted magnetic tape shall be polyethylene film with a metallized foil core and shall be 4-6 inches (75-150 MM) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The Engineer shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. No duct bank shall be less than 24 inches below finished grade. No underground conduit shall be less than 18 inches below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4-inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc. interiors IMMEDIATELY prior to pulling cable. Once cleaned and swabbed the base cans, manhole, pull boxes, etc. and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc. is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the Engineer of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200 pound test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminate from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet.

Unless otherwise shown on the plans, concrete encased duct banks shall be utilized when crossing under pavements expected to carry aircraft loads.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

The Contractor shall provide a staked centerline or offset for the duct and junction can system - utilizing the drawings and a site inspection of the existing grounds, grades and utility crossings. The Owner and Engineer shall approve the staking plan that shall be indicated on a drawing submitted for approval before starting any excavation for the ducts. The staking plan shall indicate the proposed location, elevation and dimensions of junction cans. The Engineer reserves the right to adjust duct, manhole and junction can locations and elevations before installation at no additional cost to the Owner.

The bottom surface of trenches shall be essentially smooth and free from coarse aggregate.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. Flowable backfill shall not be used. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All such rock removal shall be performed and paid for under the respective trenching or conduit or duct bank pay item.

Underground electrical warning (caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the Engineer. If not shown on the plans, the warning tape shall be located six inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared in accordance with the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet.

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the Engineer, the unsuitable material shall be removed in accordance with section L-110-3.2 and replaced with suitable material. Alternatively, additional duct bank supports that are adequate and stable shall be installed, as approved by the Engineer.

All excavation shall be unclassified and shall be considered incidental to the respective L-110 pay item of which it is a component part. Dewatering necessary for duct installation, erosion and turbidity control, in accordance with Federal, State, and Local requirements is incidental to its respective pay item as a part of Item L-110. The cost of all excavation, regardless of type of material encountered, shall be included in the unit price bid for the L-110 Item.

Unless otherwise specified, excavated materials that are deemed by the Engineer to be unsuitable for use in backfill or embankments shall be removed and disposed of off site.

Any excess excavation shall be filled with suitable material approved by the Engineer and compacted in accordance with section L-110-3.2.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cable(s) cross proposed installations, the Contractor shall insure that these cable(s) are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

(2) Trenching, etc., in cable areas shall then proceed with approval of the Engineer, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

PVC shall convert to coated galvanized rigid steel conduit prior to its emergence; no PVC shall emerge from the ground or concrete slab or encasement. Coated galvanized rigid steel conduit shall transition to non-coated galvanized rigid steel conduit no sooner than 3" above finished grade.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 24 inches (60 cm) below finished grade where installed in unpaved areas.

Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, proper provisions can be made to avoid them. Unless otherwise shown on

the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. Where two or more conduits in the duct bank are intended to carry conductors of equivalent voltage insulation rating, the Contractor shall space the conduits not less than 3 inches apart (measured from outside wall to outside wall). Where two or more conduits in the duct bank are intended to carry conductors of differing voltage insulation rating, the Contractor shall space the conduits not less than 3 inches apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. End bells or couplings with removable factory plugs shall be installed flush with the concrete encasement at access points.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5 foot (150 cm) intervals.

Install a plastic, detectable, color as noted, 4-6 inch (75-150mm) wide tape 8 inches (200mm) minimum below grade above all underground conduit or duct lines not installed under pavement.

110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide, and the trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 3 inches (75 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill shall not be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (45 cm) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 3 inches (75 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 3 inches (75 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5 -foot intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4-6 inches (100-150 mm) thick extending approximately 1 inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the Engineer. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2-inch (12 mm) and 1/4-inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

Each duct or conduit run shall be marked at approximately every 200 feet (60 m) along the duct or conduit run, with an additional marker at each change of direction of duct or conduit run.

Impression of letters shall be done in a manner, approved by the Engineer, to effect a neat, professional appearance. The letters shall be stenciled neatly. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the Engineer.

110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 inches (200 cm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted in accordance with section L-110-3.2 except that material used for back fill shall be select material not larger than 4 inches in diameter.

Flowable backfill shall not be used

Trenches shall not contain pools of water during back, filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface: except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of in accordance with instructions issued by the Engineer.

Trenches shall be backfilled and compacted in 6" layers to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D6938.

Backfilling from two directions will not be allowed. No backfilling will be accomplished without the approval of the Engineer. The Construction Observer will coordinate with the Contractor for advance scheduling of trench inspection.

110-3.6 BACKFILLING FOR DUCT BANKS. After the concrete has cured, the remaining trench shall be backfilled and compacted in accordance with section L-110-3.2 except that the material used for backfill shall be select material not larger than 4 inches in diameter. In addition to the requirements of

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section L-110-3.2, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet of duct bank or one work period's construction, whichever is less.

Flowable backfill shall not be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface: except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of in accordance with instructions issued by the Engineer.

Trenches shall be backfilled and compacted in 6" layers to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D6938.

Backfilling from two directions will not be allowed. No backfilling will be accomplished without the approval of the Engineer. The Construction Observer will coordinate with the Contractor for advance scheduling of trench inspection.

110-3.7 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling and seeding as shown on the plans of all disturbed areas. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the respective L-110 pay item.

110-3.8 CLEARING OF EXISTING DUCT. Where new cable is to be installed in existing duct, the full length of the duct shall be cleared of debris by mechanical means before the installation of the new cable. Acceptable methods of clearing existing ducts include "hydro-jetting" and "roto-rooting." All existing cables in each re-used duct shall be replaced for the length of the duct and properly spliced in a method approved by the Engineer. Clearing of existing duct banks or conduits is incidental to the cable pay item.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated, resolution, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications.

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9/30/2011

Payment will be made under:

Item L-110-5.1	Concrete Encased, Electrical Duct Bank, 2-Way 2”C – per Linear Foot
Item L-110-5.2	Non-Encased, Electrical Duct Bank, 2-Way 2”C – per Linear Foot
Item L-110-5.3	Non-Encased, Electrical Conduit, 1-Way 2”C – per Linear Foot

MATERIAL REQUIREMENTS

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2,700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
Fed.Spec.W-C-1094	Conduit and Conduit Fittings; Plastic, Rigid (cancelled; replaced by UL 514 Boxes, Nonmetallic Outlet, Flush Device Boxes, & Covers, and UL 651 Standard for Conduit & Rigid Conduit, Type EB & A Rigid PVC)
NFPA-70	National Electrical Code (NEC)
Underwriters Laboratories Standard 6	Rigid Metal Conduit
Underwriters Laboratories Standard 514B	Fittings For Conduit and Outlet Boxes
Underwriters Laboratories Standard 1242	Intermediate Metal Conduit
Underwriters Laboratories Standard 651	Schedule 40 and 80 Rigid PVC Conduit (for Direct Burial)
Underwriters Laboratories Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit (for concrete encasement)

END OF ITEM L-110

ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical junction structures (handholes, pullboxes, junction cans, etc.) installed in accordance with this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the Engineer. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

115-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer.

b. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

f. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300.

115-2.3 JUNCTION CANS. Junction Cans shall be L-867 Class 1 (non-load bearing) cans encased in concrete. The cans shall have a galvanized steel blank cover, gasket, and stainless steel hardware. Covers shall be 3/8" thickness for L-867.

Cans shall have both internal and external ground lugs. Size (diameter) and depth shall be as specified in the plans.

Galvanized cans shall have an external ground lug for mechanical connection/bolting ground clamps bonding.

115-2.5 CONCRETE. Refer to Item SS-300 for Concrete requirements.

115-2.10 FLOWABLE BACKFILL. Flowable backfill shall not be used.

115-2.12 PLASTIC CONDUIT. Plastic conduit shall comply with Item L-110 - Airport Underground Electrical Duct Banks and Conduits.

115-2.13 CONDUIT TERMINATORS. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 GROUND RODS. Ground rods shall be one piece, copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8-feet (240 cm) long nor less than 5/8 inch (15 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 UNCLASSIFIED EXCAVATION. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the Engineer without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the Engineer. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to the respective L-115 pay item of which it is a component part. Dewatering necessary for L-115 structure installation, erosion and turbidity control, in accordance with Federal, State, and Local requirements is incidental to its respective pay item as a part of Item L-115. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-115 Item.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the Engineer. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the Engineer. Structures shall be placed after the Engineer has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches of sand or a material approved by the Engineer as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.7 BACKFILLING. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches in thickness measured after compaction to the density requirements in this section. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Engineer.

Trenches shall be backfilled and compacted in 6" layers to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D6938.

Backfill shall not be placed against any structure until permission is given by the Engineer. In the case of concrete, such permission shall not be given until tests made by the laboratory under supervision of the Engineer establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the Engineer may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 CONNECTION OF DUCT BANKS. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.10 CLEANUP AND REPAIR. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound conforming MIL-P-21035. Surfaces shall be prepared and compound applied in accordance with manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 RESTORATION. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the respective L-115 pay item.

115-3.12 INSPECTION. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested utilizing the fall-of-potential ground impedance test as described by ANSI IEEE Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.14 DUCT EXTENSION TO EXISTING DUCTS. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.1 Electrical junction structures shall be measured by each unit completed in place and accepted. The following additional items are specifically included in each unit.

- All Required Excavation, Dewatering
- All Required Backfilling with On-Site Materials
- Restoration of All Surfaces and Finished Grading, Sodding
- All Required Connections
- Dewatering If Required
- Temporary Cables and Connections
- Ground Rod Testing

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the Engineer.

Payment will be made under:

Item L-115-5.1	2 Unit Pullcan Plaza, Including 2 Electrical Junction Structures, L-867 Class 1, Size 16" Diameter by 24" Depth -- Per Each
Item L-115-5.2	Concrete Encased, Electrical Junction Structure, L-867 Class 1, Size 12" Diameter by 24" Depth -- Per Each

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MATERIAL REQUIREMENTS

ANSI/IEEE Std 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program
FED SPEC J-C-30	Cable and Wire, Electrical Power, Fixed Installation (cancelled; replaced by AA-59544 Cable and Wire, Electrical (Power, Fixed Installation))
ASTM B.3	Soft or Annealed Copper Wire
ASTM B.8	Concentric-Lay-Stranded Copper Conductor, Hard, Medium-Hard, or Soft
NFPA-70	National Electrical Code (NEC)

END OF ITEM L-115

ITEM T-901 SEEDING

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding, liming, and fertilizing the areas shown on the plans or as directed by the Engineer in accordance with these specifications.

MATERIALS

901-2.1 SEED The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Fed. Spec. JJJ-S-181.

Seed shall be furnished separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.

Seeds shall be applied as specified in the Kentucky Transportation Cabinet's Standard Specifications, Section 212.0.03 – Permanent Seeding and Protection. The following information from the referenced section pertains to the area of this project (Grayson County-Highway District 4):

Seed Mix Type I: 30% Kentucky 31 Tall Fescue (*Festuca arundinacea*)
 20% Creeping Red Fescue (*Festuca rubra*)
 35% Hard Fescue (*Festuca longifolia*)
 10% Ryegrass, Perennial (*Lolium perenne*)
 5% White Dutch Clover (*Trifolium repens*)

Seed Mix Type II: 60% Kentucky 31 Tall Fescue (*Festuca arundinacea*)
 20% Ryegrass, Perennial (*Lolium perenne*)
 10% (based on pure live seed, PLS) Little Bluestem (*Schizachyrium scoparium*)
 10% Partridge Pea (*Cassia fasciculata*)

- 1) Permanent seeding on slopes 3:1 or less. Apply seed mix Type I at a minimum application rate of 100 pounds per acre.
- 2) Permanent seeding on slopes greater than 3:1 in highway districts 4, 5, 6, and 7. Apply seed mix Type II at a minimum application rate of 100 pounds per acre plus a nurse crop of either Cereal Rye or German Foxtail-Millet based on the time of year. During the months of June through August, apply 10 pounds of German Foxtail-Millet (*Setaria italic*). During the months of September through May, apply 56 pounds of Cereal Rye (*Secale cereal*). If adjacent to golf courses replace the crown vetch with Kentucky 31 Tall Fescue.

901-2.2 LIME. Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 mesh sieve and 50% will pass through a No. 100 mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the KYTC standard specifications on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate specified by the tests furnished in T-905. All liming materials shall conform to the requirements of ASTM C 602.

901-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified herein, and shall meet the

requirements of Fed. Spec. A-A-1909 and applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be 20-10-10 commercial fertilizer and shall be spread at the rate of 100 lbs/1000 feet. In addition, 3 tons of agricultural limestone per acre shall be spread.

901-2.4 MULCHING. For mulching specifications, see Item T-908 Mulching.

901-2.5 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the Engineer before being placed.

901-2.6 TOPSOIL FOR SEEDING. Topsoil for seeding (trenches included) shall be obtained from an approved off-site location. See item T-905 Topsoiling for details on requirements.

CONSTRUCTION METHODS

901-3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

However, when the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 DRY APPLICATION METHOD.

a. Liming. Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds that have previously been prepared as described above. The lime shall then be worked into the top 3 inches (75 mm) of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing, and the fertilizer and seed shall be raked within the depth range stated in the KYTC standard specifications. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the KYTC standard specifications, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawnroller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 WET APPLICATION METHOD.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the KYTC standard specifications.

b. Spraying Equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 pounds per square inch (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (15 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For ease of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Brackish water shall not be used at any time. The Contractor shall identify to the Engineer all sources of water at least 2 weeks prior to use. The Engineer may take

samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the Engineer following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within 2 hours from the time they were mixed or they shall be wasted and disposed of at locations acceptable to the Engineer.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (8 cm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to insure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the Engineer, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 MAINTENANCE OF SEEDED AREAS. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the Engineer. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the Engineer. A grass stand shall be considered adequate when bare spots are one square foot or less, randomly dispersed, and do not exceed 3% of the area seeded. If at the time when the contract has been otherwise completed it is not possible to make an adequate determination of the color, density, and uniformity of such stand of grass, payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as these requirements have been met.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding and mulching to be paid for shall be the number of units acres measured on the ground surface, completed and accepted. Seeding and mulching shall be measured to the nearest hundredth (0.01) of an acre. Topsoil, lime, fertilizer, mulch and soil to repair will not be measured for separate payment but will be considered subsidiary to seeding and mulching. This measurement shall **NOT** include trenches.

901-4.2 The quantity of topsoil and seeding of trenches to be paid for shall be the number of linear feet of trench measured on the ground surface, completed and accepted. Topsoil, lime, fertilizer, mulch and soil to repair will not be measured for separate payment but will be considered subsidiary to topsoil and seeding of trenches. This measurement shall **NOT** include contractor's staging area, employee parking area, transclosure pad area, or other area not identified as a trench.

BASIS OF PAYMENT

901-5.1 Payment for seeding and mulching shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

901-5.2 Payment for topsoil and seeding of trenches shall be made at the contract unit price per linear foot, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item T-901-5.1	Seeding and Mulching—per Acre
Item T-901-5.2	Topsoil and Seeding of Trenches—per Linear Foot

MATERIAL REQUIREMENTS

ASTM C 602	Agricultural Liming Materials
ASTM D 977	Emulsified Asphalt
FED SPEC A-A-1909	Fertilizer
FED SPEC A-A-2671	Seeds, Agriculture

END OF ITEM T-901

ITEM T-905 TOPSOILING

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, stripping and hauling from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Engineer.

MATERIALS

905-2.1 TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sods and herbaceous growth such as grass and weeds are not to be removed but shall be thoroughly broken up and intermixed with the soil during handling operations. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the association of official agricultural chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (0.075 mm) sieve as determined by the wash test in accordance with ASTM C 117. Topsoil testing shall be completed and paid for by the Contractor.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 INSPECTION AND TESTS. Within 10 days following acceptance of the bid, the Engineer shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in 905-2.1.

CONSTRUCTION METHODS

905-3.1 GENERAL. Areas to be topsoiled shall be shown on the plans, but generally consists of disturbed areas of soil including but not limited to trenches.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the Engineer before the various operations are started.

905-3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the Engineer, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be

smooth-graded and the surface left at the prescribed grades in an even and properly compacted condition to prevent, insofar as practical, the formation of low places or pockets where water will stand.

905-3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the Engineer. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the Engineer. The Contractor shall notify the Engineer sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 PLACING TOPSOIL. The topsoil shall be evenly spread on the prepared areas to a uniform depth of **4 inches** after settlement, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turving operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the Engineer. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

METHOD OF MEASUREMENT AND PAYMENT.

905-4.1 Topsoil obtained off the site will not be measured for separate payment under this item, but will be considered subsidiary to pay items T-901-5.1 "Seeding and Mulching" and T-901-5.2 "Topsoil and Seeding of Trenches".

TESTING MATERIALS

ASTM C 117 Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing

END OF ITEM T-905

ITEM T-908 MULCHING

DESCRIPTION

908-1.1 This item shall consist of furnishing, hauling, placing, and securing mulch on surfaces indicated on the plans or designated by the Engineer.

MATERIALS

908-2.1 MULCH MATERIAL. Acceptable mulch shall be the materials listed below or any approved locally available material that is similar to those specified. Low grade, musty, spoiled, partially rotted hay, straw, or other materials unfit for animal consumption will be acceptable. Mulch materials, which contain matured seed of species that would volunteer and be detrimental to the proposed overseeding, or to surrounding farm land, will not be acceptable. Straw or other mulch material which is fresh and/or excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

a. Hay. Hay shall be native hay, sudan grass hay, broomsedge hay, legume hay, or similar hay or grass clippings. Hay shall be crimped to help reduce displacement in wind.

b. Straw. Straw shall be the threshed plant residue of oats, wheat, barley, rye, or rice from which grain has been removed. Straw shall be crimped to help reduce displacement in wind.

c. Hay Mulch Containing Seed. Hay mulch shall be mature hay containing viable seed of native grasses or other desirable species stated in the KYTC standard specifications or as approved by the Engineer. The hay shall be cut and handled so as to preserve the maximum quantity of viable seed. Hay mulch that cannot be hauled and spread immediately after cutting shall be placed in weather-resistant stacks or baled and stored in a dry location until used. Material shall be crimped to help reduce displacement in wind.

d. Manufactured Mulch. Cellulose-fiber or wood-pulp mulch shall be products commercially available for use in spray applications.

908-2.2 INSPECTION. Within 5 days after acceptance of the bid, the Engineer shall be notified of sources and quantities of mulch materials available and the Contractor shall furnish him with representative samples of the materials to be used. These samples may be used as standards with the approval of the Engineer and any materials brought on the site that do not meet these standards shall be rejected.

CONSTRUCTION METHODS

908-3.1 MULCHING. Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding or with the same wet method of application of the seed as recommended by the manufacturer. The spreading of the mulch may be by hand methods, blower, or other mechanical methods, provided a uniform covering is obtained.

Mulch material shall be furnished, hauled, and evenly applied on the area shown on the plans or designated by the Engineer. Straw or hay shall be spread over the surface to a uniform thickness at the rate of 2 to 3 tons per acre (1800-2700 kg per acre) to provide a loose depth of not less than 1-1/2 inches (37 cm) nor more than 3 inches (75 mm). Other organic material shall be spread at the rate directed by the Engineer. Mulch may be blown on the slopes and the use of cutters in the equipment for this purpose will be permitted to the extent that at least 95% of the mulch in place on the slope shall be 6 inches (150

mm) or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall be not less than 1 inch (25 mm) nor more than 2 inches (50 mm).

908-3.2 SECURING MULCH. The mulch shall be held in place by light discing, a very thin covering of topsoil, small brush, pins, stakes, wire mesh, polymer tackifier or other adhesive material approved by the Engineer. Where mulches have been secured by either of the asphalt binder methods, it will not be permissible to walk on the slopes after the binder has been applied. The Contractor is warned that in the application of asphalt binder material he must take every precaution to guard against damaging or disfiguring structures or property on or adjacent to the areas worked and that he will be held responsible for any such damage resulting from his/her operations.

If the “peg and string” method is used, the mulch shall be secured by the use of stakes or wire pins driven into the ground on 5-foot (150 m) centers or less. Binder twine shall be strung between adjacent stakes in straight lines and crisscrossed diagonally over the mulch, after which the stakes shall be firmly driven nearly flush to the ground to draw the twine down tight onto the mulch.

908-3.3 CARE AND REPAIR.

a. The Contractor shall care for the mulched areas until final acceptance of the project. Such care shall consist of providing protection against traffic or other use by placing warning signs, as approved by the Engineer, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

The Contractor shall also be required to water the newly treated areas in accordance with the manufacturer’s recommendations until such time that substantial growth has been established and watering is no longer necessary for continued growth of the plants. The cost for watering the newly treated areas shall be considered subsidiary.

b. The Contractor shall be required to repair or replace any mulching that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the Engineer, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor. However, once the Contractor has completed the mulching of any area in accordance with the provisions of the specifications and to the satisfaction of the Engineer, no additional work at his/her expense will be required, but subsequent repairs and replacements deemed necessary by the Engineer shall be made by the Contractor and will be paid for as additional or extra work.

METHOD OF MEASUREMENT AND PAYMENT

908-4.1 Mulching will not be measured for separate payment under this item, but will be considered subsidiary to pay item T-901-5.1 “Seeding and Mulching”.

MATERIAL REQUIREMENTS

ASTM D 5338	Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions, Incorporating Thermophilic Temperatures.
ASTM D 6459	Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion
ASTM D 6525	Standard Test Method for Measuring Nominal Thickness of Permanent Rolled Erosion Control Products

- | | |
|-------------|---|
| ASTM D 6566 | Standard Test Method for Measuring Mass per Unit Area of Turf Reinforcement Mats |
| ASTM D 6567 | Standard Test Method for Measuring the Light Penetration of a Turf Reinforcement Mat (TRM) |
| ASTM D 7367 | Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting |
| ASTM D 7322 | Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions |

END OF ITEM T-908

PART II
SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2012* and *Standard Drawings, Edition of 2012 with the 2012 Revision*.

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Subsection:	102.15 Process Agent.
Revision:	Replace the 1st paragraph with the following: Every corporation doing business with the Department shall submit evidence of compliance with KRS Sections 14A.4-010, 271B.11-010, 271B.11-070, 271B.11-080, 271B.5-010 and 271B.16-220, and file with the Department the name and address of the process agent upon whom process may be served.
Subsection:	105.13 Claims Resolution Process.
Revision:	Delete all references to TC 63-34 and TC 63-44 from the subsection as these forms are no longer available through the forms library and are forms generated within the AASHTO SiteManager software.
Subsection:	108.03 Preconstruction Conference.
Revision:	Replace 8) Staking with the following: 8) Staking (designated by a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.
Subsection:	109.07.02 Fuel.
Revision:	Revise item Crushed Aggregate Used for Embankment Stabilization to the following: Crushed Aggregate Used for Stabilization of Unsuitable Materials Used for Embankment Stabilization
	Delete the following item from the table. Crushed Sandstone Base (Cement Treated)
Subsection:	110.02 Demobilization.
Revision:	Replace the first part of the first sentence of the second paragraph with the following: Perform all work and operations necessary to accomplish final clean-up as specified in the first paragraph of Subsection 105.12;
Subsection:	112.03.12 Project Traffic Coordinator (PTC).
Revision:	Replace the last paragraph of this subsection with the following: Ensure the designated PTC has sufficient skill and experience to properly perform the task assigned and has successfully completed the qualification courses.
Subsection:	112.04.18 Diversions (By-Pass Detours).
Revision:	Insert the following sentence after the 2nd sentence of this subsection. The Department will not measure temporary drainage structures for payment when the contract documents provide the required drainage opening that must be maintained with the diversion. The temporary drainage structures shall be incidental to the construction of the diversion. If the contract documents fail to provide the required drainage opening needed for the diversion, the cost of the temporary drainage structure will be handled as extra work in accordance with section 109.04.
Subsection:	201.03.01 Contractor Staking.
Revision:	Replace the first paragraph with the following: Perform all necessary surveying under the general supervision of a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.

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Subsection:	201.04.01 Contractor Staking.
Revision:	Replace the last sentence of the paragraph with the following: Complete the general layout of the project under the supervision of a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.
Subsection:	206.04.01 Embankment-in-Place.
Revision:	Replace the fourth paragraph with the following: The Department will not measure suitable excavation included in the original plans that is disposed of for payment and will consider it incidental to Embankment-in-Place.
Subsection:	208.02.01 Cement.
Revision:	Replace paragraph with the following: Select Type I or Type II cement conforming to Section 801. Use the same type cement throughout the work.
Subsection:	208.03.06 Curing and Protection.
Revision:	Replace the fourth paragraph with the following: Do not allow traffic or equipment on the finished surface until the stabilized subgrade has cured for a total of 7-days with an ambient air temperature above 40 degrees Fahrenheit. A curing day consists of a continuous 24-hour period in which the ambient air temperature does not fall below 40 degrees Fahrenheit. Curing days will not be calculated consecutively, but must total seven (7) , 24-hour days with the ambient air temperature remaining at or above 40 degrees Fahrenheit before traffic or equipment will be allowed to traverse the stabilized subgrade. The Department may allow a shortened curing period when the Contractor requests. The Contractor shall give the Department at least 3 day notice of the request for a shortened curing period. The Department will require a minimum of 3 curing days after final compaction. The Contractor shall furnish cores to the treated depth of the roadbed at 500 feet intervals for each lane when a shortened curing time is requested. The Department will test cores using an unconfined compression test. Roadbed cores must achieve a minimum strength requirement of 80 psi.
Subsection:	208.03.06 Curing and Protection.
Revision:	Replace paragraph eight with the following: At no expense to the Department, repair any damage to the subgrade caused by freezing.
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	A) Seed Mixtures for Permanent Seeding.
Revision:	Revise Seed Mix Type I to the mixture shown below: 50% Kentucky 31 Tall Fescue (Festuca arundinacea) 35% Hard Fescue (Festuca (Festuca longifolia) 10% Ryegrass, Perennial (Lolium perenne) 5% White Dutch Clover (Trifolium repens)
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	A) Seed Mixtures for Permanent Seeding.
Number:	2)
Revision:	Replace the paragraph with the following: Permanent Seeding on Slopes Greater than 3:1 in Highway Districts 4, 5, 6, and 7. Apply seed mix Type II at a minimum application rate of 100 pounds per acre. If adjacent to a golf course replace the crown vetch with Kentucky 31 Tall Fescue.

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Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	A) Seed Mixtures for Permanent Seeding.
Number:	3)
Revision:	Replace the paragraph with the following: Permanent Seeding on Slopes Greater than 3:1 in Highway Districts 1, 2, 3, 8, 9, 10, 11, and 12. Apply seed mix Type III at a minimum application rate of 100 pounds per acre. If adjacent to crop land or golf course, replace the Sericea Lespedeza with Kentucky 31 Fescue.
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	B) Procedures for Permanent Seeding.
Revision:	Delete the first sentence of the section.
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	B) Procedures for Permanent Seeding.
Revision:	Replace the second and third sentence of the section with the following: Prepare a seedbed and apply an initial fertilizer that contains a minimum of 100 pounds of nitrogen, 100 pounds of phosphate, and 100 pounds of potash per acre. Apply agricultural limestone to the seedbed when the Engineer determines it is needed. When required, place agricultural limestone at a rate of 3 tons per acre.
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	D) Top Dressing.
Revision:	Change the title of part to D) Fertilizer.
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	D) Fertilizer.
Revision:	Replace the first paragraph with the following: Apply fertilizer at the beginning of the seeding operation and after vegetation is established. Use fertilizer delivered to the project in bags or bulk. Apply initial fertilizer to all areas prior to the seeding or sodding operation at the application rate specified in 212.03.03 B). Apply 20-10-10 fertilizer to the areas after vegetation has been established at a rate of 11.5 pounds per 1,000 square feet. Obtain approval from the Engineer prior to the 2nd fertilizer application. Reapply fertilizer to any area that has a streaked appearance. The reapplication shall be at no additional cost to the Department. Re-establish any vegetation severely damaged or destroyed because of an excessive application of fertilizer at no cost to the Department.
Subsection:	212.03.03 Permanent Seeding and Protection.
Part:	D) Fertilizer.
Revision:	Delete the second paragraph.
Subsection:	212.04.04 Agricultural Limestone.
Revision:	Replace the entire section with the following: The Department will measure the quantity of agricultural limestone in tons.
Subsection:	212.04.05 Fertilizer.
Revision:	Replace the entire section with the following: The Department will measure fertilizer used in the seeding or sodding operations for payment. The Department will measure the quantity by tons.

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Subsection:	212.05 PAYMENT.												
Revision:	Delete the following item code:												
	<table border="1"> <thead> <tr> <th><u>Code</u></th> <th><u>Pay Item</u></th> <th><u>Pay Unit</u></th> </tr> </thead> <tbody> <tr> <td>05966</td> <td>Topdressing Fertilizer</td> <td>Ton</td> </tr> </tbody> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	05966	Topdressing Fertilizer	Ton						
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>											
05966	Topdressing Fertilizer	Ton											
Subsection:	212.05 PAYMENT.												
Revision:	Add the following pay items:												
	<table border="1"> <thead> <tr> <th><u>Code</u></th> <th><u>Pay Item</u></th> <th><u>Pay Unit</u></th> </tr> </thead> <tbody> <tr> <td>05963</td> <td>Initial Fertilizer</td> <td>Ton</td> </tr> <tr> <td>05964</td> <td>20-10-10 Fertilizer</td> <td>Ton</td> </tr> <tr> <td>05992</td> <td>Agricultural Limestone</td> <td>Ton</td> </tr> </tbody> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	05963	Initial Fertilizer	Ton	05964	20-10-10 Fertilizer	Ton	05992	Agricultural Limestone	Ton
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>											
05963	Initial Fertilizer	Ton											
05964	20-10-10 Fertilizer	Ton											
05992	Agricultural Limestone	Ton											
Subsection:	213.03.02 Progress Requirements.												
Revision:	Replace the last sentence of the third paragraph with the following: Additionally, the Department will apply a penalty equal to the liquidated damages when all aspects of the work are not coordinated in an acceptable manner within 7 calendar days after written notification.												
Subsection:	213.03.05 Temporary Control Measures.												
Part:	E) Temporary Seeding and Protection.												
Revision:	Delete the second sentence of the first paragraph.												
Subsection:	304.02.01 Physical Properties.												
Table:	Required Geogrid Properties												
Revision:	Replace all references to Test Method "GRI-GG2-87" with ASTM D 7737.												
Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.												
Part:	B) Sampling.												
Revision:	Replace the second sentence with the following: The Department will determine when to obtain the quality control samples using the random-number feature of the mix design submittal and approval spreadsheet. The Department will randomly determine when to obtain the verification samples required in Subsections 402.03.03 and 402.03.04 using the Asphalt Mixture Sample Random Tonnage Generator.												
Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.												
Part:	D) Testing Responsibilities.												
Number:	3) VMA.												
Revision:	Add the following paragraph below Number 3) VMA: Retain the AV/VMA specimens and one additional corresponding G_{mm} sample for 5 working days for mixture verification testing by the Department. For Specialty Mixtures, retain a mixture sample for 5 working days for mixture verification testing by the Department. When the Department's test results do not verify that the Contractor's quality control test results are within the acceptable tolerances according to Subsection 402.03.03, retain the samples and specimens from the affected subplot(s) for the duration of the project.												
Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.												
Part:	D) Testing Responsibilities.												
Number:	4) Density.												
Revision:	Replace the second sentence of the Option A paragraph with the following: Perform coring by the end of the following work day.												

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Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.
Part:	D) Testing Responsibilities.
Number:	5) Gradation.
Revision:	Delete the second paragraph.
Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.
Part:	H) Unsatisfactory Work.
Number:	1) Based on Lab Data.
Revision:	Replace the second paragraph with the following: When the Engineer determines that safety concerns or other considerations prohibit an immediate shutdown, continue work and the Department will make an evaluation of acceptability according to Subsection 402.03.05.
Subsection:	402.03.03 Verification.
Revision:	Replace the first paragraph with the following: 402.03.03 Mixture Verification. For volumetric properties, the Department will perform a minimum of one verification test for AC, AV, and VMA according to the corresponding procedures as given in Subsection 402.03.02. The Department will randomly determine when to obtain the verification sample using the Asphalt Mixture Sample Random Tonnage Generator. For specialty mixtures, the Department will perform one AC and one gradation determination per lot according to the corresponding procedures as given in Subsection 402.03.02. However, Department personnel will not perform AC determinations according to KM 64-405. The Contractor will obtain a quality control sample at the same time the Department obtains the mixture verification sample and perform testing according to the procedures given in Subsection 402.03.02. If the Contractor's quality control sample is verified by the Department's test results within the tolerances provided below, the Contractor's sample will serve as the quality control sample for the affected subplot. The Department may perform the mixture verification test on the Contractor's equipment or on the Department's equipment.
Subsection:	402.03.03 Verification.
Part:	A) Evaluation of Subplot(s) Verified by Department.
Revision:	Replace the third sentence of the second paragraph with the following: When the paired <i>t</i> -test indicates that the Contractor's data and Department's data are possibly not from the same population, the Department will investigate the cause for the difference according to Subsection 402.03.05 and implement corrective measures as the Engineer deems appropriate.
Subsection:	402.03.03 Verification.
Part:	B) Evaluation of Subplots Not Verified by Department.
Revision:	Replace the third sentence of the first paragraph with the following: When differences between test results are not within the tolerances listed below, the Department will resolve the discrepancy according to Subsection 402.03.05.

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Subsection:	402.03.03 Verification.
Part:	B) Evaluation of Sublots Not Verified by Department.
Revision:	Replace the third sentence of the second paragraph with the following: When the <i>F</i> -test or <i>t</i> -test indicates that the Contractor's data and Department's data are possibly not from the same population, the Department will investigate the cause for the difference according to Subsection 402.03.05 and implement corrective measures as the Engineer deems appropriate.
Subsection:	402.03.03 Verification.
Part:	C) Test Data Patterns.
Revision:	Replace the second sentence with the following: When patterns indicate substantial differences between the verified and non-verified sublots, the Department will perform further comparative testing according to subsection 402.03.05.
Subsection:	402.03 CONSTRUCTION.
Revision:	Add the following subsection: 402.03.04 Testing Equipment and Technician Verification. For mixtures with a minimum quantity of 20,000 tons and for every 20,000 tons thereafter, the Department will obtain an additional verification sample at random using the Asphalt Mixture Sample Random Tonnage Generator in order to verify the integrity of the Contractor's and Department's laboratory testing equipment and technicians. The Department will obtain a mixture sample of at least 150 lb at the asphalt mixing plant according to KM 64-425 and split it according to AASHTO R 47. The Department will retain one split portion of the sample and provide the other portion to the Contractor. At a later time convenient to both parties, the Department and Contractor will simultaneously reheat the sample to the specified compaction temperature and test the mixture for AV and VMA using separate laboratory equipment according to the corresponding procedures given in Subsection 402.03.02. The Department will evaluate the differences in test results between the two laboratories. When the difference between the results for AV or VMA is not within ± 2.0 percent, the Department will investigate and resolve the discrepancy according to Subsection 402.03.05.
Subsection:	402.03.04 Dispute Resolution.
Revision:	Change the subsection number to 402.03.05.
Subsection:	402.05 PAYMENT.
Part:	Lot Pay Adjustment Schedule Compaction Option A Base and Binder Mixtures
Table:	AC
Revision:	Replace the Deviation from JMF(%) that corresponds to a Pay Value of 0.95 to ± 0.6 .
Subsection:	403.02.10 Material Transfer Vehicle (MTV).
Revision:	Replace the first sentence with the following: In addition to the equipment specified above, provide a MTV with the following minimum characteristics:
Subsection:	412.02.09 Material Transfer Vehicle (MTV).
Revision:	Replace the paragraph with the following: Provide and utilize a MTV with the minimum characteristics outlined in section 403.02.10.

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Subsection:	412.03.07 Placement and Compaction.
Revision:	Replace the first paragraph with the following: Use a MTV when placing SMA mixture in the driving lanes. The MTV is not required on ramps and/or shoulders unless specified in the contract. When the Engineer determines the use of the MTV is not practical for a portion of the project, the Engineer may waive its requirement for that portion of pavement by a letter documenting the waiver.
Subsection:	412.04 MEASUREMENT.
Revision:	Add the following subsection: 412.04.03. Material Transfer Vehicle (MTV). The Department will not measure the MTV for payment and will consider its use incidental to the asphalt mixture.
Subsection:	501.03.19 Surface Tolerances and Testing Surface.
Part:	B) Ride Quality.
Revision:	Add the following to the end of the first paragraph: The Department will specify if the ride quality requirements are Category A or Category B when ride quality is specified in the Contract. Category B ride quality requirements shall apply when the Department fails to classify which ride quality requirement will apply to the Contract.
Subsection:	603.03.06 Cofferdams.
Revision:	Replace the seventh sentence of paragraph one with the following: Submit drawings that are stamped by a Professional Engineer licensed in the Commonwealth of Kentucky.
Subsection:	605.03.04 Tack Welding.
Revision:	Insert the subsection and the following: 605.03.04 Tack Welding. The Department does not allow tack welding.
Subsection:	606.03.17 Special Requirements for Latex Concrete Overlays.
Part:	A) Existing Bridges and New Structures.
Number:	1) Prewetting and Grout-Bond Coat.
Revision:	Add the following sentence to the last paragraph: Do not apply a grout-bond coat on bridge decks prepared by hydrodemolition.
Subsection:	609.03 Construction.
Revision:	Replace Subsection 609.03.01 with the following: 609.03.01 A) Swinging the Spans. Before placing concrete slabs on steel spans or precast concrete release the temporary erection supports under the bridge and swing the span free on its supports. 609.03.01 B) Lift Loops. Cut all lift loops flush with the top of the precast beam once the beam is placed in the final location and prior to placing steel reinforcement. At locations where lift loops are cut, paint the top of the beam with galvanized or epoxy paint.
Subsection:	611.03.02 Precast Unit Construction.
Revision:	Replace the first sentence of the subsection with the following: Construct units according to ASTM C1577, replacing Table 1 (Design Requirements for Precast Concrete Box Sections Under Earth, Dead and HL-93 Live Load Conditions) with KY Table 1 (Precast Culvert KYHL-93 Design Table) , and Section 605 with the following exceptions and additions:

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Subsection:	613.03.01 Design.
Number:	2)
Revision:	Replace "AASHTO Standard Specifications for Highway Bridges" with "AASHTO LRFD Bridge Design Specifications"
Subsection:	615.06.02
Revision:	Add the following sentence to the end of the subsection. The ends of units shall be normal to walls and centerline except exposed edges shall be beveled ¾ inch.
Subsection:	615.06.03 Placement of Reinforcement in Precast 3-Sided Units.
Revision:	Replace the reference of 6.6 in the section to 615.06.06.
Subsection:	615.06.04 Placement of Reinforcement for Precast Endwalls.
Revision:	Replace the reference of 6.7 in the section to 615.06.07.
Subsection:	615.06.06 Laps, Welds, and Spacing for Precast 3-Sided Units.
Revision:	Replace the subsection with the following: Tension splices in the circumferential reinforcement shall be made by lapping. Laps may not be tack welded together for assembly purposes. For smooth welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.2 and AASHTO 2012 Bridge Design Guide Section 5.11.6.3. For deformed welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.1 and AASHTO 2012 Bridge Design Guide Section 5.11.6.2. The overlap of welded wire fabric shall be measured between the outer most longitudinal wires of each fabric sheet. For deformed billet-steel bars, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.1. For splices other than tension splices, the overlap shall be a minimum of 12" for welded wire fabric or deformed billet-steel bars. The spacing center to center of the circumferential wires in a wire fabric sheet shall be no less than 2 inches and no more than 4 inches. The spacing center to center of the longitudinal wires shall not be more than 8 inches. The spacing center to center of the longitudinal distribution steel for either line of reinforcing in the top slab shall be not more than 16 inches.
Subsection:	615.06.07 Laps, Welds, and Spacing for Precast Endwalls.
Revision:	Replace the subsection with the following: Splices in the reinforcement shall be made by lapping. Laps may not be tack welded together for assembly purposes. For smooth welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.2 and AASHTO 2012 Bridge Design Guide Section 5.11.6.3. For deformed welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.1 and AASHTO 2012 Bridge Design Guide Section 5.11.6.2. For deformed billet-steel bars, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.1. The spacing center-to-center of the wire fabric sheet shall not be less than 2 inches or more than 8 inches.

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Subsection:	615.08.01 Type of Test Specimen.
Revision:	Replace the subsection with the following: Start-up slump, air content, unit weight, and temperature tests will be performed each day on the first batch of concrete. Acceptable start-up results are required for production of the first unit. After the first unit has been established, random acceptance testing is performed daily for each 50 yd ³ (or fraction thereof). In addition to the slump, air content, unit weight, and temperature tests, a minimum of one set of cylinders shall be required each time plastic property testing is performed.
Subsection:	615.08.02 Compression Testing.
Revision:	Delete the second sentence.
Subsection:	615.08.04 Acceptability of Core Tests.
Revision:	Delete the entire subsection.
Subsection:	615.12 Inspection.
Revision:	Add the following sentences to the end of the subsection: Units will arrive at jobsite with the "Kentucky Oval" stamped on the unit which is an indication of acceptable inspection at the production facility. Units shall be inspected upon arrival for any evidence of damage resulting from transport to the jobsite.
Subsection:	716.02.02 Paint.
Revision:	Replace sentence with the following: Conform to Section 821.
Subsection:	716.03 CONSTRUCTION.
Revision:	Replace bullet 5) with the following: 5) AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims,
Subsection:	716.03.02 Lighting Standard Installation.
Revision:	Replace the second sentence with the following: Regardless of the station and offset noted, locate all poles/bases behind the guardrail a minimum of four feet from the front face of the guardrail to the front face of the pole base.
Subsection:	716.03.02 Lighting Standard Installation.
Part:	A) Conventional Installation.
Revision:	Replace the third sentence with the following: Orient the transformer base so the door is positioned on the side away from on-coming traffic.
Subsection:	716.03.02 Lighting Standard Installation.
Part:	A) Conventional Installation.
Number:	1) Breakaway Installation and Requirements.
Revision:	Replace the first sentence with the following: For breakaway supports, conform to Section 12 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.
Subsection:	716.03.02 Lighting Standard Installation.
Part:	B) High Mast Installation
Revision:	Replace the first sentence with the following: Install each high mast pole as noted on plans.
Subsection:	716.03.02 Lighting Standard Installation.
Part:	B) High Mast Installation
Number:	2) Concrete Base Installation
Revision:	Modification of Chart and succeeding paragraphs within this section:

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Drilled Shaft Depth Data							
Level Ground		3:1 Ground Slope		2:1 Ground Slope		1.5:1 Ground Slope ⁽²⁾	
Soil	Rock	Soil	Rock	Soil	Rock	Soil	Rock
17 ft	7 ft	19 ft	7 ft	20 ft	7 ft	⁽¹⁾	7 ft
Steel Requirements							
Vertical Bars		Ties or Spiral					
Size	Total	Size	Spacing or Pitch				
#10	16	#4	12 inch				

(1): Shaft length is 22' for cohesive soil only. For cohesionless soil, contact geotechnical branch for design.

(2): Do not construct high mast drilled shafts on ground slopes steeper than 1.5:1 without the approval of the Division of Traffic.

If rock is encountered during drilling operations and confirmed by the engineer to be of sound quality, the shaft is only required to be further advanced into the rock by the length of rock socket shown in the table. The total length of the shaft need not be longer than that of soil alone. Both longitudinal rebar length and number of ties or spiral length shall be adjusted accordingly.

If a shorter depth is desired for the drilled shaft, the contractor shall provide, for the state's review and approval, a detailed column design with individual site specific soil and rock analysis performed and approved by a Professional Engineer licensed in the Commonwealth of Kentucky.

Spiral reinforcement may be substituted for ties. If spiral reinforcement is used, one and one-half closed coils shall be provided at the ends of each spiral unit. Subsurface conditions consisting of very soft clay or very loose saturated sand could result in soil parameters weaker than those assumed. Engineer shall consult with the geotechnical branch if such conditions are encountered.

The bottom of the drilled hole shall be firm and thoroughly cleaned so no loose or compressible materials are present at the time of the concrete placement. If the drilled hole contains standing water, the concrete shall be placed using a tremie to displace water. Continuous concrete flow will be required to insure full displacement of any water.

The reinforcement and anchor bolts shall be adequately supported in the proper positions so no movement occurs during concrete placement. Welding of anchor bolts to the reinforcing cage is unacceptable, templates shall be used. Exposed portions of the foundation shall be formed to create a smooth finished surface. All forming shall be removed upon completion of foundation construction.

Subsection:	716.03.03 Trenching.
Part:	A) Trenching of Conduit for Highmast Ducted Cables.
Revision:	Add the following after the first sentence: If depths greater than 24 inches are necessary, obtain the Engineer's approval and maintain the required conduit depths coming into the junction boxes. No payment for additional junction boxes for greater depths will be allowed.

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Subsection:	716.03.03 Trenching.
Part:	B) Trenching of Conduit for Non-Highmast Cables.
Revision:	Add the following after the second sentence: If depths greater than 24 inches are necessary for either situation listed previously, obtain the Engineer's approval and maintain the required conduit depths coming into the junction boxes. No payment for additional junction boxes for greater depths will be allowed.
Subsection:	716.03.10 Junction Boxes.
Revision:	Replace subsection title with the following: Electrical Junction Box.
Subsection:	716.04.07 Pole with Secondary Control Equipment.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished and installed. The Department will not measure mounting the cabinet to the pole, backfilling, restoration, any necessary hardware to anchor pole, or electrical inspection fees, and will consider them incidental to this item of work. The Department will also not measure furnishing and installing electrical service conductors, specified conduits, meter base, transformer, service panel, fused cutout, fuses, lighting arrestors, photoelectrical control, circuit breaker, contactor, manual switch, ground rods, and ground wires and will consider them incidental to this item of work.
Subsection:	716.04.08 Lighting Control Equipment.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished and installed. The Department will not measure constructing the concrete base, excavation, backfilling, restoration, any necessary anchors, or electrical inspection fees, and will consider them incidental to this item of work. The Department will also not measure furnishing and installing electrical service conductors, specified conduits, meter base, transformer, service panel, fused cutout, fuses, lighting arrestors, photoelectrical control, circuit breakers, contactor, manual switch, ground rods, and ground wires and will consider them incidental to this item of work.
Subsection:	716.04.09 Luminaire.
Revision:	Replace the first sentence with the following: The Department will measure the quantity as each individual unit furnished and installed.
Subsection:	716.04.10 Fused Connector Kits.
Revision:	Replace the first sentence with the following: The Department will measure the quantity as each individual unit furnished and installed.
Subsection:	716.04.13 Junction Box.
Revision:	Replace the subsection title with the following: Electrical Junction Box Type Various.
Subsection:	716.04.13 Junction Box.
Part:	A) Junction Electrical.
Revision:	Rename A) Junction Electrical to the following: A) Electrical Junction Box.
Subsection:	716.04.14 Trenching and Backfilling.
Revision:	Replace the second sentence with the following: The Department will not measure excavation, backfilling, underground utility warning tape (if required), the restoration of disturbed areas to original condition, and will consider them incidental to this item of work.

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Subsection:	716.04.18 Remove Lighting.															
Revision:	Replace the paragraph with the following: The Department will measure the quantity as a lump sum for the removal of lighting equipment. The Department will not measure the disposal of all equipment and materials off the project by the contractor. The Department also will not measure the transportation of the materials and will consider them incidental to this item of work.															
Subsection:	716.04.20 Bore and Jack Conduit.															
Revision:	Replace the paragraph with the following: The Department will measure the quantity in linear feet. This item shall include all work necessary for boring and installing conduit under an existing roadway. Construction methods shall be in accordance with Sections 706.03.02, paragraphs 1, 2, and 4.															
Subsection:	716.05 PAYMENT.															
Revision:	Replace items 04810-04811, 20391NS835 and, 20392NS835 under <u>Code</u> , <u>Pay Item</u> , and <u>Pay Unit</u> with the following:															
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20392NS835	Electrical Junction Box Type C	Each														
Subsection:	723.02.02 Paint.															
Revision:	Replace sentence with the following: Conform to Section 821.															
Subsection:	723.03 CONSTRUCTION.															
Revision:	Replace bullet 5) with the following: 5) AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims,															
Subsection:	723.03.02 Poles and Bases Installation.															
Revision:	Replace the first sentence with the following: Regardless of the station and offset noted, locate all poles/bases behind the guardrail a minimum of four feet from the front face of the guardrail to the front face of the pole base.															
Subsection:	723.03.02 Poles and Bases Installation.															
Part:	A) Steel Strain and Mastarm Poles Installation															
Revision:	Replace the second paragraph with the following: For concrete base installation, see Section 716.03.02, B), 2), Paragraphs 2-7. Drilled shaft depth shall be based on the soil conditions encountered during drilling and slope condition at the site. Refer to the design chart below:															
Subsection:	723.03.02 Poles and Bases Installation.															
Part:	B) Pedestal or Pedestal Post Installation.															
Revision:	Replace the fourth sentence of the paragraph with the following: For breakaway supports, conform to Section 12 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.															

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Subsection:	723.03.03 Trenching.
Part:	A) Under Roadway.
Revision:	Add the following after the second sentence: If depths greater than 24 inches are necessary, obtain the Engineer's approval and maintain either required conduit depths coming into the junction boxes. No payment for additional junction boxes for greater depths will be allowed.
Subsection:	723.03.11 Wiring Installation.
Revision:	Add the following sentence between the fifth and sixth sentences: Provide an extra two feet of loop wire and lead-in past the installed conduit in poles, pedestals, and junction boxes.
Subsection:	723.03.12 Loop Installation.
Revision:	Replace the fourth sentence of the 2nd paragraph with the following: Provide an extra two feet of loop wire and lead-in past the installed conduit in poles, pedestals, and junction boxes.
Subsection:	723.04.02 Junction Box.
Revision:	Replace subsection title with the following: Electrical Junction Box Type Various.
Subsection:	723.04.03 Trenching and Backfilling.
Revision:	Replace the second sentence with the following: The Department will not measure excavation, backfilling, underground utility warning tape (if required), the restoration of disturbed areas to original condition, and will consider them incidental to this item of work.
Subsection:	723.04.10 Signal Pedestal.
Revision:	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, specified conduits, fittings, ground rod, ground wire, backfilling, restoring disturbed areas, or other necessary hardware and will consider them incidental to this item of work.
Subsection:	723.04.15 Loop Saw Slot and Fill.
Revision:	Replace the second sentence with the following: The Department will not measure sawing, cleaning and filling induction loop saw slot, loop sealant, backer rod, and grout and will consider them incidental to this item of work.
Subsection:	723.04.16 Pedestrian Detector.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished, installed and connected to pole/pedestal. The Department will not measure installing R10-3e (with arrow) sign, furnishing and installing mounting hardware for sign and will consider them incidental to this item of work.
Subsection:	723.04.18 Signal Controller- Type 170.
Revision:	Replace the second sentence with the following: The Department will not measure constructing the concrete base or mounting the cabinet to the pole, connecting the signal and detectors, excavation, backfilling, restoration, any necessary pole mounting hardware, electric service, or electrical inspection fees and will consider them incidental to this item of work. The Department will also not measure furnishing and connecting the induction of loop amplifiers, pedestrian isolators, load switches, model 400 modem card; furnishing and installing electrical service conductors, specified conduits, anchors, meter base, fused cutout, fuses, ground rods, ground wires and will consider them incidental to this item of work.

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Subsection:	723.04.20 Install Signal Controller - Type 170.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each individual unit installed. The Department will not measure constructing the concrete base or mounting the cabinet to the pole, connecting the signal and detectors, and excavation, backfilling, restoration, any necessary pole mounting hardware, electric service, or electrical inspection fees and will consider them incidental to this item of work. The Department will also not measure connecting the induction loop amplifiers, pedestrian, isolators, load switches, model 400 modem card; furnishing and installing electrical service conductors, specified conduits, anchors, meter base, fused cutout, fuses, ground rods, ground wires and will consider them incidental to this item of work.
Subsection:	723.04.22 Remove Signal Equipment.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as a lump sum removal of signal equipment. The Department will not measure the return of control equipment and signal heads to the Department of Highways as directed by the District Traffic Engineer. The Department also will not measure the transportation of materials of the disposal of all other equipment and materials off the project by the contractor and will consider them incidental to this item of work.
Subsection:	723.04.28 Install Pedestrian Detector Audible.
Revision:	Replace the second sentence with the following: The Department will not measure installing sign R10-3e (with arrow) and will consider it incidental to this item of work.
Subsection:	723.04.29 Audible Pedestrian Detector.
Revision:	Replace the second sentence with the following: The Department will not measure furnishing and installing the sign R10-3e (with arrow) and will consider it incidental to this item of work.
Subsection:	723.04.30 Bore and Jack Conduit.
Revision:	Replace the paragraph with the following: The Department will measure the quantity in linear feet. This item shall include all work necessary for boring and installing conduit under an existing roadway. Construction methods shall be in accordance with Sections 706.03.02, paragraphs 1, 2, and 4.
Subsection:	723.04.31 Install Pedestrian Detector.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each individual unit installed and connected to pole/pedestal. The Department will not measure installing sign R 10-3e (with arrow) and will consider it incidental to this item of work.
Subsection:	723.04.32 Install Mast Arm Pole.
Revision:	Replace the second sentence with the following: The Department will not measure arms, signal mounting brackets, anchor bolts, or any other necessary hardware and will consider them incidental to this item of work.
Subsection:	723.04.33 Pedestal Post.
Revision:	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, anchor bolts, conduit, fittings, ground rod, ground wire, backfilling, restoration, or any other necessary hardware and will consider them incidental to this item of work.

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Subsection:	723.04.36 Traffic Signal Pole Base.															
Revision:	Replace the second sentence with the following: The Department will not measure excavation, reinforcing steel, anchor bolts, specified conduits, ground rods, ground wires, backfilling, or restoration and will consider them incidental to this item of work.															
Subsection:	723.04.37 Install Signal Pedestal.															
Revision:	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, anchor bolts, specified conduits, fittings, ground rod, ground wire, backfilling, restoration, or any other necessary hardware and will consider them incidental to this item of work.															
Subsection:	723.04.38 Install Pedestal Post.															
Revision:	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, anchor bolts, specified conduits, fittings, ground rod, ground wire, backfilling, restoration, or any other necessary hardware and will consider them incidental to this item of work.															
Subsection:	723.05 PAYMENT.															
Revision:	Replace items 04810-04811, 20391NS835 and, 20392NS835 under <u>Code</u> , <u>Pay Item</u> , and <u>Pay Unit</u> with the following:															
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Subsection:	804.01.02 Crushed Sand.															
Revision:	Delete last sentence of the section.															
Subsection:	804.01.06 Slag.															
Revision:	Add subsection and following sentence. Provide blast furnace slag sand where permitted. The Department will allow steel slag sand only in asphalt surface applications.															
Subsection:	804.04 Asphalt Mixtures.															
Revision:	Replace the subsection with the following: Provide natural, crushed, conglomerate, or blast furnace slag sand, with the addition of filler as necessary, to meet gradation requirements. The Department will allow any combination of natural, crushed, conglomerate or blast furnace slag sand when the combination is achieved using cold feeds at the plant. The Engineer may allow other fine aggregates.															
Subsection:	806.03.01 General Requirements.															
Revision:	Replace the second sentence of the paragraph with the following: Additionally, the material must have a minimum solubility of 99.0 percent when tested according to AASHTO T 44 and PG 76-22 must exhibit a minimum recovery of 60 percent, with a J _{NR} (nonrecoverable creep compliance) between 0.1 and 0.5, when tested according to AASHTO TP 70.															

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Subsection:	806.03.01 General Requirements.														
Table:	PG Binder Requirements and Price Adjustment Schedule														
Revision:	Replace the Elastic Recovery, % ⁽³⁾ (AASHTO T301) and all corresponding values in the table with the following:														
	<table border="1"> <thead> <tr> <th><u>Test</u></th> <th><u>Specification</u></th> <th><u>100% Pay</u></th> <th><u>90% Pay</u></th> <th><u>80% Pay</u></th> <th><u>70% Pay</u></th> <th><u>50% Pay⁽¹⁾</u></th> </tr> </thead> <tbody> <tr> <td>MSCR recovery, % ⁽³⁾ (AASHTO TP 70)</td> <td>60 Min.</td> <td>≥58</td> <td>56</td> <td>55</td> <td>54</td> <td><53</td> </tr> </tbody> </table>	<u>Test</u>	<u>Specification</u>	<u>100% Pay</u>	<u>90% Pay</u>	<u>80% Pay</u>	<u>70% Pay</u>	<u>50% Pay⁽¹⁾</u>	MSCR recovery, % ⁽³⁾ (AASHTO TP 70)	60 Min.	≥58	56	55	54	<53
<u>Test</u>	<u>Specification</u>	<u>100% Pay</u>	<u>90% Pay</u>	<u>80% Pay</u>	<u>70% Pay</u>	<u>50% Pay⁽¹⁾</u>									
MSCR recovery, % ⁽³⁾ (AASHTO TP 70)	60 Min.	≥58	56	55	54	<53									
Subsection:	806.03.01 General Requirements.														
Table:	PG Binder Requirements and Price Adjustment Schedule														
Superscript:	(3)														
Revision:	Replace ⁽³⁾ with the following: Perform testing at 64°C.														
Subsection:	813.04 Gray Iron Castings.														
Revision:	Replace the reference to "AASHTO M105" with "ASTM A48".														
Subsection:	813.09.02 High Strength Steel Bolts, Nuts, and Washers.														
Number:	A) Bolts.														
Revision:	Delete first paragraph and "Hardness Number" Table. Replace with the following: A) Bolts. Conform to ASTM A325 (AASHTO M164) or ASTM A490 (AASHTO 253) as applicable.														
Subsection:	814.04.02 Timber Guardrail Posts.														
Revision:	Third paragraph, replace the reference to "AWPA C14" with "AWPA U1, Section B, Paragraph 4.1".														
Subsection:	814.04.02 Timber Guardrail Posts.														
Revision:	Replace the first sentence of the fourth paragraph with the following: Use any of the species of wood for round or square posts covered under AWPA U1.														
Subsection:	814.04.02 Timber Guardrail Posts.														
Revision:	Fourth paragraph, replace the reference to "AWPA C2" with "AWPA U1, Section B, Paragraph 4.1".														
Subsection:	814.04.02 Timber Guardrail Posts.														
Revision:	Delete the second sentence of the fourth paragraph.														
Subsection:	814.05.02 Composite Plastic.														
Revision:	1) Add the following to the beginning of the first paragraph: Select composite offset blocks conforming to this section and assure blocks are from a manufacturer included on the Department's List of Approved Materials. 2) Delete the last paragraph of the subsection.														
Subsection:	816.07.02 Wood Posts and Braces.														
Revision:	First paragraph, replace the reference to "AWPA C5" with "AWPA U1, Section B, Paragraph 4.1".														
Subsection:	816.07.02 Wood Posts and Braces.														
Revision:	Delete the second sentence of the first paragraph.														
Subsection:	818.07 Preservative Treatment.														
Revision:	First paragraph, replace all references to "AWPA C14" with "AWPA U1, Section A".														

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<p>Subsection: Revision:</p>	<p>834.14 Lighting Poles. Replace the first sentence with the following: Lighting pole design shall be in accordance with loading and allowable stress requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims, with the exception of the following: The Cabinet will waive the requirement stated in the first sentence of Section 5.14.6.2 – Reinforced Holes and Cutouts for high mast poles (only). The minimum diameter at the base of the pole shall be 22 inches for high mast poles (only).</p>
<p>Subsection Revision:</p>	<p>834.14.03 High Mast Poles. Remove the second and fourth sentence from the first paragraph.</p>
<p>Subsection Revision:</p>	<p>834.14.03 High Mast Poles. Replace the third paragraph with the following: Provide calculations and drawings that are stamped by a Professional Engineer licensed in the Commonwealth of Kentucky.</p>
<p>Subsection: Revision:</p>	<p>834.14.03 High Mast Poles. Replace paragraph six with the following: Provide a pole section that conforms to ASTM A 595 grade A with a minimum yield strength of 55 KSI or ASTM A 572 with a minimum yield strength of 55 KSI. Use tubes that are round or 16 sided with a four inch corner radius, have a constant linear taper of .144 in/ft and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Provide pole sections that are telescopically slip fit assembled in the field to facilitate inspection of interior surface welds and the protective coating. The minimum length of the telescopic slip splices shall be 1.5 times the inside diameter of the exposed end of the female section. Use longitudinal seam welds as commended in Section 5.15 of the AASHTO 2013 Specifications. The thickness of the transverse base shall not be less than 2 inches. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration groove weld with backup bar. The handhole cover shall be removable from the handhole frame. One the frame side opposite the hinge, provide a mechanism on the handhole cover/frame to place the Department’s standard padlock as specified in Section 834.25. The handhole frame shall have two stainless studs installed opposite the hinge to secure the handhole cover to the frame which includes providing stainless steel wing nuts and washers. The handhole cover shall be manufactured from 0.25 inch thick galvanized steel (ASTM A 153) and have a neoprene rubber gasket that is permanently secured to the handhole frame to insure weather-tight protection. The hinge shall be manufactured from 7-guage stainless steel to provide adjustability to insure weather-tight fit for the cover. The minimum clear distance between the transverse plate and the bottom opening of the handhole shall not be less than the diameter of the bottom tube of the pole but needs to be at least 15 inches. Provide products that are hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A 153 (hardware items).</p>
<p>Subsection: Revision:</p>	<p>834.16 ANCHOR BOLTS. Insert the following sentence at the beginning of the paragraph: The anchor bolt design shall follow the NCHRP Report 494 Section 2.4 and NCHRP 469 Appendix A Specifications.</p>

**Supplemental Specifications to the
 Standard Specifications for Road and Bridge Construction, 2012 Edition
 Effective with the August 22, 2014 Letting**

<p>Subsection: Revision:</p>	<p>834.17.01 Conventional. Add the following sentence after the second sentence: Provide a waterproof sticker mounted on the bottom of the housing that is legible from the ground and indicates the wattage of the fixture by providing the first two numbers of the wattage.</p>
<p>Subsection: Revision:</p>	<p>834.21.01 Waterproof Enclosures. Replace the last five sentences in the second paragraph with the following sentences: Provide a cabinet door with a louvered air vent, filter-retaining brackets and an easy to clean metal filter. Provide a cabinet door that is keyed with a factory installed standard no. 2 corbin traffic control key. Provide a light fixture with switch and bulb. Use a 120-volt fixture and utilize a L.E.D. bulb (equivalent to 60 watts minimum). Fixture shall be situated at or near the top of the cabinet and illuminate the contents of the cabinet. Provide a 120 VAC GFI duplex receptacle in the enclosure with a separate 20 amp breaker.</p>
<p>Subsection: Revision:</p>	<p>835.07 Traffic Poles. Replace the first sentence of the first paragraph with the following: Pole diameter and wall thickness shall be calculated in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.</p>
<p>Subsection: Revision:</p>	<p>835.07 Traffic Poles. *Replace the first sentence of the fourth paragraph with the following: Ensure transverse plates have a thickness ≥ 2 inches. *Add the following sentence to the end of the fourth paragraph: The bottom pole diameter shall not be less than 16.25 inches.</p>
<p>Subsection: Revision:</p>	<p>835.07 Traffic Poles. Replace the third sentence of the fifth paragraph with the following: For anchor bolt design, pole forces shall be positioned in such a manner to maximize the force on any individual anchor bolt regardless of the actual anchor bolt orientation with the pole.</p>
<p>Subsection: Revision:</p>	<p>835.07 Traffic Poles. Replace the first and second sentence of the sixth paragraph with the following: The pole handhole shall be 25 inches by 6.5 inches. The handhole cover shall be removable from the handhole frame. On the frame side opposite the hinge, provide a mechanism on the handhole cover/frame to place the Department's standard padlock as specified in Section 834.25. The handhole frame shall have two stainless studs installed opposite the hinge to secure the handhole cover to the frame which includes providing stainless steel wing nuts and washers. The handhole cover shall be manufactured from 0.25 inch thick galvanized steel (ASTM 153) and have a neoprene rubber gasket that is permanently secured to the handhole frame to insure weather-tight protection. The hinge shall be manufactured from 7 gauge stainless steel to provide adjustability to insure a weather-tight fit for the cover. The minimum clear distance between the transverse plate and the bottom opening of the handhole shall not be less than the diameter of the bottom tube but needs to be at least 12 inches.</p>

**Supplemental Specifications to the
Standard Specifications for Road and Bridge Construction, 2012 Edition
Effective with the August 22, 2014 Letting**

Subsection:	835.07 Traffic Poles.									
Revision:	*Replace the first sentence of the last paragraph with the following: Provide calculations and drawings that are stamped by a Professional Engineer licensed in the Commonwealth of Kentucky. *Replace the third sentence of the last paragraph with the following: All tables referenced in 835.07 are found in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.									
Subsection:	835.07.01 Steel Strain Poles.									
Revision:	Replace the second sentence of the second paragraph with the following: The detailed analysis shall be certified by a Professional Engineer licensed in the Commonwealth of Kentucky.									
Subsection:	835.07.01 Steel Strain Poles.									
Revision:	Replace number 7. after the second paragraph with the following: 7. Fatigue calculations should be shown for all fatigue related connections. Provide the corresponding detail, stress category and example from table 11.9.3.1-1.									
Subsection:	835.07.02 Mast Arm Poles.									
Revision:	Replace the second sentence of the fourth paragraph with the following: The detailed analysis shall be certified by a Professional Engineer licensed in the Commonwealth of Kentucky.									
Subsection:	835.07.02 Mast Arm Poles.									
Revision:	Replace number 7) after the fourth paragraph with the following: 7) Fatigue calculations should be shown for all fatigue related connections. Provide the corresponding detail, stress category and example from table 11.9.3.1-1.									
Subsection:	835.07.03 Anchor Bolts.									
Revision:	Add the following to the end of the paragraph: There shall be two steel templates (one can be used for the headed part of the anchor bolt when designed in this manner) provided per pole. Templates shall be contained within a 26.5 inch diameter. All templates shall be fully galvanized (ASTM A 153).									
Subsection:	835.16.05 Optical Units.									
Revision:	Replace the 3rd paragraph with the following: The list of certified products can be found on the following website: http://www.intertek.com .									
Subsection:	835.19.01 Pedestrian Detector Body.									
Revision:	Replace the first sentence with the following: Provide a four holed pole mounted aluminum rectangular housing that is compatible with the pedestrian detector.									
Subsection:	843.01.01 Geotextile Fabric.									
Table:	TYPE I FABRIC GEOTEXTILES FOR SLOPE PROTECTION AND CHANNEL LINING									
Revision:	Add the following to the chart:									
	<table border="1"> <thead> <tr> <th><u>Property</u></th> <th><u>Minimum Value⁽¹⁾</u></th> <th><u>Test Method</u></th> </tr> </thead> <tbody> <tr> <td>CBR Puncture (lbs)</td> <td>494</td> <td>ASTM D6241</td> </tr> <tr> <td>Permittivity (1/s)</td> <td>0.7</td> <td>ASTM D4491</td> </tr> </tbody> </table>	<u>Property</u>	<u>Minimum Value⁽¹⁾</u>	<u>Test Method</u>	CBR Puncture (lbs)	494	ASTM D6241	Permittivity (1/s)	0.7	ASTM D4491
<u>Property</u>	<u>Minimum Value⁽¹⁾</u>	<u>Test Method</u>								
CBR Puncture (lbs)	494	ASTM D6241								
Permittivity (1/s)	0.7	ASTM D4491								

**Supplemental Specifications to the
Standard Specifications for Road and Bridge Construction, 2012 Edition
Effective with the August 22, 2014 Letting**

Subsection:	843.01.01 Geotextile Fabric.		
Table:	TYPE II FABRIC GEOTEXTILES FOR UNDERDRAINS		
Revision:	Add the following to the chart:		
	<u>Property</u>	<u>Minimum Value⁽¹⁾</u>	<u>Test Method</u>
	CBR Puncture (lbs)	210	ASTM D6241
	Permittivity (1/s)	0.5	ASTM D4491
Subsection:	843.01.01 Geotextile Fabric.		
Table:	TYPE III FABRIC GEOTEXTILES FOR SUBGRADE OR EMBANKMENT STABILIZATION		
Revision:	Add the following to the chart:		
	<u>Property</u>	<u>Minimum Value⁽¹⁾</u>	<u>Test Method</u>
	CBR Puncture (lbs)	370	ASTM D6241
	Permittivity (1/s)	0.05	ASTM D4491
Subsection:	843.01.01 Geotextile Fabric.		
Table:	TYPE IV FABRIC GEOTEXTILES FOR EMBANKMENT DRAINAGE BLANKETS AND PAVEMENT EDGE DRAINS		
Revision:	Add the following to the chart:		
	<u>Property</u>	<u>Minimum Value⁽¹⁾</u>	<u>Test Method</u>
	CBR Puncture (lbs)	309	ASTM D6241
	Permittivity (1/s)	0.5	ASTM D4491
Subsection:	843.01.01 Geotextile Fabric.		
Table:	TYPE V HIGH STRENGTH GEOTEXTILE FABRIC		
Revision:	Make the following changes to the chart:		
	<u>Property</u>	<u>Minimum Value⁽¹⁾</u>	<u>Test Method</u>
	CBR Puncture (lbs)	618	ASTM D6241
	Grab Strength (lbs)	700	ASTM D4632
	Apparent Opening Size	U.S. #40 ⁽³⁾	ASTM D4751
	⁽³⁾ Maximum average roll value.		

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

**TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS**

**LABOR AND WAGE REQUIREMENTS
APPLICABLE TO OTHER THAN FEDERAL-AID SYSTEM PROJECTS**

- I. Application
- II. Nondiscrimination of Employees (KRS 344)
- III. Payment of Predetermined Minimum Wages
- IV. Statements and Payrolls

I. APPLICATION

1. These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work or by subcontract. The contractor's organization shall be construed to include only workmen employed and paid directly by the contractor and equipment owned or rented by him, with or without operators.

2. The contractor shall insert in each of his subcontracts all of the stipulations contained in these Required Provisions and such other stipulations as may be required.

3. A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

II. NONDISCRIMINATION OF EMPLOYEES

**AN ACT OF THE KENTUCKY
GENERAL ASSEMBLY TO PREVENT
DISCRIMINATION IN EMPLOYMENT
KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972**

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy); or limit, segregate, or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy). The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall not print or publish or cause to be printed or published a notice or advertisement relating to employment by such an employer or membership in or any classification or referral for employment by the employment agency, indicating any preference, limitation, specification, or discrimination, based on race, color, religion, national origin, sex, disability or age (between forty and seventy), except that such notice or advertisement may indicate a preference, limitation, or specification based on religion, or national origin when religion, or national origin is a bona fide occupational qualification for employment.

3. If the contractor is in control of apprenticeship or other training or retraining, including on-the-job training programs, he shall not discriminate against an individual

because of his race, color, religion, national origin, sex, disability or age (between forty and seventy), in admission to, or employment in any program established to provide apprenticeship or other training.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

III. PAYMENT OF PREDETERMINED MINIMUM WAGES

1. These special provisions are supplemented elsewhere in the contract by special provisions which set forth certain predetermined minimum wage rates. The contractor shall pay not less than those rates.

2. The minimum wage determination schedule shall be posted by the contractor, in a manner prescribed by the Department of Highways, at the site of the work in prominent places where it can be easily seen by the workers.

IV. STATEMENTS AND PAYROLLS

1. All contractors and subcontractors affected by the terms of KRS 337.505 to 337.550 shall keep full and accurate payroll records covering all disbursements of wages to their employees to whom they are required to pay not less than the prevailing rate of wages. Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of one (1) year from the date of completion of this contract.

2. The payroll records shall contain the name, address and social security number of each employee, his correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid.

3. The contractor shall make his daily records available at the project site for inspection by the State Department of Highways contracting office or his authorized representative.

Periodic investigations shall be conducted as required to assure compliance with the labor provisions of the contract. Interrogation of employees and officials of the contractor shall be permitted during working hours.

Aggrieved workers, Highway Managers, Assistant District Engineers, Resident Engineers and Project Engineers shall report all complaints and violations to the Division of Contract Procurement.

The contractor shall be notified in writing of apparent violations. The contractor may correct the reported violations and notify the Department of Highways of the action taken or may request an informal hearing. The request for hearing shall be in writing within ten (10) days after receipt of the notice of the reported violation. The contractor may submit

records and information which will aid in determining the true facts relating to the reported violations.

Any person or organization aggrieved by the action taken or the findings established as a result of an informal hearing by the Division of Contract Procurement may request a formal hearing.

4. The wages of labor shall be paid in legal tender of the United States, except that this condition will be considered satisfied if payment is made by a negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payments, the contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

5. No fee of any kind shall be asked or accepted by the contractor or any of his agents from any person as a condition of employment on the project.

6. No laborers shall be charged for any tools used in performing their respective duties except for reasonably avoidable loss or damage thereto.

7. Every employee on the work covered by this contract shall be permitted to lodge, board, and trade where and with whom he elects and neither the contractor nor his agents, nor his employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

8. Every employee on the project covered by this contract shall be an employee of either the prime contractor or an approved subcontractor.

9. No charge shall be made for any transportation furnished by the contractor or his agents to any person employed on the work.

10. No individual shall be employed as a laborer or mechanic on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from individuals.

No Covered employee may be employed on the work except in accordance with the classification set forth in the schedule mentioned above; provided, however, that in the event additional classifications are required, application shall be made by the contractor to the Department of Highways and (1) the Department shall request appropriate classifications and rates from the proper agency, or (2) if there is urgent need for additional classification to avoid undue delay in the work, the contractor may employ such workmen at rates deemed comparable to rates established for similar classifications provided he has made written application through the Department of Highways, addressed to the proper agency, for the supplemental rates. The contractor shall retroactively adjust, upon receipt of the supplemental rates schedule, the wages of any employee paid less than the established rate and may adjust the wages of any employee overpaid.

11. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any work-week in which he is employed on such work, to work in excess of eight hours in any calendar day or in excess of forty hours in such work-week unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all hours worked in excess of eight hours in any calendar day or in excess of forty hours in such work-week. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. This agreement shall be in writing and shall be executed prior to the employee working in excess of eight (8) hours, but not more than ten (10) hours, in any one (1) calendar day.

12. Payments to the contractor may be suspended or withheld due to failure of the contractor to pay any laborer or

mechanic employed or working on the site of the work, all or part of the wages required under the terms of the contract. The Department may suspend or withhold payments only after the contractor has been given written notice of the alleged violation and the contractor has failed to comply with the wage determination of the Department of Highways.

13. Contractors and subcontractors shall comply with the sections of Kentucky Revised Statutes, Chapter 337 relating to contracts for Public Works.

Revised 2-16-95

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (6) provides:

No present or former public servant shall, within six (6) months of following termination of his office or employment, accept employment, compensation or other economic benefit from any person or business that contracts or does business with the state in matters in which he was directly involved during his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved in state government. This subsection shall not prohibit the performance of ministerial functions, including, but not limited to, filing tax returns, filing applications for permits or licenses, or filing incorporation papers.

KRS 11A.040 (8) states:

A former public servant shall not represent a person in a matter before a state agency in which the former public servant was directly involved, for a period of one (1) year after the latter of:

- a) The date of leaving office or termination of employment; or
- b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, Room 136, Capitol Building, 700 Capitol Avenue, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Kentucky Equal Employment Opportunity Act of 1978

The requirements of the Kentucky Equal Employment Opportunity Act of 1978 (KRS 45.560-45.640) shall apply to this Contract. The apparent low Bidder will be required to submit EEO forms to the Division of Construction Procurement, which will then forward to the Finance and Administration Cabinet for review and approval. No award will become effective until all forms are submitted and EEO/CC has certified compliance. The required EEO forms are as follows:

- EEO-1: Employer Information Report
- Affidavit of Intent to Comply
- Employee Data Sheet
- Subcontractor Report

These forms are available on the Finance and Administration's web page under ***Vendor Information, Standard Attachments and General Terms*** at the following address:
<https://www.eProcurement.ky.gov>.

Bidders currently certified as being in compliance by the Finance and Administration Cabinet may submit a copy of their approval letter in lieu of the referenced EEO forms.

For questions or assistance please contact the Finance and Administration Cabinet by email at **finance.contractcompliance@ky.gov** or by phone at 502-564-2874.

General Decision Number: KY140100 08/22/2014 KY100

Superseded General Decision Number: KY20130100

State: Kentucky

Construction Type: Highway

Counties: Anderson, Bath, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Carroll, Carter, Clark, Elliott, Fayette, Fleming, Franklin, Gallatin, Grant, Grayson, Greenup, Hardin, Harrison, Henry, Jefferson, Jessamine, Larue, Lewis, Madison, Marion, Mason, Meade, Mercer, Montgomery, Nelson, Nicholas, Oldham, Owen, Robertson, Rowan, Scott, Shelby, Spencer, Trimble, Washington and Woodford Counties in Kentucky.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Modification Number	Publication Date
0	01/03/2014
1	02/14/2014
2	04/18/2014
3	05/09/2014
4	05/23/2014
5	06/06/2014
6	06/27/2014
7	07/04/2014
8	07/18/2014
9	07/25/2014
10	08/22/2014

BRIN0004-003 06/01/2011

BRECKENRIDGE COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 24.11	10.07

BRKY0001-005 06/01/2013

BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, & TRIMBLE COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 24.82	10.71

BRKY0002-006 06/01/2011

BRACKEN, GALLATIN, GRANT, MASON & ROBERTSON COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 26.57	10.26

BRKY0007-004 06/01/2011		

BOYD, CARTER, ELLIOT, FLEMING, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 28.29	16.80

BRKY0017-004 06/01/2009		

ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN,
HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, SCOTT, WASHINGTON & WOODFORD COUNTIES:

	Rates	Fringes
BRICKLAYER.....	\$ 24.11	9.97

CARP0064-001 04/01/2014		

	Rates	Fringes
CARPENTER.....	\$ 27.50	14.96
Diver.....	\$ 41.63	14.96
PILEDRIVERMAN.....	\$ 27.75	14.96

ELEC0212-008 06/02/2014		

BRACKEN, GALLATIN and GRANT COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 26.74	16.45

ELEC0212-014 07/01/2013		

BRACKEN, GALLATIN & GRANT COUNTIES:

	Rates	Fringes
Sound & Communication Technician.....	\$ 22.50	9.51

* ELEC0317-012 05/28/2014		

BOYD, CARTER, ELLIOT & ROWAN COUNTIES:

	Rates	Fringes
ELECTRICIAN		
Cable Splicer.....	\$ 32.68	18.13
Electrician.....	\$ 32.62	21.45

ELEC0369-007 05/29/2013		

ANDERSON, BATH, BOURBON, BOYLE, BRECKINRIDGE, BULLITT, CARROLL,
CLARK, FAYETTE, FRAONKLIN, GRAYSON, HARDIN, HARRISON, HENRY,
JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER,
MONTGOMERY, NELSON, NICHOLAS, OLDHAM, OWEN, ROBERTSON, SCOTT,
SHELBY, SPENCER, TRIMBLE, WASHINGTON, & WOODFORD COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 29.48	14.37

ELEC0575-002 06/02/2014		

FLEMING, GREENUP, LEWIS & MASON COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 31.70	14.21

ENGI0181-018 07/01/2014		

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 28.85	14.15
GROUP 2.....	\$ 26.24	14.15
GROUP 3.....	\$ 26.65	14.15
GROUP 4.....	\$ 25.95	14.15

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - A-Frame Winch Truck; Auto Patrol; Backfiller;
Batcher Plant; Bituminous Paver; Bituminous Transfer
Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-All
Scoop; Carry Deck Crane; Central Compressor Plant; Cherry
Picker; Clamshell; Concrete Mixer (21 cu. ft. or Over);
Concrete Paver; Truck-Mounted Concrete Pump; Core Drill;
Crane; Crusher Plant; Derrick; Derrick Boat; Ditching &
Trenching Machine; Dragline; Dredge Operator; Dredge
Engineer; Elevating Grader & Loaders; Grade-All; Gurrries;
Heavy Equipment Robotics Operator/Mechanic; High Lift;
Hoe-Type Machine; Hoist (Two or More Drums); Hoisting
Engine (Two or More Drums); Horizontal Directional Drill
Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau;
Locomotive; Mechanic; Mechanically Operated Laser Screed;
Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel
Bucket; Overhead Crane; Piledriver; Power Blade; Pumpcrete;
Push Dozer; Rock Spreader, attached to equipment; Rotary
Drill; Roller (Bituminous); Rough Terrain Crane; Scarifier;
Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom;
Telescoping Type Forklift; Tow or Push Boat; Tower Crane
(French, German & other types); Tractor Shovel; Truck
Crane; Tunnel Mining Machines, including Moles, Shields or
similar types of Tunnel Mining Equipment

GROUP 2 - Air Compressor (Over 900 cu. ft. per min.);
Bituminous Mixer; Boom Type Tamping Machine; Bull Float;
Concrete Mixer (Under 21 cu. ft.); Dredge Engineer;
Electric Vibrator; Compactor/Self-Propelled Compactor;

Elevator (One Drum or Buck Hoist); Elevator (When used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Skid Steer Machine with all Attachments; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 H.P. or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler

GROUP 3 - All Off Road Material Handling Equipment, including Articulating Dump Trucks; Greaser on Grease Facilities servicing Heavy Equipment

GROUP 4 - Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steerman; Tamping Machine; Tractor (Under 50 H.P.); & Vibrator

CRANES - with booms 150 ft. & Over (Including JIB), and where the length of the boom in combination with the length of the piling leads equals or exceeds 150 ft. - \$1.00 over Group 1 rate

EMPLOYEES ASSIGNED TO WORK BELOW GROUND LEVEL ARE TO BE PAID 10% ABOVE BASIC WAGE RATE. THIS DOES NOT APPLY TO OPEN CUT WORK.

IRON0044-009 06/01/2013

BRACKEN, GALLATIN, GRANT, HARRISON, ROBERTSON,
BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan);
CARROLL (Eastern third, including the Township of Ghent);
FLEMING (Western part, excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);
MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington);
NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills);
OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley);
SCOTT (Northern two-thirds, including Townships of Biddle, Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall)

Rates Fringes

IRONWORKER

Fence Erector.....	\$ 22.50	18.40
Structural.....	\$ 24.80	18.40

IRON0070-006 06/01/2014

ANDERSON, BOYLE, BRECKINRIDGE, BULLITT, FAYETTE, FRANKLIN,
 GRAYSON, HARDIN, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON,
 MARION, MEADE, MERCER, NELSON, OLDHAM, SHELBY, SPENCER,
 TRIMBLE, WASHINGTON & WOODFORD
 BOURBON (Southern two-thirds, including Townships of Austerlity,
 Centerville, Clintonville, Elizabeth, Hutchison, Littlerock,
 North Middletown & Paris);
 CARROLL (Western two-thirds, including Townships of Carrollton,
 Easterday, English, Locust, Louis, Prestonville & Worthville);
 CLARK (Western two-thirds, including Townships of Becknerville,
 Flanagan, Ford, Pine Grove, Winchester & Wyandotte);
 OWEN (Eastern eighth, including Townships of Glenmary, Gratz,
 Monterey, Perry Park & Tacketts Mill);
 SCOTT (Southern third, including Townships of Georgetown, Great
 Crossing, Newtown, Stampling Ground & Woodlake);

Rates Fringes

IRONWORKER.....	\$ 26.97	19.75
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IRON0372-006 06/01/2013

BRACKEN, GALLATIN, GRANT, HARRISON and ROBERTSON
 BOURBON (Northern third, including Townships of Jackson,
 Millersburg, Ruddel Mills & Shawhan);
 CARROLL (Eastern third, including the Township of Ghent);
 FLEMING (Western part, Excluding Townships of Beechburg, Colfax,
 Elizaville, Flemingsburg, Flemingsburg Junction, Foxport,
 Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills,
 Nepton, Pecksrige, Plummers Landing, Plummers Mill, Poplar
 Plains,
 Ringos Mills, Tilton & Wallingford);
 MASON (Western two-thirds, including Townships of Dover,
 Lewisburg, Mays Lick, Maysville, Minerva, Moranburg,
 Murphysville, Ripley, Sardis, Shannon, South Ripley &
 Washington);
 NICHOLAS (Townships of Barefoot, Barterville, Carlisle,
 Ellisville, Headquarters, Henryville, Morningglory, Myers &
 Oakland Mills);
 OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook,
 Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New
 Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita &
 Wheatley);
 SCOTT (Northern two-thirds, including Townships of Biddle,
 Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers
 Gap, Sadieville, Skinnersburg & Stonewall) COUNTIES

Rates Fringes

IRONWORKER, REINFORCING.....	\$ 26.47	19.30
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IRON0769-007 12/01/2012

BATH, BOYD, CARTER, ELLIOTT, GREENUP, LEWIS, MONTGOMERY & ROWAN
CLARK (Eastern third, including townships of Bloomingdale,
Hunt, Indian Fields, Kiddville, Loglick, Rightangele & Thomson);
FLEMING (Townships of Beechburg, Colfax, Elizaville,
Flemingsburg, Flemingsburg Junction, Foxport, Grange City,
Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton,
Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains,
Ringos Mills, Tilton & Wallingford);
MASON (Eastern third, including Townships of Helena, Marshall,
Orangeburg, Plumville & Springdale);
NICHOLAS (Eastern eighth, including the Township of Moorefield
Sprout)

	Rates	Fringes
IRONWORKER.....	\$ 32.54	20.18

LABO0189-003 07/01/2014		

BATH, BOURBON, BOYD, BOYLE, BRACKEN, CARTER, CLARK, ELLIOTT,
FAYETTE, FLEMING, FRANKLIN, GALLATIN, GRANT, GREENUP, HARRISON,
JESSAMINE, LEWIS, MADISON, MASON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, ROBERTSON, ROWAN, SCOTT, & WOOLFORD COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 21.80	11.96
GROUP 2.....	\$ 22.05	11.96
GROUP 3.....	\$ 22.10	11.96
GROUP 4.....	\$ 22.70	11.96

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement
Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter
Tender; Cement Mason Tender; Cleaning of Machines;
Concrete; Demolition; Dredging; Environmental - Nuclear,
Radiation, Toxic & Hazardous Waste - Level D; Flagperson;
Grade Checker; Hand Digging & Hand Back Filling; Highway
Marker Placer; Landscaping, Mesh Handler & Placer; Puddler;
Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail
& Fence Installer; Signal Person; Sound Barrier Installer;
Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper;
Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer);
Brickmason Tender; Mortar Mixer Operator; Scaffold Builder;
Burner & Welder; Bushhammer; Chain Saw Operator; Concrete
Saw Operator; Deckhand Scow Man; Dry Cement Handler;
Environmental - Nuclear, Radiation, Toxic & Hazardous Waste
- Level C; Forklift Operator for Masonary; Form Setter;
Green Concrete Cutting; Hand Operated Grouter & Grinder
Machine Operator; Jackhammer; Pavement Breaker; Paving
Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven
Georgia Buggy & Wheel Barrow; Power Post Hole Digger;

Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind
Trencher; Sand Blaster; Concrete Chipper; Surface Grinder;
Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman;
Gunnite Operator & Mixer; Grout Pump Operator; Side Rail
Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free
Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher;
Environmental - Nuclear, Radiation, Toxic & Hazardous Waste
- Levels A & B; Miner & Driller (Free Air); Tunnel Blaster;
& Tunnel Mucker (Free Air); Directional & Horizontal
Boring; Air Track Drillers (All Types); Powdermen &
Blasters; Troxler & Concrete Tester if Laborer is Utilized

LABO0189-008 07/01/2014

ANDERSON, BULLITT, CARROLL, HARDIN, HENRY, JEFFERSON, LARUE,
MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE &
WASHINGTON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....\$	22.71	11.05
GROUP 2.....\$	22.96	11.05
GROUP 3.....\$	23.01	11.05
GROUP 4.....\$	23.61	11.05

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement
Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter
Tender; Cement Mason Tender; Cleaning of Machines;
Concrete; Demolition; Dredging; Environmental - Nuclear,
Radiation, Toxic & Hazardous Waste - Level D; Flagperson;
Grade Checker; Hand Digging & Hand Back Filling; Highway
Marker Placer; Landscaping, Mesh Handler & Placer; Puddler;
Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail
& Fence Installer; Signal Person; Sound Barrier Installer;
Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper;
Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer);
Brickmason Tender; Mortar Mixer Operator; Scaffold Builder;
Burner & Welder; Bushhammer; Chain Saw Operator; Concrete
Saw Operator; Deckhand Scow Man; Dry Cement Handler;
Environmental - Nuclear, Radiation, Toxic & Hazardous Waste
- Level C; Forklift Operator for Masonary; Form Setter;
Green Concrete Cutting; Hand Operated Grouter & Grinder
Machine Operator; Jackhammer; Pavement Breaker; Paving
Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven
Georgia Buggy & Wheel Barrow; Power Post Hole Digger;
Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind
Trencher; Sand Blaster; Concrete Chipper; Surface Grinder;
Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

LABO0189-009 07/01/2014

BRECKINRIDGE & GRAYSON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 22.66	11.10
GROUP 2.....	\$ 22.91	11.10
GROUP 3.....	\$ 22.96	11.10
GROUP 4.....	\$ 23.56	11.10

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushhammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste

- Levels A & B; Miner & Driller (Free Air); Tunnel Blaster;
 & Tunnel Mucker (Free Air); Directional & Horizontal
 Boring; Air Track Drillers (All Types); Powdermen &
 Blasters; Troxler & Concrete Tester if Laborer is Utilized

 PAIN0012-005 06/11/2005

BATH, BOURBON, BOYLE, CLARK, FAYETTE, FLEMING, FRANKLIN,
 HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
 ROBERTSON, SCOTT & WOODFORD COUNTIES:

	Rates	Fringes
PAINTER		
Bridge/Equipment Tender and/or Containment Builder..\$	18.90	5.90
Brush & Roller.....\$	21.30	5.90
Elevated Tanks; Steeplejack Work; Bridge &		
Lead Abatement.....\$	22.30	5.90
Sandblasting &		
Waterblasting.....\$	22.05	5.90
Spray.....\$	21.80	5.90

 PAIN0012-017 05/01/2014

BRACKEN, GALLATIN, GRANT, MASON & OWEN COUNTIES:

	Rates	Fringes
PAINTER (Heavy & Highway Bridges - Guardrails - Lightpoles - Striping)		
Bridge Equipment Tender and Containment Builder.....\$	20.73	8.71
Brush & Roller.....\$	23.39	8.71
Elevated Tanks; Steeplejack Work; Bridge &		
Lead Abatement.....\$	24.39	8.71
Sandblasting & Water		
Blasting.....\$	24.14	8.71
Spray.....\$	23.89	8.71

 PAIN0118-004 06/01/2014

ANDERSON, BRECKINRIDGE, BULLITT, CARROLL, GRAYSON, HARDIN,
 HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY,
 SPENCER, TRIMBLE & WASHINGTON COUNTIES:

	Rates	Fringes
PAINTER		
Brush & Roller.....\$	18.50	12.02
Spray, Sandblast, Power Tools, Waterblast & Steam		
Cleaning.....\$	19.00	12.02

PAIN1072-003 12/01/2013

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS and ROWAN COUNTIES

Rates Fringes

Painters:

Bridges; Locks; Dams;		
Tension Towers & Energized		
Substations.....	\$ 31.03	15.10
Power Generating Facilities.	\$ 27.79	15.10

PLUM0248-003 06/01/2014

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS & ROWAN COUNTIES:

Rates Fringes

Plumber and Steamfitter.....	\$ 33.00	18.95
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PLUM0392-007 06/01/2014

BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN & ROBERTSON COUNTIES:

Rates Fringes

Plumbers and Pipefitters.....	\$ 29.80	17.79
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PLUM0502-003 08/01/2013

BRECKINRIDGE, BULLITT, CARROLL (Western Half), FRANKLIN (Western three-fourths), GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES

Rates Fringes

PLUMBER.....	\$ 32.00	17.17
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SUKY2010-160 10/08/2001

Rates Fringes

Truck drivers:

GROUP 1.....	\$ 16.57	7.34
GROUP 2.....	\$ 16.68	7.34
GROUP 3.....	\$ 16.86	7.34
GROUP 4.....	\$ 16.96	7.34

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Mobile Batch Truck Tender

GROUP 2 - Greaser; Tire Changer; & Mechanic Tender

GROUP 3 - Single Axle Dump; Flatbed; Semi-trailer or Pole Trailer when used to pull building materials and equipment;

Tandem Axle Dump; Distributor; Mixer; & Truck Mechanic

GROUP 4 - Euclid & Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat; 5-Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Forklift when used to transport building materials; & Pavement Breaker

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

These rates are listed pursuant to the Kentucky Determination No. CR-14-III- HWY dated July 14, 2014.

No laborer, workman or mechanic shall be paid at a rate less than that of a Journeyman except those classified as bona fide apprentices.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

TO: EMPLOYERS/EMPLOYEES

PREVAILING WAGE SCHEDULE:

The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.

OVERTIME:

Overtime is to be paid after an employee works eight (8) hours a day or forty (40) hours a week, whichever gives the employee the greater wages. At least time and one-half the base rate is required for all overtime. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. Wage violations or questions should be directed to the designated Engineer or the undersigned.

Diana Castle Radcliffe, P.E.
Director, Division of Construction Procurement
Frankfort, Kentucky 40622

PART IV
INSURANCE

INSURANCE

The Contractor shall procure and maintain the following insurance in addition to the insurance required by law:

- 1) Commercial General Liability-Occurrence form – not less than \$2,000,000 General aggregate, \$2,000,000 Products & Completed Aggregate, \$1,000,000 Personal & Advertising, \$1,000,000 each occurrence.
- 2) Automobile Liability- \$1,000,000 per accident
- 3) Employers Liability:
 - a) \$100,000 Each Accident Bodily Injury
 - b) \$500,000 Policy limit Bodily Injury by Disease
 - c) \$100,000 Each Employee Bodily Injury by Disease
- 4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:
 - a) "policy contains no deductible clauses."
 - b) "policy contains _____ (amount) deductible property damage clause but company will pay claim and collect the deductible from the insured."
- 5) **KENTUCKY WORKMEN'S COMPENSATION INSURANCE.** The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

The cost of insurance is incidental to all contract items. All subcontractors must meet the same minimum insurance requirements.

PART V
BID ITEMS

PROPOSAL BID ITEMS

141269

Page 1 of 2

Report Date 9/3/14

Section: 0001 - LIGHTING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	FP	AMOUNT
0010	23514EC		TOPSOIL AND SEEDING OF TRENCHES	15,455.00	LF		\$	
0020	40000		SITE PREPARATION	1.00	LS		\$	
0030	40003		LOCKOUT-TAGOUT AND CC REGULATOR CAL PRO	1.00	LS		\$	
0040	40004		EX STK MTD EDGE LIGHT-REMOVED	51.00	EACH		\$	
0050	40053		CABLE TRENCH-18 IN MIN DEPTH	8,490.00	LF		\$	
0060	40089		ELECTRICAL CONDUIT (NON-ENCASED - 1 W - 2 IN C)	475.00	LF		\$	
0070	40095		SEEDING AND MULCHING	.50	ACRE		\$	
0080	40115		JUNCTION STRUCTURE L-867B CLASS1	4.00	EACH		\$	
0090	40116		2 UNIT L-867D PULLCAN PLAZA	6.00	EACH		\$	
0100	40117		ELEC DUCT BANK (CONC ENCASED - 2W - 2 IN C)	65.00	LF		\$	
0110	40117		ELEC DUCT BANK (NON-ENCASED - 2W - 2 IN C)	75.00	LF		\$	
0120	40118		LIGHTING REGULATOR (L-828, 4 KW)	1.00	EACH		\$	
0130	40118		LIGHTING REGULATOR (L-828, 2.5 KW)	1.00	EACH		\$	
0140	40119		NO.8 AWG (5KV, L-824C CABLE)	16,685.00	LF		\$	
0150	40120		NO.6 AWG (STR, 600V, TYPE XHHW, GROUND)	100.00	LF		\$	
0160	40120		NO.6 AWG (SOLID, BARE COUNTERPOISE WIRE)	8,675.00	LF		\$	
0170	40121		COUNTERPOISE TRENCH (8 IN MIN DEPTH)	7,335.00	LF		\$	
0180	40122		SEGMENTED CIRCLE MARKER (PAINTED)	1.00	EACH		\$	
0190	40123		LED INTERNAL LIGHT KIT (L-807)	1.00	EACH		\$	
0200	40124		WC SOCK AND LIGHT KIT (REMOVE EXISTING)	1.00	EACH		\$	
0210	40125		REMOVE POWER AND CONTROL RACK	2.00	EACH		\$	
0220	40126		TRANCLOSURE AND FOUNDATION IN PLACE	1.00	LS		\$	
0230	40127		TRANCLOSURE EQUIPMENT IN PLACE	1.00	LS		\$	
0240	40128		WIND SOCK (36 IN)	1.00	EACH		\$	
0250	40129		BEACON TIP-DOWN POLE AND FOUNDATION	1.00	EACH		\$	
0260	40130		ROTATING BEACON AND POLE (REMOVE)	1.00	EACH		\$	
0270	40131		AIRPORT ROTATING BEACON (L-801A)	1.00	EACH		\$	
0280	40132		PAPI SYSTEM (L-881)	1.00	EACH		\$	
0290	40132		PAPI SYSTEM (L-881 (L))	1.00	EACH		\$	
0300	40133		PAPI AIMING BAR (L-881)	1.00	EACH		\$	
0310	40134		REIL SYSTEM (L-849A (L), INSTALLED)	2.00	EACH		\$	

PROPOSAL BID ITEMS

141269

Page 2 of 2

Report Date 9/3/14

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	FP	AMOUNT
0320	40135		BASE MOUNTED 2-MOD SIGN (L-858 (L))	1.00	EACH		\$	
0330	40136		STAKE MOUNTED RUNWAY EDGE LIGHT (L-861 (L))	27.00	EACH		\$	
0340	40137		BASE MOUNTED RUNWAY EDGE LIGHT (L-861 (L))	5.00	EACH		\$	
0350	40138		STAKE MTD RWY THRESHOLD LIGHT (L-861E (L))	12.00	EACH		\$	
0360	40139		BASE MTD RWY THRESHOLD LIGHT (L-861E (L))	4.00	EACH		\$	
0370	40140		STAKE MTD TAXIWAY EDGE LIGHT (L-861T (L))	12.00	EACH		\$	
0380	40141		BASE MTD TAXIWAY EDGE LIGHT (L-861T (L))	2.00	EACH		\$	

Section: 0002 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	FP	AMOUNT
0390	02569		DEMOBILIZATION	1.00	LS		\$	