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NOTICE TO OFFERORS
NOTICE OF INVITATION OF BID
PRC RW 3R-21L RSA Improvements Project
PRC Project No. 2010DB003
FAA AIP NO. 3-04-0030-032 & -033
ADOT Project No. E1F52 and E2F97

ADDENDUM #3

November 23, 2011

TO ALL PROSPECTIVE OFFERORS RESPONDING TO INVITATION OF BID FOR THE CONSTRUCTION OF **RUNWAY 3R-21L RSA IMPROVEMENTS** AT THE PRESCOTT MUNICIPAL AIRPORT, as outlined in the aforementioned Invitation of Bids (NIB) published in the Prescott Daily Courier and the Arizona Republic on October 31, November 1, November 9, and November 10 of 2011 and available via the internet at www.prescott-az.gov/business/bids.

This addendum is issued to clarify the aforementioned NIB issued by the Prescott Municipal Airport (PRC).

I. Contract Documents

1. The attached pages B-5 and B-9 (**REVISED 11.23.11**) **SUPERSEDE** pages B-5 and B-9 contained in Division I – *BIDDING REQUIREMENTS AND AGREEMENT DOCUMENTS* of the Contract Documents, and must be completed and affixed in place and submitted with the Bid.

II. Contract Technical Specifications

1. Pages L-109-1 to L-109-7, of Division V – ELECTRICAL TECHNICAL SPECIFICATIONS of the Contract Documents; **REMOVE** in its entirety and **REPLACE** with attached pages L-109-1 to L-109-7, *Item L-109 Airfield Lighting Vault Equipment, (***REVISED 11.23.11**).

   Major changes include:

   a. The Unit Measurement in Payment Line Item L-109-5.3 *Modifications to ALCMS by Crouse Hinds* has changed to an Allowance unit.

   b. Requirements for Regulatory Supply Voltages have been clarified.

2. Pages L-852-1 to L-852-4, of Division V – ELECTRICAL TECHNICAL SPECIFICATIONS of the Contract Documents; **REMOVE** in its entirety and **REPLACE** with attached pages L-852-1 to L-852-4, *Item L-852 Flush Taxiway In-Pavement Lights, (***REVISED 11.23.11**).

   Major changes include:

   a. Requirements for Light fixture grounding have been clarified.

3. Pages L-858-1 to L-858-13, of Division V – ELECTRICAL TECHNICAL SPECIFICATIONS of the Contract Documents; **REMOVE** in its entirety and **REPLACE** with attached pages L-858-1 to L-858-13, *Item L-858 Airport Guidance Lighting System (Signage),* (**REVISED 11.23.11**).

   Major changes include:

   a. Minimum rated operating lamp life requirements when operating at the highest intensity have been clarified.
   b. Required wind loads capacities for guidance signs have been clarified.
   c. Multiple Module Signs shall not be equipped with a lamp bypass circuit.

III. Construction Plan Sheets

1. Plan Sheets G2.4, G2.7, and G2.8 (sheets 10, 13, and 14 of 139 respectively); **ADD** the following Reference Note:

   "Based on asphalt temperature restrictions, the Contractor may install temporary pavement markings at the locations where the storm drain crosses airfield pavement to reduce the total amount of closure time or to meet the scheduled closure. Permanent Pavement Markings must be installed at a later date, and must be coordinated with and approved by the Airport prior to installation."

2. Plan Sheet C2.1 (sheet 26 of 139), reference Construction Note 3; **REVISE** Construction Note 3 which currently reads "YIELD TO AIRCRAFT VEHICLE SIGN SEE DETAIL 7, SHEET C3.3" to read the following:

   *"YIELD TO AIRCRAFT VEHICLE SIGN SEE **DETAIL 4**, SHEET C3.3"*

3. Plan Sheet C3.3, (sheet 35 of 139), reference the Detail 4, YIELD TO AIRCRAFT SIGN, specifically the bottom left dimension of the detail which currently reads " 11" " (eleven inches); **DELETE** the number "11" and **REPLACE** with the following:

   "6"

4. Plan Sheet C4.2 (sheet 26 of 139), reference Construction Note 5; **REVISE** Construction Note 5 to include the following:

   "20" Grate, 18" INSIDE DIMENSION"

Registered Professional Engineer (Civil)
CERTIFICATE NO.
24433
KENNETH L.
SNYDER
Date Signed 11.23.11
ARIZONA, U.S.A.
Expires 06/30/13

By:
PRESCOTT MUNICIPAL AIRPORT
Benjamin Vardiman, ACE Airport Manager

CONTRACTOR NAME: _____

RUNWAY 3R-21L RSA IMPROVEMENTS – SCHEDULE I						
LINE NO.	ITEM NO.	DESCRIPTION	APPROX. QTY.	UNIT	UNIT PRICE	AMOUNT
		CIVIL				
49	P-401-8.1	Bituminous Surface Course (3/4")	13,048	TON		
50	P-405-7.1	Bituminous Surface Course (MAG 3/4")	10,033	TON		
51	P-602-5.1	Bituminous Prime Coat (Contingent Bid Item)	47	TON		
52	P-603-5.1	Bituminous Tack Coat	20	TON		
53	P-620-5.1	Permanent Pavement Marking (Yellow)	**23,611**	SF		
54	P-620-5.2	Permanent Pavement Marking (White)	102,663	SF		
55	P-620-5.3	Permanent Pavement Marking (Green)	53,477	SF		
56	P-620-5.4	ILS Holding Positioning Marking	385	LF		
57	P-620-5.5	Surface Painted Holding Position Sign	21	EA		
58	P-620-5.6	Taxiway Shoulder Marking	19	EA		
59	P-620-5.7	Temporary Pavement Marking	**36,959**	SF		
60	D-701-5.1	12" SRMP Storm Drain Pipe	10	LF		
61	D-701-5.2	18" SRMP Storm Drain Pipe	1,078	LF		
62	D-701-5.3	24" SRMP Storm Drain Pipe	629	LF		
63	D-701-5.4	30" SRMP Storm Drain Pipe	14	LF		
64	D-701-5.5	36" SRMP Storm Drain Pipe	1,505	LF		
65	D-701-5.6	42" SRMP Storm Drain Pipe	275	LF		
66	D-701-5.7	48" SRMP Storm Drain Pipe	606	LF		
67	D-701-5.8	54" SRMP Storm Drain Pipe	113	LF		
68	D-701-5.9	60" SRMP Storm Drain Pipe	842	LF		
69	D-701-5.10	66" SRMP Storm Drain Pipe	1,786	LF		
70	D-701-5.11	72" SRMP Storm Drain Pipe	1,373	LF		
71	D-701-5.12	78" SRMP Storm Drain Pipe	1,572	LF		
72	D-701-5.13	6" HDPE Storm Drain Pipe	104	LF		
73	D-751-5.1	Concrete Catch Basin with Aircraft Traffic Rated Grate with Bolt-Down Lid (MAG Std Det 535 with Neenah Model # R-3475 or Approved Equal)	1	EA		

CONTRACTOR NAME: _____

RUNWAY 3R-21L RSA IMPROVEMENTS – SCHEDULE I						
LINE NO.	ITEM NO.	DESCRIPTION	APPROX. QTY.	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL				
132	L-100-5.5	Remove and salvage taxiway edge light and isolation transformer, demo base can	79	EA		
133	L-100-5.6	Remove and salvage runway edge light and isolation transformer, demo base can	4	EA		
134	L-100-5.7	Remove and salvage runway end light and isolation transformer, demo base can	16	EA		
135	L-100-5.8	Remove and salvage existing Runway End Identification Light (REIL)	4	EA		
136	L-100-5.9	Remove and salvage existing Precision Approach Path Indicator (PAPI)	1	LS		
137	L-100-5.10	Remove and salvage 100A metered pedestal	2	EA		
138	L-100-5.11	Remove and salvage existing airfield guidance sign and sign base	17	EA		
139	L-100-5.12	Remove and salvage existing airfield guidance sign, sign base to remain	1	EA		
140	L-100-5.13	Remove and salvage existing handhole	13	EA		
141	L-100-5.14	Remove and salvage existing wind cone	1	EA		
142	L-100-5.15	Remove and salvage existing L-853 taxiway marker	28	EA		
143	L-100-5.16	Excavate and remove existing ductbank	8,945	LF		
144	L-100-5.17	Remove existing conductor, conduit to remain	3,515	LF		
145	L-100-5.18	Remove and salvage existing constant current regulator	3	EA		
146	L-100-5.19	Flashing Alert Sign System, complete and tested	1	LS		
147	L-100a-2.1	Photometric Testing	1	LS		
148	L-108-5.1	L-824, Type C, 1/C #8 AWG, 5kV Cable	15,600	LF		
149	L-108-5.2	L-824, Type C, 2/C #8 AWG, 5kV Cable	14,100	LF		
150	L-109-5.1	New 4kW Ferroresonant Constant Current Regulator, installed and tested	1	EA		
151	L-109-5.2	New 15kW Ferroresonant Constant Current Regulator, installed and tested	1	EA		
152	L-109-5.3	Modifications to ALCMS by Crouse Hinds	1	**ALLOW**	**$10,000**	**$10,000**
153	L-110-5.1	Single-way, (1) - 2" Conduit, Slurry Encased	8,335	LF		
154	L-110-5.2	Single-way, (1) - 2" Conduit, Concrete Encased	3,610	LF		

SECTION L-109 AIRFIELD LIGHTING VAULT EQUIPMENT

DESCRIPTION

109-1.1 GENERAL. This work shall include the furnishing and installing new Constant Current Regulators; 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 Owner.

109-1.2 RELATED DOCUMENTS. The General Provisions of the Contract, including General and Special Conditions, apply to work specified in this Item.

109-1.3 SHOP DRAWINGS AND MATERIAL LISTS. Prior to the installation of any material and equipment and within 30 days of contract award, the Contractor shall submit to the Owner for approval six (6) copies of manufacturers' brochures containing complete dimensional and performance characteristics, wiring diagrams, installation and operation instructions, etc., for the following equipment:

a. Constant current regulators and appurtenances.
b. Equipment cabinets and appurtenances.
c. Control and monitoring cables.

In addition to the above specific items, a materials list shall be submitted listing each specification paragraph number.

The submittal shall be complete and made in one submission in booklet form with hardbound cover. Partial submissions will not be reviewed or considered.

EQUIPMENT AND MATERIALS

109-2.1 GENERAL.

a. Airport lighting equipment and materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20591, and shall be listed in Advisory Circular 150/5345-53c, Airport Lighting Equipment Certification Program.

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

109-2.2 PLASTIC CONDUIT. Plastic conduit shall not be used in the vault.

109-2.3 RIGID STEEL CONDUIT. Rigid steel conduit and fittings shall be in accordance with Fed. Spec. WW-C-581.

109-2.4 GROUNDING. All metallic elements contained in the vault shall be grounded to the building grounding system per Item L-100.

109-2.5 FAA-APPROVED EQUIPMENT. Certain items of airport lighting equipment installed in vaults are covered by individual FAA equipment specifications. The specification is listed below:

AC 150/5345-10F Specification Constant Current Regulator and Regulator Monitors.

(1) Constant Current Regulators. Constant current regulators shall be dry type, air cooled, L-828, designed to supply three-precision output current levels (6.6 amp maximum) to power series lighting circuits on airport runways and taxiways.

The regulators shall use solid-state circuitry to accurately regulate the output current from the phase-linear power transformer to within +/-3% of the preset current level from no load to full load and with input voltage variations of -5% to +10% of nominal (-40° to +55°C). The nominal output current levels shall be maintained even when 50% of the isolation transformers in the series lighting circuit have open secondaries.

Brightness-step selection shall be either by manual operation of the rotary control switch or push buttons on the regulator's front panel or by 48 V ac or 120 V ac remote control signals from a distant location.

Efficient operation (which results in high primary power factor) at low loads shall be ensured by a half-power tap on the output winding of the main transformer. Regulator supply voltages shall be 240 V, 1 phase, 60 Hz and set at the factory according to user requirements.

Protective circuitry shall automatically de-energize the regulator when an over-current or open-circuit is sensed in the series lighting circuit. The regulators shall be connected directly to a load-switching device (such as an L-847 switching panel) without causing regulator malfunction or damage to the series lighting circuit. The regulators shall be shipped ready for use and can be floor mounted or mounted on a rack or shelf.

(2) Other features and characteristics shall include:

a. Primary contactor shall never open or close under load.

b. LED indicators for open-circuit, over-current, W-VA and system-in-operation.

c. Remote input shall have 1,000 V ac surge withstand capability.

d. Built-in true rms-reading ammeter (10 A maximum scale.)

e. Minimum power factor of 0.90 (at full load, using proper tap.)

f. On/off switching capability under any load.

g. Over-current, open-circuit, under voltage, transient protection from lightning (25,000 amp surge) and other sources on output lines and remote input lines.

h. Input lightning protection assemblies.

i. Output current surge limitation--protects series incandescent lamps.

j. After a supply power loss, operation shall resume within 5 seconds after input power is restored at preset brightness level.

k. Pressure-type terminal blocks for connections of external remote control wiring.

l. The regulator shall use no solid-state components directly in the output (series) circuit and shall not be susceptible to extraneous signals, which can affect solid-state design CCRs.

m. The regulators shall be designed not to cause any electromagnetic interference, which can affect the operation of other airport equipment.

n. Automatic shutdown if supply voltage is ±15% of optimum.

o. Automatic shutdown if series circuit is disconnected.

p. Regulators shall have full self-diagnostic capabilities.

q. Regulator shall provide 120V power to power the existing Crouse-Hinds Digitrac unit.

109-2.6 OTHER ELECTRICAL EQUIPMENT. 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 (IEEE) or the National Electrical Manufacturers Association (NEMA). 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 specification and plans.

109-2.7 WIRE. Wire in conduit rated up to 5,000 volts shall conform to Advisory Circular 150/5345-7e, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits, for XLP-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 specification.

a. Control Circuits. Wire shall be not less than No. 12 AWG and shall be insulated for 600 volts. Multiple pair telephone-grade communication/control cables for installation in ducts, conduits and cable trays shall be No. 19 AWG Aerial and Duct Telephone Cable conforming to U.S. Department of Agriculture, Rural Electrification Administration (REA) Specification PE-22.

b. Power Circuits.

(1) 600 Volts Maximum**.** Wire shall have gauge size shown on plans and be insulated for at least 600 volts.

(2) 5,000 Volts Maximum**.** Wire shall be No. 8 AWG and insulated for at least 5,000 volts and shall conform to the requirements of Item L-108.

INSTALLATION OF EQUIPMENT IN VAULT

109-3.1 GENERAL. The Contractor shall furnish, install, connect, and test all Constant Current Regulators.

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

109-3.2 SYSTEM TESTING. Test all lighting and control systems per applicable FAA A/C's and directives. Notify Owner 48 hours prior to performing tests.

109-3.3 CONSTANT CURRENT REGULATORS.

a. Visual Examination. Each constant current regulator shall be visually examined to insure that porcelain bushings are not cracked, no shipping damage has occurred, internal and external connections are correct, switches and relays operate freely and are not tied or blocked, fuses (if required) are correct. The instructions on the plates attached to the regulators shall be accomplished. After examination and tests are completed, replace all covers tightly.

b. Electric Tests. The supply voltage and input tap shall be checked to see that they correspond. With the load disconnected, the regulator shall be energized and the open circuit protector observed to see that it de-energizes the regulator within 3 seconds. After testing the circuits for open connections and grounds, and after determining that all lamps are good and in place, the circuit load shall be applied to the regulator and the voltage and current measured simultaneously on all brightness taps. The true RMS voltmeter and ammeter shall have an accuracy of plus or minus one percent. Readings shall be recorded and shall be made during the day and night in order to obtain the average supply voltage. The output current on each brightness tap shall be within plus or minus 2 percent of the nameplate values after any necessary correction is made in the supply voltage. If the output current on tap 3 deviates from the nameplate value by more than 2%, and the regulator is not overloaded, the internal adjustment shall be checked as described on the regulator instruction plate. Since the adjustment may be rather delicate, it is recommended that a deviation of up to plus or minus 5% be allowed on taps 1 to 4 before attempting to readjust the regulator.

109-3.4 ANCHOR BOLTS. Wall- or ceiling-mounted items shall be attached to the concrete or cement masonry unit (CMU) wall or ceiling with galvanized bolts of not less than 3/8-inch diameter engaging metal expansion shields or anchors with a minimum of 3 inches of embedment.

109-3.5 WIRING AND CONNECTIONS. The Contractor shall make all necessary electrical connections in the vault in accordance with the wiring diagrams furnished. 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.

109-3.6 MARKING AND LABELING. All equipment, control wires, terminal blocks, etc., shall be tagged, marked or labeled as specified below:

a. Wire Identification**.** Also refer to Item L-100, Paragraph 100-3.6 for 5 kV and 600 V cable 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 nonferrous metal not less than 3/4-inch in diameter and not less than 1/32-inch thick. Identification markings designated in the plans shall be stamped on tags by means of small tool dies. Each tag shall be securely tied to the proper wire by a nonmetallic cord.

b. Labels. The Contractor shall provide engraved phenolic identifying labels on the cases of regulators at circuit breakers, and on distribution and control relay cases. The attachment method, colors, sizes, and letter and numeral type shall match the existing protocol. 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.

METHOD OF MEASUREMENT

109-4.1 REGULATORS. The quantity of constant current regulators (CCRs) to be paid for under this item shall consist of the installation of each new CCR and all work in place, to include conduit, conductor, and circuit breaker, as shown on the plans, and accepted as complete units.
The installation control and power cabling and cable terminations shall be incidental.

109-4.2 ALCMS MODIFICATIONS. The quantity of modifications to the ALCMS by Crouse Hinds to be paid for under this item shall include updates to the system to include; the new runway lighting, taxiway lighting, runway guard lights, airfield signage, and circuit changes, and any other system that is impacted by the project, as shown on the plans. This item shall also include changes to the graphics in the ALCMS to reflect the new runway and taxiway(s) layout, as shown on the plans. This item shall also include 4.0 hours of training to airport personnel on the reconfigurations and/or modifications made to the ALCMS.

BASIS OF PAYMENT

109-5.1 REGULATOR INSTALLATION. Payment will be made at the contract unit price for completed and accepted vault and 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. The unit price of each of these items shall also include the Contractor's overhead, profit and markup.

Payment will be made under:

Item L-109-5.1	New 4 kW Ferroresonant Constant Current Regulator, Installed and tested—per each
Item L-109-5.2	New 15 kW Ferroresonant Constant Current Regulator, Installed and tested—per each
Item L-109-5.3	Modifications to ALCMS by Crouse Hinds—per allowance

REFERENCED PUBLICATIONS

109-6.1 FEDERAL SPECIFICATIONS REFERENCED IN ITEM L-109.

Number	Title
J-C-30	Cable and Wire, Electrical (Power, Fixed Installation)
WW-C-581	Conduit, Metal, Rigid; and Coupling, Elbow and Nipple, Electrical Conduit: Zinc-Coated

109-6.2 FAA SPECIFICATIONS REFERENCED IN ITEM L-109.

Number	Title
AC 150/5345-7E	Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits
AC 150/5345-10F	Specification for Constant Current Regulators and Regulator Monitors

109-6.3 AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI) SPECIFICATION REFERENCED IN ITEM L-109.

Number	Title
ANSI B16.3-2006	Malleable Iron Threaded Fittings, Class 150 and 300

109-6.4 NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) PUBLICATION REFERENCED IN ITEM L-109.

Number	Title
BU1-2002	Busways

END OF ITEM l-109

ITEM L-852 FLUSH TAXIWAY IN-PAVEMENT LIGHTS

DESCRIPTION

852-1.1 RELATED DOCUMENTS. The General Provisions of the Contract, including General and Special Conditions apply to work specified in this Item.

852-1.2 GENERAL. This Item shall consist of installing new L-852T and LED L-852T taxiway flush in-pavement lights in accordance with these specifications and at the locations shown on the plans.

This Item shall consist of the following for installations in proposed pavements:

a. Furnishing and installing L-852T and LED L-852T taxiway edge lights, bases and isolation transformers in accordance with these specifications and at the locations shown on the plans.

A number of spare fixtures, isolation transformers and cable connector kits shall be provided in shipping packaging and delivered to the Owner at the Airport maintenance shop.

This item involves the following work:

a. Install all new conduit/duct system (per Item L-110) and make connections into new handholes (per Item L-127) and install bottom portion of L-868 bases as shown on the plans. Encase the base section with P-610 concrete according to the detail shown on the plans.

b. Install temporary "mud" covers on bases prior to paving operations.

c. Upon completion of paving, core drill pavement and install Type L-868 base extensions at indicated locations. Encase the L-868 bases with P-610 concrete according to detail shown on plans. Place sealant as shown on the plans.

d. Install all new 5 kV lighting cable between lights for entire circuit (per Item L-108).

e. After paving and area grading have been completed, install and connect the fixtures.

852-1.3 LOCATION/ELEVATION. Lights shall be spaced as indicated on the drawings.

Elevation of in-pavement bases shall be set in accordance with the civil grading and drainage drawings. The base shall be set so that the light fixture flange shall be within +0/-1/8 inch of the finished pavement, including extension rings. The +/- 0.04 foot tolerance for the finished surface of the concrete shall be considered when installing the base cans so that the light fixture flange may be placed within the above tolerance using adjustment spacer rings as necessary.

852-1.4 LIGHT BASE AND LIGHT INSTALLATION ALIGNMENT TOOL. The tolerance requirements for location, elevation, and orientation of all light fixtures is of critical importance and must be maintained. In order to do so the light bases and lights shall be installed using an installation and alignment tool. This tool shall be capable of achieving the final alignment specified and shall be of sufficient strength to support the

light base during placement and compaction of concrete around the base. The Contractor shall submit to the Engineer the proposed installation and alignment tool for approval. Upon approval, the Contractor shall procure a sufficient number of these tools to use in the installation process. No light base or light shall be installed without using an approved installation and alignment tool.

852-1.5 FAA ADVISORY CIRCULARS. Additional details pertaining to the specific elements covered in this Item are contained in the following FAA Advisory Circulars:

AC 150/5345-26C	Specification for L-823 Plug and Receptacle, Cable Connections
AC 150/5345-42F	Specification for Light Base and Transformer Housings, Junction Boxes and Accessories
AC 150/5345-46D	Specification for Runway and Taxiway Light Fixtures.
AC 150/5345-47B	Isolation Transformers for Airport Lighting Systems.

852-1.6 SHOP DRAWINGS AND MATERIAL LISTS. Prior to the installation of any material and equipment and within 30 days of contract award, the Contractor shall submit to the Owner for approval six (6) copies of manufacturers' brochures containing complete dimensional and performance characteristics, wiring diagrams, installation and operation instructions, etc., for the following equipment:

a. L-852T (Omni-directional)
b. L-852T LED (Omni-directional)
c. L-868 base.
d. L-830 Isolation transformer.
e. L-823 Cable Connections.
f. Installation tools and details.
g. Sealant.
h. P-606 Grout.

In addition to the above specific items, a materials list shall be submitted listing each specification paragraph number and stating whether the materials proposed are as specified or are substitutions. If the item is a substitute item, a complete submittal as described in the above paragraph shall be provided for that item.

The submittal shall be complete and made in one submission in booklet form with hardbound cover. Partial submissions will not be reviewed or considered.

852-1.7 TESTING. Refer to Item L-100a

MATERIALS

852-2.1 GENERAL. Airport lighting equipment and materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20590. All in-pavement lights shall meet the requirements of AC 150/5345-46D, and be suitable for use with 6.6

amp secondary circuits and mount on a 12 inch diameter (Size B) L-868 base can. The reveal above the adjacent pavement surface shall not exceed 0.25".

852-2.2 FLUSH IN-PAVEMENT TAXIWAY CENTERLINE LIGHT FIXTURES. Type LED L-852T, meeting the requirements of FAA AC 150/5345-46D. Lights shall have blue optical system filter as indicated on the plans. Provide with grounding lug. Bond #6 AWG bare copper ground bas can ground lug and bolt to fixture base plate ground lug.

852-2.3 FLUSH IN-PAVEMENT TAXIWAY CENTERLINE LIGHT FIXTURES. Type L-852T, meeting the requirements of FAA AC 150/5345-46D. Lights shall have blue optical system filter as indicated on the plans. Provide with grounding lug. Bond #6 AWG bare copper ground bas can ground lug and bolt to fixture base plate ground lug.

852-2.4 LIGHT BASE. Type L-868; size B, 24-inch-deep, two-piece meeting the requirements of FAA AC 150/5345-42F. All L-852 type fixtures shall be installed on flange rings with spacer rings as required to adjust the fixture appropriate to pavement.

852-2.5 ISOLATION TRANSFORMER. Type L-830, 65 watts, or as required per manufacturer of light, 6.6A 60 hertz, meeting the requirements of FAA AC 150/5345-47C.

852-2.6 HARDWARE. All bolts, nuts, washers and lock washers shall be stainless steel. Install using high temperature anti-seize compound.

852-2.7 CABLE. See Item L-108. Type L-824C, 5 kV, and 600 V, meeting the requirements of FAA AC 150/5345-7E.

852-2.8 PLUG AND RECEPTACLE CABLE CONNECTORS. Type I, Class A, meeting the requirements of FAA AC 150/5345-26D.

852-2.9 CONCRETE. Concrete for backfill shall conform to the requirements of Item P-610 Structural Portland Portland_Cement Concrete.

852-2.10 SEALANT. Shall meet the requirements of ASTM D 3405, Joint Sealants, hot poured for bituminous pavements, and applicable section(s) of FAA Specification Item P-605. Each lot or batch of sealing compound shall be delivered to the job site in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, and the safe heating temperature and shall be accompanied by the manufacturer's certification stating that the compound meets the requirements of this specification.

852-2.11 GROUT. Filling/sealing grout used to encase in-pavement transformer/light bases shall meet FAA Specification P-606 and shall be a two-component liquid, rapid curing, stress-relieved epoxy adhesive for use in waterproofing nonmoving joints in portland cement concrete pavement.

Prior to application the exposed surfaces of the hole-saw cut shall be sand blasted to a clean, rough surface finish to assure adequate bond between the grout and the portland cement concrete pavement.

METHOD OF MEASUREMENT

852-3.1 FLUSH TAXIWAY EDGE LIGHTS. The quantity to be measured shall be for the installation of the new flush in-pavement taxiway edge light fixtures, light bases, isolation transformers, connectors and lighting cable in accordance with the plans and specifications and as accepted by the Owner.

BASIS OF PAYMENT

852-4.1 FLUSH TAXIWAY EDGE LIGHTS. Payment for the installation of new flush taxiway edge lights shall be made at the contract unit price for installing said lights. The unit price shall be full compensation for furnishing all materials and for all preparation, erection and installation of these materials to complete the item. The unit price of each of these items shall also include the Contractor's overhead, profit and markup.

Payment will be made under:

Item L-852-4.1	New L-852T Taxiway Edge Light on New L-868 Base Can--per each
Item L-852-4.2	New LED L-852T Taxiway Edge Light on New L-868 Base Can--per each

REFERENCED PUBLICATIONS

852-5.1 FAA SPECIFICATIONS REFERENCED IN L-852.

AC 150/5345-26D	Specification for L-823 Plug and Receptacle, Cable Connections
AC 150/5345-42F	Specification for Light Base and Transformer Housings, Junction Boxes and Accessories
AC 150/5345-46D	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47C	Isolation Transformers for Airport Lighting Systems

END OF ITEM L-852

ITEM L-858 AIRPORT GUIDANCE LIGHTING SYSTEMS (SIGNAGE)

DESCRIPTION

858-1.1 RELATED DOCUMENTS. The General Provisions of the Contract, including General and Special Conditions apply to work specified in this Item.

858-1.2 GENERAL. This Item shall consist of internally lighted airport taxiway guidance signage furnished and installed in accordance with this specification, the referenced specifications, the manufacturer's recommendations, and the applicable codes, standards and Advisory Circulars. The signs shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RE, including concrete sign base and transformer enclosure with cover. This Item also shall include the electrical adjustment of multi-step signs per sign manufacturer's installation requirements. Also included are temporary unlighted taxiway guidance signs, to be furnished and installed if lighted signs are not available when required.

858-1.3 FAA ADVISORY CIRCULARS AND STANDARDS.

a. Taxiway signs and related materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, DC 20591, and shall be certified by an approved laboratory such as ETL as conforming with applicable FAA standards and requirements, or shall be verified as exceeding FAA standards as required by these specifications.

b. All other equipment and material covered by other referenced specifications shall be subjected to acceptance through manufacturer's certification of compliance with the applicable specification. All electrical materials and equipment for which there is a nationally recognized standard shall bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories, Inc., Factory Mutual, ETL, or approved equal.

c. The following documents, of the issue in effect on date of application for qualification, are applicable to the extent specified:

Federal Aviation Administration (FAA) Advisory Circulars.

AC 150/5340-18F	Standards for Airport Sign Systems.
AC 150/5345-26D	FAA Specification for L-823 Plug and Receptacle, Cable Connections.
AC 150/5345-42F	Specification for Light Base and Transformer Housings, Junction Boxes and Accessories.
AC 150/5345-44J	Specification for Taxiway and Runway Signs.

AC 150/5345-47C	Specification for Series to Series Isolation Transformers for Airport Lighting Systems.

Federal Specification

L-S-300	Sheeting and Tape -- Reflective; Non-exposed Lens, Adhesive Backing

Military Standard

MIL-STD-810	Environmental Test Methods

American Society for Testing and Materials (ASTM)

ASTM D 4956	Specification for Retro reflective Sheeting for Traffic Control

National Fire Protection Association (NFPA)

NFPA 70	National Electrical Code

(Copies of FAA Advisory Circulars may be obtained from the Department of Transportation, Publications Section, M-494.3, Washington, DC 20590).

(Copies of Federal Specifications may be obtained from General Services Administration offices in Washington, DC, Atlanta, Boston, Denver, Chicago, Kansas City, New York, San Francisco, and Seattle).

(Copies of Military Standards may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, PA 19120, Attention: Code CDS).

The signs shall meet or exceed FAA requirements when subjected to the qualification tests as described in the latest edition of AC 150/5345-44.

The installation of Underground Cable for Airports, Airport Underground Electrical Duct, and Airport Lighting Systems that are not a part of this item are covered under the separate respective items of these specifications.

858-1.4 SHOP DRAWINGS AND MATERIAL LISTS. Prior to the installation of any material and equipment and within 30 days of contract award, the Contractor shall submit to the Owner for approval six (6) copies of manufacturers' brochures containing complete dimensional and performance characteristics, installation and operation instructions, etc., for the following equipment: This list shall include the name of each item, the Federal Aviation Administration specification number, the manufacture's name, the manufacturer's catalog number, and the size, type and/or rating of each item.

a. Shop drawings shall be submitted showing: installation requirements (i.e., anchor bolt location, etc.); sign assembly, including all fabrication assembly and internal and external wiring diagrams; message layout for each sign; and tabulation of total volt-ampere (VA) for each sign at highest intensity step.

b. Catalog cuts shall be submitted showing: sign and sign base (features and accessories,

installation details); results of tests performed by an independent laboratory testing source in accordance with AC 150/5345-44 addressing visual examination, wind load and frangibility load tests, photometric test results with luminance maps, environmental tests, production tests; load data for all brightness steps, as measured from the primary side of the isolation transformer, and power factor; lamp life.

c. Sign schedules including sign numbers and face panel descriptions.

d. Steel L-867 base and steel cover (sign base and transformers enclosure).

e. Dimensioned and detailed drawings on poured continuous sign base for installation

f. Manufacturer's statement of warrantee (see Paragraph 858-2.8b)

In addition to the above specific items, a materials list shall be submitted listing each specification paragraph number and stating whether the materials proposed are as specified or are substitutions. If the item is a substitute item, a complete submittal as described in the above paragraph shall be provided for that item.

The submittal shall be complete and made in one submission in booklet form with hardbound cover. Partial submissions will not be reviewed or considered.

858-1.5 MATERIAL DELIVERY SCHEDULE AND REQUIREMENTS. All signs and associated materials (transformers and connecting cables, transformer housings, anchor bolts, floor flanges, breakable couplings, and incidental mounting hardware), for the project shall be procured under this contract in accordance with the material delivery directed by the RE. The following material distinction is made to define the material to be delivered:

a. Mounting Hardware. Mounting hardware shall include detailed installation shop drawings as prepared by the sign supplier and approved by the RE, transformer housings, anchor bolts and floor flange templates, and sign markers (blank).

b. Sign. Signs shall include the actual sign to be installed, transformer and connecting cables, floor flanges, breakable couplings, tethers, and all other incidentals necessary to provide a complete and operable sign.

EQUIPMENT AND MATERIALS

858-2.1 GENERAL. Taxiway guidance signs, hereinafter referred to as "Signs," shall be retro reflective and shall be the internally illuminated, non-fiber optics type, conforming to AC 150/5345-44, other referenced publications, and to the requirements of this Section. In the event of conflict, the more stringent of these shall apply. The signs shall have a record of having operated successfully for a minimum period of one year at an airport located in the continental United States. The sign manufacturer shall have minimum five years experience in the manufacture of lighted airfield signs to FAA requirements.

Airport signage equipment and materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20591, and shall be listed in Advisory Circular 150/5345-53C, Airport Lighting Equipment Certification Program.

All other equipment and materials covered by other referenced specifications shall be subject to acceptance through the manufacturer's certification of compliance with the applicable specifications and subject to Owner's approval.

Lists of the equipment and materials required for a particular system are contained in the applicable Advisory Circulars.

858-2.2 SIGN CLASSIFICATION. The classification of each sign shall be as shown on the Construction Drawings and as specified below:

a. Types. Signs of the following types are included:

(1) Type L-858Y. Direction, Destination, and Boundary Sign. Black legend on a yellow background.

(2) Type L-858L. Taxiway Location Sign. Yellow legend and border on a black background.

(3) Type L-858R. Mandatory Instruction Sign. White Legend on a red background.

b. Sizes. Signs of the following sizes are included:

(1) Size 1. 18-inch Legend Panel with a 12-inch Legend.

(2) Size 2. 24-inch Legend Panel with a 15-inch Legend.

c. Styles. Signs of the following styles are included:

(1) Style 2. Powered from a series Lighting Circuit of 4.8 to 6.6 ampers (A).

d. Classes. Lighted signs of the following classes are included:

(1) Class 1. Operation from -4 degrees Fahrenheit (F) (-20 degrees Celsius (C)) to131 degrees F (55 degrees C) environment.

858-2.3 EQUIPMENT TO BE SUPPLIED. The sign shall be complete in accordance with all specification requirements and shall include mounting legs and hardware, an electrical disconnect, any required series circuit adapter unit, and an instruction booklet.

858-2.4 ENVIRONMENTAL REQUIREMENT. The signs, including all required components, shall be designed for continuous outdoor use under an ambient temperature range from -20 degrees C to +55 degrees C. The signs shall be capable of withstanding wind velocities up to 200 mph and exposure to driving rains.

858-2.5 TAXIWAY GUIDNACE SIGN CONSTRUCTION FEATURES.

a. Sign Construction.

(1) Signs shall be constructed of light weight, nonferrous materials, and shall be designed for installation on a concrete pad foundation. All required mounting hardware, except anchor bolts, shall be supplied with the sign. Loose parts shall be tethered to, or otherwise prevented from blowing away from, the installed sign enclosure. All screws or latches shall be the captive type, and shall be easy to open and close.

(2) Mounting legs for each sign shall have frangible points located 2 inches or less, above the concrete pad foundation. The frangible points shall withstand wind loads due to jet blast of 200 mph, as simulated by an applied static load of 0.9 psi, but shall break before reaching an applied static load over the legend panel of 1.3 psi. Legend panels and panel supports shall withstand, at a minimum, the pressure at which the frangible points break. A production sample of two-module sign of proposed signs shall be tested using an inflatable air bag to verify conformance to the strength requirements herein and FAA AC 150/5345-44. There shall be no permanent deformation to the sign body or face as a result of the test. The strength tests shall be certified by the manufacturer.

(3) Taxiway guidance signs shall be of a modular design, which shall consist of two (2) lamps per sign module. Multiple module signs shall **NOT** be equipped with a lamp bypass circuit.

(4) Signs shall have legends on one or both sides, as required by the Drawings. The sign face shall comply with paragraph 126-3.7. The sign face assembly shall have gasketing between the sign material and housing.

(6) The color of the sign enclosure shall be black. Reflective material shall be applied to the sides of the sign (and back if blank) such that the sign will be visible to vehicles during the hours of darkness.

(7) The sign shall be completely sealed against sand and dust so that all internal surfaces will remain bright and clean. The lamp(s) shall be easily changeable, and ballast and all electrical control equipment shall be easily accessible in enclosures mounted to the exterior of the sign structure.

(8) When joining two signs for one array, provide a tree unit and rib sections of the correct color added.

b. Tether. Each sign shall be supplied with a minimum of two tethers, with not less than two tethers per five sign legs, which can be secured to the sign enclosure. The tethers shall be installable such that each sign, when knocked down by a wind of greater than 200 mph, shall remain attached to the sign foundation. Tethers shall be 1/8” stainless steel aircraft cable and shall be secured to the sign enclosure and to a support leg base flange anchor bolt with lock nuts and large diameter washers.

c. Electrical Features.

(1) The signs shall be relampable without the use of tools. Loose parts shall be tethered to, or otherwise prevented from blowing away from, the installed sign enclosure. All screws and latches shall be the captive type.

(2) Power input from the lighting circuit shall be made through an isolation transformer conforming to AC 150/5345-47.

(3) Power input leads shall be at least two feet in length and shall allow for lead termination in a Type 1, Class A, Style 9 receptacle conforming to AC 150/5345-26.

(4) The signs shall have quartz type lamps. The minimum power factor for signs shall be 0.9 across all brightness steps with quartz type lamps. Signs shall be "Low VA-High Power Factor" type. The maximum VA per sign shall be as follows (an equivalent sign length is shown in parenthesis for signs that are fabricated continuous over the length rather than having modular design):

Size 1 -

1-module sign	119VA
2-module sign	205VA
3-module sign	212VA
4-module sign	241VA

Size 2 -

1-module sign	170VA
2-module sign	230VA
3-module sign	409VA
4-module sign	517VA

(5) All wiring shall conform to the requirements of NFPA 70. All wiring shall be color-coded and shall be clearly labeled. There shall be no exposed wiring.

(6) All electrical materials and equipment for which there is a nationally recognized standard shall bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories, Inc., Factory Mutual, or ETL.

d. Photometrics and Lamp Features.

(1) The ratio of the maximum reading of the light across the face of the signs to the minimum reading of the light output across the face of the signs shall not exceed the value of 5:1.

(2) Type R signs: The ratio of average luminance between message (white) and background (red) shall be not more than 10:1 and not less than 5:1.

(3) Manufacturer shall provide the minimum service life for the lamps in the signs when the sign is operational at its highest step.

(4) Manufacturer shall provide minimum time between failures (MTBF) for
- Lamps in the signs.
- Sign intensity control mechanisms

858-2.6 ELECTRICAL DISCONNECT.

a. All signs shall be equipped with a power input disconnect cable terminated with a Type II plug, conforming to the requirements of the latest edition of FAA AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors. The length of this cable shall permit the plug end to reach at least 6 inches below the top of the concrete pad on which the sign is mounted. A cable clamp or similar restraining device shall be provided in the sign to prevent strain on the cable terminal connections when the cable plug is pulled apart.

b. An external electrical disconnect switch shall be included in each sign assembly.
This switch, when activated, shall de-energize the sign for relamping purposes while maintaining continuity of the series lighting circuit.

858-2.7 SIGN SIZES. The heights of the signs shall be in accordance with the dimensions as follows:

Size	Legend Height (Inches)	Legend Panel Height (Inches)	Overall Mounting Height (Inches)
1	12	18	24-30
2	15	24	30-36

The lengths of the signs shall be determined by the message to be conveyed, but shall not exceed the maximum length specified by Table 1 of AC 150/5345-44.

858-2.8 SIGN FACES

a. The signs shall be either single face (message only on one side) or double face (messages on two sides). The spacing, stroke, shape of legend characters, numerals, symbols, border for Type L-858L sign faces, and message dividers shall be in accordance with FAA AC 150/5345-44.

b. The Contractor and Manufacturer shall provide a warranty for a minimum of three years against the delamination of the surface films from the face of the signs.

858-2.9 PERFORMANCE REQUIREMENTS.

a. Sign Operation.

(1) Signs shall be energized and operated at any incoming current value of the series lighting circuit without flickering.

(2) The luminance level and uniformity of the sign shall be maintained across all series lighting circuit current values, as measured from the primary side of the isolation transformer.

(3) Power input from the series lighting circuit shall be made through isolation transformers, properly rated, and conforming to AC 150/5345-47.

(4) Minimum rated operating lamp life, when sign is operated at the highest intensity step, shall not be less than 1,500 hours.

(5) The connection of multiple signs on a taxiway lighting circuit shall not adversely impact other circuit components, such as constant current regulator or isolation transformer.

b. Sign Luminance and Color.

(1) The internally illuminated background of the Type L-858Y sign and the legend of the Types L-858R and L858L signs shall have an average luminance from 10 to 30 footlamberts, with 16 to 30 footlamberts at the 2 highest intensity steps (white or yellow).

(2) The message of the sign shall be readily identifiable up to a distance of 800 feet when viewed during the day or when lighted at night. Uniformity shall be kept as defined in FAA AC 150/5345-44.

(3) The sign shall have a uniformity ratio no greater than 5:1 for luminance measured at any 3-inch grid on the sign for a specific color, and no more than 1.5:1 for luminance measured at any adjacent 3-inch grids.

(4) Contractor shall provide a three year warranty on the retro reflective material lamination process.

858-2.10 FINISH. External surfaces of the signs, excluding the mounting legs and face panel, shall be painted with a primer coat and a low luster, black finish coat. The surface color treatment of the nonmetallic surfaces shall be equal in quality to that obtained on metal surfaces.

858-2.11 NAMEPLATE. Each sign shall have a nameplate giving the Sign Name as shown on the Construction Drawings, Type, Size, Style, Class, manufacturer's name, address, catalog number, and lamp data, including type and rating. The nameplate on Style 2, 3, and 5 signs shall give the total maximum volt-amp load and power factor as seen from the primary of the isolation transformer. The total maximum volt-amp load indicated shall reflect the highest possible volt-amp loading on the regulator and shall include loading due to a "worst case" isolation transformer, and any required ballast and/or adaptor units. The nameplate shall be mounted to the exterior of the sign enclosure at the topside of the sign.

858-2.12 WORKMANSHIP. The equipment shall be fabricated in accordance with the highest quality workmanship. All wiring shall be neatly run and laced. All sharp edges and burrs shall be removed. Painted surfaces shall be free from runs, blotches, and scratches.

858-2.13 INSTRUCTION BOOKLET. Ten (10) copies of an instruction booklet shall be included with each order of signs, which shall include installation instructions, maintenance procedures (including operating voltage and point readings), and a complete parts list, including recommended spare parts list. It shall also describe the lamp wattage or current needed to maintain the luminance levels specified herein.

858-2.14 SIGN COVER. Sign covers shall be capable of fully covering the sign and withstanding the weather conditions and jet blast to which it may be subjected during its installation. The material shall be sufficiently heavy (similar to canvas) to completely obscure the sign message so that it cannot be read.

858-2.15 SPARES. New installations shall include 15 percent spare lamps, and other components recommended by the sign manufacturer and approved by the RE, which shall be furnished to airport maintenance.

858-2.16 CONDUIT. Rigid steel and EMT conduit and fittings shall conform to the requirements of Fed. Spec. WW-C-581. PVC conduit and fittings shall conform to the requirements of Fed. Spec. W-C-1094.

858-2.17 ISOLATING TRANSFORMER. An isolating transformer shall be provided with each signs and shall conform to the requirements of the applicable Advisory Circular. Provide with extended secondary connector cable kit. Transformers shall be minimum sized per manufacturer's requirements. Isolation transformer shall conform to the latest edition of FAA AC 150-5345-47, Isolation Transformers for Airport Lighting Systems. The isolation transformer shall be an integrated unit, with power input leads at least 24 inches in length - one lead terminating in a Type I, Class A, Style 2 plug and the other lead in a Type I, Class A, Style 9 receptacle, conforming to the latest edition of FAA AC 150-5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors.

858-2.18 CONCRETE. Concrete for bases shall conform to the requirements of Item P-610 Structural Portland Cement Concrete.

858-2.19 LIGHT BASE. Type L-867, galvanized steel, size B, one-piece, with steel cover plate meeting the requirements of FAA AC 15/5345-42F. Provide with grounding lug as shown on the drawings.

CONSTRUCTION METHODS

858-3.1 GENERAL. The installation and testing details for the systems shall be as specified in the applicable Advisory Circulars.

858-3.2 PHASING AND INTERRUPTIONS. The construction phasing and airfield operational requirements for this project may require that new signs are installed, tested, switched to OFF, and covered until directed by the RE to activate the signs. Activating the signs will be done as directed by the RE.

858-3.3 TEMPORARY UNLIGHTED SIGNS. If lighted signs are not available when required, temporary unlighted signs shall be provided and installed on the foundations for the associated permanent sign where required for aircraft operations. Sign legs with frangible points shall be fastened to the concrete foundation with drilled anchor bolts as required and as approved by the RE. When no longer required, signs shall be removed and any remaining holes in the concrete foundation shall be filled with grout. Temporary unlighted signs shall be salvaged when no longer required unless otherwise directed by the RE.

858-3.4 LOCATION/ELEVATION. The signs shall be installed at the locations indicated in the plans. Guidance signs shall be located where indicated, offset 55'-0" from edge of full-strength pavement unless otherwise noted. Longitudinal tolerance is +/1 10' -0" Foundation elevation shall be set at new grade +1/4" inch (min) to +2 inches (max) above finish pavement grade, as established on the civil grading and drainage drawings. Existing sign bases within the area of new shoulder construction, shall be adjusted so that the elevation of the base is +1/4" inch (min) to +2 inches (max) above finish pavement grade. In areas where the sign base can not be adjusted to the new elevations, and the grading slope can not be adjusted properly to obtain the correct elevation of the base, the base may be removed and replaced at the discretion of the Engineer.

858-3.5 TRANSFORMER. The transformer shall be installed in the L-867 base at location and position as indicated on the plans. The primary cable connections shall be made by use of the L-823 plug and receptacle cable connectors and with heat-shrinkable sleeves over the connectors.

858-3.6 HARDWARE. All bolts, nuts, washers and lock washers shall be stainless steel. Install using high temperature anti-seize compound.

858-3.7 CABLE, CONNECTOR, AND ISOLATION TRANSFORMERS. The primary and secondary cable leads of the transformers are supplied with factory-installed molded connectors. Visual inspection of these items during installation is very important. Minor cuts, bruises, or mishandling may result in progressive deterioration, which will eventually cause complete failure, but not until sometime after acceptance tests. During installation, these items shall be inspected for the following:

a. The mating surfaces of molded connectors are clean and dry when plugged together. If clean and dry inside, these high voltage connectors, with taping, form a connection equal or superior to a conventional high voltage splice. Conversely, if they are wet or dirty no amount of taping can produce a satisfactory connection. Two or three turns of tape should be used to hold the connector together and keep the parting line clean. Keeping the factory-installed caps in place until the final connection is made can ensure cleanliness of mating surfaces. The mating surfaces of uncapped connectors should not be laid down, touched, or breathed upon. If a connection must be broken, the connectors should be immediately capped.

b. The connectors are completely plugged together. After initial plugging, trapped air pressure may partially separate the plug and receptacle. If this happens, wait a few seconds and push them together again. Two or three turns of tape should be used to hold them in place.

c. The cables are not cut by shovels, kinked, crushed by vehicle wheels bruised by rocks, or damaged in any way during handling and installation.

d. The cables do not directly cross each other and are separated by the specified distance.

e. The cables are not bent sharply where they enter (or leave) a conduit, and are supported properly by tamped ground so future settling will not cause sharp bends.

858-3.8 IDENTIFICATION NUMBERS. Labeling of the circuit number, feeding the sign, shall be accomplished by use of 2-inch diameter nonferrous metal tag, with the numerals approximately 1/4-inch in height, stamped in, embedded in the concrete base, so that the tag faces the taxiway or runway.

858-3.9 FIELD TESTS AND INSPECTIONS

a. Contractor shall provide the RE 10 working days notice prior to test(s). All deficiencies found shall be corrected and tests repeated.

b. Operation. Upon completion of all the tests required under other sections, the Contractor shall show by in-service demonstration that all circuits, control equipment, and all lights covered by the contract are in good operating condition. The testing of each circuit shall be made using local control switches on the regulators in each lighting vault. Each switch shall be operated so that each switch position is engaged at least five times. During this process, all lights and associate equipment shall be observed to determine that each circuit operates properly. Telephone or radio communication between the operator and the observers shall be provided. The above tests shall be repeated from the alternate control station, from the remote control points, and also again from the local control switches on the regulators. Each lighting circuit shall be tested by operating the lighting circuits at each brightness step. Visual examination shall be made at the beginning and at the end of this test to determine that the correct signs are energized.

METHOD OF MEASUREMENT

858-4.1 NEW L-858 SIZE 1 SIGN ON NEW BASE. The quantity of each new sign shall include: Furnishing a new L-858 sign, lamps and transformer mounting supports and hardware; and furnishing and installing a new cast in place (C.I.P.) concrete foundation, L-867 Type I base, conduits to sign and stub out from base.

858-4.2 NEW L-858 SIZE 2 SIGN ON NEW BASE. The quantity of each new sign shall include: Furnishing a new L-858 sign, lamps and transformer mounting supports and hardware; and furnishing and installing a new cast in place (C.I.P.) concrete foundation, L-867 Type I base, conduits to sign and stub out from base.

858-4.3 NEW CAST IN PLACE SIGN BASE FOR EXISTING SIGN (CONTINGENCY). The quantity of each new, cast in place airfield guidance sign base, shall be measured by the number of sign bases needing to be adjusted to the new grade, but are unable to, due to deteriorating materials and or proper grading slopes can not be achieved and must be replaced. Prior to construction of a new base sign, in lieu of adjusting, the contractor must have prior approval by the Engineer.

BASIS OF PAYMENT

858-5.1 SYSTEM COMPONENT. Payment will be made at the contract unit price for each complete system component listed below installed in place by the Contractor and accepted. 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-858-5.1	New Size 1, 2 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.2	New Size 1, 3 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.3	New Size 1, 4 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.4	New Size 1, 7 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.5	New Size 2, 1 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.6	New Size 2, 2 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.7	New Size 2, 3 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.8	New Size 2, 4 Module, Airfield Guidance Sign on New Sign Base--per each
Item L-858-5.9	New Size 2, 4 module, Airfield Guidance Sign on Existing Base, Extended – per each
Item L-858-5.10	Salvaged Size 1, 2 Module, Airfield Guidance Sign, On New Sign Base – per each
Item L-858-5.11	L-858 Size 3, 1 Module, Airfield Guidance Sign, Provided by Airport, on New Sign Base--per each
Item L-858-5.12	New L-858 Size 1, Airfield Guidance Sign Panel--per each
Item L-858-5.13	New L-858 Size 2, Airfield Guidance Sign Panel--per each
Item L-858-5.14	Adjust Existing Sign Base to New Grade -- per each
Item L-858-5.15	New Cast in Place Sign Base for Existing Sign (Contingency) -- per each

REFERENCED PUBLICATIONS

858-7.1 FEDERAL SPECIFICATIONS REFERENCED IN ITEM L-858.

Number	Title
WW-C-581	Conduit, Metal, Rigid; and Coupling, Elbow; and Nipple, Electrical Conduit: Zinc-Coated
W-C-1094	Conduit, Plastic-Type II Schedule 40

858-7.2 FAA SPECIFICATION REFERENCED IN L-858.

AC 150/5340-18F	Standards for Airport Sign Systems.
AC 150/5345-26D	Specification for L-823 Plug and Receptacle, Cable Connections
AC 150/5345-42F	Specification for Light Base and Transformer Housings, Junction Boxes and Accessories.
AC 150/5345-44J	Specification for Taxiway and Runway Signs.
AC 150/5345-47C	Specifications for Series to Series Isolation Transformers for Airport Lighting Systems.

END OF ITEM L-858