Augusta GEORGIA

Procurement Department

Mrs. Geri Sams, Director

E-MAILED/MAILED

TO: All Vendors
Tywanna Scott, Quality Assurance Analyst
Herbert Judon, Jr., Augusta Regional Airport

FROM: Geri Sams
Procurement Director

DATE: March 13, 2023

SUBJ: **Addendum 2 – New Bid Opening Date, Clarifications to the Specifications and Responses to Vendor's Questions**

BID ITEM: **Bid Item #23-131 Construct Taxiway G for Augusta, GA - Augusta Regional Airport**

NEW BID OPENING DATE: Thursday, March 23, 2023 @ 3:00 p.m.

ADDENDUM NO. 2

This Addendum shall form a part of the referenced Bid Item #23-131 Construct Taxiway G and any agreement entered into in connection therewith equally as if bound into the original document. Acknowledge receipt of all Addendums on Attachment "B" within the Specifications package.

The Bid Opening Date for Bid Item #23-131 Construct Taxiway G for Augusta, GA – Augusta Regional Airport has been changed:

From: Wednesday, March 15, 2023 @ 3:00 p.m.

To: Thursday, March 23, 2023 @ 3:00 p.m.

Clarifications to the Specifications:

Project Manual Changes/Clarifications:

1. **Pages BF-1 through BF-48:** Updated and revised all line items within the bid tabs for each bid alternative (base bid, bid alt, asphalt shoulder, concrete shoulder) to address questions received below. **Delete** pages BF-1 through BF-48 and **replace** with pages BF-1 thru BF-50 attached to this Addendum No. 2
2. **Page L-108-9: Delete** page **L-108-9** and **replace** with the revised **L-108-9** attached to this Addendum No. 2.
3. **Pages L-109-1 through L-109-9:** New Specification has been added to address comments/questions concerning AWOS equipment. **Add** L-109 Specification attached to this Addendum No. 2 and include after L-108 specification within project manual.
4. **Page L-110-7: Delete** page **L-110-7** and **replace** with the revised **L-110-7** attached to in this Addendum No. 2.

Construction Drawing changes:

1. **Sheets G-061 & G-062: Revised sheets to match revised estimate and bid tabs. Delete sheets G-061 & G-062 and replace with pages G-061 & G-062 attached to this Addendum No. 2.**

Room 605 - 535 Telfair Street, Augusta Georgia 30901
(706) 821-2422 - Fax (706) 821-2811
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Scan this QR code with your smartphone or camera equipped tablet to visit the Augusta, Georgia

2. **Sheet E-201: Revised sheet to address taxiway edge light callouts. Delete sheet E-201 and replace with page E-201 attached to this Addendum No. 2.**
3. **Sheet E-205: Revised sheet to address AWOS cabling callouts. Delete sheet E-205 and replace with page E-205 attached to this Addendum No. 2.**

Responses to Vendor's Questions:

1. Question: In Addendum 1 Q&A, questions #56 and #57 were answered the same "L-108.4 shall include the cost associated with disconnecting the AWOS and surge arrestor in the vault." This answer did not solidify our understanding. The plans call for the contractor to install a disconnect at both the AWOS and vault. Also, the plans call for the contractor to install a surge arrestor at the vault. What line items shall the furnishing/installation of the new disconnects and surge arrestor be billed under?
   Response: An additional L-109 specification and associated line item(s) have been added to address the AWOS equipment. Please refer to Project Manual Change/Clarification #1 and #3 as referenced above.
2. Question: Per Addendum 1 Q&A #59, the contractor will bill the AWOS cable under line-item L-108.4 "No.6,600V, XHHW Cable, Installed in Trench, Duct Bank or Conduit". The plans have the AWOS circuitry labeled as no.4, 600v, XHHW w/ #6 ground. How does this relate to the L-108.4-line item? Please also check the quantity of 525ft vs the distance from the lighting vault to the AWOS site.
   Response: The plans have been revised to show the proposed cable and conduit as No. 6, 600V, XHHW Cable. Please refer to Construction Drawing change 3 and Project Manual Change/Clarification 1 as referenced above.
3. Question: On plan page E-205, the AWOS conduit from the existing MH to the AWOS is labeled as both 4" PVC and 2" PVC. Is this conduit existing? If it is not existing, what size conduit should the contractor install? If 4" PVC should be installed, what line item should it be billed under?
   Response: Contractor shall install new 2" PVC as shown on plan sheet E-205 back to existing electrical manhole. Please refer to Project Manual Change/Clarification #1 as referenced above and Construction Drawing change #3.
4. Question: In the base bid, where will Concrete Encased Electrical Duct Bank, 2W-2"- 364ft be utilized?
   Response: 2W-2" Concrete Encased Electrical Duct Bank as shown in the bid documents shall be constructed under the first Taxiway stub within the Base Bid.
5. Question: For Line-item L-110.3 "Concrete Encased Conduit 1W-2" Type II PVC", should the conduit be incased in P-610 concrete or P-153 CLSM (flowable fill) as described in the detail on plan page E-602? Will the encasement type be the same for conduit under asphalt shoulder and PCC shoulder?
   Response: P-610 shall be required for the 4W-4" Duct bank within the pavement section. P-154 encasement shall be required in conduit along the taxiway/runway shoulders. The encasement type shall be the same for either shoulder pavement option.
6. Question: On plan page E-201, the (E) 4w4" duct bank is labeled with key note 4, which details exposing the existing conduits and then encasing them in concrete. On plan page E-204 the (N) 4w4" duct bank is not labeled with key note 4 which leads the contractor to believe this is a new duct bank. Is the intent of Line-item L-110.2 "Concrete Encased Electrical Duct Bank, 4W-4", for the contractor to expose existing 4w4" conduit and then encase in concrete, or is the intent to install a new 4w4" concrete encased duct bank? If both methods are intended to be used, how are these 2ea duct banks supposed to be billed under the same line item when the requirements are drastically different?
   Response: The two different 4W-4" duct bank line items have been broken out into two separate work items. Please refer to Project Manual Change/Clarification #1 and #4 as referenced above.

7. Question: How were sign quantities and modules determined? For the base bid, we are counting 1module-4ea, 2module-0ea, 3module-1ea, 4module-0ea. For the bid alternate, we are counting 1module-3ea, 2module-2ea, 3module-0ea, 4module-0ea.
   Response: The base bid sign quantity breakdown per the bid schedule is correct. Please refer to Project Manual Change/Clarification #1 as referenced above for the Bid Alternate changes.
8. Question: All bid schedules include a Miscellaneous Lighting Equipment line item. The L-125 specifications have a detailed list of miscellaneous lighting equipment. Is the intent for this list to be broken apart amongst bid schedules, or should each bid schedule include the full list of miscellaneous lighting equipment found in the L-125 specs?
   Response: Each bid schedule shall include the full list of miscellaneous lighting equipment.
9. Question: Are the Non-Lighted Taxiway End Signs to be installed in the base bid at the end of the stub Taxiway? There is no line item in the bid alternate for non-lighted signs.
   Response: The Non-Lighted Taxiway End signs are reference per line-item L-125.6.
10. Question: On E-201, Junction cans are paired with a note that says "Existing (junction) can to be removed and reinstalled". Is the intent for the contractor to reinstall the existing junction cans, or is the intent to replace the existing junction cans with new junction cans?
    Response: Contractor shall reinstall existing junction can in location(s) shown on sheet E-201.
11. Question: On plan page E-203, taxiway lights L-46, L-47, L-48, L-50, & L-51 are paired with Key note 13 which describes installing a blank lid and delivering the light fixture and transformer to the airport for later use. Should taxiway light L-49 be labeled with key note 13? Also, should lights L-14, L-15, L-16, L-17, L-18, & L-19 on plan page E-201 be labeled with key note 13? Are the blank lids intended to be incidental to taxiway edge light line items? To avoid confusion, can an additional line item be made for these blank lids?
    Response: Taxiway edge lights L-14, L-15, L-16, L-17, L-18, & L-19 shall be revised to show with Keynote 13, "Install 3/8" blank cover. Deliver light fixture and ISO transformer to the Airport for later use." Please refer to Construction Drawing change #1 as reference above. The blank lids shall be incidental to the taxiway edge lights noted.
12. Question: Augusta Richmond County General Note #5 on plan page G-082 explains that any inspection by the city on days before or after normal work hours and on weekends will need to be paid by the individual that requested it. Is work allowed outside of "normal hours" without an inspector present?
    Response: Work is allowed outside of "normal hours." Any necessary work item that is required to be inspected shall be done so by an Augusta-Richmond County inspector.
13. Question: The edge light details on E-601 show the use of one-piece cans. This does not appear to be an applicable installation method for edge lights in PCC shoulder or asphalt shoulder. What type of base cans will be required for edge lights installed in PCC shoulder and asphalt shoulder?
    Response: One-piece as well as two-piece cans are accepted/allowed. It is up to the contractor's discretion on how they bid and install the edge light/junction cans.
14. Question: Alternate 1 (asphalt shoulder) line #15 has a quantity of 10,000 cubic yards. Alternate 2 (concrete shoulder) line #15 has a quantity of 20,600 cubic yards. This is a disadvantage for contractors that only want to bid the concrete package by over $1 million. Unsuitable excavation should be the same whether you are constructing the shoulders in concrete or asphalt.
    Response: Please refer to Project Manual Change/Clarification 1 as referenced above.

Please acknowledge addendum in your submittal

END OF ADDENDUM

ATTACHMENTS: **REVISED BID FORM (50 PAGES)**
ITEM L-108 (10 PAGES)
ITEM L-109 (9 PAGES)
ITEM L-110 (9 PAGES)
DRAWINGS (3 PAGES)

BID FORM

(Failure to furnish all requested data will be cause for considering BIDDER non-responsive and may render this BID invalid on that basis.)

BID FOR: **AUGUSTA REGIONAL AIRPORT**
CONSTRUCT TAXIWAY G

SUBMITTED TO: Augusta-Richmond County
Attn: Procurement Director
535 Telfair Street, Room 605
Augusta, GA 30901

SUBMITTED BY: _____

Bidder's Name

_____

Address

_____

City, State and Zip Code

_____

Phone / Fax Date Completed

1. The undersigned, hereinafter called Bidder, in compliance with the "Notice to Bidders" accepting all of the terms and conditions of the "Instructions to Bidders," including without limitation those dealing with the disposition of the Bid Security; proposes and agrees, if awarded the Contract, to enter into an agreement with the Owner utilizing the form Contract included in the Bid Documents. Bidder shall furnish all materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the work to be performed under the Contract within the time indicated in the contract, in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Contract Documents, to the full and entire satisfaction of the Owner, for the amounts contained in this Bid Schedule.

2. This Bidder's bid shall remain open for sixty (60) days after the day of Bid opening. If awarded a contract, Bidder will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within fifteen (15) calendar days after the date indicated in Owner's Notice of Award.

3. In submitting this Bid, the Bidder represents that:

   a. Bidder has become thoroughly familiar with the terms and conditions of the Bid Documents accepting the same as sufficient to indicate understanding of all the conditions and requirements under the Contract which will be executed for the Work.

   b. Bidder has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as Bidder deems necessary.

c. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from submitting a bid; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

d. No member of the Augusta Board of Commissioners, Aviation Commission or other officers or employees of said Owner Is interested directly or indirectly in the bid or in any portion of the bid or in the Contract or any part of the Contract which may be awarded the undersigned on the basis of such bid without such full disclosure being made.

e. It is a condition of this bid and any subsequent contract entered into pursuant to this bid, and it shall be made a condition of each subcontract entered into pursuant to the prime contract that the Contractor and any subcontractor shall not require any laborer to mechanic employed in the performance of the contract to work in surroundings or under working conditions which are unsatisfactory, hazardous, or dangerous to his/her health or safety, as determined under Construction Safety and Health Standards, Title 29 , CFR Part 1518 36FR7340, promulgated by the U.S. Secretary of Labor, in accordance with Section 107 of the Contract Work hours and Safety Standards act, Stat. 96; that is further condition of this bid that Bidder shall be solely responsible for the enforcement of such Construction and Health Standards, and that Bidder fully understands that the Owner and its authorized representatives will not assume any liability resulting from the Contractor's failure to police and enforce all such standards.

f. The description under each bid item, being briefly stated, implies, although it does not mention, all incidentals and that the prices stated are intended to cover all such work, materials and incidentals as constitute Bidder's obligations as described in the Specifications, and any details not specifically mentioned, but evidently included in the Contract shall be compensated for in the item which most logically includes it.

g. The unit prices bid include all applicable taxes and fees. Bids shall also include appropriate provisions for price escalation for materials and labor including but not limited to increases in federal, state and local sales taxes and income or FICA taxes.

4. **Contract Time:** Bidder agrees that:

a. The work will be completed within the timeframes described in the General Provisions and the Construction Documents.

b. Bidder shall commence work with an adequate force and equipment at the time stated in the Notice to Proceed and complete all work by the date established in said Notice. Bidder shall not work overtime or on Saturdays, Sundays, or legal holidays except as specifically allowed by the Contract Documents and approved by the Owner.

c. **The quantities of work listed in the Bid Schedules are APPROXIMATE and are assumed solely for the comparison of bids. Compensation will be based upon the unit price bid and the ACTUAL quantities of work performed in accordance with the Contract Documents and as accepted by the ENGINEER.**

5. **Bid Schedule:** See attached Pages BF-3 through BF-36.

BID SCHEDULE – BASE BID (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
1	C-100.1	Contractor Quality Control program (CQCP)	1	LS		
	Written Unit Price					
2	C-102.1a	Installation, Maintenance, and Removal of Silt Fence or Silt Sock, Type A	11,754	LF		
	Written Unit Price					
3	C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	48	EA		
	Written Unit Price					
4	C-102.1c	Construct, Maintain, and Remove Construction Exit	1	EA		
	Written Unit Price					
5	C-102.1d	Water Quality Monitoring and Sampling	36	EA		
	Written Unit Price					
6	C-102.1e	Water Quality Inspections	18	EA		
	Written Unit Price					
7	C-102.1f	Erosion Control Mobilization	1	LS		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
8	C-102.1g	Emergency Erosion Control Mobilization	1	LS		
	Written Unit Price					
9	C-102.1h	Permanent Water Quality Inserts	14	EA		
	Written Unit Price					
10	C-105.1	Mobilization, Clean-up and Demobilization	1	LS		
	Written Unit Price					
11	C-105.2	Airfield Safety & Traffic Control	1	LS		
	Written Unit Price					
12	P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	2,032	SY		
	Written Unit Price					
13	P-101.2	Cold Milling	233	SY		
	Written Unit Price					
14	P-152.1	Unclassified Excavation, Dispose Off Site	3,290	CY		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
15	P-152.3	Subgrade Preparation	16,190	SY		
	Written Unit Price					
16	P-152.4	Unsuitable/Over Excavation	5,000	CY		
	Written Unit Price					
17	P-154.1	Aggregate Base Course (6" Depth)	1,607	CY		
	Written Unit Price					
18	P-154.2	Aggregate Base Course (12" Depth)	1,895	CY		
	Written Unit Price					
19	P-306.1	Lean Concrete Base Course (5"Depth)	11,170	SY		
	Written Unit Price					
20	P-401.1	Asphalt Concrete Surface Course (4" Depth)	1,085	TON		
	Written Unit Price					
21	P-403.1	Asphalt Concrete Base Course (4" Depth, 30% RAP)	1,085	TON		
	Written Unit Price					

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Location of Project: Augusta Regional Airport, Augusta, Georgia
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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
22	P-501.1	Portland Cement Concrete Pavement (14" Depth)	10,581	SY		
	Written Unit Price					
23	X-501.1	Portland Cement Concrete Curing Facility	1	LS		
	Written Unit Price					
24	P-602.1	Emulsified Asphalt Prime Coat	482	Gal		
	Written Unit Price					
25	P-603.1	Emulsified Asphalt Tack Coat	241	Gal		
	Written Unit Price					
26	P-605.1	Joint Sealing Filler	17,577	LF		
	Written Unit Price					
27	P-620.1	Permanent Pavement Markings	9,393	SF		
	Written Unit Price					
28	P-620.2	Temporary Pavement Markings	9,393	SF		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
29	P-620.3	Reflective Media	280	LBS		
	Written Unit Price					
30	P-620.4	Thermoplastic Preformed Surface Sign	2	EA		
	Written Unit Price					
31	P-620.6	Marking Removal	5,566	SF		
	Written Unit Price					
32	D-701.1	Concrete Sewer Pipe, 18-inch, Class V	70	LF		
	Written Unit Price					
33	D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	1,165	LF		
	Written Unit Price					
34	D-705.2	Underdrain Cleanout	8	EA		
	Written Unit Price					
35	D-751.2	Airfield Inlet with Aircraft Rated Grate	1	EA		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
36	D-751.3	Adjust Storm Manhole/Inlet to Grade	1	EA		
	Written Unit Price					
37	D-751.4	Connect Storm Pipe to Existing Storm Structure	1	EA		
	Written Unit Price					
38	T-901.1	Temporary Seeding	3	AC		
	Written Unit Price					
39	T-901.2	Permanent Seeding	3	AC		
	Written Unit Price					
40	T-901.3	Seeding, Staging Area	1	AC		
	Written Unit Price					
41	T-905.1	Topsoiling (Obtain Onsite or Removed from Stockpile)	1173	CY		
	Written Unit Price					
42	T-905.2	Topsoiling, Staging Area	2,762	CY		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
43	L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	1,696	LF		
	Written Unit Price					
44	L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	2,789	LF		
	Written Unit Price					
45	L-108.3	Remove Abandoned Communication Line	1,957	LF		
	Written Unit Price					
46	L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	364	LF		
	Written Unit Price					
47	L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	367	LF		
	Written Unit Price					
48	L-110.3	Concrete Encased Conduit, 1W-2" Type II PVC	2,089	LF		
	Written Unit Price					
49	L-110.4	Non-Encased Conduit, 1W-2" Type II PVC	426	LF		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
50	L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	1	EA		
	Written Unit Price					
51	L-115.2	Electrical Junction Can with Aircraft rated Blank Cover, without Drainage	1	EA		
	Written Unit Price					
52	L-115.3	Electrical Junction Can with Blank Cover, without Drainage	1	EA		
	Written Unit Price					
53	L-125.1	In-Pavement LED Medium Intensity Runway Edge Light, L-852D (L)	2	EA		
	Written Unit Price					
54	L-125.2	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can With Drainage	25	EA		
	Written Unit Price					
55	L-125.3	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can Without Drainage	11	EA		
	Written Unit Price					
56	L-125.4	Miscellaneous Lighting Equipment	1	LS		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
57	L-125.5	Remove Edge Light Fixture and/or Base Can	5	EA		
	Written Unit Price					
58	L-125.6	L-858(L) Airfield Guidance Sign, 1 Module	2	EA		
	Written Unit Price					
59	L-125.7	L-858(L) Airfield Guidance Sign, 2 Module	2	EA		
	Written Unit Price					
60	L-125.9	L-858(L) Airfield Guidance Sign, 4 Module	1	EA		
	Written Unit Price					
61	L-125.10	Non-Lighted Taxiway End Sign	1	EA		
	Written Unit Price					
62	L-125-11	Edge Light Number Tags	36	EA		
	Written Unit Price					

Total Base Bid (Asphalt Shoulder) = _____

Total Base Bid Written (Asphalt Shoulder) = _____

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
1	C-100.1	Contractor Quality Control program (CQCP)	1	LS		
	Written Unit Price					
2	C-102.1a	Installation and Removal of Silt Fence or Silt Sock, Type A	11,754	LF		
	Written Unit Price					
3	C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	48	EA		
	Written Unit Price					
4	C-102.1c	Construct, Maintain, and Remove Construction Exit	1	EA		
	Written Unit Price					
5	C-102.1d	Water Quality Monitoring and Sampling	36	EA		
	Written Unit Price					
6	C-102.1e	Water Quality Inspections	18	EA		
	Written Unit Price					
7	C-102.1f	Erosion Control Mobilization	1	LS		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
8	C-102.1g	Emergency Erosion Control Mobilization	1	LS		
	Written Unit Price					
9	C-102.h	Permanent Water Quality Inserts	14	EA		
	Written Unit Price					
10	C-105.1	Mobilization, Clean-up and Demobilization	1	LS		
	Written Unit Price					
11	C-105.2	Airfield Safety and Traffic Control	1	LS		
	Written Unit Price					
12	P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	1,972	SY		
	Written Unit Price					
13	P-101.2	Cold Milling	233	SY		
	Written Unit Price					
14	P-152.1	Unclassified Excavation, Dispose Off Site	3,290	CY		
	Written Unit Price					

BID SCHEDULE – BASE BID (CONCRETE SHOULDER)
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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
15	P-152.3	Subgrade Preparation	16,190	SY		
	Written Unit Price					
16	P-152.4	Unsuitable/Over Excavation	5,000	CY		
	Written Unit Price					
17	P-154.1	Aggregate Base Course (6" Depth)	2,698	CY		
	Written Unit Price					
18	P-306.1	Lean Concrete Base Course (5" Depth)	11,170	SY		
	Written Unit Price					
19	P-501.1	Portland Cement Concrete Pavement (14" Depth)	15,402	SY		
	Written Unit Price					
20	X-501.1	Portland Cement Concrete Curing Facility	1	LS		
	Written Unit Price					
21	P-605.1	Joint Sealing Filler	17,577	LF		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
22	P-620.1	Permanent Pavement Markings	9,393	SF		
	Written Unit Price					
23	P-620.2	Temporary Pavement Markings	9,393	SF		
	Written Unit Price					
24	P-620.3	Reflective Media	280	LBS		
	Written Unit Price					
25	P-620.4	Thermoplastic Preformed Surface Sign	2	EA		
	Written Unit Price					
26	P-620.6	Marking Removal	5566	SF		
	Written Unit Price					
27	D-701.1	Concrete Sewer Pipe, 18-Inch, Class V	70	LF		
	Written Unit Price					
28	D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	1,165	LF		
	Written Unit Price					

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Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
29	D-705.2	Underdrain Cleanout	8	EA		
	Written Unit Price					
30	D-751.2	Airfield Inlet with Aircraft Rated Grate	1	EA		
	Written Unit Price					
31	D-751.3	Adjust Storm Manhole/Inlet to Grade	1	EA		
	Written Unit Price					
32	D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	1	EA		
	Written Unit Price					
33	T-901.1	Temporary Seeding	3	AC		
	Written Unit Price					
34	T-901.2	Permanent Seeding	3	AC		
	Written Unit Price					
35	T-901.3	Seeding, Staging Area	1	AC		
	Written Unit Price					

BID SCHEDULE – BASE BID (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
36	T-905.1	Topsoiling (Obtain Onsite or Removed from Stockpile)	1173	CY		
	Written Unit Price					
37	T-905.2	Topsoiling, Staging Area	2,762	CY		
	Written Unit Price					
38	L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	1,696	LF		
	Written Unit Price					
39	L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	2,789	LF		
	Written Unit Price					
40	L-108.3	Remove Abandoned Communication Line	1,957	LF		
	Written Unit Price					
41	L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	364	LF		
	Written Unit Price					
42	L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	367	LF		
	Written Unit Price					

BID SCHEDULE – BASE BID (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
43	L-110.3	Concrete Encased Conduit, 1W-2" Type II PVC	2,089	LF		
	Written Unit Price					
44	L-110.4	Non-Encased Conduit, 1W-2" Type II PVC	426	LF		
	Written Unit Price					
45	L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	1	EA		
	Written Unit Price					
46	L-115.2	Electrical Junction Can with Aircraft rated Blank Cover, without Drainage	1	EA		
	Written Unit Price					
47	L-115.3	Electrical Junction Can with Blank Cover, without Drainage	1	EA		
	Written Unit Price					
48	L-125.1	In-Pavement LED Medium Intensity Runway Edge Light, L-852D (L)	2	EA		
	Written Unit Price					
49	L-125.2	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can With Drainage	25	EA		
	Written Unit Price					

BID SCHEDULE – BASE BID (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
50	L-125.3	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can Without Drainage	11	EA		
	Written Unit Price					
51	L-125.4	Miscellaneous Lighting Equipment	1	LS		
	Written Unit Price					
52	L-125.5	Remove Edge Light Fixture and/or Base Can	5	EA		
	Written Unit Price					
53	L-125.6	L-858(L) Airfield Guidance Sign, 1 Module	2	EA		
	Written Unit Price					
54	L-125.7	L-858(L) Airfield Guidance Sign, 2 Module	2	EA		
	Written Unit Price					
55	L-125.9	L-858(L) Airfield Guidance Sign, 4 Module	1	EA		
	Written Unit Price					
56	L-125.10	Non-Lighted Taxiway End Sign	1	EA		
	Written Unit Price					

BID SCHEDULE – BASE BID (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
57	L-125-11	Edge Light Number Tags	36	EA		
	Written Unit Price					

Total Base Bid (Concrete Shoulder) = _____

Total Base Bid (Concrete Shoulder) Written = _____

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
1	C-100.1	Contractor Quality Control program (CQCP)	1	LS		
	Written Unit Price					
2	C-102.1a	Installation, Maintenance, and Removal of Silt Fence or Silt Sock, Type A	11,754	LF		
	Written Unit Price					
3	C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	48	EA		
	Written Unit Price					
4	C-102.1c	Construct, Maintain, and Remove Construction Exit	1	EA		
	Written Unit Price					
5	C-102.1d	Water Quality Monitoring and Sampling	36	EA		
	Written Unit Price					
6	C-102.1e	Water Quality Inspections	18	EA		
	Written Unit Price					
7	C-102.1f	Erosion Control Mobilization	1	LS		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
8	C-102.1g	Emergency Erosion Control Mobilization	1	LS		
	Written Unit Price					
9	C-105.1	Mobilization, Clean-up and Demobilization	1	LS		
	Written Unit Price					
10	C-105.2	Airfield Safety & Traffic Control	1	LS		
	Written Unit Price					
11	P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	488	SY		
	Written Unit Price					
12	P-101.3	Remove Existing 36" RCP	102	LF		
	Written Unit Price					
13	P-152.2	Unclassified Excavation, Select Fill from On-Site	2,844	CY		
	Written Unit Price					
14	P-152.3	Subgrade Preparation	37,137	SY		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
15	P-152.4	Unsuitable/Over Excavation	10,000	CY		
	Written Unit Price					
16	P-154.1	Uncrushed Aggregate Base Course (6" Depth)	3,998	CY		
	Written Unit Price					
17	P-154.2	Uncrushed Aggregate Base Course (12" Depth)	4,383	CY		
	Written Unit Price					
18	P-306.1	Lean Concrete Base Course (5" Depth)	23,536	SY		
	Written Unit Price					
19	P-401.1	Asphalt Concrete Surface Course (4" Depth)	2,959	TON		
	Written Unit Price					
20	P-403.1	Asphalt Concrete Base Course (4" Depth, 30% RAP)	2,959	TON		
	Written Unit Price					
21	P-501.1	Portland Cement Concrete Pavement (14" Depth)	22,182	SY		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
22	X-501.1	Portland Cement Concrete Curing Facility	1	LS		
	Written Unit Price					
23	P-602.1	Emulsified Asphalt Prime Coat	1,315	Gal		
	Written Unit Price					
24	P-603.1	Emulsified Asphalt Tack Coat	657	Gal		
	Written Unit Price					
25	P-605.1	Joint Sealing Filler	32,861	LF		
	Written Unit Price					
26	P-620.1	Permanent Pavement Markings	30,223	SF		
	Written Unit Price					
27	P-620.2	Temporary Pavement Markings	30,223	SF		
	Written Unit Price					
28	P-620.3	Reflective Media	1,060	LBS		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
29	P-620.4	Thermoplastic Preformed Surface Sign	2	EA		
	Written Unit Price					
30	P-620.5	Temporary Displaced Threshold	1	LS		
	Written Unit Price					
31	D-701.1	Concrete Sewer Pipe, 18" Class V	231	LF		
	Written Unit Price					
32	D-701.2	Concrete Sewer Pipe, 24" Class V	89	LF		
	Written Unit Price					
33	D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	3,281	LF		
	Written Unit Price					
34	D-705.2	Underdrain Cleanout	14	EA		
	Written Unit Price					
35	D-751.1	Aircraft Rated Manhole with Aircraft Rated Lid	2	EA		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
36	D-751.2	Airfield Inlet with Aircraft Rated Grate	1	EA		
	Written Unit Price					
37	D-751.3	Adjust Storm Manhole/Inlet to Grade	1	EA		
	Written Unit Price					
38	D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	1	EA		
	Written unit Price					
39	T-901.1	Temporary Seeding	6	AC		
	Written Unit Price					
40	T-901.2	Permanent Seeding	6	AC		
	Written Unit Price					
41	T-901.3	Seeding, Staging Area	1	AC		
	Written Unit Price					
42	T-905.1	Topsoiling (Obtain Onsite or Removed from Stockpile)	2,612	CY		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
43	T-905.2	Topsoiling, Staging Area	2,762	CY		
	Written Unit Price					
44	L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	5,141	LF		
	Written Unit Price					
45	L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	5,565	LF		
	Written Unit Price					
46	L-108.4	No. 6, 600V, XHHW Cable	1612	LF		
	Written Unit Price					
47	L-109.1	Furnish and Install Specified Vault Equipment	1	LS		
	Written Unit Price					
48	L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	354	LF		
	Written Unit Price					
49	L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	196	LF		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
50	L-110.3	Concrete Encased New Electrical Duct Bank, 4W-4"	149	LF		
	Written Unit Price					
51	L-110.4	Concrete Encased Conduit, 1W-2" Type II PVC	4,255	LF		
	Written Unit Price					
52	L-110.5	Non-Encased Conduit, 1W-2" Type II PVC	1,046	LF		
	Written Unit Price					
53	L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	2	EA		
	Written Unit Price					
54	L-115.3	Electrical Junction Can with Blank Cover, without Drainage	1	EA		
	Written Unit Price					
55	L-125.2	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can With Drainage	22	EA		
	Written Unit Price					
56	L-125.3	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can Without Drainage	28	EA		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (ASPHALT SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
57	L-125.4	Miscellaneous Lighting Equipment	1	LS		
	Written Unit Price					
58	L-125.6	L-858(L) Airfield Guidance Sign, 1 Module	2	EA		
	Written Unit Price					
59	L-125.7	L-858(L) Airfield Guidance Sign, 2 Module	1	EA		
	Written Unit Price					
60	L-125.8	L-858(L) Airfield Guidance Sign, 3 Module	1	EA		
	Written Unit Price					
61	L-125.9	L-858(L) Airfield Guidance Sign, 4 Module	2	EA		
	Written Unit Price					
62	L-125.10	Edge Light Number Tags	50	EA		
	Written Unit Price					

Total Bid Alternate 1 (Asphalt Shoulder) = _____

Total Bid Alternate 1 (Asphalt Shoulder) Written = _____

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
1	C-100.1	Contractor Quality Control program (CQCP)	1	LS		
	Written Unit Price					
2	C-102.1a	Installation, Maintain, and Removal of Silt Fence or Silt Sock, Type A	11,754	LF		
	Written Unit Price					
3	C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	48	EA		
	Written Unit Price					
4	C-102.1c	Construct, Maintain, and Remove Construction Exit	1	EA		
	Written Unit Price					
5	C-102.1d	Water Quality Monitoring and Sampling	36	EA		
	Written Unit Price					
6	C-102.1e	Water Quality Inspections	18	EA		
	Written Unit Price					
7	C-102.1f	Erosion Control Mobilization	1	LS		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
8	C-102.1g	Emergency Erosion Control Mobilization	1	LS		
	Written Unit Price					
9	C-105.1	Mobilization, Clean-up and Demobilization	1	LS		
	Written Unit Price					
10	C-105.2	Airfield Safety and Traffic Control	1	LS		
	Written Unit Price					
11	P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	488	SY		
	Written Unit Price					
12	P-101.3	Remove Existing 36" RCP	102	LF		
	Written Unit Price					
13	P-152.2	Unclassified Excavation, Select Fill from On-Site	2,844	CY		
	Written Unit Price					
14	P-152.3	Subgrade Preparation	37,137	SY		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
15	P-152.3	Unsuitable/Over Excavation	10,000	CY		
	Written Unit Price					
16	P-154.1	Uncrushed Aggregate Base Course (6" Depth)	6,189	CY		
	Written Unit Price					
17	P-306.1	Lean Concrete Base Course (5" Depth)	23,536	SY		
	Written Unit Price					
18	P-501.1	Portland Cement Concrete Pavement (14" Depth)	35,331	SY		
	Written Unit Price					
19	X-501.1	Portland Cement Concrete Curing Facility	1	LS		
	Written Unit Price					
20	P-605.1	Joint Sealing Filler	32,861	LF		
	Written Unit Price					
21	P-620.1	Permanent Pavement Markings	30,223	SF		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
22	P-620.2	Temporary Pavement Markings	30,223	SF		
	Written Unit Price					
23	P-620.3	Reflective Media	1,060	LBS		
	Written Unit Price					
24	P-620.4	Thermoplastic Preformed Surface Sign	2	EA		
	Written Unit Price					
25	P-620.5	Temporary Displaced Threshold	1	LS		
	Written Unit Price					
26	D-701.1	Concrete Sewer Pipe, 18" Class V	231	LF		
27	D-701.2	Concrete Sewer Pipe, 24" Class V	89	LF		
28	D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	3,281	LF		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
29	D-705.2	Underdrain Cleanout	14	EA		
	Written Unit Price					
30	D-751.1	Aircraft Rated Manhole with Aircraft Rated Lid	2	EA		
	Written Unit Price					
31	D-751.2	Airfield Inlet with Aircraft Rated Grate	1	EA		
	Written Unit Price					
32	D-751.3	Adjust Storm Manhole/Inlet to Grade	1	EA		
	Written Unit Price					
33	D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	1	EA		
	Written Unit Price					
34	T-901.1	Temporary Seeding	6	AC		
	Written Unit Price					
35	T-901.2	Permanent Seeding	6	AC		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
36	T-901.3	Seeding, Staging Area	1	AC		
	Written Unit Price					
37	T-905.1	Topsoiling (Obtain Onsite or Removed from Stockpile)	2,612	CY		
	Written Unit Price					
38	T-905.2	Topsoiling, Staging Area	2,762	CY		
	Written Unit Price					
39	L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	5,141	LF		
	Written Unit Price					
40	L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	5,565	LF		
	Written Unit Price					
41	L-108.4	No. 6, 600V, XHHW Cable	1612	LF		
	Written Unit Price					
42	L-109.1	Furnish and Install Specified Vault Equipment	1	LS		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
43	L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	354	LF		
	Written Unit Price					
44	L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	196	LF		
	Written Unit Price					
45	L-110.3	Concrete Encased New Electrical Duct Bank, 4W-4"	149	LF		
	Written Unit Price					
46	L-110.3	Concrete Encased Conduit, 1W-2" Type II PVC	4,255	LF		
	Written Unit Price					
47	L-110.4	Non-Encased Conduit, 1W-2" Type II PVC	1,046	LF		
	Written Unit Price					
48	L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	2	EA		
	Written Unit Price					
49	L-115.3	Electrical Junction Can with Blank Cover, without Drainage	1	EA		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
50	L-125.2	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can with Drainage	22	EA		
	Written Unit Price					
51	L-125.3	Base Mounted, LED Medium Intensity Taxiway Edge Light, L-861T on New L-867B Base Can Without Drainage	28	EA		
	Written Unit Price					
52	L-125.4	Miscellaneous Lighting Equipment	1	LS		
	Written Unit Price					
53	L-125.6	L-858(L) Airfield Guidance Sign, 1 Module	2	EA		
	Written Unit Price					
54	L-125.8	L-858(L) Airfield Guidance Sign, 3 Module	1	EA		
	Written Unit Price					
55	L-125.8	L-858(L) Airfield Guidance Sign, 3 Module	1	EA		
	Written Unit Price					
56	L-125.9	L-858(L) Airfield Guidance Sign, 4 Module	2	EA		
	Written Unit Price					

BID SCHEDULE – BID ALTERNATE 1 (CONCRETE SHOULDER)
Location of Project: Augusta Regional Airport, Augusta, Georgia
Title of Project: Augusta Regional Airport Construct Taxiway G

Line No.	Item No.	Item Description	Est. Qty.	Units	Unit Price	Bid Amount
57	L-125.11	Edge Light Number Tags	50	EA		
	Written Unit Price					

Total Bid Alternate 1 (Concrete Shoulder) = _____

Total Bid Alternate 1 (Concrete Shoulder) Written = _____

SUMMARY OF BID

BASE BID (Asphalt Shoulder) = _____

BASE BID (ASPHALT SHOULDER) WRITTEN: _____

_____

BASE BID (Concrete Shoulder) = _____

BASE BID (Concrete Shoulder) Written = _____

_____

BID ALTERNATE 1 (Asphalt Shoulder) = _____

BID ALTERNATE 1 (Asphalt Shoulder) Written = _____

_____

BID ALTERNATE 1 (Concrete Shoulder) = _____

BID ALTERNATE 2 (Concrete Shoulder) Written = _____

_____

TOTAL BASE BID + BID ALTERNATE 1 (ASPHALT SHOULDER) = _____

TOTAL BASE BID + BID ALTERNATE 1 (ASPHALT SHOULDER) WRITTEN = _____

_____

TOTAL BASE BID + BID ALTERNATE 1 (CONCRETE SHOULDER) = _____

TOTAL BASE BID + BID ALTERNATE 2 (CONCRETE SHOULDER) WRITTEN = _____

_____

6. **Determination of Low Bidder:** Low bidder will be determined based on the total of the base bid plus all bid alternates regardless of the alternates chosen for the project.

7. **Execution of Contract:** Bidder agrees that in case of failure on its part to execute the said Contract and Bonds within fifteen (15) days after the date indicated in the "Notice of Award," the check or bid bond accompanying this bid, and the money payable thereon, shall be paid to the Owner as liquidated damages for such failure; otherwise the Bid Security or check accompanying this bid shall be returned to the undersigned.

8. **Documentation:** The following required documents are attached to and made a part of this bid

   a. Required Bid Security in the form of a Bid Bond payable to the order of the City of Augusta;
   b. Performance of Work by Subcontractor List;
   c. Certificate of Prompt Payment

9. Name and business address (mailing and street) of Bidder to which all formal notices shall be sent:

_____

_____

_____

10. The terms used in this bid, which are defined in the General Provisions of the Construction Contract as a part of the Contract Documents, have the meanings assigned to them in the General Provisions.

11. Bidder hereby acknowledges receipt of the following addenda:

Addendum No.	Date
_____	_____
_____	_____
_____	_____

12. The Bidder shall state on the line below, if a corporation, the name of state in which incorporated and the date of said corporation.

_____

Signed this _____ day of _____, 20_____.

Contractor

_____

By: _____

(Signature of individual, partner or officer signing the Bid)

(SEAL)

_____

License Number

ATTEST:

_____

NOTE: If Contractor is a Corporation, Secretary should attest seal. Seal is required if Bidder is a Corporation. If Contractor is a Partnership, all partners shall execute the bid (add spaces as required).

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

as **Principal,** and

as **Surety,** are hereby

held and firmly bound unto _____ as **Owner**

in the penal sum of _____

for the payment of which, well and truly to be made, we hereby jointly and severally

bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed this _____ day of _____, 20____.

The conditions of the above obligation is such that whereas the Principal has submitted to the Augusta Airport Aviation Commission certain Bill, attached hereto and hereby made a part hereof to enter into a Contract in writing for the Construction of:

AUGUSTA REGIONAL AIRPORT CONSTRUCT TAXIWAY G

NOW THEREFORE,

(a) If said bid shall be rejected, or in the alternate,
(b) If said bid shall be accepted, and the Principal shall execute and deliver a Contract in the Form of Contract attached hereto (properly completed in accordance with said Bill) and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bill, the this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, thereby stipulates and agrees that obligations of said Surety and its Bonds shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

(L.S.)
Principal

Surety

By:

(SEAL)

(1) Date of Bond must be same date as bid.

(2) Bond must be signed or countersigned by Surety's proper Georgia Resident Agent. Date of Power-of-Attorney shall be same date as date of Bond.

(3) If a Partnership, all partners shall execute Bond.

PERFORMANCE OF WORK BY SUBCONTRACTORS

The Bidder hereby states that he proposes to use the subcontractors listed below on this project if awarded the Contract. Please list all proposed subcontractors, trade specialty and dollar value of their work. The Bidder shall obtain prior written permission of the Owner should it choose to add or substitute other subcontractor(s) not shown below.

Subcontractor Name/Address/Phone Number	Subcontractor Work Items	Dollar Value of Subcontractor Work

Estimated Total Cost of Items that Bidder states will be performed by Subcontractors is:

$_____.

CERTIFICATION OF PROMPT PAYMENT

The prime Contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than thirty (30) days from the receipt of each payment the prime Contractor receives from the Owner. The prime Contractor further agrees to return retainage payments to each subcontractor within thirty (30) days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval from the Owner. This clause applies to both DBE and non-DBE subcontractors.

Name of Bidder's Authorized Representative (Please Print or Type Name)	Signature of Bidder's Authorized Representative
Title of Bidder's Authorized Representative	Date

LETTER OF INTENT
Disadvantage Business Enterprise
(This page shall be submitted for each DBE firm)

Bidder/Offer Name:_____

Address:_____

City:_____ State:_____ Zip:_____

DBE Firm: DBE Firm:_____

Address:_____

City:_____ State:_____ Zip:_____

DBE Contact Person: Name: _____ Phone:( )_____

DBE Certifying Agency: _____ Expiration Date:_____

Each DBE Firm shall submit evidence (such as a photocopy) of their certification status.

Classification: ☐ Prime Contractor ☐ Subcontractor ☐ Joint Venture ☐ Manufacturer ☐ Supplier

Work item(s) to be performed by DBE	Description of Work Item	Quantity	Total

The Bidder/offeror is committed to utilizing the above-named DBE firm for the work described above. The estimated participation is as follows:

DBE contract amount: $_____Percent of total contract:_____%

AFFIRMATION:
The above-named DBE firm affirms that it will perform that portion of the contract for the estimated dollar value as stated herein above.

By: _____
(Signature) *(Title)*

* In the event the bidder/offeror does not receive award of the prime contract, any and all representations in this Letter of Intent and Affirmation shall be null and void.

UTILIZATION STATEMENT
Disadvantage Business Enterprise (DBE)

The undersigned Bidder has satisfied the requirements of the bid specification in the following manner. *(Please mark the appropriate box)*

- ☐ **The Bidder is committed to a minimum of _____% DBE utilization on this contract.**
- ☐ **The Bidder, while unable to meet the DBE contract goal of_____%, hereby commits to a minimum of ____% DBE utilization on this contract and submits the attached documentation as evidence demonstrating good faith efforts (GFE) in seeking participation by certified DBE firms.**

The undersigned hereby further assures that the information included herein is true and correct, and that the DBE firm or firms identified within the submitted Letter-of-Intent forms have agreed to perform a commercially useful function for the indicated work elements.

The undersigned further understands that no changes to this statement may be made without prior approval from the Owner and the Federal Aviation Administration.

_____
Bidder's / Offeror's Firm Name

_____ _____
Signature Date

DBE UTILIZATION SUMMARY

	Contract amount		DBE Amount	Contract Percentage
DBE Prime Contractor	$	x 1.00 =	$	%
DBE Subcontractor	$	x 1.00 =	$	%
DBE Supplier	$	x 0.60 =	$	%
DBE Manufacturer	$	x 1.00 =	$	%
Total Amount DBE			$	%
DBE Goal			$	%

* If the total proposed DBE participation is less than the established DBE goal, Bidder/Proposer must provide written documentation of the good faith efforts as required by 49 CFR Part 26. All participation will be calculated in accordance with 49 CFR Part 26 and its applicable subparts.

Description of Good Faith Efforts

If you will not meet the Disadvantage Business Enterprises (DBE) goal set forth in the solicitation in addition to the information included on the Statement of Interested Subcontractors and Statement of Bid Proposals/Price Quotations submitted with your bid/proposal, please provide a narrative explanation of why you cannot meet the DBE goal and the steps taken to include DBEs in your proposal/bid. Describe specific actions (i.e. phone calls, etc.). Please provide copies of any solicitation notices sent, whether by email, fax or mail, and the amount of time given for response. Describe efforts to follow up initial communications. Identify the individuals from your organization who performed these activities. Attach additional pages as needed.

I hereby attest that I have exercised good faith efforts to meet the City's federally required Disadvantaged Business Enterprise goals for this Project. Despite such good faith efforts, I have not been able to meet the DBE goal for this Project.

_____
Signature

_____
Name and Title (typed or printed)

_____
Name of Firm

CHECKLIST OF GOOD FAITH EFFORTS

A Bidder or Proposer that does not meet the City's DBE participation benchmark is required to demonstrate that it made "**good faith efforts**." Please indicate whether any of the following actions were taken.

	Yes	No	
1.	☐	☐	Attendance at a Pre-Bid Meeting, if any, scheduled by the City inform DBEs of subcontracting opportunities under a given solicitation; Advertisement for solicitation of DBEs in general circulation media, trade association publications, and minority-focus media, to provide notice of subcontracting opportunities.
2.	☐	☐	Advertisement in general circulation media at least seven (7) days prior to Bid or proposal opening any and all Subcontractor opportunities. Proof of advertisement must be submitted with the Bid or Proposal.
3.	☐	☐	Provided interested DBEs with timely, adequate information about the plans, specifications, and other such requirements of the Contract to facilitate their quotation and conducted follow up to initial solicitations.
4.	☐	☐	Provided written notice to DBEs that their interest in subcontracting opportunities or furnishing supplies is solicited. Provided a contact log showing the name, address, email and contact number (phone or fax) used to contact the proposed certified subcontractors, nature of work requested for quote, date of contact, the name and title of the person making the effort, and the amount of the quoted price if one was obtained.
5.	☐	☐	Efforts were made to divide the work for DBE subcontracting in areas likely to be successful and identify portions of work available to DBEs consistent with their availability. Include a list of divisions of work not subcontracted and the corresponding reasons for not including them. The ability or desire of a Bidder/Proposer to perform the work of a contract with its own organization does not relieve it of the responsibility to make good faith efforts on all scopes of work subject to subcontracting.
6.	☐	☐	Efforts were made to assist potential DBE subcontractors to meet bonding, insurance or other governmental contracting requirements. Where feasible, facilitating the leasing of supplies or equipment when they are of such a specialized nature that a DBE could not readily and economically obtain them in the marketplace.
7.	☐	☐	Utilization of services of available minority community organizations, minority contractor groups and other organizations that provide assistance in the recruitment and placement of DBEs.
8.	☐	☐	Communication with the GDOT or the City's DBE Office seeking assistance in identifying available DBEs.
9.	☐	☐	Exploration of joint venture opportunities with DBEs.
10.	☐	☐	Other actions (specify): _____

Please provide written explanation to any "no" answers listed above (by number):

This list is a guideline and by no means exhaustive. The City will review these efforts, along with other documents, towards assessing the Bidder/Proposer's efforts to meet the City's DBE benchmark. If you require assistance in identifying certified DBEs, please contact the Procurement Department or check the GDOT website.

Item L-108 Underground Power Cable for Airports

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per 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 RPR. 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 cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per 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 RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR 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 products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be tabbed by specification section and electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of 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 maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in

accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

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 latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. 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 Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire . For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper or copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet long and 3/4 inch in diameter.

108-2.4 Cable connections. In-line connections or splices 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. Not used.

b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink 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 D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description 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 that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using 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 per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

108-2.5 Splicer qualifications. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport 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. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

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 –Scotch™ 88 (1-1/2 inch wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 Electrical coating. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

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. Cable shall be run without splices, from fixture to fixture.

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 RPR 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 and on both sides of slack loops where a future connector would be 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 light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

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, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch in size. The cable circuit identification shall match the circuits noted on the construction plans.

Removed cable, not called out as abandoned communication line, shall be incidental to the installation bid item.

108-3.2 Installation in duct banks or conduits. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. 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 per the latest version of the 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 any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per 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 ensure that the duct bank or conduit is open, continuous and clear of

debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, 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 re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage 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 hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. 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 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 RPR, 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 use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 Installation of direct-buried cable in trenches. Not used.

108-3.4 Cable markers for direct-buried cable. Not used.

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. Not used.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by the following method: roll-over water seal flap to sealing position on mating connector. wrapped with at least two layers of rubber or synthetic rubber tape and two layers of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by the following method: roll-over water seal flap to sealing position on mating connector. wrapped with at least two layers of rubber or synthetic

rubber tape and two layers of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint .

d. Taped or heat-shrink splices. Not used.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems, i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

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. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90-degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential, with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7..

b. Isolation. Not used this project.

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Nonmetallic light bases are not allowed.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, **external to the raceway or sleeve**.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet 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.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Not used this project.

108-3.7 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 area 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 area of protection measured 45 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.

108-3.8 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.

108-3.9 Exothermic bonding. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, 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:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 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 RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. 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 RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

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

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

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

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than **500** megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. 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.

g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

h. 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.

i. 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 used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation 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 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 installed in trench, duct bank or conduit shall be measured by the number of linear feet installed 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 not include additional quantities required for slack.

108-4.3 No separate payment will be made for ground rods.

108-4.4 Additional ground rods necessary to achieve the required impedance to ground reading shall be incidental to overall project.

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 RPR. 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, and incidentals, including ground rods, ground connectors, removed cable, and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108.1	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed In Trench with Duct, Including Grounding Rods, Including Connections/Terminations - per linear foot
Item L-108.2	No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit - per liner foot
Item L-108.3	Remove Abandoned Communication Line – per linear foot
Item L-108.4	No. 6, 600V, XHHW Cable, Installed in Trench, Duct Bank or Conduit - per liner foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
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

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

END OF ITEM L-108

Item L-109 Airport Transformer Vault and Vault Equipment

DESCRIPTION

109-1.1 This item shall consist of constructing an airport transformer vault or a prefabricated metal housing per these specifications and per the design and dimensions shown in the plans. This work shall also include the installation of conduits in the floor and foundation, painting and lighting of the vault or metal housing, and the furnishing of all incidentals that are necessary to produce a completed unit. Included as a separate part under this item or as a separate item where an existing vault is to be used shall be the furnishing of all vault equipment, wiring, electrical buses, cable, conduit, potheads, and grounding systems. 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 RPR.

EQUIPMENT AND MATERIALS

109-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

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 RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR 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 products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be provided in electronic pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

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.

CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

109-3.1 Electrical vault building. Not included within this project.

109-3.2 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

109-3.3 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

109-3.4 Reinforcing steel. Reinforcing steel bars shall be intermediate or structural grade deformed-type bars and shall be per ASTM A615.

109-3.5 Brick. Brick shall be per ASTM C62, Grade SW.

109-3.6 Rigid steel conduit. Rigid steel conduit and fittings shall be per Underwriters Laboratories Standards 6 and 514B.

109-3.7 Plastic Conduit and fittings. Plastic Conduit and fittings shall conform to the requirements of UL-651 and UL-654 schedule 40 polyvinyl chloride (PVC) suitable for use above or below ground.

109-3.8 Lighting. Vault or metal-housing light fixtures shall be of a vapor-proof type.

109-3.9 Outlets. Convenience outlets shall be heavy-duty duplex units designed for industrial service.

109-3.10 Switches. Vault or metal-housing light switches shall be single-pole switches.

109-3.11 Paint.

a. Priming paint for non-galvanized metal surfaces shall be a high solids alkyd primer compatible with the manufacturer's recommendations for the intermediate or topcoat.

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 (MPI), Reference #9, Exterior Alkyd, Gloss.

c. Priming paint for wood surfaces shall be mixed on the job by thinning the specified white paint by adding 1/2 pint (0.24 liter) of raw linseed oil to each gallon (liter).

d. Paint for the floor, ceiling, and inside walls shall be per Porter Paint Company 69, 71, and 79 or equivalent. Walls and ceiling shall be light gray and the floor shall be medium gray.

e. The roof coating shall be hot asphalt material per ASTM D2823. Asbestos-free roof coating per ASTM D4479 may be substituted if required by local codes.

109-3.12 Ground bus. Ground bus shall be 1/8 × 3/4 inch (3 × 19 mm) minimum copper bus bar.

109-3.13 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 × 4 inch (100 × 100 mm) except where otherwise shown in the plans.

109-3.14 Ground rods. Ground rods shall be in accordance with Item L-108.

109-3.15 Vault prefabricated metal housing. The prefabricated metal housing shall be a commercially available unit.

109-3.16 FAA-approved equipment. Certain items of airport lighting equipment installed in vaults are covered by individual ACs 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
AC 150/5345-56	Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)

109-3.17 Other electrical equipment. 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 and ACs 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 proposal and plans. Equipment selected and installed by the Contractor shall maintain the interrupting current rating of the existing systems or specified rating whichever is greater.

109-3.18 Wire. Wire (in conduit) rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 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 American wire gauge (AWG) and shall be insulated for 600 volts. If telephone control cable is specified, No. 19 AWG telephone cable per ANSI/Insulated Cable Engineers Association (ICEA) S-85-625 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.

109-3.19 Short circuit / coordination / device evaluation / arc flash analysis. The Contractor shall, based upon the equipment provided, include as a part of the submittal process the electrical system "Short Circuit / Coordination / Device evaluation / Arc Flash Analysis". The analysis shall be performed by the equipment manufacturer and submitted in a written report. The analysis shall be signed and sealed by a registered professional Engineer from the state in which the project is located. The analysis shall comply with NFPA-70E and IEEE 1584.

The analysis will include: one line diagrams, short circuit analysis, coordination analysis, equipment evaluation, arc flash analysis and arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary.

The selected firms field service Engineer shall perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will furnish and install the arc flash labels. The components worst case incident energy will be considered the available arc flash energy at that specific point in the system. Submit three written copies and one electronic copy of the report.

CONSTRUCTION METHODS

CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

109-4.1 General. The Contractor shall construct the transformer vault or prefabricated metal housing at the location indicated in the plans. Vault construction shall be reinforced concrete, concrete masonry, or brick wall as specified. The metal housing 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. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program.

The Contractor shall clear, grade, and seed the area around the vault or metal housing for a minimum distance of 10 feet (3 m) on all sides. The slope shall be not less than 1/2 inch per foot (12 mm per 0.3 m) away from the vault or metal housing in all directions.

The vault shall provide adequate protection against weather elements, including rain, wind-driven dust, snow, ice and excessive heat. The vault 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 vault. The Contractor is responsible for contacting the manufacturer of the equipment to be installed to obtain environmental limitations of the equipment to be installed.

109-4.2 Foundation and walls.

a. Reinforced concrete construction. The Contractor shall construct the foundation and walls per the details shown in the plans. Unless otherwise specified, internal ties shall be of the mechanical type so that when the forms are removed the ends of the ties shall be at least one inch (25 mm) beneath the concrete surface; the holes shall be plugged and finished to prevent discoloration. Reinforcing steel shall be placed, as shown in the drawings, and secured in position to prevent displacement during the concrete placement.

The external surfaces of the concrete shall be thoroughly worked during the placing operation to force all coarse aggregate from the surface. Thoroughly work the mortar against the forms to produce a smooth finish free from air pockets and honeycomb.

The surface film of all pointed surfaces shall be removed before setting occurs. As soon as the pointing has set sufficiently, the entire surface inside and outside of the vault shall be thoroughly wet with water and rubbed with a No. 16 carborundum stone, or equivalent quality abrasive, bringing the surface to a paste. All form marks and projections shall be removed. The surface produced shall be smooth and dense without pits or irregularities. The materials which have been ground into a paste during the rubbing process shall be spread or brushed uniformly over the entire surface (except the interior surfaces that are to be painted shall have all paste removed by washing before painting) and permitted to reset. Final exterior finish shall be obtained by rubbing with No. 30 carborundum stone, or an equivalent quality abrasive. The surface shall be rubbed until the entire surface is smooth and uniform in color.

b. Brick and concrete construction. When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The outer edge of the foundation at the floor level shall be beveled 1-1/2 inches (38 mm) at 45 degrees. Brick walls shall be 8 inches (200 mm) thick, laid in running bond with every sixth course a header course. Brick shall be laid in cement mortar (one

part masonry cement and 3 parts sand) with full mortar bed and shoved joints. All joints shall be completely filled with mortar, and facing brick shall be back-parged with mortar as work progresses. All joints shall be 3/8 inch (9 mm) thick, exterior joints tooled concave, and interior joints struck flush. Both interior and exterior brick surfaces shall be cleaned and nail holes, cracks and other defects filled with mortar. When specified, a nonfading mineral pigment mortar coloring shall be added to the mortar. Steel reinforcing bars, 3/8 inch (9 mm) in diameter and 12 inches (300 mm) long, shall be set vertically in the center of the brick wall on not more than 2 feet (60 cm) centers to project 2-1/2 inches (60 mm) into the concrete roof slab. Lintels for supporting the brickwork over doors, windows, and louvers shall consist of two 4 × 3 × 3/8 inch (100 × 75 × 9 mm) steel angles. Lintels shall be painted with one coat of corrosion-inhibiting primer before installation, and all exposed parts shall be painted similar to doors and window sash after installation.

Window sills may be concrete poured in place or precast concrete as indicated in the plans. All exposed surfaces shall have a rubbed finish as specified under reinforced concrete construction. After completion, all interior and exterior faces of walls shall be scrubbed with a solution of muriatic acid and water in the proportions of not less than one part acid to 10 parts of water. All traces of efflorescence, loose mortar, and mortar stain shall be removed, and the walls washed down with clear water.

c. Concrete masonry construction. When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The concrete masonry units shall be standard sizes and shapes and shall conform to ASTM C90 and shall include the closures, jambs, and other shapes required by the construction as shown in the plans. Standard construction practice shall be followed for this type of work including mortar, joints, reinforcing steel for extensions into roof slab, etc. Plaster for interior walls, if specified, shall be Portland cement plaster.

109-4.3 Roof. The roof shall be reinforced concrete as shown in the plans. Reinforcing steel shall be placed as shown in the drawing and secured in position to prevent displacement during the pouring of the concrete. The concrete shall be poured monolithically and shall be free of honeycombs and voids. The surface shall have a steel-troweled finish and shall be sloped as shown in the drawing. The underside of the roof slab shall be finished in the same manner as specified for walls.

One brush or mop coat of hot asphalt roof coating shall be applied to the top surface of the roof slab. The asphalt material shall be heated to within the range specified by the manufacturer and immediately applied to the roof. The finished coat shall be continuous over the roof surface and free from holidays and blisters. Smears and dribbles of asphalt on the roof edges and building walls shall be removed.

109-4.4 Floor. Construct building foundation in accordance with the details shown in the plans. The floor shall be reinforced concrete as shown in the drawings. When present, all sod, roots, refuse, and other perishable material shall be removed from the area under the floor to a depth of 8 inches (200 mm), unless a greater depth is specified in the invitation for bids. This area shall be backfilled with materials consisting of sand, cinders, gravel, or stone. Fill shall be placed in layers not to exceed 4 inches (100 mm) and shall be thoroughly compacted by tamping or rolling. A layer of building paper shall be placed over the fill prior to placing concrete. The floor surfaces shall have a steel-troweled finish. The floor shall be level unless a drain is specified, in which case the floor shall be pitched 1/4 inch (6 mm) per foot downward toward the drain. A 1/4-inch (6-mm) asphalt felt expansion joint shall be placed between floor and foundation walls. The floor shall be poured monolithically and shall be free of honeycombs and voids.

109-4.5 Floor drain. If shown in the plans, a floor drain and dry well shall be installed in the center of the floor of the equipment room. The dry well shall be excavated 4 × 4 feet (1.2 × 1.2 m) square and to a depth of 4 feet (1.2 m) below the finished floor elevation and shall be backfilled to the elevation of the underside of the floor with gravel - which shall all pass a 2-inch (50 mm) mesh sieve and shall all be retained on a 1/4-inch (6.3 mm) mesh sieve. The gravel backfill shall be placed in 6 inch (150 mm)

maximum layers, and the entire surface of each layer shall be tamped either with a mechanical tamper or with a hand tamper weighing not less than 25 pounds (11 kg) and having a face area of not more than 36 square inches (232 square cm) nor less than 16 square inches (103 square cm). The drain inlet shall be set flush in the concrete floor. The drain shall have a clear opening of not less than 8 inches (200 mm) in diameter.

109-4.6 Conduits in floor and foundation. Conduits shall be installed in the floor and through the foundation walls per the details shown in the plans. All underground conduit shall be painted with an asphalt 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. Space conduit entrances shall be left closed.

109-4.7 Doors. Doors shall be metal-clad fireproof Class A (three (3) hour rated) doors conforming to requirements of the National Electrical Code (NEC) and local electrical codes. Panic bar exit hardware shall be installed per NEC requirements. Refer to the new electrical vault detail plan sheets for construction requirements.

109-4.8 Painting. The floor, ceiling, and inside walls of concrete construction shall first be given a hardening treatment, after which the Contractor shall apply two coats of paint as specified below, except that interior face brick walls need not be painted. 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 fluorosilicate or zinc sulfate crystals in one 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 RPR. The floor paint shall be a medium gray color approved by the RPR. Before painting, the surfaces shall be dry and clean. The first coat shall be thinned by adding 2/3-quart (0.63 liters) of spar varnish and 1/3-quart (0.31 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.

109-4.9 Lights and switches. The Contractor shall furnish and install a minimum of two duplex convenience outlets in the vault room. Where a control room is specified, at least two duplex outlets shall be installed.

INSTALLATION OF EQUIPMENT IN VAULT OR PREFABRICATED METAL HOUSING

109-5.1 General. The Contractor shall furnish, install, and connect all equipment, equipment accessories, conduit, cables, wires, buses, grounds, and support necessary to ensure 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. All electrical work shall comply with the NEC and local code agency having jurisdiction including the separation of under 600V work from 5,000V work."

109-5.2 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 RPR. The power supply equipment shall be set on steel "H" sections, "I" beams, channels, or concrete blocks to provide a minimum space of 1-1/2 inch (38 mm) between the equipment and the floor. The equipment shall be placed so as not to obstruct the oil-sampling plugs of the oil-filled units; and name-plates shall, so far as possible, not be obscured.

If specified in the plans and specifications, equipment for an alternate power source or an emergency power generator shall be furnished and installed. The alternate power supply installation shall include all equipment, accessories, an automatic changeover switch, and all necessary wiring and connections. The emergency power generator set shall be the size and type specified.

109-5.3 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 RPR. 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 vaults.

109-5.4 Duct and conduit. The Contractor shall furnish and install square-type exposed metallic ducts with hinged covers for the control circuits in the vault. 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.

109-5.5 Wiring and connections. The Contractor shall make all necessary electrical connections in the vault per the wiring diagrams furnished and as directed by the RPR. 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.

109-5.6 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 (19 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 small tool 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 RPR. The letters and numerals shall be not less than one inch (25 mm) in height and shall be of proportionate width. The Contractor shall also mark the correct circuit designations per the wiring diagram on the terminal marking strips, which are a part of each terminal block.

METHOD OF MEASUREMENT

109-6.1 The quantity of equipment to be paid for under this item shall consist of all equipment installed, connected and accepted as a complete unit ready for operation within an existing vault or prefabricated metal housing. Major vault equipment items to be furnished by the Contractor include:

Disconnect, 30A, 600V, Heavy Duty, Fusible, for AWOS. One in the vault, one at the AWOS Rack.

Transformer 480V-240/120V, 5kVA, nema 3R. Installed at the AWOS power rack.

BASIS OF PAYMENT

109-7.1 Payment will be made at the contract lump sum price for vault 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-109.1	Furnish and Install Specified Vault Equipment - per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

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
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits
AC 150/5345-49	Specification L-854, Radio Control Equipment;
AC 150/5345-53	Airport Lighting Equipment Certification Program

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/ICEA S-85-625	Standard for Telecommunications Cable Aircore, Polyolefin Insulated, Copper Conductor Technical Requirements

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C62	Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C90	Standard Specification for Loadbearing Concrete Masonry Units
ASTM D2823	Standard Specification for Asphalt Roof Coatings, Asbestos Containing
ASTM D4479	Standard Specification for Asphalt Roof Coatings – Asbestos-Free

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation) Institute of Electrical and Electronic Engineers (IEEE)
IEEE 1584	Guide for Performing Arc-Flash Hazard Calculations

Master Painter's Institute (MPI)

MPI Reference #9	Alkyd, Exterior, Gloss (MPI Gloss Level 6)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit – Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-70E	Standard for Electrical Safety in the Workplace
NFPA-780	Standard for the Installation of Lightning Protection Systems

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 or buried in sand) installed per this specification at the locations and per 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, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per 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 requested by the RPR.

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

c. All materials and equipment used to construct this item shall be submitted to the RPR 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 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 made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be tabbed by specification section and electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

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.

110-2.2 Steel conduit. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 Plastic conduit. Plastic conduit and fittings-shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 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.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement 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. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches 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 RPR 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 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 per 100 feet. 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. Under pavement, the top of the duct bank shall not be less than 18 inches below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not 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 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 light bases, manholes, 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 RPR 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 contaminants 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 used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

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.

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 may alternatively be used

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 RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per 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 RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

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

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables) cross proposed installations, the Contractor shall ensure that these cables 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:

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

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, 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.

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 18 inches below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet beyond the edges of the pavement or 3 feet beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, 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 thick prior to its initial set. 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 thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

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 RPR 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 intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches wide tape, 8 inches minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch wide tape only for single conduit runs. Utilize the 6-inch wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches nor more than 12 inches wide. 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 4 inches 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 sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively 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 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 below the finished grade per National Electric Code (NEC), Table 300.5.

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 apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches 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 be placed not less than 3 inches apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches 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 RPR for review prior to use.

110-3.4 Markers. Not required.

110-3.5 Backfilling for conduits. For conduits, 8 inches 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 per Item P-152 except that material used for back fill shall be select material not larger than 4 inches in diameter.

Flowable backfill may alternatively 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 per instructions issued by the RPR.

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfilling shall be select material not larger than 4 inches in diameter. In addition to the requirements of Item P-152, 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 may alternatively 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 per instructions issued by the RPR.

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 seeding and mulching shown on the plans. 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 pay item of which it is a component part.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, 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 removal and disposal of existing duct banks and conduits as shown on the plans, 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 per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110.1	Concrete Encased Electrical Duct Bank, 2W-2" - per linear foot
Item L-110.2	Concrete Encased Electrical Duct Bank, 4W-4" – per linear foot
Item L-110.3	Concrete Encased New Electrical Duct Bank, 4W-4" – per linear foot
Item L-110.4	Concrete Encased Conduit, 1W-2" Type II PVC – per linear foot
Item L-110.5	Non-Encased Electrical Conduit, 1W-2" Type II PVC - per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers

UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

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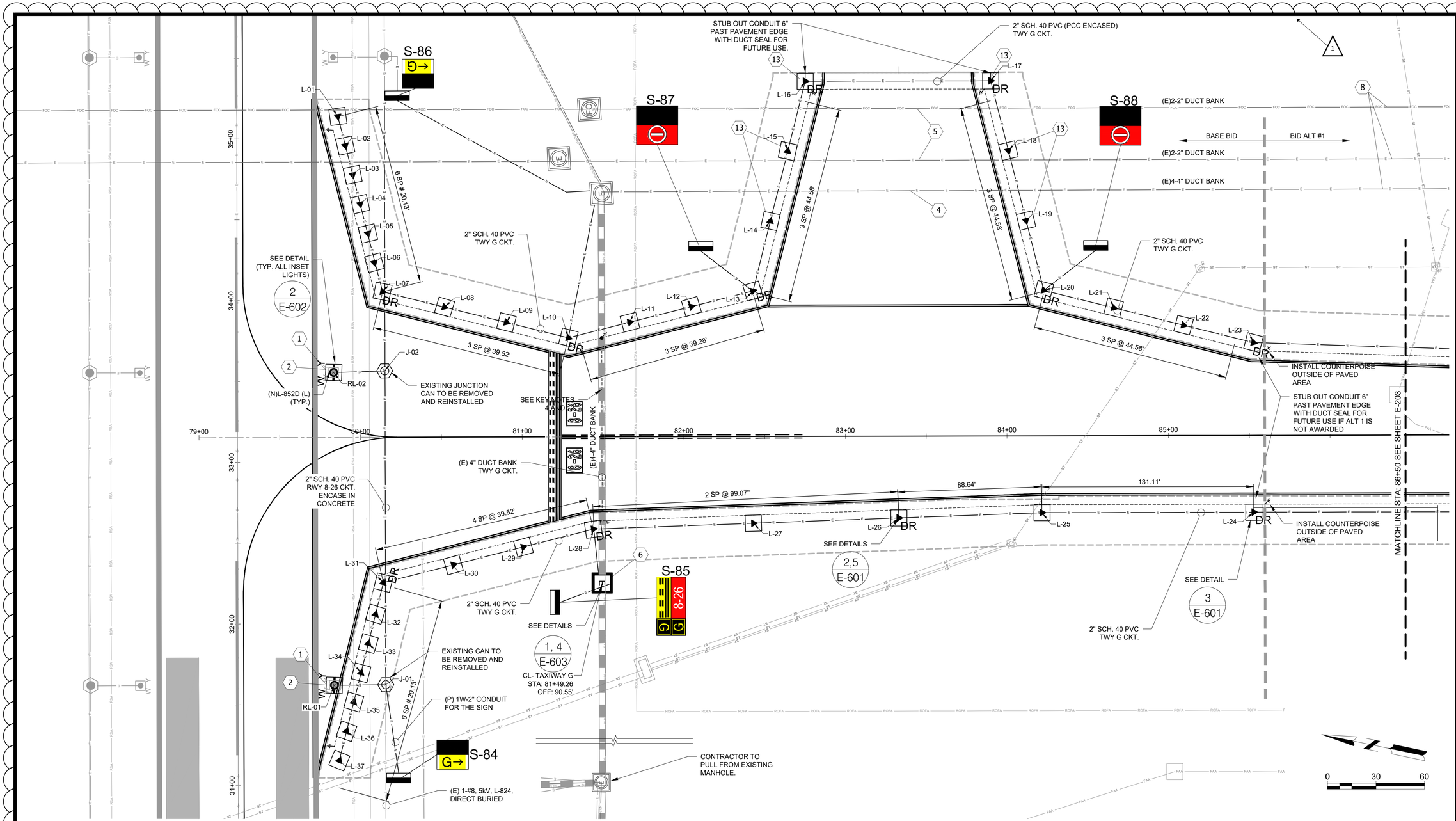

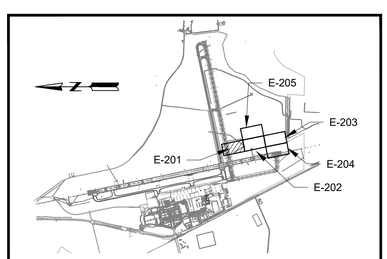

KEYMAP
NOT TO SCALE

ELECTRICAL LEGEND

- (E) WIRE/CONDUIT TO REMAIN
- (N) #8 5KV, L-824C, IN (N) 2" SCH. 40 PVC
- (N) #6 SOLID BARE COPPER COUTERPOISE
- (N) L-861T LED MITL, ON L-867 BASE
- DR (N) L-861T LED MITL, ON L-867 BASE WITH DRAINAGE
- W Y (N) L852D(L) INSET, LED MIRL ON L868 BASE
- (N) TAXIWAY GUIDANCE SIGN PCC BASE.
- L-867D J-CAN W/ 3/4" SOLID COVER (PULL THRU ONLY)
- E (N) 4'X4'X4' AIRCRAFT RATED HANDHOLE WITH SPRING-ASSISTED LID
- (N) ¾"X10' COPPER CLAD GROUND ROD
- G - 101 FUTURE ELEVATED LIGHT NUMBER, SEE SCHEDULE E-211

ELECTRICAL KEY NOTES

1. REMOVE (E) RUNWAY EDGE LIGHT FIXTURE BASE CAN, AND 2" PVC. SALVAGE FIXTURE TO THE AIRPORT
2. INSTALL (N) L852D(L), (COLOR AS SHOWN) ON (N) L868 BASE CAN. SEE DETAIL ON SHEET E-601
3. RUNWAY EDGE LIGHTS IMPACTED BY THE SHOULDER RECONSTRUCTION ON RUNWAY 8-26 AND NOT SCHEDULED FOR REPLACEMENT, SHALL BE REMOVED, STORED, AND REINSTALLED ON (N) L867 LIGHT BASE. SEE DETAIL ON SHEET E-601
4. LOCATE (E) 4-4" DUCT BANK. EXPOSE CAREFULLY AND CONCRETE ENCASE UNDER PROPOSED PAVEMENT. A MINIMUM OF 3" COVER AROUND DUCT BANK IS REQUIRED. CONTRACTOR TO PROTECT EXISTING COUNTERPOISE.
5. LOCATE (E) 2-2" DUCT BANK. EXPOSE CAREFULLY AND CONCRETE ENCASE UNDER PROPOSED PAVEMENT. A MINIMUM OF 3" COVER AROUND DUCT BANK IS REQUIRED.CONTRACTOR TO PROTECT EXISTING COUNTERPOISE.
6. INSTALL (N) AIRCRAFT-RATED HANDHOLE 4'X4'X4' (INSIDE DIMENSIONS) WITH SPRING ASSISTED COVER, ON TO (E) 4-4" DUCT BANK. INSTALLATION SHALL INCLUDE: LOCATING EXISTING DUCT; PULLING BACK (E)14-#5KV HOMERUN CABLES; RE-INSTALLING AND RECONNECTING (E) HOMERUNS USING L823 SUPERKIT OR COMPLETE KIT CONNECTORS.
7. INSTALL TEMPORARY #8, 5KV JUMPER CABLES, AS NECESSARY TO KEEP RWY AND/OR TWY CIRCUIT ENERGIZED.
8. PROTECT (E) UTILITIES AT ALL TIMES DURING THE PROJECT.
9. CLEAN (E) CONDUIT PRIOR TO REUSING.
10. IF CONFLICT BETWEEN THE ELECTRICAL DUCT RUN AND PAVEMENT EDGE DRAIN OR STORM LINE ARISES, CONTRACTOR SHALL ROUTE DUCT 6" (MIN) BELOW EDGE DRAIN OR STORM LINE INVERT.
11. CORE (E) L867 LIGHT BASE AND INSTALL 2" PVC MALE ADAPTER. CONNECT (N) 2" PVC TO (E) LIGHT BASE
12. INSTALL COUNTERPOISE USING THE EQUIPOTENTIAL METHOD WHERE THE COUTERPOISE IS CENTERED OVER THE DUCT AND BONDED TO THE LIGHT BASE/GROUND ROD. ALL CONDUIT/DUCT RUNS REQUIRES COUNTERPOISE INSTALLATION.
13. INSTALL ⅜" BLANK COVER. DELIVER LIGHT FIXTURE AND ISO TRANSFORMER TO THE AIRPORT FOR LATER USE.

Mead & Hunt
Mead and Hunt, Inc.
878 South Lake Drive
Lexington, SC 29072
phone: 803-996-2900
meadhunt.com

Augusta Regional Airport

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AUGUSTA REGIONAL AIRPORT
CONSTRUCT TAXIWAY G

1501 AVIATION WAY
AUGUSTA, GA 30906-9620

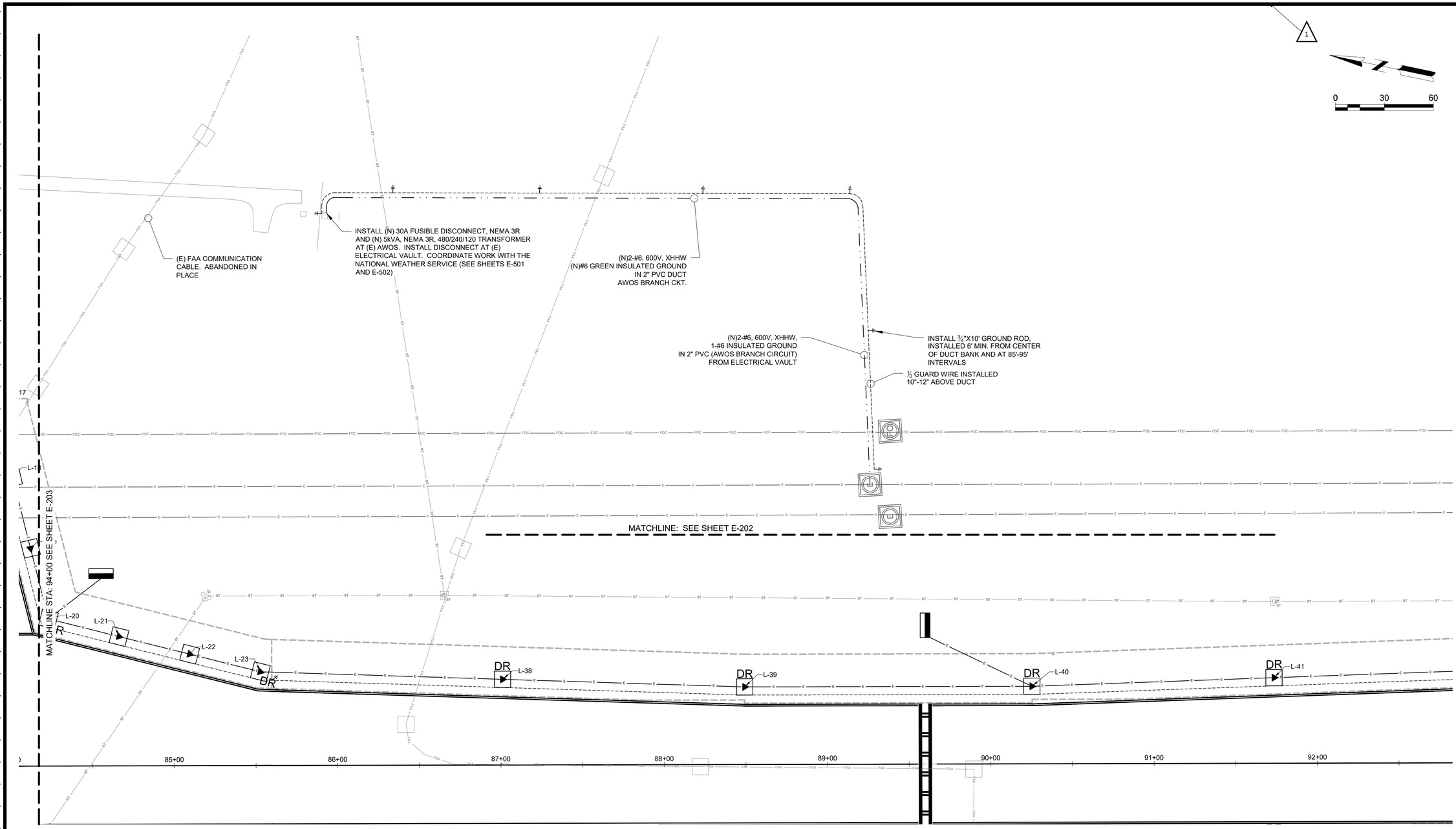
REVISION
ISSUED FOR BID
REV. 1: REVISED CALL-OUTS

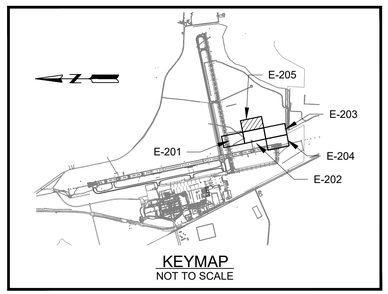
NOT FOR CONSTRUCTION

M&H NO.: 0119700-170869.02
DATE: DECEMBER 6, 2022
DESIGNED BY: AR
DRAWN BY: AR
CHECKED BY: CH
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ELECTRICAL LAYOUT

SHEET NO.
E-201





KEYMAP
NOT TO SCALE

ELECTRICAL LEGEND

- (E) WIRE AND CONDUIT TO REMAIN
- (N) #8 5KV, L-824C, IN (N) 2" SCH. 40 PVC
- (N) #6 SOLID BARE COPPER COUTERPOISE
- (N) L861T(L) ELEVATED, LED MITL ON L867 BASE
- (N) L861T(L) ELEVATED, LED MITL ON L867 BASE WITH DRAINAGE
- W Y (N) L850C, INSET HIRL ON L868 BASE
- W Y (N) L852D(L) INSET, LED MIRL ON L868 BASE
- (N) L858 (L) TAXIWAY GUIDANCE SIGN ON PCC BASE.
- L868D J-CAN W/ 1-1/4" SOLID COVER (PULL THRU ONLY)
- E (N) 4'X4'X4' AIRCRAFT RATED HANDHOLE WITH SPRING-ASSISTED LID
- (N) ¾"X10' COPPER CLAD GROUND ROD
- S - 11 SIGN NUMBER, SEE SCHEDULE E-212
- A - 101 ELEVATED LIGHT NUMBER, SEE SCHEDULE E-211

ELECTRICAL KEY NOTES

1. REMOVE (E) RUNWAY EDGE LIGHT FIXTURE BASE CAN, AND 2" PVC. SALVAGE FIXTURE TO THE AIRPORT
2. INSTALL (N) L852D(L), (COLOR AS SHOWN) ON (N) L868 BASE CAN. SEE DETAIL ON SHEET E-601
3. RUNWAY EDGE LIGHTS IMPACTED BY THE SHOULDER RECONSTRUCTION ON RUNWAY 8-26 AND NOT SCHEDULED FOR REPLACEMENT, SHALL BE REMOVED, STORED, AND REINSTALLED ON (N) L867 LIGHT BASE. SEE DETAIL ON SHEET E-601
4. LOCATE (E) 4-4" DUCT BANK. EXPOSE CAREFULLY AND CONCRETE ENCASE UNDER PROPOSED PAVEMENT. A MINIMUM OF 3" COVER AROUND DUCT BANK IS REQUIRED. CONTRACTOR TO PROTECT EXISTING COUNTERPOISE.
5. LOCATE (E) 2-2" DUCT BANK. EXPOSE CAREFULLY AND CONCRETE ENCASE UNDER PROPOSED PAVEMENT. A MINIMUM OF 3" COVER AROUND DUCT BANK IS REQUIRED.CONTRACTOR TO PROTECT EXISTING COUNTERPOISE.
6. INSTALL (N) AIRCRAFT-RATED HANDHOLE 4'X4'X4' (INSIDE DIMENSIONS) WITH SPRING ASSISTED COVER, ON TO (E) 4-4" DUCT BANK. INSTALLATION SHALL INCLUDE: LOCATING EXISTING DUCT; PULLING BACK (E)14-#5KV HOMERUN CABLES; RE-INSTALLING AND RECONNECTING (E) HOMERUNS USING L823 SUPERKIT OR COMPLETE KIT CONNECTORS.
7. INSTALL TEMPORARY #8, 5KV JUMPER CABLES, AS NECESSARY TO KEEP RWY AND/OR TWY CIRCUIT ENERGIZED.
8. PROTECT (E) UTILITIES AT ALL TIMES DURING THE PROJECT.
9. CLEAN (E) CONDUIT PRIOR TO REUSING.
10. IF CONFLICT BETWEEN THE ELECTRICAL DUCT RUN AND PAVEMENT EDGE DRAIN OR STORM LINE ARISES, CONTRACTOR SHALL ROUTE DUCT 6" (MIN) BELOW EDGE DRAIN OR STORM LINE INVERT.
11. CORE (E) L867 LIGHT BASE AND INSTALL 2" PVC MALE ADAPTER. CONNECT (N) 2" PVC TO (E) LIGHT BASE
12. INSTALL COUNTERPOISE USING THE EQUIPOTENTIAL METHOD WHERE THE COUTERPOISE IS CENTERED OVER THE DUCT AND BONDED TO THE LIGHT BASE/GROUND ROD. ALL CONDUIT/DUCT RUNS REQUIRES COUNTERPOISE INSTALLATION.
13. INSTALL ¾" BLANK COVER. DELIVER LIGHT FIXTURE AND ISO TRANSFORMER TO THE AIRPORT FOR LATER USE.

Mead & Hunt
Mead and Hunt, Inc.
878 South Lake Drive
Lexington, SC 29072
phone: 803-996-2900
meadhunt.com

Augusta Regional Airport

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AUGUSTA REGIONAL AIRPORT
CONSTRUCT TAXIWAY G

1501 AVIATION WAY
AUGUSTA, GA 30906-9620

REVISION
ISSUED FOR BID
REV. 1: REVISED CALL-OUTS

NOT FOR CONSTRUCTION

AIP NO.:
M&H NO.: 0119700-170869.02
DATE: DECEMBER 6, 2022
DESIGNED BY: EJS
DRAWN BY: NJH
CHECKED BY: DES
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SHEET CONTENTS
ELECTRICAL LAYOUT

SHEET NO.
E-205

1-2

SUMMARY OF QUANTITIES			
SPEC.	ITEM	UNIT	QUANTITY
AGS TAXIWAY G (BASE BID - ASPHALT SHOULDERS)			
C-100.1	Contractor Quality Control Program	LS	1
C-102.1a	Installation, Maintenance, and Removal of Silt Fence or Silt Sock	LF	11754
C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	EA	48
C-102.1c	Construct, Maintain, and Remove Construction Exit	EA	1
C-102.1d	Water Quality Monitoring and Sampling	EA	36
C-102.1e	Water Quality Inspections	EA	18
C-102.1f	Erosion Control Mobilization	LS	1
C-102.1g	Emergency Erosion Control Mobilization	LS	1
C-102.1h	Permanent Water Quality Inserts	EA	14
C-105.1	Mobilization, Cleanup, and Demobilization	LS	1
C-105.2	Airfield Safety and Traffic Control	LS	1
P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	SY	2032
P-101.2	Cold Milling	SY	233
P-152.1	Unclassified Excavation, Dispose Off-Site	CY	3290
P-152.3	Subgrade Preparation	SY	16190
P-152.4	Unsuitable/Over Excavation	CY	5000
P-154.1	Uncrushed Aggregate Base Course (6")	CY	1607
P-154.2	Uncrushed Aggregate Base Course (12")	CY	1895
P-306.1	Lean Concrete Base Course (5")	SY	11170
P-401.1	Asphalt Concrete Surface Course (4")	TON	1085
P-403.1	Asphalt Concrete Base Course (4")	TON	1085
P-501.1	Portland Cement Concrete Pavement (14")	SY	10581
X-501.1	Portland Cement Concrete Curing Facility	LS	1
P-602.1	Emulsified Asphalt Prime Coat	Gal	482
P-603.1	Emulsified Asphalt Tack Coat	Gal	241
P-605.1	Joint Sealing Filler	LF	17577
P-620.1	Permanent Pavement Markings	SF	9393
P-620.2	Temporary Pavement Markings	SF	9393
P-620.3	Reflective Media	LBS	280
P-620.4	Thermoplastic Preformed Surface Sign	EA	2
P-620.6	Marking Removal	SF	5566
D-701.1	Concrete Sewer Pipe, 18-inch, Class V	LF	70
D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	LF	1165
D-705.2	Underdrain Clean-out	EA	8
D-751.2	Airfield Inlet with Aircraft Rated Grate	EA	1
D-751.3	Adjust Storm Manhole/Inlet to Grade	EA	1
D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	EA	1
T-901.1	Temporary Seeding	AC	3
T-901.2	Permanent Seeding	AC	3
T-901.3	Seeding, Staging Area	AC	1
T-905.1	Topsoiling (Obtain on Site or Removed from Stockpile)	CY	1173
T-905.2	Topsoiling, Staging Area	CY	2762
L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	LF	1696
L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	LF	2789
L-108.3	Remove Abandoned Communication Line	LF	1957
L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	LF	364
L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	LF	367
L-110.3	Concrete Encased Conduit, 1W-2" Type II PVC	LF	2089
L-110.4	Non-Encased Conduit, 1W-2" Type II PVC	LF	426
L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	EA	1
L-115.2	Electrical Junction Structure with Aircraft rated Blank Cover, without Drainage	EA	1
L-115.3	Electrical Junction Structure with Blank Cover, without Drainage	EA	1
L-125.1	In-Pavement LED Medium Intensity Runway Edge Light, L-852D (L)	EA	2
L-125.2	Base Mounted, LED Medium Intensity Taxiway Edge Light With Drainage	EA	25
L-125.3	Base Mounted, LED Medium Intensity Taxiway Edge Light Without Drainage	EA	11
L-125.4	Miscellaneous Lighting Equipment	LS	1
L-125.5	Remove Edge Light Fixture and/or Base Can	EA	5
L-125.6	Taxiway Guidance Sign, 1 Module, Size 2, Style 3, Mode 2	EA	2
L-125.7	Taxiway Guidance Sign, 2 Module, Size 2, Style 3, Mode 3	EA	2
L-125.9	Taxiway Guidance Sign, 4 Module, Size 2, Style 3, Mode 3	EA	1
L-125.10	Non-Lighted Taxiway End Sign	EA	1
L-125.11	Edge Light Number Tags	EA	36

SUMMARY OF QUANTITIES			
SPEC.	ITEM	UNIT	QUANTITY
AGS TAXIWAY G (BASE BID-CONCRETE SHOULDERS)			
C-100.1	Contractor Quality Control Program	LS	1
C-102.1a	Installation, Maintenance, and Removal of Silt Fence or Silt Sock	LF	11754
C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	EA	48
C-102.1c	Construct, Maintain, and Remove Construction Exit	EA	1
C-102.1d	Water Quality Monitoring and Sampling	EA	36
C-102.1e	Water Quality Inspections	EA	18
C-102.1f	Erosion Control Mobilization	LS	1
C-102.1g	Emergency Erosion Control Mobilization	LS	1
C-102.1h	Permanent Water Quality Inserts	EA	14
C-105.1	Mobilization, Cleanup, and Demobilization	LS	1
C-105.2	Airfield Safety and Traffic Control	LS	1
P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	SY	1972
P-101.2	Cold Milling	SY	233
P-152.1	Unclassified Excavation, Remove Off-Site	CY	3290
P-152.3	Subgrade Preparation	SY	15718
P-152.4	Unsuitable/Over excavation	CY	5000
P-154.1	Uncrushed Aggregate Base Course (6")	CY	2620
P-306.1	Lean Concrete Base Course (5")	SY	10844
P-501.1	Portland Cement Concrete Pavement (14")	SY	14953
X-501.1	Portland Cement Concrete Curing Facility	LS	1
P-605.1	Joint Sealing Filler	LF	17065
P-620.1	Permanent Pavement Markings	SF	9120
P-620.2	Temporary Pavement Markings	SF	9120
P-620.3	Reflective Media	LBS	272
P-620.4	Thermoplastic Preformed Surface Sign	EA	2
P-620.6	Marking Removal	SF	5404
D-701.1	Concrete Sewer Pipe, 18-inch, Class V	LF	70
D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	LF	1165
D-705.2	Underdrain Clean-out	EA	8
D-751.2	Airfield Inlet with Aircraft Rated Grate	EA	1
D-751.3	Adjust Storm Manhole/Inlet to Grade	EA	1
D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	EA	1
T-901.1	Temporary Seeding	AC	3
T-901.2	Permanent Seeding	AC	3
T-901.3	Seeding, Staging Area	AC	1
T-905.1	Topsoiling (Obtain on Site or Removed from Stockpile)	CY	1139
T-905.2	Topsoiling, Staging Area	CY	2762
L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	LF	1647
L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	LF	2708
L-108.3	Remove Abandoned Communication Line	LF	1900
L-110.1	Concrete Encase Electrical Duct Bank, 2W-2"	LF	353
L-110.2	Concrete Encase Electrical Duct Bank, 4W-4"	LF	356
L-110.3	Concrete Encased Conduit, 1W-2" Type II PVC	LF	2028
L-110.4	Non-Encased Conduit, 1W-2" Type II PVC	LF	414
L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	EA	1
L-115.2	Electrical Junction Structure with Aircraft rated Blank Cover, without Drainage	EA	1
L-115.3	Electrical Junction Structure with Blank Cover, without Drainage	EA	1
L-125.1	In-Pavement LED Medium Intensity Runway Edge Light, L-852D (L)	EA	2
L-125.2	Base Mounted, LED Medium Intensity Taxiway Edge Light With Drainage	EA	25
L-125.3	Base Mounted, LED Medium Intensity Taxiway Edge Light Without Drainage	EA	11
L-125.4	Miscellaneous Lighting Equipment	LS	1
L-125.5	Remove Edge Light Fixture and/or Base Can	EA	5
L-125.6	Taxiway Guidance Sign, 1 Module, Size 2, Style 3, Mode 2	EA	2
L-125.7	Taxiway Guidance Sign, 2 Module, Size 2, Style 3, Mode 2	EA	2
L-125.9	Taxiway Guidance Sign, 4 Module, Size 2, Style 3, Mode 2	EA	1
L-125.10	Non-Lighted Taxiway End Sign	EA	1
L-125.11	Edge Light Number Tags	EA	36

NOTE: SUMMARY OF QUANTITIES TABLES ARE DESIGNED TO BE USED AS A REFERENCE IN THE FIELD. VALUES OUTLINED IN THE BID FORM TAKE SUPERIORITY OVER ANY VALUES SHOWN IN THE QUANTITY TABLES

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Augusta Regional Airport

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AUGUSTA REGIONAL AIRPORT
CONSTRUCT TAXIWAY G

1501 AVIATION WAY
AUGUSTA, GA 30906-9620

REVISION
ISSUED FOR BID
REV. 1: REVISED QUANTITIES
REV. 2: REVISED QUANTITIES

NOT FOR CONSTRUCTION

M&H NO.: 0119700-170869.02
DATE: DECEMBER 6, 2022
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SHEET CONTENTS
PROJECT QUANTITY TABLES

SHEET NO.
G-061

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SUMMARY OF QUANTITIES			
SPEC.	ITEM	UNIT	QUANTITY
AGS TAXIWAY G (ALTERNATE 1 - ASHPALT SHOULDERS)			
C-100.1	Contractor Quality Control Program	LS	1
C-102.1a	Installation, Maintenance, and Removal of Silt Fence or Silt Sock	LF	11754
C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	EA	48
C-102.1c	Construct, Maintain, and Remove Construction Exit	EA	1
C-102.1d	Water Quality Monitoring and Sampling	EA	36
C-102.1e	Water Quality Inspections	EA	18
C-102.1f	Erosion Control Mobilization	LS	1
C-102.1g	Emergency Erosion Control Mobilization	LS	1
C-105.1	Mobilization, Cleanup, and Demobilization	LS	1
C-105.2	Airfield Safety and Traffic Control	LS	1
P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	SY	488
P-101.3	Remove Existing 36" RCP	LF	102
P-152.2	Unclassified Excavation, Select Fill from On-Site Material	CY	2844
P-152.3	Subgrade Preparation	SY	37137
P-152.4	Unsuitable/Over excavation	CY	10000
P-154.1	Uncrushed Aggregate Base Course (6")	CY	3998
P-154.2	Uncrushed Aggregate Base Course (12")	CY	4383
P-306.1	Lean Concrete Base Course (5")	SY	23536
P-401.1	Asphalt Concrete Surface Course (4")	TON	2959
P-403.1	Asphalt Concrete Base Course (4")	TON	2959
P-501.1	Portland Cement Concrete Pavement (14")	SY	22182
X-501.1	Portland Cement Concrete Curing Facility	LS	1
P-602.1	Emulsified Asphalt Prime Coat	Gal	1315
P-603.1	Emulsified Asphalt Tack Coat	Gal	657
P-605.1	Joint Sealing Filler	LF	32861
P-620.1	Permanent Pavement Markings	SF	30223
P-620.2	Temporary Pavement Markings	SF	30223
P-620.3	Reflective Media	LBS	1060
P-620.4	Thermoplastic Preformed Surface Sign	EA	2
P-620.5	Temporary Displaced Threshold	LS	1
D-701.1	Concrete Sewer Pipe, 18-inch, Class V	LF	231
D-701.2	Concrete Sewer Pipe, 24-inch, Class V	LF	89
D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	LF	3281
D-705.2	Underdrain Clean-out	EA	14
D-751.1	Aircraft Ranted Manhole with Aircraft Rated Lid	EA	2
D-751.2	Airfield Inlet with Aircraft Rated Grate	EA	1
D-751.3	Adjust Storm Manhole/Inlet to Grade	EA	1
D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	EA	1
T-901.1	Temporary Seeding	AC	6
T-901.2	Permanent Seeding	AC	6
T-901.3	Seeding, Staging Area	AC	1
T-905.1	Topsoiling (Obtain on Site or Removed from Stockpile)	CY	2612
T-905.2	Topsoiling, Staging Area	CY	2762
L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	LF	5141
L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	LF	5565
L-108.4	No. 6, 600V, XHHW Cable	LF	1612
L-109.1	Furnish and Install Specificed Vault Equipment	LS	1
L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	LF	354
L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	LF	196
L-110.3	Concrete Encased New Electrical Duct Bank, 4W-4"	LF	149
L-110.4	Concrete Encased Conduit, 1W-2" Type II PVC	LF	4255
L-110.5	Non-Encased Conduit, 1W-2" Type II PVC	LF	1046
L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	EA	2
L-115.3	Electrical Junction Structure with Blank Cover, without Drainage	EA	1
L-125.2	L-861T(L) Elevated, 14" HT, LED MITL on New L-867B Base Can with Drainage	EA	22
L-125.3	L-861T(L) Elevated, 14" HT, LED MITL on New L-867B Base Can without Drainage	EA	28
L-125.4	Miscellaneous Lighting Equipment	LS	1
L-125.6	Taxiway Guidance Sign, 1 Module, Size 2, Style 3, Mode 2	EA	2
L-125.7	Taxiway Guidance Sign, 2 Module, Size 2, Style 3, Mode 3	EA	1
L-125.8	Taxiway Guidance Sign, 3 Module, Size 2, Style 3, Mode 4	EA	1
L-125.9	Taxiway Guidance Sign, 4 Module, Size 2, Style 3, Mode 3	EA	2
L-125.10	Edge Light Number Tags	EA	50

SUMMARY OF QUANTITIES			
SPEC.	ITEM	UNIT	QUANTITY
AGS TAXIWAY G (ALTERNATE 1 - CONCRETE SHOULDERS)			
C-100.1	Contractor Quality Control Program	LS	1
C-102.1a	Installation, Maintenance, and Removal of Silt Fence or Silt Sock	LF	11754
C-102.1b	Construct, Maintain, and Remove Inlet Sediment Trap	EA	48
C-102.1c	Construct, Maintain, and Remove Construction Exit	EA	1
C-102.1d	Water Quality Monitoring and Sampling	EA	36
C-102.1e	Water Quality Inspections	EA	18
C-102.1f	Erosion Control Mobilization	LS	1
C-102.1g	Emergency Erosion Control Mobilization	LS	1
C-105.1	Mobilization, Cleanup, and Demobilization	LS	1
C-105.2	Airfield Safety and Traffic Control	LS	1
P-101.1	Asphaltic Concrete Pavement Removal, Full Depth, Off Site	SY	488
P-101.3	Remove Existing 36" RCP	LF	102
P-152.2	Unclassified Excavation, Select Fill from On-Site Material	CY	2844
P-152.3	Subgrade Preparation	SY	37137
P-152.4	Unsuitable/Over excavation	CY	10000
P-154.1	Uncrushed Aggregate Base Course (6")	CY	6189
P-306.1	Lean Concrete Base Course (5")	SY	23536
P-501.1	Portland Cement Concrete Pavement (14")	SY	35331
X-501.1	Portland Cement Concrete Curing Facility	LS	1
P-605.1	Joint Sealing Filler	LF	32861
P-620.1	Permanent Pavement Markings	SF	30223
P-620.2	Temporary Pavement Markings	SF	30223
P-620.3	Reflective Media	LBS	1060
P-620.4	Thermoplastic Preformed Surface Sign	EA	2
P-620.5	Temporary Displaced Threshold	LS	1
D-701.1	Concrete Sewer Pipe, 18-inch, Class V	LF	231
D-701.2	Concrete Sewer Pipe, 24-inch, Class V	LF	89
D-705.1	6-Inch Perforated Polyethylene Underdrain Pipe, Schedule 40, Complete	LF	3281
D-705.2	Underdrain Clean-out	EA	14
D-751.1	Aircraft Ranted Manhole with Aircraft Rated Lid	EA	2
D-751.2	Airfield Inlet with Aircraft Rated Grate	EA	1
D-751.3	Adjust Storm Manhole/Inlet to Grade	EA	1
D-751.4	Connect Storm Sewer Pipe to Existing Storm Structure	EA	1
T-901.1	Temporary Seeding	AC	6
T-901.2	Permanent Seeding	AC	6
T-901.3	Seeding, Staging Area	AC	1
T-905.1	Topsoiling (Obtain on Site or Removed from Stockpile)	CY	2612
T-905.2	Topsoiling, Staging Area	CY	2762
L-108.1	No. 6 AWG Counterpoise, Including Grounding Rods, Installed	LF	5141
L-108.2	No. 8 AWG, 5kV, L-824 Type C Cable	LF	5565
L-108.4	No. 6, 600V, XHHW Cable	LF	1612
L-109.1	Furnish and Install Specificed Vault Equipment	LS	1
L-110.1	Concrete Encased Electrical Duct Bank, 2W-2"	LF	354
L-110.2	Concrete Encased Electrical Duct Bank, 4W-4"	LF	196
L-110.3	Concrete Encased New Electrical Duct Bank, 4W-4"	LF	149
L-110.4	Concrete Encased Conduit, 1W-2" Type II PVC	LF	4255
L-110.5	Non-Encased Conduit, 1W-2" Type II PVC	LF	1046
L-115.1	Aircraft Rated Manhole, 4'x4' with Spring Assisted Cover	EA	2
L-115.3	Electrical Junction Structure with Blank Cover, without Drainage	EA	1
L-125.2	L-861T(L) Elevated, 14" HT, LED MITL on New L-867B Base Can with Drainage	EA	22
L-125.3	L-861T(L) Elevated, 14" HT, LED MITL on New L-867B Base Can without Drainage	EA	28
L-125.4	Miscellaneous Lighting Equipment	LS	1
L-125.6	Taxiway Guidance Sign, 1 Module, Size 2, Style 3, Mode 2	EA	2
L-125.7	Taxiway Guidance Sign, 2 Module, Size 2, Style 3, Mode 2	EA	1
L-125.8	Taxiway Guidance Sign, 3 Module, Size 2, Style 3, Mode 2	EA	1
L-125.9	Taxiway Guidance Sign, 4 Module, Size 2, Style 3, Mode 2	EA	2
L-125.10	Edge Light Number Tags	EA	50

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CONSTRUCT TAXIWAY G

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SHEET CONTENTS
PROJECT QUANTITY TABLES

SHEET NO.
G-062

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