



E-MAILED/MAILED

TO: All Vendors  
 Tywana Scott, Quality Assurance Analyst  
 Steve Gay, Daniel Field Airport  
 Becky Shealy, Daniel Field Airport

FROM: Geri Sams  
 Procurement Director *(Signature)*

DATE: March 20, 2023

SUBJ: **Addendum 2 – New Bid Opening Date and Clarifications to the Specifications**

BID ITEM: **Bid Item #23-150 Construction - Airfield Electrical System Upgrade for Runways 5-23 & 11-29 for Augusta, GA – Daniel Field Airport**

**NEW BID OPENING DATE: Tuesday, March 28, 2023 @ 3:00 p.m.**

**ADDENDUM NO. 2**

This Addendum shall form a part of the referenced Bid Item #23-150 Construction - Airfield Electrical System Upgrade for Runways 5-23 & 11-29 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 #23-150 Construction - Airfield Electrical System Upgrade for Runways 5-23 & 11-29 for Augusta, GA – Daniel Field Airport has been changed:

**From: Wednesday, March 22, 2023 @ 3:00 p.m.**

**To: Tuesday, March 28, 2023 @ 3:00 p.m.**

**Clarifications to the Specifications:**

**Construction Drawings Changes/Clarifications:**

- A. **Replace Sheet GE1** – Electrical Legends & Notes with revised Sheet GE1 attached to this Addendum 2.
  - Added General Electrical Note 26.
- B. **Replace Sheet E1** – Airfield Lighting & Wiring Plan – Runway 5/23 – Part 1 with revised Sheet E1 attached to this Addendum 2.
  - Added note on REIL Sync Cable Keynote 1 stating "Route cable around Runway 5 end threshold as required".
- C. **Replace Sheet E6** – Airfield Lighting & Wiring Plan – Runway 5/23 – Part 6 with revised Sheet E6 attached to this Addendum 2.
  - Added one (1) REIL light on opposite of Runway 23 end.
  - Added Keynote 7.
  - Added one (1) Runway 5-23 edge light.

Room 605 - 535 Telfair Street, Augusta Georgia 30901  
 (706) 821-2422 - Fax (706) 821-2811

[www.augustaga.gov](http://www.augustaga.gov)

Register at [www.demandstar.com/supplier](http://www.demandstar.com/supplier) for automatic bid notification



Scan this QR code with your smartphone or camera equipped tablet to visit the Augusta, Georgia

- D. **Replace Sheet E7** – Airfield Lighting & Wiring Plan Runway 5/23 – Part 7 with revised Sheet E7 attached to this Addendum 2.
- Conduit size for Wind cone Circuit revised to 1” C.
- E. **Replace Sheet E22** – Airfield Lighting & Wiring Plan –Runway 11/29 - Part 1 (ADD) with revised Sheet E22 attached to this Addendum 2.
- Keynote 1 revised to add note stating “ Route cable around Runway 11 end threshold as required.”
  - General Note has been revised, See Section III Clarification Notes of this Addendum 2.
- F. **Replace Sheets E23-E26** – Airfield Lighting & Wiring Plan –Runway 11/29 - Parts 2-5 (ADD) with revised Sheets E23-E26 attached to this Addendum 2.
- General Note has been revised, See Section III Clarification Notes of this Addendum 2.

**Project Manual Changes/Clarifications:**

- G. **Replace Specification L-108** – Underground Power Cable for Airports and its entirety with revised Specification Section L-108 attached to this Addendum 2.
- Line Item L-108-5.0 – Existing L-824, 5kV Conductor, Removed has been added
  - Line Item L-108-5.4 – No. 12 AWG, 600V, Type THHN, Installed in Conduit – per linear foot has been added.
- H. **Replace Specification L-109** – Airport Transformer Vault and Vault Equipment and its entirety with revised Specification Section L-109 attached to this Addendum 2.
- Line Item L-109-7.2 – L-828 4kW Constant Current Regulator has been added.
  - Line Item L-109-7.3 – L-828 7.5kW Constant Current Regulator has been added.
  - Line Item L-109-7.4 – L-828 10kW Constant Current Regulator has been added.
  - Line Item L-109-7.5 – L-828 15kW Constant Current Regulator has been added.
  - Line Item L-109-7.6 – Vault Lighting & Power Equipment (New Power & Light Control Panels) has been added.
- I. **Replace Specification L-110** – Airport Underground Electrical Duct Banks and Conduits and its entirety with revised Specification Section L-110 attached to this Addendum 2.
- Line Item L-110-5.1 has been revised to Directional Boring, 2-way-2-inch Polyethylene Conduit
  - Line Item L-110-5.2 has been revised to Non-encased Electrical Conduit, 1-way, 1-inch
  - Line Item L-110-5.3 – Non-Encased Electrical Conduit, 1-way, 2-inch has been added
  - Line Item L-110-5.4 – Non-Encased Electrical Conduit, 1-way, 4 1/2-inch has been added.
- J. **Replace Specification L-125** – Installation of Airport Lighting Systems and its entirety with revised Specification Section L-125 attached to this Addendum 2.
- Line Item L-110-5.1 has been revised to Existing Base-Mounted Runway Edge, Threshold or End Lights
  - Line Item L-125-5.2 has been revised to Existing Stake-Mounted Runway Edge, Threshold or End Lights
  - Line Item L-125-5.3 has been revised to Existing Base-Mounted Taxiway Edge Light, Removed-per each
  - Line Item L-125-5.4 has been revised to Existing Stake-Mounted Taxiway Edge Light, Removed-per each
  - Line Item L-125-5.5 has been revised to Existing Base-Mounted Airport Guidance Sign
  - Line Item L-125-5.6 has been revised to Existing REIL Light, Removed- per each
  - Line Item L-125-5.7 has been revised to Existing PAPI 2-Box Units, Removed-per each
  - Line Item L-125-5.8 has been revised to L-861 Base Mounted Runway Edge, Threshold or End Lights, Class 1, Mode 1, Style 3, LED, Installed – per each
  - Line Item L-125-5.9 has been revised to L-861 Stake Mounted Runway Edge, Threshold or End Lights, Class 1, Mode 1, LED, Installed – per each
  - Line Item L-125-5.10 has been revised to L-861T (MITL LED), Base Mounted Taxiway Edge Light, Class 1, Mode 1, Style 3, LED, Installed – per each
  - Line Item L-125-5.11 has been revised to L-861T (MITL LED), Base Mounted Taxiway Edge Light, Class 1, Mode 1, Style 3, LED, Installed – per each

- Line Item L-125-5.12 has been revised to Lighted Airport Guidance Sign (Size 1, Style 2, Class 2, Mode 2), 1-Module, Installed – per each
- Line Item L-125-5.13- Lighted Airport Guidance Sign (Size 1, Style 2, Class 2, Mode 2), 2-Module, Installed – per each has been added.
- Line Item L-125-5.14 L-867 Junction Base Can, Installed-per each
- Line Item L-125-5.6 - Runway End Identifier Light System (REIL), L849(L), Style E, Installed Complete In Place – per each has been revised to L-125-5.15
- Line Item L-125-5.7 - Precision Approach Path Indicator System (PAPI), 2-box system, L-881, Style B, Class I, Installed Complete in Place – per each has been revised to L-125-5.16

#### K. Revised Proposal Form

##### Runway 5-23

- Added Line Item: L-108-5.1 Trenching
- Added Line Item: L-108-5.4 No. 12 AWG, 600V, THHN
- Added Line Item: L-110-5.2 Non-encased electrical conduit, 1-way-1inch
- Added Line Item: L-110-5.4 Non-encased electrical conduit, 1-way-4 1/2inch
- Added Line Item: L-115.5.1 Electrical Manhole, Installed
- Added Line Item: L-125 5.2 Existing Stake Mounted Runway Edge Light, Removed
- Added Line Item: L-125 5.5 Existing Base Mounted Guidance Sign, Removed
- Added Line Item: L-125 5.9 L-861 (MIRL LED), Stake Mounted Runway Edge Light, Installed
- Majority of the quantities of line items have been revised. See Bid Proposal Attachment for revisions

##### Taxiway D

- Added Line Item: L-108-5.1 Trenching
- Majority of the quantities of line items have been revised. See Bid Proposal Attachment for revisions

##### Runway 11-29 Additive Bid

- Added Line Item: L-108-5.1 Trenching
- Added Line Item: L-115.5.1 Electrical Manhole, Installed
- Added Line Item: L-125 5.2 Existing Stake Mounted Runway Edge Light, Removed
- Added Line Item: L-125 5.5 Existing Base Mounted Guidance Sign, Removed
- Added Line Item: L-125 5.9 L-861 (MIRL LED), Stake Mounted Runway Edge Light, Installed
- Majority of the quantities of line items have been revised. See Bid Proposal Attachment for revisions

##### Taxiway A Additive Bid

- Added Line Item: L-108-5.1 Trenching
- Majority of the quantities of line items have been revised. See Bid Proposal Attachment for revisions

#### Clarification Notes:

- General Note on Sheets E22-E26 have been revised to state that “Contractor has option to match existing routes and route new cables in existing trenches, duct banks, etc. New cabling consists of: 1#8, 5kV, L-824C Direct Buried 18” below grade min. (Typical for one (1) Runway (R2) lighting circuit and one (1) Taxiway ‘A’ (T3) lighting circuit uno)**
- All runway edge lights on Runway 5/23 & Runway 11/29 are equipped with existing paved shoulders in asphalt from grade to existing lighting fixtures. Contractor to utilize existing conduit, or raceways in existing paved shoulders to route new cabling direct buried in grade to existing paved shoulders and continue to route new cabling in existing conduit/raceways to new lighting fixtures. Contractor to verify existing conduit/raceways are in good condition and code complaint. See Revised sheet GE1 attached to this Addendum 2.**

**Please acknowledge addendum in your submittal**

**END OF ADDENDUM**

**ATTACHMENTS: REVISED BID FORM (4 PAGES)**  
**ITEM C-102 (4 PAGES)**  
**ITEM C-105 (2 PAGES)**  
**ITEM T-901 (6 PAGES)**  
**ITEM T-908 (4 PAGES)**  
**SECTION L-108 (PAGES 13)**  
**SECTION L-109 (6 PAGES)**  
**SECTION L-110 (8 PAGES)**  
**SECTION L-115 (8 PAGES)**  
**SECTION L-125 (9 PAGES)**  
**DRAWINGS (50 PAGES)**

**BID PROPOSAL FORM**  
**DANIEL FIELD AIRPORT**  
**GDOT PROJECT**  
**PID: T007935**  
**AIRFIELD ELECTRICAL SYSTEM UPGRADE**  
**AUGUSTA, GEORGIA**  
**Revised Per Addendum #2**

SPEC. NO.	DESCRIPTION OF ITEM	BID QTY	UNIT	UNIT PRICE	TOTAL PRICE
-----------	---------------------	---------	------	------------	-------------

**RUNWAY LIGHTING 05-23 (DISPLACED THRESHOLD) BASE BID**

1.	C-101	MOBILIZATION	1	LS		
2.	C-102-6.1	TEMPORARY EROSION CONTROL	1	LS		
3.	L-108-5.0	EXISTING L-824, 5KV CONDUCTOR, REMOVED	1	LS		
5.	L-108-5.1	TRENCHING	12,500	LF		
4.	L-108-5.2	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH, DUCT BANK OR CONDUIT	15,000	LF		
5.	L-108-5.3	NO. 8 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, INCLUDING GROUND RODS AND GROUND CONNECTORS	12,500	LF		
6.	L-108-5.4	NO.12 AWG, 600V, TYPE THHN, INSTALLED IN CONDUIT	2,500	LF		
7.	L-109-7.1	INSTALLATION OF EQUIPMENT WITHIN AN EXISTING VAULT WITH NEW ELECTRICAL SERVICE	1	EA		
10.	L-109-7.2	L-828 4KW CONSTANT CURRENT REGULATOR	1	EA		
9.	L-109-7.5	L-828 15 KW CONSTANT CURRENT REGULATOR	1	EA		
11.	L-109-7.6	VAULT LIGHTING & POWER (NEW POWER & LGT CONTROL PNLs)	1	EA		
12.	L-110-5.1	DIRECTIONAL BORING, 2-WAY 2-INCH POLYETHYLENE CONDUIT	300	LF		
13.	L-110-5.2	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 1-INCH	3,000	LF		
14.	L-110-5.3	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 2-INCH	500	LF		
15.	L-110-5.4	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 4-1/2 INCH	500	LF		
16.	L-115-5.1	ELECTRICAL MANHOLE, INSTALLED	30	EA		
17.	L-125-5.1	EXISTING BASE-MOUNTED RUNWAY EDGE LIGHT, REMOVED	9	EA		
18.	L-125-5.2	EXISTING STAKE-MOUNTED RUNWAY EDGE LIGHT, REMOVED	59	EA		
18.	L-125-5.5	EXISTING BASE MOUNTED GUIDANCE SIGN, REMOVED	9	EA		
20.	L-125-5.6	EXISTING REIL LIGHT, REMOVED	1	EA		
21.	L-125-5.7	EXISTING PAPI 2-BOX UNITS, REMOVED	2	EA		
22.	L-125-5.8	L-881 (MIRL LED), BASE MOUNTED RUNWAY EDGE LIGHT, INSTALLED	20	EA		
23.	L-125-5.8	L-861E (MIRL LED), BASE MOUNTED RUNWAY THRESHOLD/END LIGHT, INSTALLED	32	EA		
24.	L-125-5.9	L-861 (MIRL LED), STAKE MOUNTED RUNWAY EDGE LIGHT, INSTALLED	16	EA		
25.	L-125-5.12	L-858(L) BASE MOUNTED, LED 1-MODULE GUIDANCE SIGN, INSTALLED	2	EA		
26.	L-125-5.13	L-858(L) BASE MOUNTED, LED 2-MODULE GUIDANCE SIGN, INSTALLED	7	EA		
27.	L-125-5.14	L-867 JUNCTION BASE CAN, INSTALLED	70	EA		
28.	L-125-5.15	L-848E(I) REILS, INSTALLED	4	EA		
29.	L-125-5.16	L-881 STYLE B PAPI 2-BOX UNITS, INSTALLED	2	EA		
30.	T-901-5.1	SEEDING	0.6	AC		
31.	T-908-5.1	MULCHING	2,650	SY		

**TOTAL RUNWAY LIGHTING 05-23 BASE BID**

	SPEC. NO.	DESCRIPTION OF ITEM	BID QTY	UNIT	UNIT PRICE	TOTAL PRICE
<b>TAXIWAY D LIGHTING (ADJACENT TO 05-23) BASE BID</b>						
1.	C-101	MOBILIZATION	1	LS		
2.	C-102-6.1	TEMPORARY EROSION CONTROL	1	LS		
3.	L-108-5.0	EXISTING L-824, 5KV CONDUCTOR, REMOVED	1	LS		
6.	L-108-5.1	TRENCHING	15,000	LF		
4.	L-108-5.2	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH DUCT BANK OR CONDUIT	18,000	LF		
5.	L-108-5.3	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, INCLUDING GROUND RODS AND GROUND CONNECTORS	15,000	LF		
6.	L-108-7.1	INSTALLATION OF EQUIPMENT WITHIN AN EXISTING VAULT WITH NEW ELECTRICAL SERVICE	0	EA		
7.	L-108-7.2	L-828 4KW CONSTANT CURRENT REGULATOR	1	EA		
8.	L-108-7.4	L-828 10kW CONSTANT CURRENT REGULATOR	1	EA		
9.	L-110-5.1	DIRECTIONAL BORING, 1-WAY 2-INCH POLYETHYLENE CONDUIT	0	LF		
10.	L-110-5.3	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 2-INCH	500	LF		
11.	L-125-5.3	EXISTING BASE-MOUNTED TAXIWAY EDGE LIGHT, REMOVED	25	EA		
12.	L-125-5.4	EXISTING STAKE-MOUNTED TAXIWAY EDGE LIGHT, REMOVED	73	EA		
13.	L-125-5.5	EXISTING BASE MOUNTED GUIDANCE SIGN, REMOVED	12	EA		
14.	L-125-5.10	L-861T (MITL LED), BASE MOUNTED TAXIWAY EDGE LIGHT, INSTALLED	32	EA		
15.	L-125-5.11	L-861T (MITL LED), STAKE MOUNTED TAXIWAY EDGE LIGHT, INSTALLED	68	EA		
16.	L-125-5.12	L-858(L) BASE MOUNTED, LED 1-MODULE GUIDANCE SIGN, INSTALLED	6	EA		
17.	L-125-5.13	L-858(L) BASE MOUNTED, LED 2-MODULE GUIDANCE SIGN, INSTALLED	8	EA		
18.	L-125-5.14	L-867 JUNCTION BASE CAN	40	EA		
19.	T-901-5.1	SEEDING	1	AC		
20.	T-908-5.1	MULCHING	2,500	SY		
<b>TOTAL TAXIWAY D LIGHTING (ADJACENT TO 05-23) BASE BID</b>						

	SPEC. NO.	DESCRIPTION OF ITEM	BID QTY	UNIT	UNIT PRICE	TOTAL PRICE
<b>RUNWAY LIGHTING 11-29 ADDITIVE BID</b>						
1.	C-101	MOBILIZATION	1	LS		
2.	C-102-6.1	TEMPORARY EROSION CONTROL	1	LS		
3.	L-108-5.0	EXISTING L-824, 5KV CONDUCTOR, REMOVED	1	LS		
4.	L-108-5.1	TRENCHING	15000	LF		
5.	L-108-5.2	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH, DUCT BANK OR CONDUIT	20000	LF		
6.	L-108-5.3	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, INCLUDING GROUND RODS AND GROUND CONNECTORS	15000	LF		
7.	L-109-7.3	L-828 7.5 KW CONSTANT CURRENT REGULATOR	1	EA		
8.	L-110-5.1	DIRECTIONAL BORING, 1-WAY 2-INCH POLYETHYLENE CONDUIT	0	LF		
9.	L-110-5.3	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 2-INCH	500	LF		
10.	L-115-5.1	ELECTRICAL MANHOLE, INSTALLED	12	EA		
11.	L-125-5.1	EXISTING BASE-MOUNTED RUNWAY EDGE LIGHT, REMOVED	44	EA		
12.	L-125-5.2	EXISTING STAKE-MOUNTED RUNWAY EDGE LIGHT, REMOVED	22	EA		
13.	L-125-5.5	EXISTING BASE MOUNTED GUIDANCE SIGN, REMOVED	4	EA		
14.	L-125-5.6	EXISTING REIL LIGHT, REMOVED	2	EA		
15.	L-125-5.8	L-861 (MIRL LED), BASE MOUNTED RUNWAY EDGE LIGHT, INSTALLED	12	EA		
16.	L-125-5.8	L-861E (MIRL LED), BASE MOUNTED RUNWAY THRESHOLD/END LIGHT, INSTALLED	32	EA		
17.	L-125-5.9	L-861 (MIRL LED), STAKE MOUNTED RUNWAY EDGE LIGHT, INSTALLED	22	EA		
18.	L-125-5.12	L-858(L) BASE MOUNTED, LED 1-MODULE GUIDANCE SIGN, INSTALLED	1	EA		
19.	L-125-5.13	L-858(L) BASE MOUNTED, LED 2-MODULE GUIDANCE SIGN, INSTALLED	3	EA		
20.	L-125-5.14	L-887 JUNCTION BASE CAN	50	EA		
21.	L-125-5.15	L-849E(L) REILS, INSTALLED	2	EA		
22.	T-801-5.1	SEEDING	0.4	AC		
23.	T-808-5.1	MULCHING	1250	SY		
<b>TOTAL RUNWAY LIGHTING 11-29 ADDITIVE BID</b>						

	SPEC. NO.	DESCRIPTION OF ITEM	BID QTY	UNIT	UNIT PRICE	TOTAL PRICE
<b>TAXIWAY A LIGHTING (ADJACENT TO 11-29) ADDITIVE BID</b>						
1.	C-101	MOBILIZATION	1	LS		
2.	C-102-6.1	TEMPORARY EROSION CONTROL	1	LS		
3.	L-108-5.0	EXISTING L-824, 5KV CONDUCTOR, REMOVED	1	LS		
4.	L-108-5.1	TRENCHING	15000	LF		
5.	L-108-5.2	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH, DUCT BANK OR CONDUIT	20,000	LF		
6.	L-108-5.3	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, INCLUDING GROUND RODS AND GROUND CONNECTORS	15,000	LF		
7.	L-109-7.3	L-828 7.5 KW CONSTANT CURRENT REGULATOR	1	EA		
8.	L-110-5.1	DIRECTIONAL BORING, 1-WAY 2-INCH POLYETHYLENE CONDUIT	0	LF		
9.	L-110-5.3	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 2-INCH	500	LF		
10.	L-125-5.3	EXISTING BASE-MOUNTED TAXIWAY EDGE LIGHT, REMOVED	20	EA		
11.	L-125-5.4	EXISTING STAKE-MOUNTED TAXIWAY EDGE LIGHT, REMOVED	42	EA		
12.	L-125-5.5	EXISTING BASE MOUNTED GUIDANCE SIGN, REMOVED	4	EA		
13.	L-125-5.10	L-851T (MITL LED), BASE MOUNTED TAXIWAY EDGE LIGHT, INSTALLED	20	EA		
14.	L-125-5.11	L-851T (MITL LED), STAKE MOUNTED TAXIWAY EDGE LIGHT, INSTALLED	42	EA		
15.	L-125-5.12	L-858(L) BASE MOUNTED, LED 1-MODULE GUIDANCE SIGN, INSTALLED	3	EA		
16.	L-125-5.13	L-858(L) BASE MOUNTED, LED 2-MODULE GUIDANCE SIGN, INSTALLED	1	EA		
17.	L-125-5.14	L-887 JUNCTION BASE CAN	25	EA		
18.	T-501-5.1	SEEDING	0.3	AC		
18.	T-808-5.1	MULCHING	2,000	SY		
<b>TOTAL TAXIWAY A LIGHTING (ADJACENT TO 11-29) ADDITIVE BID</b>						



**Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control****DESCRIPTION**

**102-1.** This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

**MATERIALS**

**102-2.1 Grass.** Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

**102-2.2 Mulches.** Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

**102-2.3 Fertilizer.** Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

**102-2.4 Slope drains.** Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

**102-2.5 Silt fence.** Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

**102-2.6 Other.** All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

**CONSTRUCTION REQUIREMENTS**

**102-3.1 General.** In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

**102-3.2 Schedule.** Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

**102-3.3 Construction details.** The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

**102-3.4 Installation, maintenance and removal of silt fence.** Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

### METHOD OF MEASUREMENT

**102-4.1** Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

- a. Temporary seeding and mulching will be measured by the square yard.
- b. Temporary slope drains will be measured by the linear foot.
- c. Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard of excavation performed, including necessary cleaning of sediment basins, and the cubic yard of embankment placed as directed by the RPR.
- d. All fertilizing will be measured by the ton.
- e. Installation and removal of silt fence will be measured by the linear foot.

**102-4.2** Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

### BASIS OF PAYMENT

**102-5.1** Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-5.1            Temporary seeding and mulching - per square yard

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

### 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 150/5200-33            *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2            *Operational Safety on Airports During Construction*

#### ASTM International (ASTM)

ASTM D6461            *Standard Specification for Silt Fence Materials*

#### United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

### END OF ITEM C-102

This page intentionally left blank

### Item C-105 Mobilization

**105-1 Description.** This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

**105-2 Mobilization limit.** Mobilization shall be limited to 10 percent of the total project cost.

**105-3 Posted notices.** Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

**105-4 Engineer/RPR field office.** An Engineer/RPR field office is not required.

### METHOD OF MEASUREMENT

**105-5 Basis of measurement and payment.** Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, Contractor Final Project Documentation, the final 10%.

### BASIS OF PAYMENT

**105-6 Payment will be made under:**

Item C-105          Mobilization

**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.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

## Item T-901 Seeding

### DESCRIPTION

**901-1.1** This item shall consist of soil preparation, seeding, fertilizing and liming the areas shown on the plans or as directed by the Engineer in accordance with these specifications.

### MATERIALS

**901-2.1 Seed.** The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

**901-2.2 Lime.** Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 mesh sieve and 50% will pass through a No. 100 mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate of two (2) tons per acre. All liming materials shall conform to the requirements of ASTM C602.

**901-2.3 Fertilizer.** Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

The initial fertilization shall be a commercial fertilizer that will provide at least 120 pounds of N, 120 pounds of P<sub>2</sub>O<sub>5</sub>, and 120 pounds of K<sub>2</sub>O per acre, as computed from the nominal contents of fertilizer

elements. Only one half of this rate shall be applied when the required seeding is Annual Ryegrass. Agricultural limestone (lime) shall be applied prior to seeding at a rate of two tons per acre. Lime may be applied in dry, pelletized or slurry form. The rate of application is required regardless of the form of application.

Fertilizers and agricultural limestone (lime) shall be applied uniformly at the required rates of placement. The fertilizer shall be well pulverized and free of lumps when applied. In no case shall fertilizer that is not mixed with soil be permitted to be in direct contact with seed. When fertilizers are applied hydraulically they shall be diluted sufficiently so that no damage is done to either seed or established vegetation. Agricultural limestone, basic slag or a combination of limestone and slag shall be applied separately but may be incorporated into the soil with fertilizers in one operation.

Fertilizer and agricultural limestone that is not applied hydraulically shall be uniformly mixed with the soil by harrows, rotary tillers, or other soil mixing equipment prior to subsequent operations. Mixing with the soil will not be required when the fertilizer and agricultural limestone is applied hydraulically.

**901-2.4 Soil for repairs.** The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the Engineer before being placed.

## CONSTRUCTION METHODS

**901-3.1 Advance preparation and cleanup.** After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

### **901-3.2 Dry application method.**

**a. Liming.** Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds that have previously been prepared as described above. The lime shall then be worked into the top 3 inches (75 mm) of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

**b. Fertilizing.** Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

**c. Seeding.** Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions.



Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

**d. Rolling.** After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

### **901-3.3 Wet application method.**

**a. General.** The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

**b. Spraying equipment.** The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For ease of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

**c. Mixtures.** Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Brackish water shall not be used at any time. The Contractor shall identify to the Engineer all sources of water at least two (2) weeks prior to use. The Engineer may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the Engineer following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

**d. Spraying.** Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the Engineer, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

**901-3.4 Maintenance of seeded areas.** The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the Engineer. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the Engineer. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

#### **METHOD OF MEASUREMENT**

**901-4.1** The quantity of seeding to be paid for shall be the number of units per acre or fraction thereof, measured on the ground surface, completed and accepted.

#### **BASIS OF PAYMENT**

**901-5.1** Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item T-901-5.1            Seeding – per acre

**MATERIAL REQUIREMENTS**

ASTM C602	Standard Specification for Agricultural Liming Materials
ASTM D977	Standard Specification for Emulsified Asphalt
FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural

**END OF ITEM T-901**

Intentionally Left Blank

## Item T-908 Mulching

### DESCRIPTION

**908-1.1** This item shall consist of furnishing, hauling, placing, and securing mulch on surfaces indicated on the plans or designated by the Engineer.

### MATERIALS

**908-2.1 Mulch material.** Acceptable mulch shall be the materials listed below or any approved locally available material that is similar to those specified. Mulch shall be free from noxious weeds, mold, and other deleterious materials. Mulch materials, which contain matured seed of species that would volunteer and be detrimental to the proposed overseeding, or to surrounding farm land, will not be acceptable. Straw or other mulch material which is fresh and/or excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

**a. Hay.** Hay shall be native hay in an air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

**b. Straw.** Straw shall be the stalks from threshed plant residue of oats, wheat, barley, rye, or rice from which grain has been removed. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

**c. Hay mulch containing seed.** Hay mulch shall be mature hay containing viable seed of native grasses or other desirable species stated in the special provisions or as approved by the Engineer. The hay shall be cut and handled so as to preserve the maximum quantity of viable seed. Hay mulch that cannot be hauled and spread immediately after cutting shall be placed in weather-resistant stacks or baled and stored in a dry location until used.

**d. Manufactured mulch.** Cellulose-fiber or wood-pulp mulch shall be products commercially available for use in spray applications.

**e. Asphalt binder.** Asphalt binder material shall conform to the requirements of ASTM D977, Type SS-1 or RS-1.

**908-2.2 Inspection.** The Engineer shall be notified of sources and quantities of mulch materials available and the Contractor shall furnish him with representative samples of the materials to be used 30 days before delivery to the project. These samples may be used as standards with the approval of the Engineer and any materials brought on the site that do not meet these standards shall be rejected.

### CONSTRUCTION METHODS

**908-3.1 Mulching.** Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding. The spreading of the mulch may be by hand methods, blower, or other mechanical methods, provided a uniform covering is obtained.

Mulch material shall be furnished, hauled, and evenly applied on the area shown on the plans or designated by the Engineer. Straw or hay shall be spread over the surface to a uniform thickness at the rate of 2 to 3 tons per acre (1800 - 2700 kg per acre) to provide a loose depth of not less than 1-1/2 inches (38 cm) nor more than 3 inches (75 mm). Other organic material shall be spread at the rate directed by the Engineer. Mulch may be blown on the slopes and the use of cutters in the equipment for this purpose will be permitted to the extent that at least 95% of the mulch in place on the slope shall be 6 inches (150 mm) or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall be not less than one inch (25 mm) nor more than 2 inches (50 mm).

**908-3.2 Securing mulch.** The mulch shall be held in place by light discing, a very thin covering of topsoil, pins, stakes, wire mesh, asphalt binder, or other adhesive material approved by the Engineer. Where mulches have been secured by either of the asphalt binder methods, it will not be permissible to walk on the slopes after the binder has been applied. When an application of asphalt binder material is used to secure the mulch, the Contractor must take every precaution to guard against damaging or disfiguring structures or property on or adjacent to the areas worked and will be held responsible for any such damage resulting from the operation.

If the "peg and string" method is used, the mulch shall be secured by the use of stakes or wire pins driven into the ground on 5-foot (1.5-m) centers or less. Binder twine shall be strung between adjacent stakes in straight lines and crisscrossed diagonally over the mulch, after which the stakes shall be firmly driven nearly flush to the ground to draw the twine down tight onto the mulch.

**908-3.3 Care and repair.**

a. The Contractor shall care for the mulched areas until final acceptance of the project. Care shall consist of providing protection against traffic or other use by placing warning signs, as approved by the Engineer, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

b. The Contractor shall be required to repair or replace any mulch that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the Engineer, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor.

c. If the "asphalt spray" method is used, all mulched surfaces shall be sprayed with asphalt binder material so that the surface has a uniform appearance. The binder shall be uniformly applied to the mulch at the rate of approximately 8 gallons (32 liters) per 1,000 square feet (100 sq m), or as directed by the Engineer, with a minimum of 6 gallons (24 liters) and a maximum of 10 gallons (40 liters) per 1,000 square feet (100 sq m) depending on the type of mulch and the effectiveness of the binder securing it. Bituminous binder material may be sprayed on the mulched slope areas from either the top or the bottom of the slope. An approved spray nozzle shall be used. The nozzle shall be operated at a distance of not less than 4 feet (1.2 m) from the surface of the mulch and uniform distribution of the bituminous material shall be required. A pump or an air compressor of adequate capacity shall be used to ensure uniform distribution of the bituminous material.

d. If the "asphalt mix" method is used, the mulch shall be applied by blowing, and the asphalt binder material shall be sprayed into the mulch as it leaves the blower. The binder shall be uniformly applied to the mulch at the rate of approximately 8 gallons (32 liters) per 1,000 square feet (100 sq m) or as directed by the Engineer, with a minimum of 6 gallons (24 liters) and a maximum of 10 gallons (40 liters) per 1,000 square feet (100 sq m) depending on the type of mulch and the effectiveness of the binder securing it.

### **METHOD OF MEASUREMENT**

**908-4.1** Mulching shall be measured in square yards on the basis of the actual surface area acceptably mulched.

### **BASIS OF PAYMENT**

**908-5.1** Payment will be made at the contract unit price per square yard for mulching. The price shall be full compensation for furnishing all materials and for placing and anchoring the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-908-5.1            Mulching - per square yard

### **MATERIAL REQUIREMENTS**

ASTM D977            Standard Specification for Emulsified Asphalt

**END OF ITEM T-908**

Intentionally Left Blank



## 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 sent in electronically 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 B, 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 THHN-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, THHN-, 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. tinned copper wire per ASTM B33. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case 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.** A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

**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 or heat shrink tubing with integral sealant 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.

Figure 3 of AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors, employing connector kits, is acceptable for field attachment to single conductor cable.

**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. See AC 150/5340-30 for additional information about methods of attaching a ground to a galvanized 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 for cable markers shall be per specification Item P-610, Structural Portland Cement Concrete.

**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 (38 mm) wide) and Scotch™ 130C® liner less rubber splicing tape (2-inch (50 mm) 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

Item L-108 Underground Power Cable for Airports

659

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 (1 m) 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 (30 cm) 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 (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

**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 that 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.** Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

**a. Trenching.** Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.75 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

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

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active 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:

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

(2) Trenching, etc., in cable areas shall then proceed, with approval of the 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 or replacement.

**b. Backfilling.** After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one-inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153.

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

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of

the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

**c. Restoration.** Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the sodding, topsoiling, fertilizing, liming, seeding, sprigging, mulching as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfilling with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

**108-3.4 Cable markers for direct-buried cable.** The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

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

**a. Cast splices.** These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

**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 one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

**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 one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

**d. Taped or heat-shrink splices.** A taped splice shall be made in the following manner:

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

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

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

**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.

**Equipotential.** – may be used by the RPR for areas that have high rates of lightning strikes. The counterpoise size is determined by the RPR. 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** – used in areas where lightning strikes are not common. Counterpoise size is selected by the RPR. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define “adjacent to”.

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches (203 mm) minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a 6 AWG solid copper conductor.

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 Isolation Method of lightning protection.

### **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.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

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 (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

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.** Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

**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 50 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** Trenching shall be measured by the linear feet (meters) of trench, including the excavation, backfill, and restoration, completed, measured as excavated, and accepted as satisfactory. When specified, separate measurement shall be made for trenches of various specified widths.

**108-4.2** Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) 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.

### 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 and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108-5.0	Existing L-824 5kV Conductor, Removed
Item L-108-5.1	Trenching for direct-buried cable, 18-inch minimum depth - per linear foot (meter) – Use existing trenches as applicable
Item L-108-5.2	No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit - per liner foot (meter)
Item L-108-5.3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Connections/Terminations - per linear foot (meter)
Item L-108-5.4	No. 12 AWG, 600V, Type THHN, Installed in Conduit - per liner foot (meter)

### 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  
Lightning and Surge Protection, Grounding Bonding and Shielding  
Requirements for Facilities and Electronic Equipment

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

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

FAA STD-019E Federal Aviation Administration Standard

**END OF ITEM L-108**

## Item L-109 Airport Transformer Vault and Vault Equipment

### DESCRIPTION

**109-1.1** This item shall consist of removing an existing airport equipment while utilizing an existing airport transformer vault per these specifications and per the design shown in the plans. This work shall also include the installation of conduits surface mounted around the vault, 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.

### 109-2.1 General.

#### EQUIPMENT AND MATERIALS

**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.

### 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 Current Constant Regulators.** Constant Current Regulators shall conform to AC 150/5345-10. Provide the type, class, style, and rating as shown on the Plans and in Table 109-1.

**TABLE 109-1. CONSTANT CURRENT REGULATORS**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Constant Current Regulator	L-828, class, style, and size as indicated on Plans, 60 hertz (Hz) input, with brightness control for remote operation. Regulator shall be ferroresonant, dry-type with 6.6 A output current and front-mounted monitoring 7-inch LCD touchscreen. Regulator shall have input circuit breaker and door documentation pocket options taken. Install as indicated on plans.	5345-10

**109-5.3 Radio Controls.** Radio Control Equipment shall conform to AC 150/5345-49. Provide the type and style as shown on the Plans and in Table 109-2.

**TABLE 109-2. RADIO CONTROL EQUIPMENT**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Radio Control Equipment	L-854, Type I, Style A, with enclosure for surface mounting, antenna and feedline and field-adjustable frequency set to the Common Traffic Advisory Frequency (CTAF) for the project airport as found in the Georgia Supplement of the U.S. Government Flight Publication. Install as indicated on plans.	5345-49

**109-5.3 Lighting Control Cabinet.** Lighting Control Equipment shall conform to AC 150/5345-3G. Provide the type and style as shown on the Plans and in Table 109-3.

**TABLE 109-3. LIGHTING CONTROL EQUIPMENT**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Lighting Control Equipment	L-821, Type I, Class S, Style 1, Mode 1 with enclosure for surface mounting and relays required for a complete lighting control system. Install as indicated on plans.	5345-3G

**109-5.4 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.

**109-5.5 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.

**109-5.6 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.

**109-5.7 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.

**109-5.8 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.

**109-5.9 Lighting fixtures.** Install lighting fixtures as specified on plans. Lighting fixtures inside the vault shall be vapor tight.

### METHOD OF MEASUREMENT

**109-6.1** The quantity of vaults to be paid for under this item shall consist of the number of vaults constructed in place and accepted as a complete unit.

**109-6.2** The quantity of prefabricated metal housings to be paid for under this item shall consist of the number of housings constructed in place and accepted as a complete unit.

**109-6.3** 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.

### BASIS OF PAYMENT

**109-7.1** Payment will be made at the contract unit price for each completed and accepted vault or prefabricated metal housing 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-109-7.1	Installation of Equipment with in existing vault in place as indicated on plans and this specification L-109 with new electrical service - per unit
Item L-109-7.2	L-828 4kW Constant Current Regulator
Item L-109-7.3	L-828 7.5kW Constant Current Regulator
Item L-109-7.4	L-828 10kW Constant Current Regulator
Item L-109-7.5	L-828 15kW Constant Current Regulator
Item L-109-7.6	Vault Lighting & Power Equipment (New Power & Light Control Panels)

## 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~~  
Item L-109 Airport Transformer Vault and Vault Equipment

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 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 (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

## CONSTRUCTION METHODS

**110-3.1 General.** The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The 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 (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

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

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the 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 (90 kg) 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 (1.5 m).

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, taxi lanes, 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 (75 mm) 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 (6.3 mm) 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 (60 cm).

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 (0.5 m) 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 (1 m) beyond the edges of the pavement or 3 feet (1 m) 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 (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. 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 (150 mm) 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 (1.5-m) 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 (1.5-m) 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 (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) 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 (150 mm) nor more than 12 inches (300 mm) 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 (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding



material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) 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 (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade 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 (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

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

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) 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 (1.5-m) 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.** The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

**110-3.5 Backfilling for conduits.** For conduits, 8 inches (200 mm) 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 (100 mm) 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 backfill shall be select material not larger than 4 inches (100 mm) 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 (76 m) 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 sodding, top soiling, fertilizing, liming, seeding, sprigging, 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.

#### **110-3.8 Ownership of removed cable.**

All existing electrical equipment and cabling to be removed shall be evaluated by the engineer or owner to determine any material to be retained by the owner. Any cable to be retained by the owner shall be banded on pallets.

### **METHOD OF MEASUREMENT**

**110-4.1** Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated 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-110-5.1	Directional Boring, 2-way-2-inch Polyethylene Conduit – per liner foot (meter)
Item L-110-5.2	Non-Encased Electrical Conduit, 1-way 1-inch, per linear foot (meter)
Item L-110-5.3	Non-Encased Electrical Conduit, 1-way 2-inch, per linear foot (meter)
Item L-110-5.4	Non-Encased Electrical Conduit, 1-way 4 1/2-inch, per linear foot (meter)

### 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**

## Item L-115 Electrical Manholes and Junction Structures

### DESCRIPTION

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

### EQUIPMENT AND MATERIALS

#### 115-2.1 General.

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

b. 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.

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 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.

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 electronically submitted in 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.

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 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.

**115-2.2 Concrete structures.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

**115-2.3 Precast concrete structures.** 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. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 12,500 lb aircraft loads (design aircraft (existing) King Air 200 and (ultimate) Citation CJ2), unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

**115-2.4 Junction boxes.** Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

**115-2.5 Mortar.** The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

**115-2.6 Concrete.** Concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi.

**115-2.7 Frames and covers.** The frames shall conform to one of the following requirements:

- a. ASTM A48      Gray iron castings
- b. ASTM A47      Malleable iron castings
- c. ASTM A27      Steel castings
- d. ASTM A283, Grade D      Structural steel for grates and frames
- e. ASTM A536      Ductile iron castings
- f. ASTM A897      Austempered ductile iron castings

All castings specified shall withstand a maximum load of 12,500 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA

1910.146 (c)(2).

**115-2.8 Ladders.** Ladders, if specified, shall be galvanized steel or as shown on the plans.

**115-2.9 Reinforcing steel.** All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

**115-2.10 Bedding/special backfill.** Bedding or special backfill shall be as shown on the plans.

**115-2.11 Flowable backfill.** Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**115-2.12 Cable trays.** Cable trays shall be of galvanized steel, plastic, or aluminum. Cable trays shall be located as shown on the plans.

**115-2.13 Plastic conduit.** Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

**115-2.14 Conduit terminators.** Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

**115-2.15 Pulling-in irons.** Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

**115-2.16 Ground rods.** Ground rods shall be one piece, copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

## CONSTRUCTION METHODS

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

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

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

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

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

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner

that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

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

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

**115-3.2 Concrete structures.** Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

**115-3.3 Precast unit installations.** Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

**115-3.4 Placement and treatment of castings, frames and fittings.** All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

**115-3.5 Installation of ladders.** Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

**115-3.6 Removal of sheeting and bracing.** In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

**115-3.7 Backfilling.** After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

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

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

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

**115-3.9 Grounding.** A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtailed shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

**115-3.10 Clean up and repair.** After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

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

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

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

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

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.



After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

**115-3.12 Inspection.** Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

**115-3.13 Manhole elevation adjustments.** The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

**115-3.14 Duct extension to existing ducts.** Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

#### METHOD OF MEASUREMENT

**115-4.1** Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

**115-4.2 Manhole elevation adjustments** shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

#### BASIS OF PAYMENT

**115-5.1** The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

**115-5.2** Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115	Electrical Manhole, Installed – per linear foot
Item L-115	Electrical Junction Structure, Installed – 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.

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

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

Advisory Circular (AC)

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 150/5345-42 Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories

AC 150/5340-30 Design and Installation Details for Airport Visual Aids

AC 150/5345-53 Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544 Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27 Standard Specification for Steel Castings, Carbon, for General Application

ASTM A47 Standard Specification for Ferritic Malleable Iron Castings

ASTM A48 Standard Specification for Gray Iron Castings

ASTM A123 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products

ASTM A283 Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates

ASTM A536 Standard Specification for Ductile Iron Castings

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

ASTM A897 Standard Specification for Austempered Ductile Iron Castings

ASTM C144 Standard Specification for Aggregate for Masonry Mortar

ASTM C150 Standard Specification for Portland Cement

ASTM C206 Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83 In Pavement Light Fixture Bolts  
Mil Spec  
MIL-P-21035 Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)  
NFPA-70 National Electrical Code (NEC)

**END OF ITEM L-115**

## Item L-125 Installation of Airport Lighting Systems

### DESCRIPTION

**125-1.1** This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

### EQUIPMENT AND MATERIALS

#### 125-2.1 General.

**a.** Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

**b.** Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with 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, which do comply with these specifications, at the sole cost of the Contractor.

**c.** All materials and equipment used 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. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing 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 submitted in an electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

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

All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics." Obstruction lighting warranty is set by the individual manufacturer.

### EQUIPMENT AND MATERIALS

**125-2.2 Conduit/Duct.** Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

**125-2.3 Cable and Counterpoise.** Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

**125-2.4 Tape.** Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively and Scotch 130C liner less rubber splicing tape (2" wide), as manufactured by 3M Company or an approved equal.

**125-2.5 Cable Connections.** Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

**125-2.7 Runway and Taxiway Lights.** Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

**TABLE 125-1. LIGHTS**

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-861	1	1		5	N	N	Y	LED Bi-directional white-yellow, mount at 14" above grade
L-861	1	1		5	Y	N	Y	LED Bi-directional white-yellow, mount at 14" above grade
L-861E	1	1	3	5	Y	N	Y	LED Omni-directional red, mount at 14" above grade
L-861E	1	1	3	5	Y	N	Y	LED Bi-directional yellow-green, mount at 14" above grade

L-861E	1	1	3	5	Y	N	Y	LED Bi-directional green-obscure, mount at 14" above grade
L-861T	1	1				N	Y	LED Omni-directional blue, mount at 14" above grade
L-861T	1	1			Y	N	Y	LED Omni-directional blue, mount at 14" above grade

**125-2.8 Runway and Taxiway Signs.** Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44. Install all signs as indicated on plans.

**TABLE 125-2. SIGNS**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Airport Signs	L-858, internally lighted, Class 2, Size 1, Style 2, and mode as indicated on the Plans, with acrylic panels, LED lamps, and on/off switch with protective cover. Panels shall be smooth and free from aberration with the exception of the panel joints in modular signs. Panel joints shall not interfere with the legibility of the sign. Language shall match per Sign Chart & Layouts as indicated on plans.	5345-44

**125-2.9 Runway End Identifier Light (REIL).** The REIL fixtures shall meet the requirements of AC 150/5345-51, Type L-849(L), Style E. Install all REIL lights as indicated on plans.

**125-2.10 Precision Approach Path Indicator (PAPI).** The light units for the PAPI shall meet the requirements of AC 150/5345-28, Type L-881. Style B. Class I. Install all PAPI light units as indicated on plans.

**125-2.11 Circuit Selector Cabinet.** The circuit selector cabinet shall meet the requirements of AC 150/5345-5, Type L-847, one circuit control as indicated Class A, Indoor Rating 1, for 6.6 amperes.

**125-2.12 Light Base and Transformer Housings.** Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867 Class 1A Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

**TABLE 125-3. LIGHT BASE AND TRANSFORMER HOUSINGS**

	<b>ITEM</b>	<b>DESCRIPTION</b>	<b>FAA AC 150 /</b>
<b>a.</b>	Airport Light Base	L-867, transformer housing, Class I, Size B or D, 12- or 16-inches diameter by 24 inches deep, galvanized steel one-piece light base with internal grounding lug, gasket, steel cover, base extension (where required), drain opening and conduit hubs or openings as indicated.	5345-42
<b>b.</b>	Airport Light Base	L-867, watertight, transformer housing, Class II, Size B, 12 inches diameter by 24 inches deep, non-metallic one piece light base made from Type III, ultra-high molecular weight, heavy-wall, high-density polyethylene pipe having a cell classification of 345434C or better according to ASTM D3350. Conduit stubs made of the same material as the light bases shall be sidewall fused to the bases using saddle fittings, or other approved method for a watertight connection.	5345-42
<b>c.</b>	Airport Light Base	L-868, transformer housing, Class I, Size B, 12 inches diameter by depth as indicated on the Plans, galvanized steel two section light base assembly with grooved and "O" ringed flange ring with concrete ring. Step the top flange of the light base bottom section to fit outside a standard top section. Complete with any necessary spacer rings, internal grounding lug, mud plate, anti-rotational fins and conduit hubs. Light base and cover shall be suitable for vehicle and aircraft wheel loading.	5345-42
<b>d.</b>	Primary Handhole	L-868, Class I, Size B, 12 inches diameter by 24 inches deep, galvanized steel, one piece with conduit hubs or openings and drain hole as indicated, steel cover and gasket, internal ground lug with connector, and other items as indicated. Handhole and cover shall be suitable for vehicle and aircraft wheel loading.	5345-42

	ITEM	DESCRIPTION	FAA AC 150 /
e.	Handhole	L-867, watertight, transformer housing, Class II, Size B, 12 inches diameter by 24 inches deep, non-metallic one-piece light base made from Type III, ultra-high molecular weight, heavy wall, high density polyethylene pipe having a cell classification of 345434C or better according to ASTM D3350. A conduit stub made of the same material as the light bases shall be sidewall to ASTM D3350. Conduit stubs made of the same material as the light bases shall be sidewall fused to the bases using saddle fittings, or other approved method for a watertight connection. Complete with 1/2-inch galvanized steel cover and gasket.	5345-42
f.	Spacer Ring	L-867 or L-868, galvanized steel spacer ring with bolt hole pattern to match light base.	5345-42
g.	Light Base Extension	L-867, Class I, Size B or D, depth as required or indicated, galvanized steel light base extension with bolt hole pattern to match light base.	5345-42

**125-2.13 ISOLATION TRANSFORMERS.** Isolation Transformers shall conform to AC 150/5345-47.

**125-2.13 Isolation Transformers.** Isolation Transformers shall be Type L-830-1 size as required for each installation. Transformer shall conform to AC 150/5345-47.

**TABLE 125-4. ISOLATION TRANSFORMERS**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Isolation Transformer	L-830, individual lamp type, series-to-series, 5000 V, 6.6 A to 6.6 A.	5345-47
b.	Isolation Transformer	L-830, individual lamp type, series-to-series, 5000 V, 20 A to 6.6 A.	5345-47

### INSTALLATION

**125-3.1 Installation.** The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.



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

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

The Contractor shall assemble units and connect them to the system in accordance with the manufacturer's recommendation and instructions.

**125-3.2 Testing.** All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

**125-3.3 Shipping and Storage.** Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

**125-3.4 Elevated and In-pavement Lights.** Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

#### METHOD OF MEASUREMENT

**125-4.1** Reflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR. Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. Guidance signs will be measured by the number of each type and size installed as completed units, in place, ready for operation, and accepted by the RPR. Runway End Identifier Lights shall be measured by each system installed as a completed unit in place, ready for operation, and accepted by the RPR.

Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the RPR. Abbreviated Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the RPR.

#### BASIS OF PAYMENT

**125-5.1** Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

## Payment will be made under:

L-125-5.1	Existing Base-Mounted Runway Edge, Threshold or End Lights, Removed- per each
L-125-5.2	Existing Stake-Mounted Runway Edge, Threshold or End Lights, Removed-per each
L-125-5.3	Existing Base-Mounted Taxiway Edge Light, Removed-per each
L-125-5.4	Existing Stake-Mounted Taxiway Edge Light, Removed-per each
L-125-5.5	Existing Base-Mounted Airport Guidance Sign, Removed- per each
L-125-5.6	Existing REIL Light, Removed – per each
L-125-5.7	Existing PAPI 2-Box Units, Removed – per each
L-125-5.8	L-861 Base Mounted Runway Edge, Threshold or End Lights, Class 1, Mode 1, Style 3, LED, Installed – per each
L-125-5.9	L-861 Stake Mounted Runway Edge, Threshold or End Lights, Class 1, Mode 1, LED, Installed – per each
L-125-5.10	L-861T (MITL LED), Base Mounted Taxiway Edge Light, Class 1, Mode 1, Style 3, LED, Installed – per each
L-125-5.11	L-861T (MITL LED), Base Mounted Taxiway Edge Light, Class 1, Mode 1, Style 3, LED, Installed – per each
L-125-5.12	Lighted Airport Guidance Sign (Size 1, Style 2, Class 2, Mode 2), 1-Module, Installed – per each
L-125-5.13	Lighted Airport Guidance Sign (Size 1, Style 2, Class 2, Mode 2), 2-Module, Installed – per each
L-125-5.14	L-867 Junction Base Can, Installed – per each
L-125-5.15	Runway End Identifier Light System (REIL), L-849(L), Style E, Installed Complete In Place – per each
L-125-5.16	Precision Approach Path Indicator System (PAPI), 2-box system, L-881, Style B, Class I, Installed Complete in Place – per each

**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 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
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 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series-to-Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

**Engineering Brief (EB)**

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures
-----------	---

**END OF ITEM L-125**

This page intentionally left blank

# DANIEL FIELD AIRPORT (DNL) AUGUSTA, GA

## AIRFIELD ELECTRICAL SYSTEM UPGRADE

**GDOT PID T007935** <sup>▲</sup>

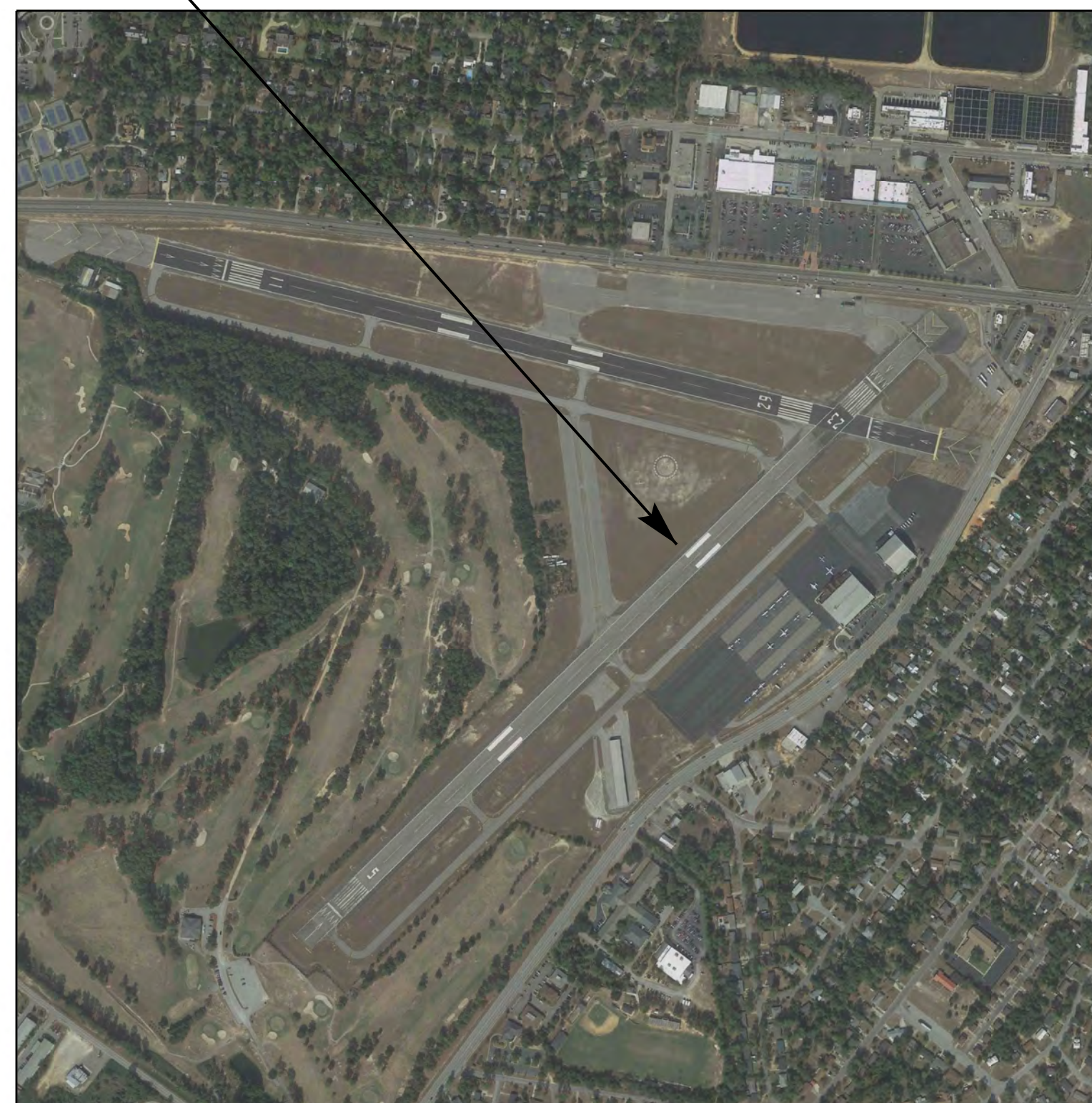
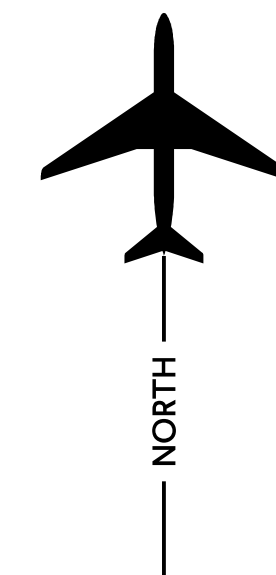
### GMC PROJECT NO TAUG220004

### FEBRUARY 2023

#### INDEX

SHEET NO.	DESCRIPTION
Sheet 1	TITLE SHEET
Sheet C2	PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLAN (OVERALL)
Sheets C3 - C9	PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLANS
Sheets GE0 - GE1	ELECTRICAL LEGENDS & NOTES
Sheet E0	OVERALL ELECTRICAL REFERENCE PLAN
Sheets ED1 - ED12	DEMOLITION PLANS
Sheets E1 - E8	5/23 LIGHTING & WIRING PLANS
Sheets E9 - E10	5/23 SIGN CHART AND LAYOUT PLANS
Sheets E11 - E12	ELECTRICAL VAULT PLANS
Sheets E13 - E21	ELECTRICAL DETAILS
Sheets E22 - E26	11/29 LIGHTING & WIRING PLANS
Sheets E27 - E28	11/29 SIGN CHART AND LAYOUT PLANS

DANIEL FIELD AIRPORT

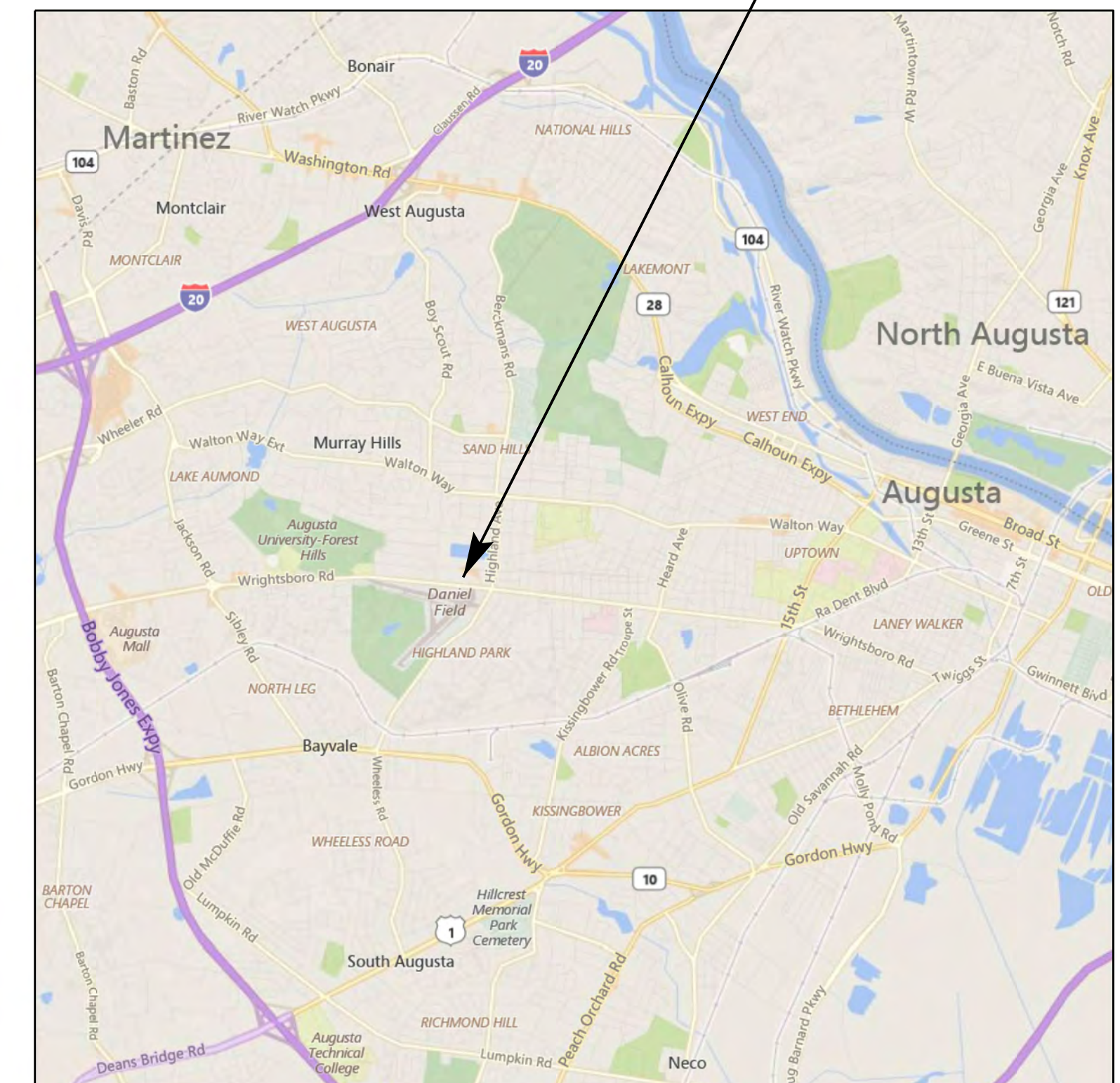


**VICINITY MAP**  
N.T.S.

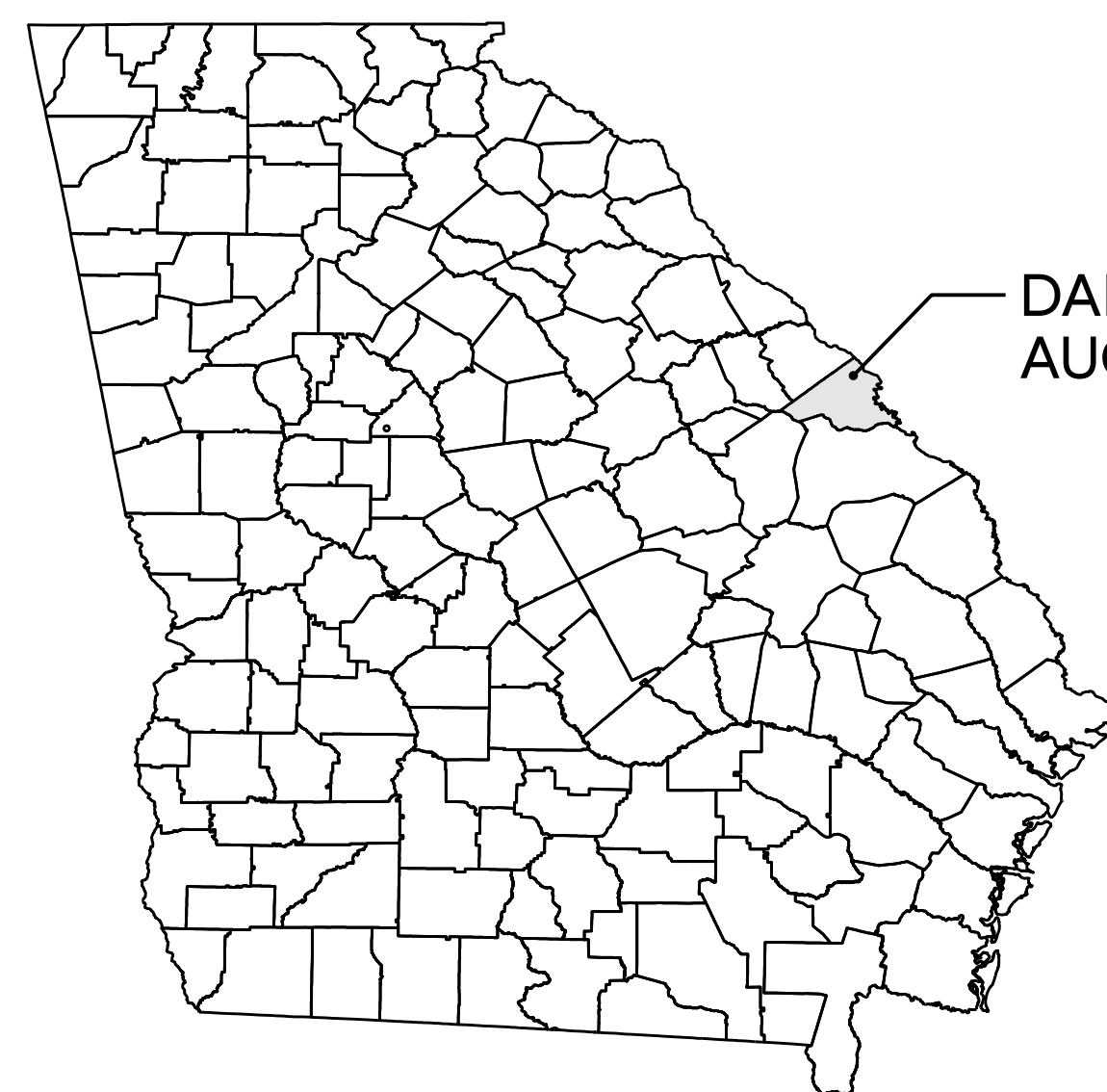
NOTE:  
ALL MATERIALS USED SHALL BE IN ACCORDANCE WITH GEORGIA DEPARTMENT OF TRANSPORTATION, STATE OF GEORGIA, STANDARD SPECIFICATIONS CONSTRUCTION OF TRANSPORTATION SYSTEMS, 2020 EDITION OR BY SPECIAL PROVISION, EXCEPT FOR ELECTRICAL ITEMS OF WORK WHICH SHALL BE IN ACCORDANCE WITH APPLICABLE FAA SPECIFICATIONS.

**REVISED PER ADDENDUM NO. 2**

DANIEL FIELD AIRPORT

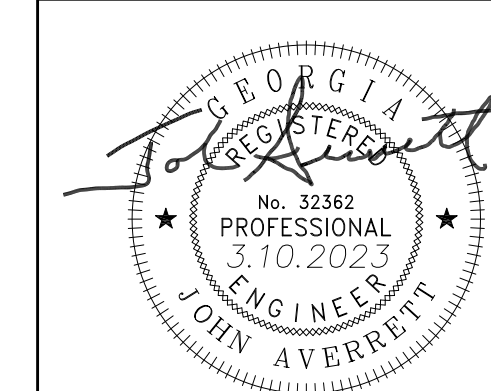


**LOCATION MAP**  
N.T.S.



**STATE MAP**  
N.T.S.

**PLANS PREPARED BY:**



DATE: 03/10/2023



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 706.303.3272  
GMCNETWORK.COM

REGISTERED ENGINEER  
STATE OF GEORGIA

JOHN AVERRETT  
LICENSE NO. 32362

BID	PHASE	WORK AREA	DURATION	DESCRIPTION
BASE BID	I	1, 2	30*	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 5/23 AND 11/29 OPEN FOR DURATION OF PHASE</li> <li>UTILIZE STAGING AREA 1 AND 2</li> <li>BACK TAXI REQUIRED ON RUNWAY 5/23</li> <li>INTERMITTANT ACCESS TO APRONS AND RAMPS MAY BE REQUIRED (AS DIRECTED) FOR EASE OF AIRCRAFT OPERATIONS.</li> </ul>
	II	3, 4, 5	30	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 5/23 CLOSED FOR DURATION OF PHASE</li> <li>RUNWAY 11/29 OPEN FOR WORK IN AREAS 3 AND 4</li> <li>RUNWAY 11/29 INTERSECTION CLOSED FOR WORK IN AREA 5 (NIGHT WORK ONLY)</li> <li>UTILIZE STAGING AREA 1 AND 2</li> <li>PORTIONS OF TAXIWAY AND CONNECTORS TO BE CLOSED FOR AIRCRAFT USE (AS SHOWN)</li> </ul>
ADD #1	III	6	30	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 5/23 AND 11/29 OPEN FOR DURATION OF PHASE</li> <li>UTILIZE STAGING AREA 2</li> <li>ACCESS TO WORK AREA SHALL BE COORDINATED WITH AIRPORT AND SHALL BE VIA GROUND CONTROL FREQUENCY (RADIO ANNOUNCEMENT)</li> <li>BACK TAXI ON RUNWAY 11/29 REQUIRED</li> </ul>
	IV	7, 8, 9	30	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 11/29 CLOSED FOR DURATION OF PHASE</li> <li>RUNWAY 5/23 OPEN FOR WORK IN AREAS 7 AND 8</li> <li>RUNWAY 5/23 INTERSECTION CLOSED FOR WORK IN AREA 9 (NIGHT WORK ONLY)</li> <li>UTILIZE STAGING AREA 1 AND 2</li> <li>PORTIONS OF TAXIWAY AND CONNECTORS CLOSED FOR AIRCRAFT USE (AS SHOWN)</li> <li>INTERMITTANT ACCESS TO APRONS AND RAMPS MAY BE REQUIRED (AS DIRECTED)</li> </ul>

NOTES:

- IF BASE BID + ADDITIVE #1 IS AWARDED, PHASES I AND II WILL BE COMPLETED AFTER PHASES III AND IV. RUNWAY 11/29 AND ASSOCIATED TAXIWAY WORK WILL COMMENCE FIRST UPON OFFICIAL NTP OF PROJECT. ORDER OF WORK SHALL BE AS FOLLOWS: PHASE III - PHASE IV - PHASE I - PHASE II.
- IF ONLY BASE BID IS AWARDED, CONTRACT TIME SHALL BE 75 CALENDAR DAYS (\*PHASE I DURATION INCREASED TO 45 DAYS). IF BASE + ADDITIVE #1 IS AWARDED, CONTRACT TIME SHALL BE 120 CALENDAR DAYS.

NOTE:  
THE CLOSURE MARKERS SHALL BE POSITIONED PRIOR TO ANY WORK DURING ANY PHASE REQUIRING A RUNWAY CLOSURE. A RUNWAY CLOSURE SHALL REQUIRE A NOTICE TO AIRMEN (NOTAM) AND SHALL BE COORDINATED WITH THE AIRPORT WELL IN ADVANCE OF THE CLOSURE.

**LEGEND**

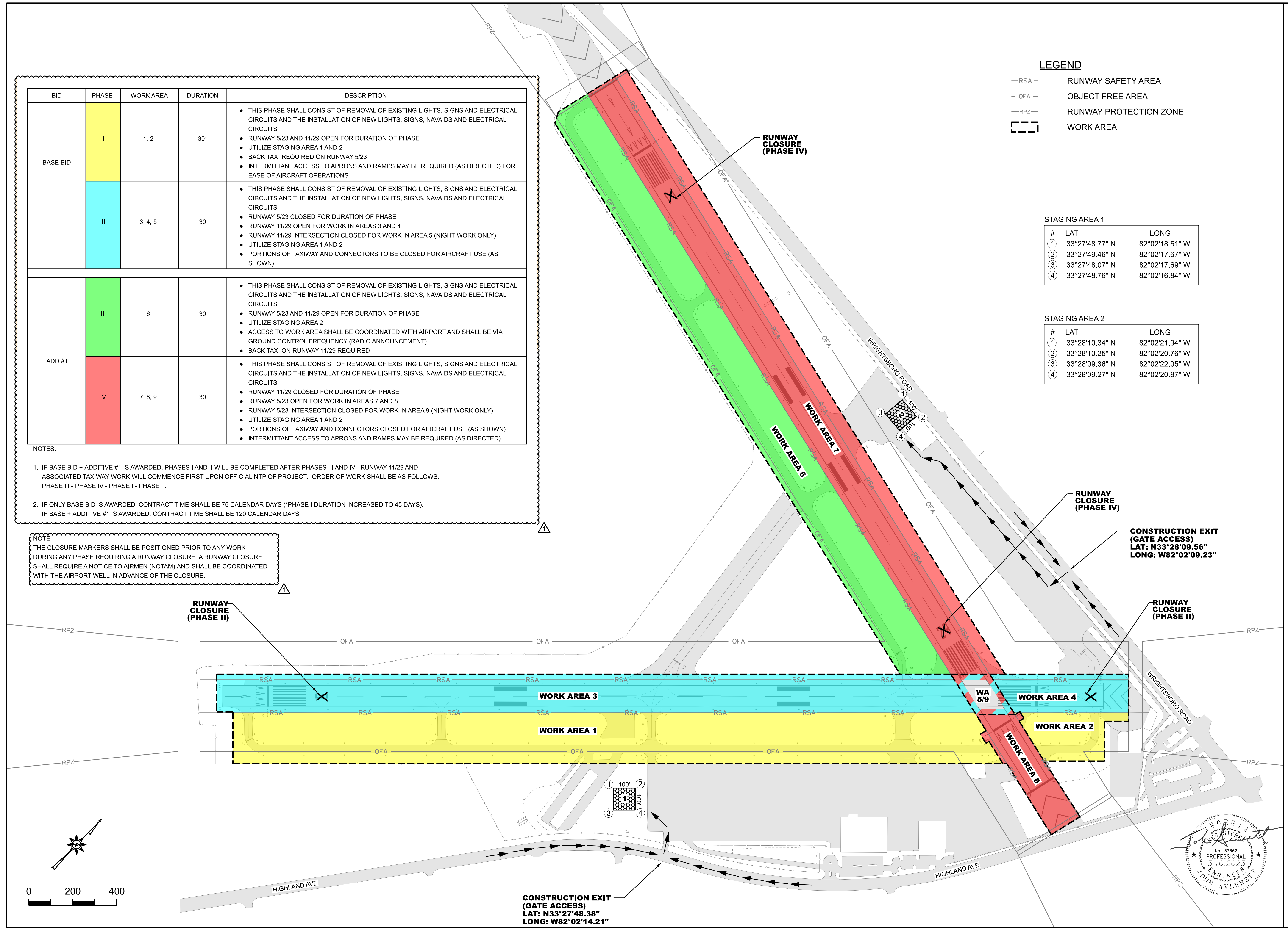
- RSA— RUNWAY SAFETY AREA
- OFA - OBJECT FREE AREA
- RPZ— RUNWAY PROTECTION ZONE
- WORK AREA

**STAGING AREA 1**

#	LAT	LONG
①	33°27'48.77" N	82°02'18.51" W
②	33°27'49.46" N	82°02'17.67" W
③	33°27'48.07" N	82°02'17.69" W
④	33°27'48.76" N	82°02'16.84" W

**STAGING AREA 2**

#	LAT	LONG
①	33°28'10.34" N	82°02'21.94" W
②	33°28'10.25" N	82°02'20.76" W
③	33°28'09.36" N	82°02'22.05" W
④	33°28'09.27" N	82°02'20.87" W



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 706.303.3272  
GMCNETWORK.COM

ISSUE DATE	100% SUBMITTAL	ADDENDUM #1
	1/20/2023	3/10/2023

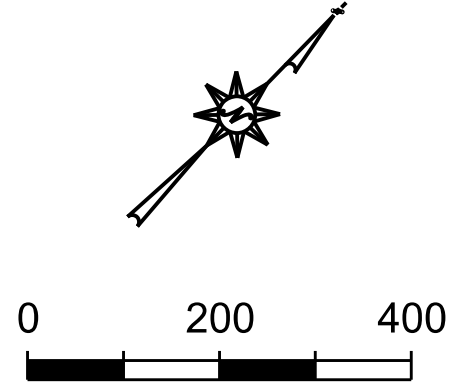
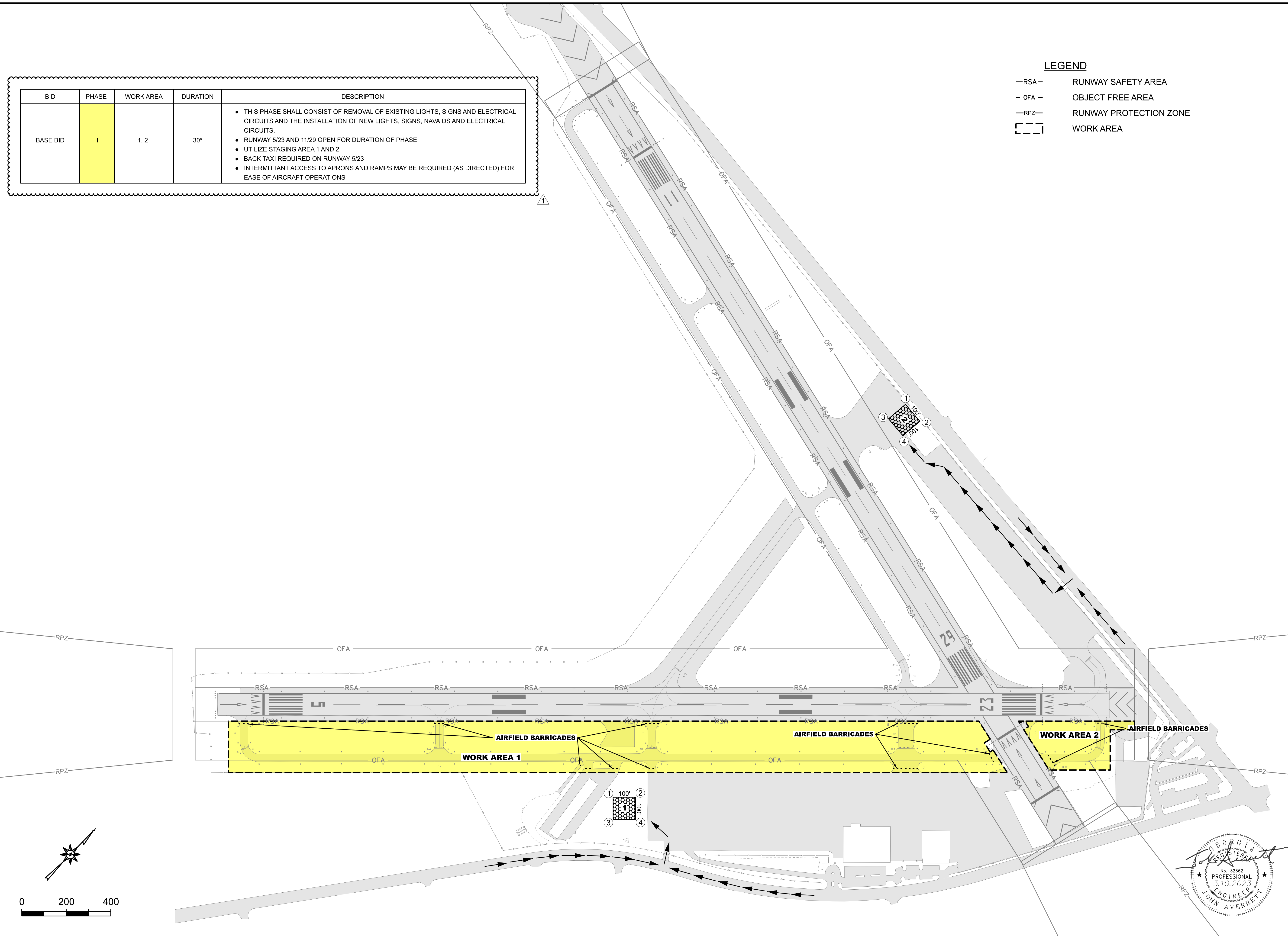
designed by: JMR  
drawn by: CAM  
checked by: JEA

**PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLAN (OVERALL)**  
AIRFIELD ELECTRICAL SYSTEM UPGRADE  
DANIEL FIELD AIRPORT (DNL)  
AUGUSTA, GEORGIA  
GDOT PID: T007935  
TAUG220004  
SCALE: 1" = 200'



BID	PHASE	WORK AREA	DURATION	DESCRIPTION
BASE BID	I	1, 2	30*	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 5/23 AND 11/29 OPEN FOR DURATION OF PHASE</li> <li>UTILIZE STAGING AREA 1 AND 2</li> <li>BACK TAXI REQUIRED ON RUNWAY 5/23</li> <li>INTERMITTANT ACCESS TO APRONS AND RAMPS MAY BE REQUIRED (AS DIRECTED) FOR EASE OF AIRCRAFT OPERATIONS</li> </ul>

- LEGEND**
- RSA- RUNWAY SAFETY AREA
  - OFA- OBJECT FREE AREA
  - RPZ- RUNWAY PROTECTION ZONE
  - WORK AREA



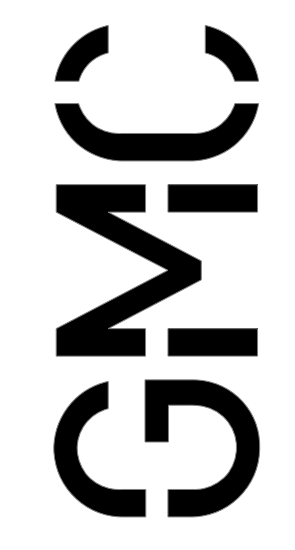
**PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLAN (PHASE I)**  
**AIRFIELD ELECTRICAL SYSTEM UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**  
 AUGUSTA, GEORGIA  
 GDOT PID: T007935  
 TAUG220004

SCALE: 1" = 200'

**C3**  
 sheet 3 of 52

801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 706.303.3272  
 GMCNETWORK.COM

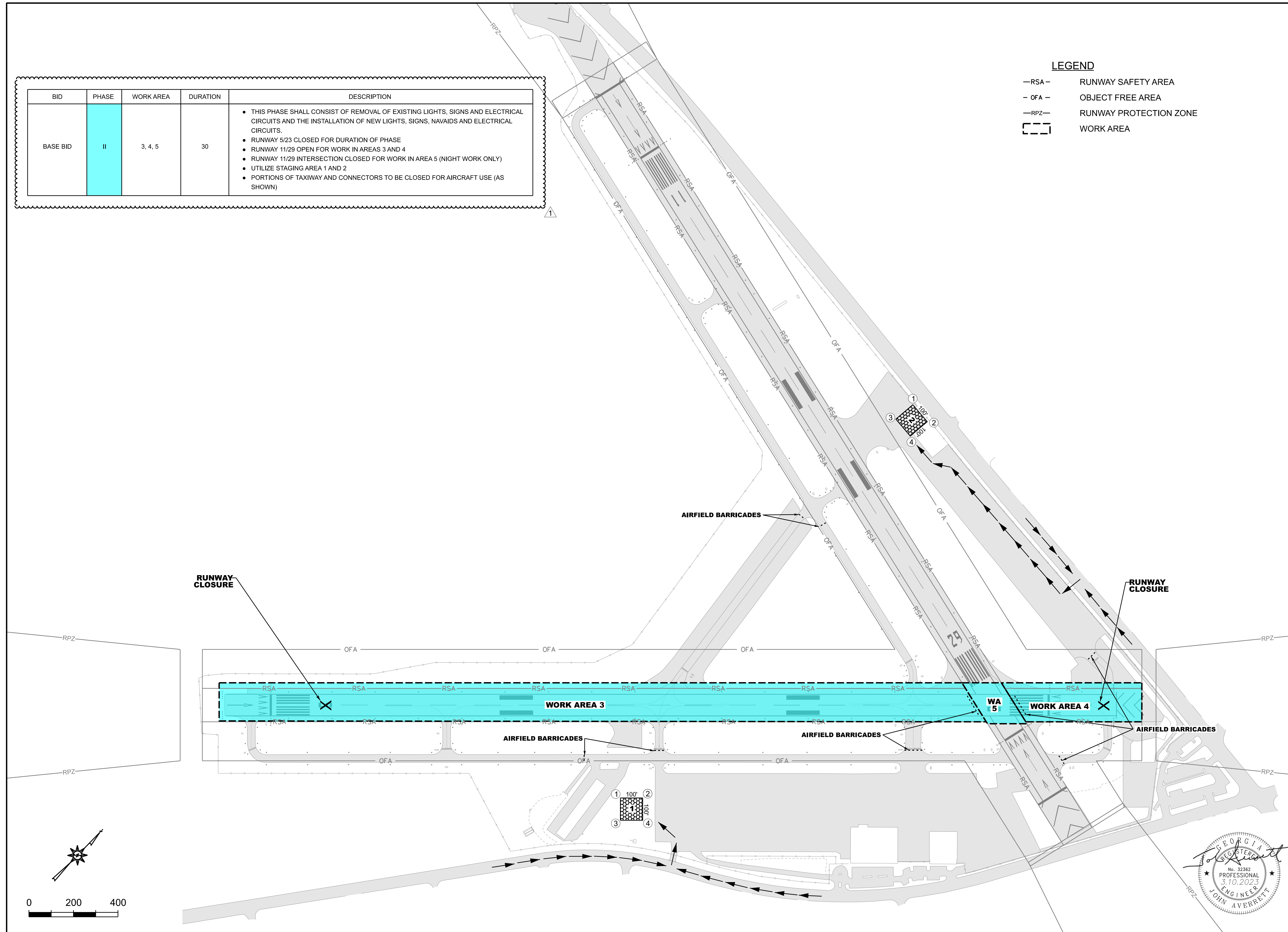
ISSUE DATE	100% SUBMITTAL	ADDENDUM #1
	1/20/2023	3/10/2023
designed by:	JMR	
drawn by:	CAM	
checked by:	JEA	



BID	PHASE	WORK AREA	DURATION	DESCRIPTION
BASE BID	II	3, 4, 5	30	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 5/23 CLOSED FOR DURATION OF PHASE</li> <li>RUNWAY 11/29 OPEN FOR WORK IN AREAS 3 AND 4</li> <li>RUNWAY 11/29 INTERSECTION CLOSED FOR WORK IN AREA 5 (NIGHT WORK ONLY)</li> <li>UTILIZE STAGING AREA 1 AND 2</li> <li>PORTIONS OF TAXIWAY AND CONNECTORS TO BE CLOSED FOR AIRCRAFT USE (AS SHOWN)</li> </ul>

**LEGEND**

—RSA—	RUNWAY SAFETY AREA
-OFA-	OBJECT FREE AREA
—RPZ—	RUNWAY PROTECTION ZONE
---	WORK AREA



801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 706.303.3272  
 GMCNETWORK.COM

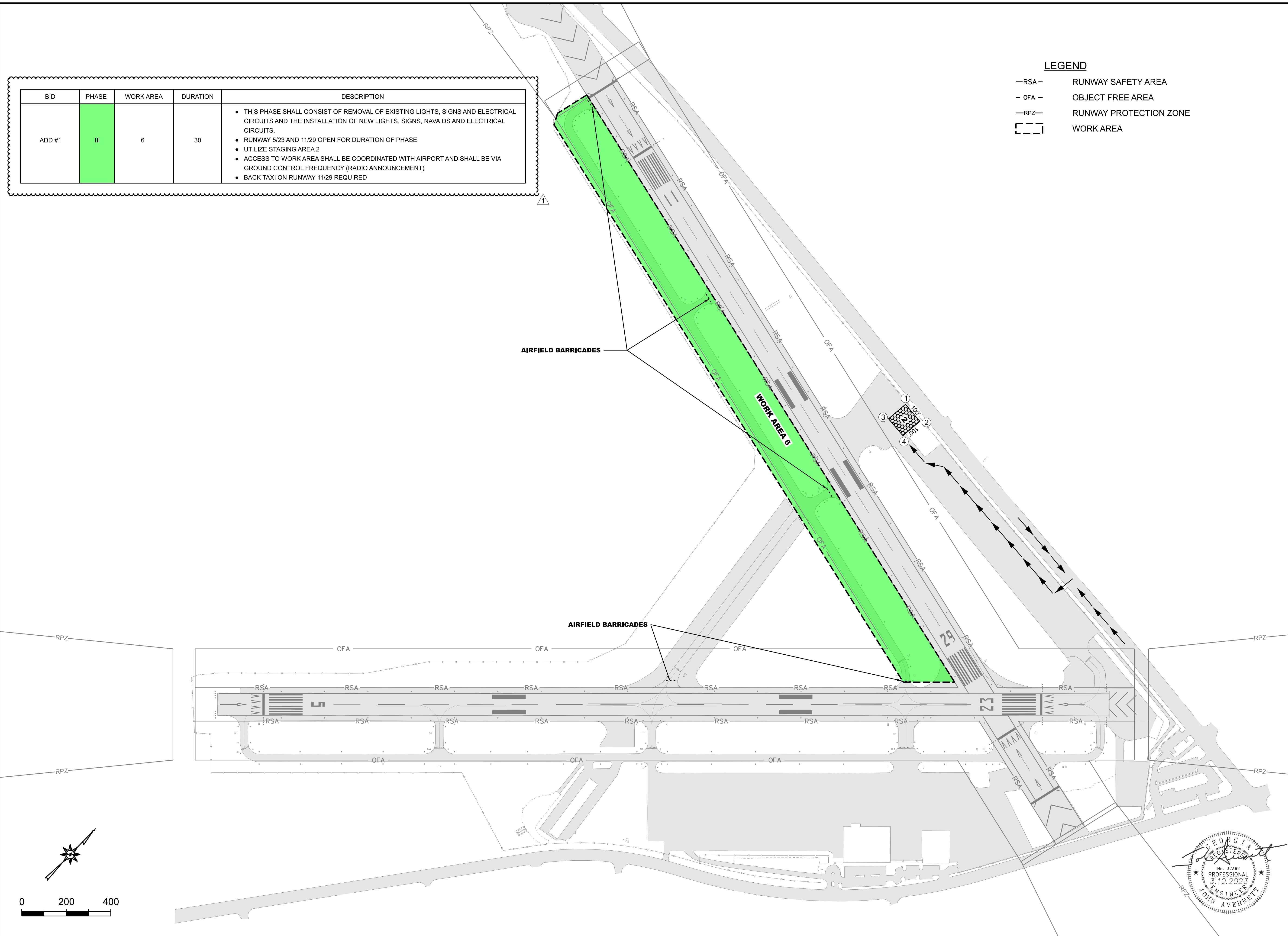
ISSUE DATE	100% SUBMITTAL	ADDENDUM #1
	1/20/2023	3/10/2023
designed by:	JMR	
drawn by:	CAM	
checked by:	JEA	

**PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLAN (PHASE II)**  
**AIRFIELD ELECTRICAL SYSTEM UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**  
 AUGUSTA, GEORGIA  
 GDOT PID: T007935  
 TAUG220004  
 SCALE: 1" = 200'



BID	PHASE	WORK AREA	DURATION	DESCRIPTION
ADD #1	III	6	30	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 5/23 AND 11/29 OPEN FOR DURATION OF PHASE</li> <li>UTILIZE STAGING AREA 2</li> <li>ACCESS TO WORK AREA SHALL BE COORDINATED WITH AIRPORT AND SHALL BE VIA GROUND CONTROL FREQUENCY (RADIO ANNOUNCEMENT)</li> <li>BACK TAXI ON RUNWAY 11/29 REQUIRED</li> </ul>

- LEGEND**
- RSA- RUNWAY SAFETY AREA
  - OFA- OBJECT FREE AREA
  - RPZ- RUNWAY PROTECTION ZONE
  - WORK AREA



801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 706.303.3272  
 GMCNETWORK.COM

ISSUE DATE	
100% SUBMITTAL	1/20/2023
ADDENDUM #1	3/10/2023
designed by:	JMR
drawn by:	CAM
checked by:	JEA

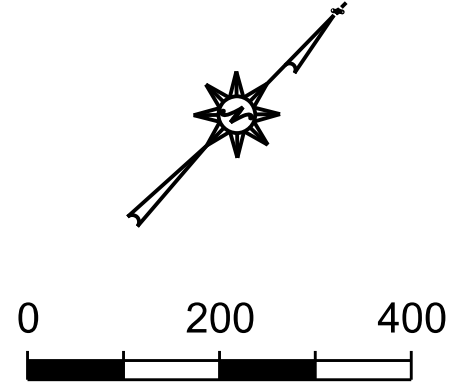
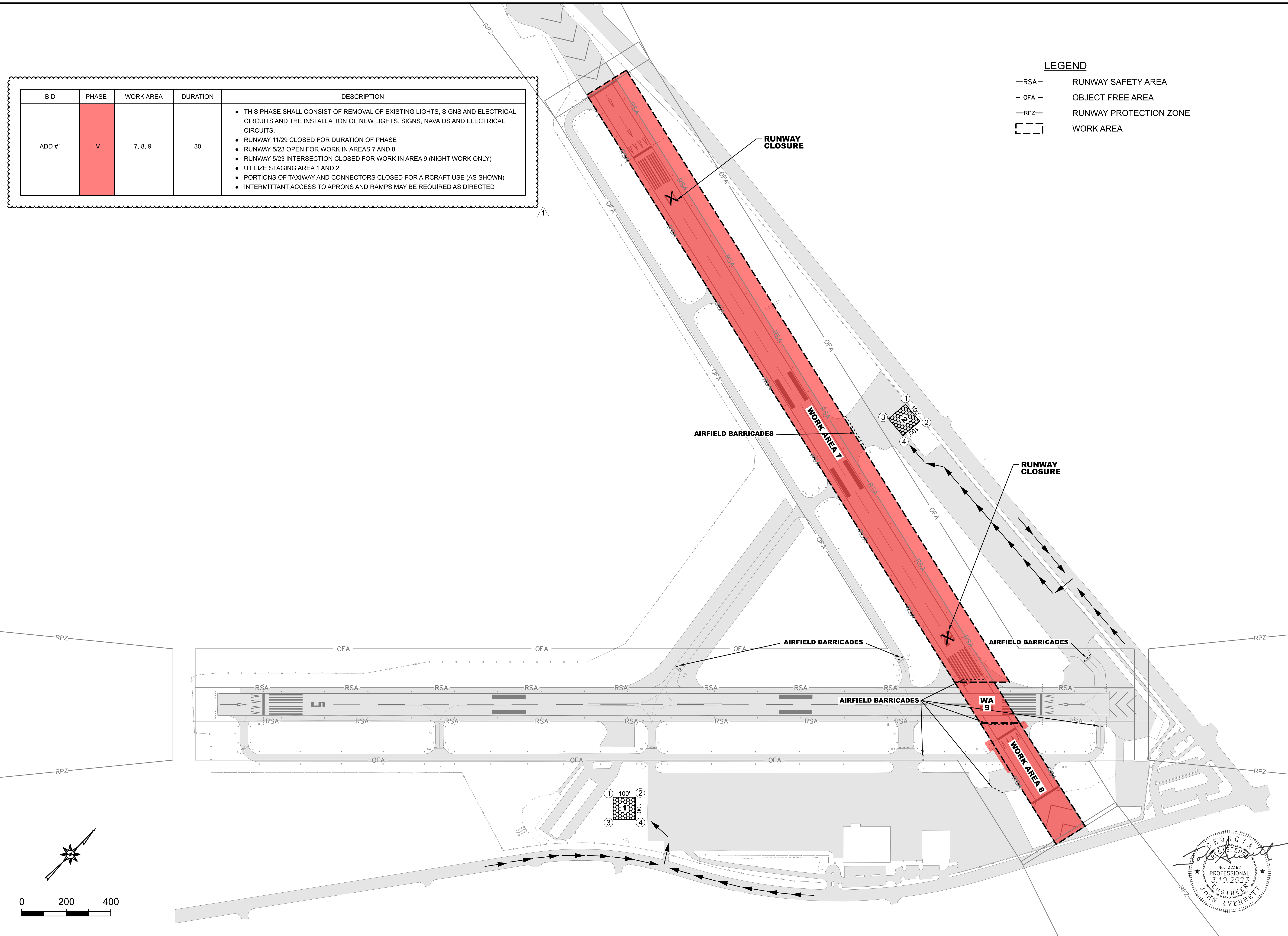
**PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLAN (PHASE III)**  
**AIRFIELD ELECTRICAL SYSTEM UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**  
 AUGUSTA, GEORGIA  
 GDOT PID: T007935  
 TAUG220004  
 SCALE: 1" = 200'



BID	PHASE	WORK AREA	DURATION	DESCRIPTION
ADD #1	IV	7, 8, 9	30	<ul style="list-style-type: none"> <li>THIS PHASE SHALL CONSIST OF REMOVAL OF EXISTING LIGHTS, SIGNS AND ELECTRICAL CIRCUITS AND THE INSTALLATION OF NEW LIGHTS, SIGNS, NAVAIDS AND ELECTRICAL CIRCUITS.</li> <li>RUNWAY 11/29 CLOSED FOR DURATION OF PHASE</li> <li>RUNWAY 5/23 OPEN FOR WORK IN AREAS 7 AND 8</li> <li>RUNWAY 5/23 INTERSECTION CLOSED FOR WORK IN AREA 9 (NIGHT WORK ONLY)</li> <li>UTILIZE STAGING AREA 1 AND 2</li> <li>PORTIONS OF TAXIWAY AND CONNECTORS CLOSED FOR AIRCRAFT USE (AS SHOWN)</li> <li>INTERMITTANT ACCESS TO APRONS AND RAMPS MAY BE REQUIRED AS DIRECTED</li> </ul>

**LEGEND**

—RSA—	RUNWAY SAFETY AREA
-OFA-	OBJECT FREE AREA
—RPZ—	RUNWAY PROTECTION ZONE
---	WORK AREA



**PROJECT LAYOUT AND CONSTRUCTION SAFETY PHASING PLAN (PHASE IV)**  
**AIRFIELD ELECTRICAL SYSTEM UPGRADE DANIEL FIELD AIRPORT (DNL)**  
 AUGUSTA, GEORGIA  
 GDOT PID: T007935  
 TAUG220004

**GMC**  
 801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 706.303.3272  
 GMCNETWORK.COM

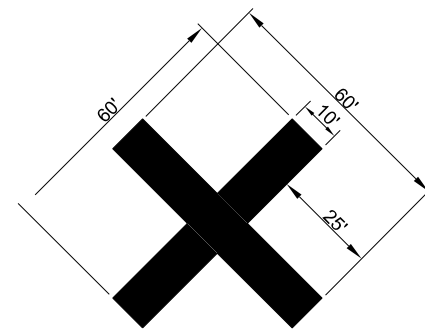
ISSUE DATE	100% SUBMITTAL	ADDENDUM #1
	1/20/2023	3/10/2023

designed by: JMR  
 drawn by: CAM  
 checked by: JEA

**C6**  
 sheet 6 of 52  
 SCALE: 1" = 200'

**SAFETY NOTES**

1. ALL CONSTRUCTION VEHICLES AND EQUIPMENT OPERATING ON THE AIRPORT PROPERTY SHALL BE MARKED WITH STANDARD FAA WARNING FLAGS OR BEACONS. VEHICLES AND EQUIPMENT OPERATING DURING HOURS OF DARKNESS OR REDUCED VISIBILITY SHALL BE LIGHTED WITH A FLASHING CIRCULAR AMBER EMERGENCY WARNING LIGHT, ACCORDING TO FAA ADVISORY CIRCULAR 150/5370-2F.
2. ALL FOREMAN'S AND SUPERINTENDENT'S VEHICLES SHALL CONTAIN RADIOS CAPABLE OF TRANSMITTING AND RECEIVING THE UNICOM FREQUENCY OF 123.05 MHZ. NORMAL RADIO COMMUNICATIONS BETWEEN CONTRACTOR PERSONNEL WILL NOT BE ALLOWED ON THE UNICOM CONTROL OR ANY OTHER FAA FREQUENCY.
3. CONTRACTOR SHALL USE EXTREME CAUTION WHILE WORKING NEAR FUEL FARM FACILITY. FLAMMABLE FUEL TANKS EXIST IN THE FUEL FARM.
4. ALL OPEN EXCAVATIONS SHALL BE ADEQUATELY MARKED AND SIGNED.
5. THE CONTRACTOR SHALL NOT AT ANY TIME BE ON THE RUNWAY UNLESS THE ENGINEER OR AIRPORT PERSONNEL GIVES PRIOR APPROVAL.
6. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION, MAINTENANCE, REMOVAL AND CLEANUP OF ALL HAUL ROUTES (ON AND OFF AIRPORT PROPERTY).
7. ALL ACTIVE AIRPORT OPERATIONAL AREAS ADJACENT TO WORK AREAS SHALL BE SEPARATED BY BARRICADES.
8. RUNWAY WILL BE CLOSED AS NECESSARY FOR WORK PERFORMED IN THE OFA.
9. RUNWAY CLOSURE X'S MUST BE SECURED BY DOUBLE-BAGGED YELLOW SANDBAGS PLACED AT EVERY CORNER AND APPROXIMATELY 10' SPACING BETWEEN EACH BAG. IF A BAG IS DAMAGED OR TARNISHED, CONTRACTOR IS REQUIRED TO CLEAN DEBRIS AND REPLACE APPROPRIATELY.

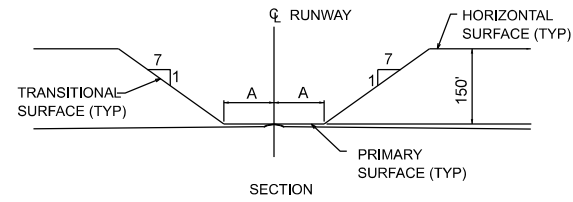


**RUNWAY CLOSURE DETAIL**  
Not to scale

NOTE:  
CONTRACTOR SHALL MAINTAIN ALL RUNWAY CLOSURES THROUGHOUT THE DURATION OF THE PROJECT.

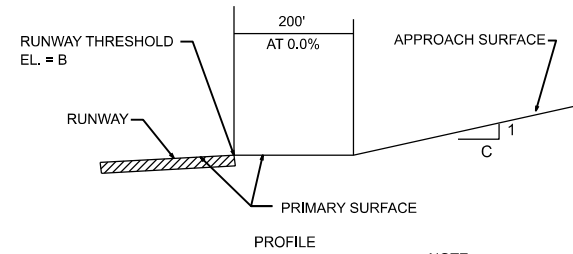
RUNWAY CLOSURE X'S SHALL CONSIST OF YELLOW VINYL MATERIAL.

**PART 77 DETAIL**  
Not to scale



PAVEMENT	SAFETY AREA WIDTH
RUNWAY 5/23	150'
RUNWAY 11/29	150'

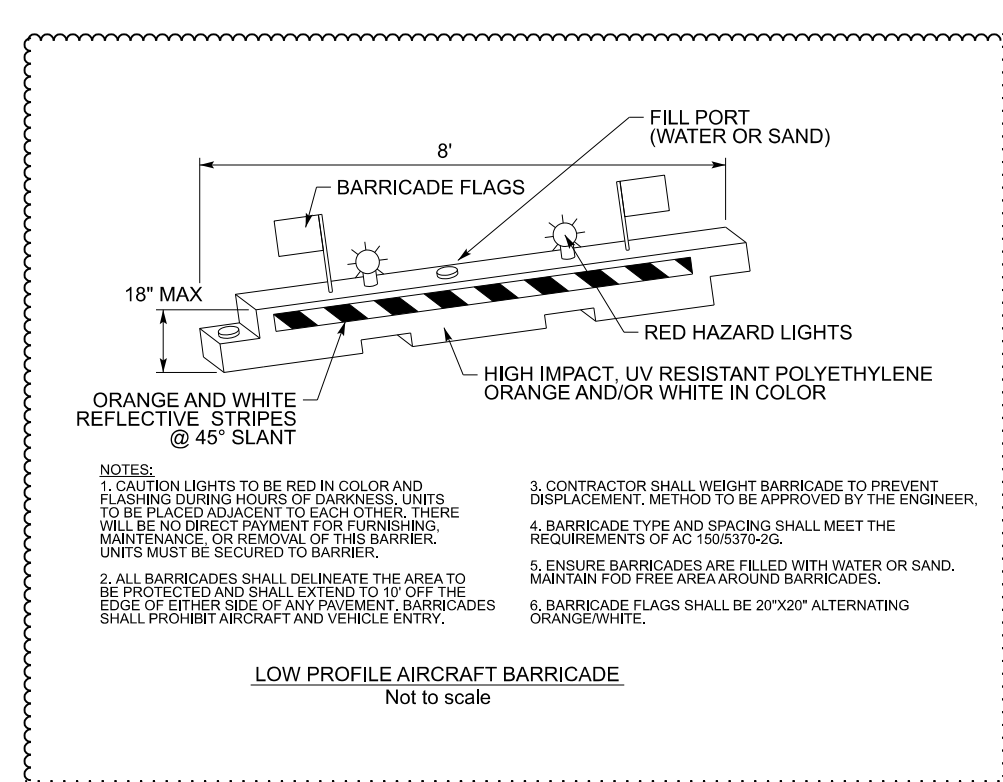
SAFETY AREA DIMENSIONS



RUNWAY END	A	B	C
RUNWAY 5	250	373.9	20
RUNWAY 23	250	422.3	20
RUNWAY 11	250	421.4	34
RUNWAY 29	250	418.7	20

FAR PART 77 SURFACES

NOTE:  
THE PART 77 SURFACE IS CENTERED ON THE RUNWAY AT THE CENTERLINE ELEVATION AND TO THE WIDTH INDICATED. THE PART 77 SURFACE IS LOCATED ON THE PROFILE OF THE EXTENDED RUNWAY CENTERLINE AT THE RUNWAY THRESHOLD ELEVATION TO A POINT 200' BEYOND EACH THRESHOLD. THE SECTION THEN RISES ALONG THE SLOPES INDICATED.



- NOTES:
1. CAUTION LIGHTS TO BE RED IN COLOR AND FLASHING DURING HOURS OF DARKNESS. UNITS TO BE PLACED ADJACENT TO EACH OTHER. THERE WILL BE NO DIRECT PAYMENT FOR FURNISHING, MAINTENANCE, OR REMOVAL OF THIS BARRIER. UNITS MUST BE SECURED TO BARRIER.
  2. ALL BARRICADES SHALL DELINEATE THE AREA TO BE PROTECTED AND SHALL EXTEND TO 10' OFF THE EDGE OF EITHER SIDE OF ANY PAVEMENT. BARRICADES SHALL PROHIBIT AIRCRAFT AND VEHICLE ENTRY.
  3. CONTRACTOR SHALL WEIGHT BARRICADE TO PREVENT DISPLACEMENT. METHOD TO BE APPROVED BY THE ENGINEER.
  4. BARRICADE TYPE AND SPACING SHALL MEET THE REQUIREMENTS OF AC 150/5370-2G.
  5. ENSURE BARRICADES ARE FILLED WITH WATER OR SAND. MAINTAIN FOD FREE AREA AROUND BARRICADES.
  6. BARRICADE FLAGS SHALL BE 20"X20" ALTERNATING ORANGE/WHITE.

**LOW PROFILE AIRCRAFT BARRICADE**  
Not to scale



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 706.303.3272  
GMCNETWORK.COM

ISSUE DATE	100% SUBMITTAL	ADDENDUM #1	DESIGNED BY	DRAWN BY	CHECKED BY
1/20/2023	1/20/2023	3/10/2023	JMR	CAM	JEA

**CONSTRUCTION SAFETY NOTES AND DETAILS**  
**AIRFIELD ELECTRICAL SYSTEM UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**  
AUGUSTA, GEORGIA  
GDOT ID: T007935  
TAUG220004  
SCALE: NOT TO SCALE

SWITCH LEGEND	
\$	WALL SWITCH SPST 42" AFF TO CENTER UNO 20A 120/277V.
\$M	MOTOR RATED TOGGLE SWITCH 30A 120/277V 2HP MAX 120/240V.

AIRFIELD LIGHTING LEGEND	
	MEDIUM INTENSITY TAXIWAY LIGHT (BLUE LENS), BASE MOUNTED.
	MEDIUM INTENSITY TAXIWAY LIGHT (BLUE LENS), STAKE MOUNTED.
	MEDIUM INTENSITY RUNWAY LIGHT (COLOR AS INDICATED, G=GREEN, R=RED, W=WHITE, Y= YELLOW, O=OBSCURE), BASE MOUNTED.
	MEDIUM INTENSITY RUNWAY LIGHT (COLOR AS INDICATED, G=GREEN, R=RED, W=WHITE, Y= YELLOW, O=OBSCURE), STAKE MOUNTED.
	GUIDANCE SIGN, SEE SIGN LAYOUT SHEETS E9, E10, E27, & E28.
	PAPI LIGHT UNIT, "EX" INDICATES EXISTING TO REMAIN.
	PAPI CONTROL UNIT.
	UNIDIRECTIONAL REIL, HEAD AND POWER CONTROL UNIT.
	OMNI DIRECTIONAL REIL, HEAD AND POWER CONTROL UNIT.

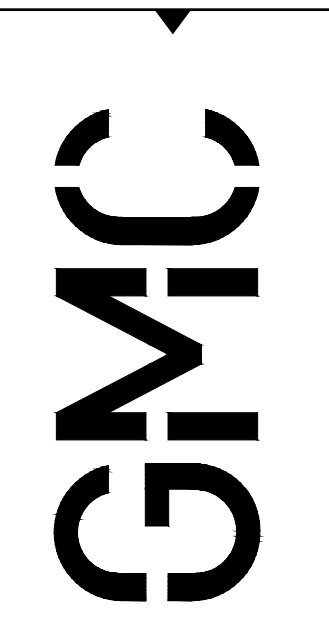
AIRFIELD LIGHTING DEMOLITION LEGEND	
	EXISTING AIRFIELD MEDIUM INTENSITY LIGHT TO BE REMOVED UNO.
	EXISTING RUNWAY 5KV CIRCUIT/WIRING TO BE REMOVED.
	EXISTING TAXIWAY 5KV CIRCUIT/WIRING TO BE REMOVED.
	EXISTING PAPI 5KV CIRCUIT/WIRING TO BE REMOVED.
	EXISTING DUCT BANK TO REMAIN.
	EXISTING JUNCTION CAN / BOX TO REMAIN.
	EXISTING REIL LIGHT UNIT AND ALL ASSOCIATED COMPONENTS TO BE REMOVED.
	EXISTING PAPI LIGHT UNIT AND ALL ASSOCIATED COMPONENTS TO BE REMOVED UNO.

POWER LEGEND	
	PANELBOARD 208/120V, SURFACE MOUNTED.
	PANELBOARD, 480/277V, SURFACE MOUNTED.
	DISCONNECT SWITCH, NEMA 1, NON-FUSED, SUBSCRIPT INDICATES DISCONNECT SWITCH AMP RATING - SEE DISCONNECT SWITCH SCHEDULE.
	DISCONNECT SWITCH, NEMA 1, FUSED, SUBSCRIPT INDICATES DISCONNECT SWITCH AMP RATING - SEE DISCONNECT SWITCH SCHEDULE.
	DISCONNECT SWITCH, NEMA 3R, FUSED, SUBSCRIPT INDICATES DISCONNECT SWITCH AMP RATING - SEE DISCONNECT SWITCH SCHEDULE.
	COMBINATION MOTOR STARTER DISCONNECT SWITCH.
	PHOTOELECTRIC CELL AS SPECIFIED ON PLANS. MOUNT IN INCONSPICUOUS LOCATION ABOVE ROOF FACING NORTH.
	NEW TRANSFORMER.
	EXHAUST FAN.
	DAMPER MOTOR.
	EXISTING PANELBOARD, SURFACE MOUNTED.
	JUNCTION BOX WALL MOUNTED AT HEIGHT REQUIRED WITH FLEXIBLE CONNECTION TO EQUIPMENT.
	JUNCTION BOX CEILING/WALL MOUNTED. REFER TO SPECIFICATIONS FOR COLOR REQUIREMENTS FOR COVER.
	SURGE PROTECTION DEVICE
	METER BASE
	GROUND BUS BAR
	PAPI CONSTANT CURRENT REGULATOR, "X" INDICATES PAPI NAME.
	RUNWAY CONSTANT CURRENT REGULATOR, "X" INDICATES RUNWAY NAME.
	TAXIWAY CONSTANT CURRENT REGULATOR, "X" INDICATES TAXIWAY NAME.
	DUPLEX RECEPTACLE WALL MOUNTED 18" A.F.F. TO CENTER UNO.
	SIMPLEX RECEPTACLE WALL MOUNTED 18" A.F.F. TO CENTER UNO.
	DUPLEX GROUND FAULT CIRCUIT INTERRUPTER (5mA) RECEPTACLE WALL MOUNTED 18" A.F.F. TO CENTER UNO. "WP" INDICATES WEATHERPROOF "IN-USE" HEAVY DUTY METAL COVER.
	THERMOSTAT.
	TIME CLOCK.
	RADIO CONTROLLER.

CONDUIT & WIRING LEGEND	
	ELECTRICAL HANDHOLE PULL OR JUNCTION BOX AS NOTED
	CONDUIT OR RACEWAY EXPOSED TO VIEW. RUN PARALLEL OR PERPENDICULAR TO STRUCTURE CONCEAL FROM VIEW AS MUCH AS POSSIBLE.
	CONDUIT OR RACEWAY CONCEALED IN CEILING CAVITY OR WALL.
	CONDUIT OR RACEWAY UNDERGROUND OR CONCEALED IN FLOOR SLAB.
	OVERHEAD ELECTRICAL CABLE.
	UNDERGROUND PRIMARY.
	UNDERGROUND SECONDARY.
	GROUNDING CONDUCTOR. SEE PLANS & DETAILS FOR MORE INFORMATION.
	EXISTING ELECTRICAL LINE TO BE REMOVED.
	CONDUIT STUB UP.
	CONDUIT STUB DOWN.
	CONDUIT STUB IN.
	PHASE CONDUCTOR, NEUTRAL CONDUCTOR AND ISOLATED GROUND CONDUCTOR.
	HOMERUN. TICKS INDICATES NUMBER OF CONDUCTORS NO TICKS INDICATES 1 PHASE, 1 NEUTRAL, 1 GROUND CONDUCTOR.
	UNDERGROUND HOMERUN. ARROW INDICATES NUMBER OF CIRCUITS. TICKS INDICATES NUMBER OF CONDUCTORS NO TICKS INDICATES 1 PHASE, 1 NEUTRAL, 1 GROUND CONDUCTOR.
	EXPOSED TO VIEW HOMERUN. ARROW INDICATES NUMBER OF CIRCUITS. TICKS INDICATES NUMBER OF CONDUCTORS NO TICKS INDICATES 1 PHASE, 1 NEUTRAL, 1 GROUND CONDUCTOR.
	GROUND ROD AS SPECIFIED, 3/4"x10'. SEE DETAIL 7/E20.
	ELECTRICAL MANHOLE. SEE DETAIL 4&5/E20.
	CONDUIT MARKER IN-GRADE. SEE DETAIL 4/E14.
	DUCT MARKER IN-GRADE. SEE DETAIL 4/E14.
	PROPOSED RUNWAY 5-23 (R1) 5KV CIRCUIT (BASE BID) (DASHES/TICKS INDICATES NUMBER OF CABLES).
	PROPOSED TAXIWAY 'D' (T1) 5KV CIRCUIT (BASE BID) AND TAXIWAY 'A' (T3) 5KV CIRCUIT (ADDITIVE BID) (DASHES/TICKS INDICATES NUMBER OF CABLES).
	PROPOSED PAPI 5-23 5KV CIRCUIT (BASE BID) (DASHES/TICKS INDICATES NUMBER OF CABLES).
	PROPOSED RUNWAY 11-29 (R2) 5KV CIRCUIT (ADDITIVE BID) (DASHES/TICKS INDICATES NUMBER OF CABLES).
	PROPOSED 120V WINDCONE CIRCUIT (BASE BID).

LIGHTING LEGEND	
	1' x 4' SURFACE TROFFER, WRAPAROUND OR ENCLOSED STRIP FIXTURE - SURFACE MOUNTED OR CHAINHUNG. LETTER "X" INDICATES FIXTURE TYPE, SEE LUMINAIRE SCHEDULE. THE LETTER "E" INDICATES THAT THE FIXTURE IS EQUIPPED WITH EMERGENCY BATTERY.
	WALL MOUNTED LIGHT FIXTURE. LETTER "X" INDICATES FIXTURE TYPE, SEE LUMINAIRE SCHEDULE. THE LETTER "E" INDICATES THAT THE FIXTURE IS EQUIPPED WITH EMERGENCY BATTERY.
	EMERGENCY LIGHT WITH BATTERY POWER, CONNECTED TO UNSWITCHED HOTLEG. LETTER "X" INDICATES FIXTURE TYPE, SEE LUMINAIRE SCHEDULE.

VAUG220003



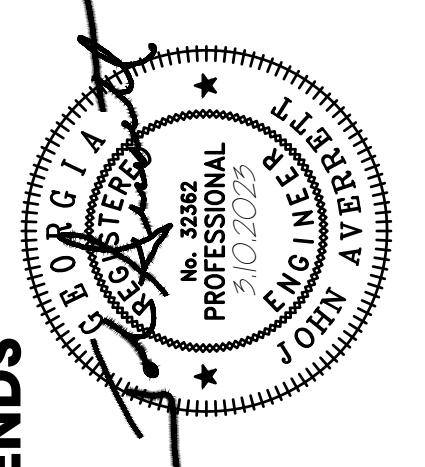
801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM


ISSUE DATE	100% SUBMITTAL
1/20/2023	1/20/2023
ADDENDUM #1	3/10/2023

**AIRFIELD ELECTRICAL UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
**GDOT PID : I007935**  
**GMC NUMBER : TAUG220004**  
**SCALE: NOT TO SCALE**

designed by: **JDZ**  
drawn by: **JRA, JDZ**  
checked by: **JEA**





Sheet 10 of 52

**GENERAL ELECTRICAL NOTES**

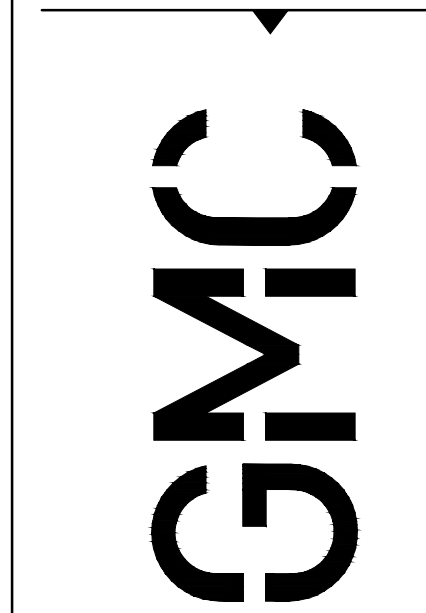
1. THE CONTRACTOR IS RESPONSIBLE TO FURNISH ALL LABOR, EQUIPMENT, MATERIALS, AND SUPPLIES AS NECESSARY FOR A NEAT, COMPLETE, AND SATISFACTORY OPERATING ELECTRICAL SYSTEMS WHICH CONFORMS TO ALL LOCAL CODES, PLANS, AND SPECIFICATIONS.
2. ELECTRICAL CONTRACTOR SHALL REVIEW ENTIRE SET OF CONTRACT DOCUMENTS INCLUDING BUT NOT NECESSARILY LIMITED TO ALL CIVIL, ELECTRICAL AND ENTIRE PROJECT MANUAL. ELECTRICAL CONTRACTOR SHALL ACKNOWLEDGE AND INCLUDE IN THE SCOPE OF WORK (CONTRACT) ALL CONDITIONS PERTINENT TO THE COMPLETION OF THE ELECTRICAL WORK. ELECTRICAL CONTRACTOR SHALL FULLY COORDINATE ELECTRICAL WORK WITH THE INSTALLATION OF WORK BY ALL OTHER TRADES AND MAKE NECESSARY FIELD ADJUSTMENTS AS REQUIRED TO ACCOMMODATE THE INSTALLATION. ALL OF THE ABOVE SHALL BE INCLUDED IN THE SCOPE OF WORK AT NO ADDITIONAL COST TO THE OWNER.
3. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE, IT SHALL NOT BE THE INTENT OF ISSUED PLANS AND/OR SPECIFICATIONS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE ELECTRICAL CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL NECESSARY ITEMS FOR A COMPLETE AND OPERATING SYSTEM.
4. ALL INSTALLATIONS SHALL CONFORM TO THE LATEST EDITION OF ALL ENFORCED INTERNATIONAL BUILDING CODE AND ALL FAA CIRCULAR ADVISORIES AT THE TIME OF PERMIT.
5. EACH BIDDER SHALL VISIT THE JOB SITE PRIOR TO BIDDING TO FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS AND TO ASCERTAIN THE EXTENT OF WORK REQUIRED. FAILURE TO VISIT SITE SHALL NOT EXCUSE CONTRACTOR FROM PERFORMING REQUIRED WORK NOR SHALL IT BE AN ACCEPTABLE REASON FOR REQUESTING ADDITIONS TO THE CONTRACT.
6. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED BY AN AGENCY SUCH AS UNDERWRITER'S LABORATORIES (UL), ELECTRICAL TESTING LABORATORY (ETL), ETC AND ACCEPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION. FOR THE USE INTENDED WHERE A STANDARD FOR SUCH MATERIALS AND USE EXISTS. ALL ITEMS OF THE SAME TYPE AND RATING SHALL BE IDENTICAL AND OF THE SAME MANUFACTURER.
7. THE WORD "PROVIDE" MEANS THAT THIS CONTRACTOR SHALL FURNISH, FABRICATE, ERECT, CONNECT, AND COMPLETELY INSTALL SYSTEMS IN PROPER OPERATING CONDITION. ALL LABOR, PRODUCT OPTIONS, ACCESSORIES AND INCIDENTAL MATERIALS REQUIRED SHALL BE INCLUDED AS PART OF THIS WORK TO COMPLETE THE INSTALLATION.
8. ALL ELECTRICAL CONNECTIONS WILL BE CODE COMPLIANT WITH N.E.C.
9. WIRING SYSTEMS SHALL CONSIST OF COPPER WIRING INSTALLED IN CONDUIT, MINIMUM WIRE SIZE SHALL BE #12AWG, MINIMUM CONDUIT SIZE SHALL BE 3/4".
10. CONDUCTORS SHALL BE 99% COPPER (NO ALUMINUM CONDUCTORS WILL BE ACCEPTED). MINIMUM SIZE #12 AWG-3/4" C.
11. SUBSURFACE CONDUIT SHALL BE SCHEDULE 40 PVC UNO. FOR RUNS GREATER THAN 50 FEET IN LENGTH, VERTICAL TURN UPS SHALL BE GRS SWEEP 90S WITH A BITUMASTIC COATING UNO.
12. CONTRACTOR SHALL REPAIR ANY DISTURBED AREA TO SAME COMPACTION, GRADE, SLOPE, ETC. AS ORIGINAL AREA INCLUDING REPLACEMENT OF SOD, GRASS, ROCK, GRAVEL, RIP-RAP, ETC. TO THE SATISFACTION OF THE OWNER AND ENGINEER.
13. ANY AREA OF CONSTRUCTION DAMAGED DURING THIS CONTRACT SHALL BE REPAIRED TO MATCH ADJACENT SURFACES.
14. WITHIN ALL AREAS OF WORK, ALL UNUSED OR ABANDONED ELECTRICAL CONDUIT, CONDUCTORS, FITTINGS AND SUPPORTS SHALL BE REMOVED.
15. CLEAN UP ALL DEBRIS AROUND CONSTRUCTION SITE DAILY.
16. PROVIDE COMPLETE AIRFIELD LIGHTING SYSTEMS AS INDICATED ON THE CONTRACT DRAWINGS AND SPECIFIED, INCLUDING BUT NOT LIMITED TO, RUNWAY AND TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, PAI'S, REIL'S, LIGHTING CONTROL PANEL, RADIO CONTROLLER, TRANSFORMERS, CCRs, BASE-CANS, GROUNDING, AND ASSOCIATED WIRING AND CONCRETE PADS AS INDICATED.
17. PROVIDE ELECTRICAL SERVICE AND POWER DISTRIBUTION AS INDICATED ON THE CONTRACT DRAWINGS AND SPECIFIED, INCLUDING BUT NOT LIMITED TO, VAULT BUILDING PANELBOARDS, TRANSFER SWITCH, GROUNDING, AND ASSOCIATED WIRING.
18. MAINTAIN A MINIMUM 4" CLEARANCE BETWEEN 5kV AND 600 VOLT NONMETALLIC CONDUITS AS INDICATED IN THE CABLE TRENCH DETAIL, INCLUDING WITHIN EQUIPMENT ENCLOSURES, SUCH AS WITHIN CCR'S. MAINTAIN A MINIMUM 6" CLEARANCE BETWEEN CONTROL CABLES AND ALL POWER CABLES AS INDICATED IN THE CABLE TRENCH DETAIL, INCLUDING WITHIN EQUIPMENT ENCLOSURES.
19. DO NOT INSTALL 5kV CABLES IN SAME RACEWAY WITH 600 VOLT CABLES.
20. TERMINATION OF PHASE, NEUTRAL AND GROUNDING CONDUCTORS SHALL BE MADE TO INDIVIDUAL TERMINALS / LUGS AT PANELS, DISCONNECTS, DEVICES, ETC.
21. PROVIDE WARNING TAPE FOR UNDERGROUND CONDUITS AS SPECIFIED IN SPECIFICATION L-110 AND AS INDICATED ON DETAILS. INSTALL WARNING TAPE ABOVE THE FULL LENGTH OF THE CONDUIT RUNS AND AT A MAXIMUM OF 4" BELOW GRADE.
22. WHERE STEEL CONDUIT OR COPPER CONDUCTORS EMERGE FROM CONCRETE INTO SOIL, APPLY DIRECT BURIAL TAPE WRAP THE THE CONDUIT OR CONDUCTORS TO PREVENT CORROSION AS SPECIFIED IN SPECIFICATION SECTION L-109. TAPE WRAP SHALL BE EQUAL TO 3M TEMFLEX 1700 VINYL ELECTRICAL TAPE. INSTALL PER THE MANUFACTURER'S INSTRUCTIONS.
23. ALL WORK OF THIS CONTRACT REQUIRING POWER INTERRUPTIONS TO EQUIPMENT SHALL BE COORDINATED WITH THE OWNER. THE OWNER WILL NEED AT LEAST A 48 HOUR NOTIFICATION. WORK REQUIRING INTERRUPTIONS SHALL BE CONDUCTED DURING THE TIMES AND DAYS STIPULATED BY THE OWNER.
24. CONSTANT CURRENT REGULATORS SHALL BE CALIBRATED AND TESTED IN ACCORDANCE WITH SPECIFICATION L-109.
25. AT SUBMITTAL COMPLETION REMOVE STANDING WATER AND DEBRIS FROM ALL BASE-CANS.
26. PROJECT NOTE: ALL RUNWAY LIGHTS ON BOTH RUNWAY 5/23 AND 11/29 ARE EQUIPPED WITH EXISTING PAVED SHOULDERS IN ASPHALT FROM GRADE TO EXISTING LIGHTING FIXTURES. CONTRACTOR TO UTILIZE EXISTING CONDUIT, OR RACEWAYS IN EXISTING PAVED SHOULDERS TO ROUTE NEW CABLING DIRECT BURIED IN GRADE TO EXISTING PAVED SHOULDERS AND CONTINUE TO ROUTE NEW CABLING IN EXISTING CONDUIT/RACEWAYS TO NEW LIGHTING FIXTURES. CONTRACTOR TO VERIFY EXISTING CONDUIT/RACEWAYS ARE IN GOOD CONDITION AND CODE COMPLAINT.

**ELECTRICAL DEMOLITION NOTES**

1. PARTIAL AND TOTAL DEMOLITION OF PORTIONS SHALL BE PERFORMED ALONG WITH ALL NECESSARY MODIFICATIONS TO THAT PORTION OF THE EXISTING BUILDING WHICH SHALL REMAIN SO THAT IT CONTINUES TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION.
2. WHERE INCLUDED AS PART OF THE CONTRACT DOCUMENTS, THE DRAWINGS INDICATE THE GENERAL AREAS OF WORK INVOLVED. HOWEVER, THE ELECTRICAL CONTRACTOR SHALL PERFORM WORK OUTSIDE THOSE AREAS SHOWN AS IS NECESSARY TO COMPLY WITH THE INTENT OF THIS SECTION.
3. THE ELECTRICAL CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE EXISTING SITE WITH THE WORK OF ALL OTHER TRADES AND INCLUDE ALL WORK NECESSARY TO COMPLY WITH THE INTENT OF THE DEMOLITION.
4. IT SHALL BE UNDERSTOOD THAT FIELD CONDITIONS MAY BE ENCOUNTERED DURING THE EXECUTION OF THIS CONTRACT WHICH WILL REQUIRE EXTENSION OR RELOCATION OF EXISTING SYSTEMS OR EQUIPMENT WHICH ARE NOT SPECIFICALLY SHOWN ON THE DRAWINGS, BUT WHICH ARE REQUIRED TO MEET THE STATED INTENT THAT THE BUILDING CONTINUE TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION. THE ELECTRICAL CONTRACTOR SHALL INCLUDE SUCH WORK AS WOULD NORMALLY BE EXPECTED IN AN EXISTING ELECTRICAL SYSTEM TYPE.
5. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TOOLS, EQUIPMENT, LABOR, ETC. IN ORDER TO ACCOMPLISH THE DEMOLITION PORTION OF THE PROJECT.
6. THE ELECTRICAL CONTRACTOR SHALL INCLUDE COORDINATION WITH THE GENERAL CONTRACTOR AND SUCH DEMOLITION OF THE EXISTING ELECTRICAL SYSTEMS AS IS NECESSARY SO THAT THE DEMOLITION WORK OF THE GENERAL CONTRACTOR SHALL NOT DAMAGE THOSE PORTIONS OF THE ELECTRICAL SYSTEMS WHICH ARE TO REMAIN IN SERVICE, ARE TO BE REUSED, OR ARE TO BECOME THE PROPERTY OF THE OWNER.
7. TURN OVER ALL SALVAGEABLE MATERIALS AS NOTED, ITEMS SHOWN AS BEING REMOVED AND NOT REINSTALLED. ITEMS NOT DIRECTED OR REQUESTED TO BE TURNED OVER TO THE OWNER SHALL BE DISPOSED OF BY THE ELECTRICAL CONTRACTOR.
8. EQUIPMENT OR MATERIALS WHICH ARE TO BE REUSED OR TURNED OVER TO THE OWNER SHALL BE CAREFULLY REMOVED, CLEANED, AND STORED IN A CLEAN AND DRY AREA. SHOULD THE ELECTRICAL CONTRACTOR ENCOUNTER SUCH EQUIPMENT WHICH IS NOT IN SATISFACTORY CONDITION FOR REUSE AND NOT IN WORKING ORDER, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY.
9. WHERE EXISTING BRANCH CIRCUITS AND SYSTEMS ARE INTERRUPTED BY NEW WORK OR SYSTEMS (ELECTRICAL, COMMUNICATIONS, ETC.), EXTEND AND RECONNECT THOSE CIRCUITS AND SYSTEMS. WHERE THOSE CIRCUITS OR SYSTEMS MUST REMAIN IN SERVICE DURING THE EXECUTION OF THIS CONTRACT, PROVIDE TEMPORARY CONNECTIONS UNTIL FINAL CONNECTIONS ARE COMPLETE.
10. THE INFORMATION CONTAINED IN THE DEMOLITION PLANS IS NOT CONSIDERED FULLY ACCURATE AS IT PERTAINS TO THE EXACT QUANTITY AND LOCATION IN THE FIELD. THE INFORMATION WAS OBTAINED FROM ASBUILTS AND LIMITED SITE VISITS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATIONS, SERVICE, AND QUANTITY OF ALL EXISTING ELECTRICAL COMPONENTS PRIOR TO BEGINNING DEMOLITION WORK. THE INFORMATION ON THE DEMOLITION PLANS IS TO BE USED AS A GUIDE TO THE CONTRACTOR TO COMPLETE THE DESIGN INTENT SHOWN. EXISTING ITEMS TO BE RE-USED CAN BE FOUND ON THE NEW WORK PLANS.
11. BEFORE COMMENCEMENT OF DEMOLITION WORK ALL CIRCUITS THAT ARE BEING WORKED ON AT THE TIME SHALL BE SHUT DOWN AND PROVIDE A LOCKOUT/TAGOUT PROCEDURE AT THE ELECTRICAL VAULT. THE ASSOCIATED CIRCUIT BEING WORKED ON AT THAT TIME SHALL HAVE ITS EXISTING SAFETY CUTOUT REMOVED. DO NOT WORK ON ANY LIVE CIRCUITS!

**ELECTRICAL ABBREVIATIONS**

A, AMP	AMPERE
ACSR	ALUMINUM CONDUCTOR STEEL-REINFORCED
AF	AIRFIELD
AFG	ABOVE FINISHED GRADE
AFF	ABOVE FINISHED FLOOR
AIC	AMPS INTERRUPTING CAPACITY (SYM RMS)
ADD	ADDITIVE BID
AWG	AMERICAN WIRE GAUGE
BSDC	BARE SOFT DRAWN COPPER
C	CONDUIT
CCR	CONSTANT CURRENT REGULATOR
CKT	CIRCUIT
CU	COPPER
DETD	DUAL ELEMENT TIME DELAY
EC	EMPTY CONDUIT
ELEC	ELECTRIC OR ELECTRICAL
EPR	ETHYLENE-PROPYLENE RUBBER INSULATION
EX	EXISTING TO REMAIN
EXIST	EXISTING
FAA	FEDERAL AVIATION ADMINISTRATION
GFI	GROUND FAULT INTERRUPTER
G	GROUND
GRS	GALVANIZED RIGID STEEL
IN-PL	IN PLACE
KV	KILOVOLT
KVA	KILOVOLT AMPERES
KW	KILOWATT
MIN	MINIMUM
N12	NEMA 12 RATED FOR DUST ENCLOSURE
N3R	NEMA 3R RATED FOR EXTERIOR USE
NIC	NOT IN THIS CONTRACT
NEC	NATIONAL ELECTRIC CODE
PNL	PANEL
P	POLE
PH	PHASE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
RE	REPLACE EXISTING
RECPT	RECEPTACLE
REQD	REQUIRED
RL	EXISTING ITEM TO BE RELOCATED
RM	EXISTING ITEM TO BE REMOVED
RU	RACK UNIT
RW	RUNWAY
SPD	SURGE PROTECTIVE DEVICE
SPEC	SPECIFICATIONS
SWBD	SWITCHBOARD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TW	TAXIWAY
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLT
VA	VOLT AMPERE
W	WATT
WP	WEATHERPROOF
XFMR	TRANSFORMER
#	NUMBER

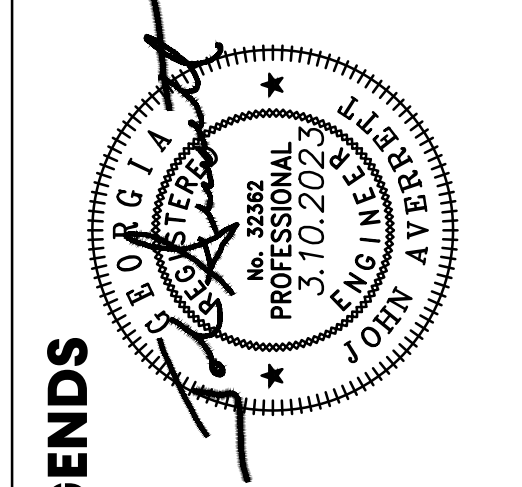


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	
ADDENDUM #1 3/16/2023	
ADDENDUM #2 3/17/2023	
designed by: JDZ	
drawn by: JRA, JDZ	
checked by: JEA	

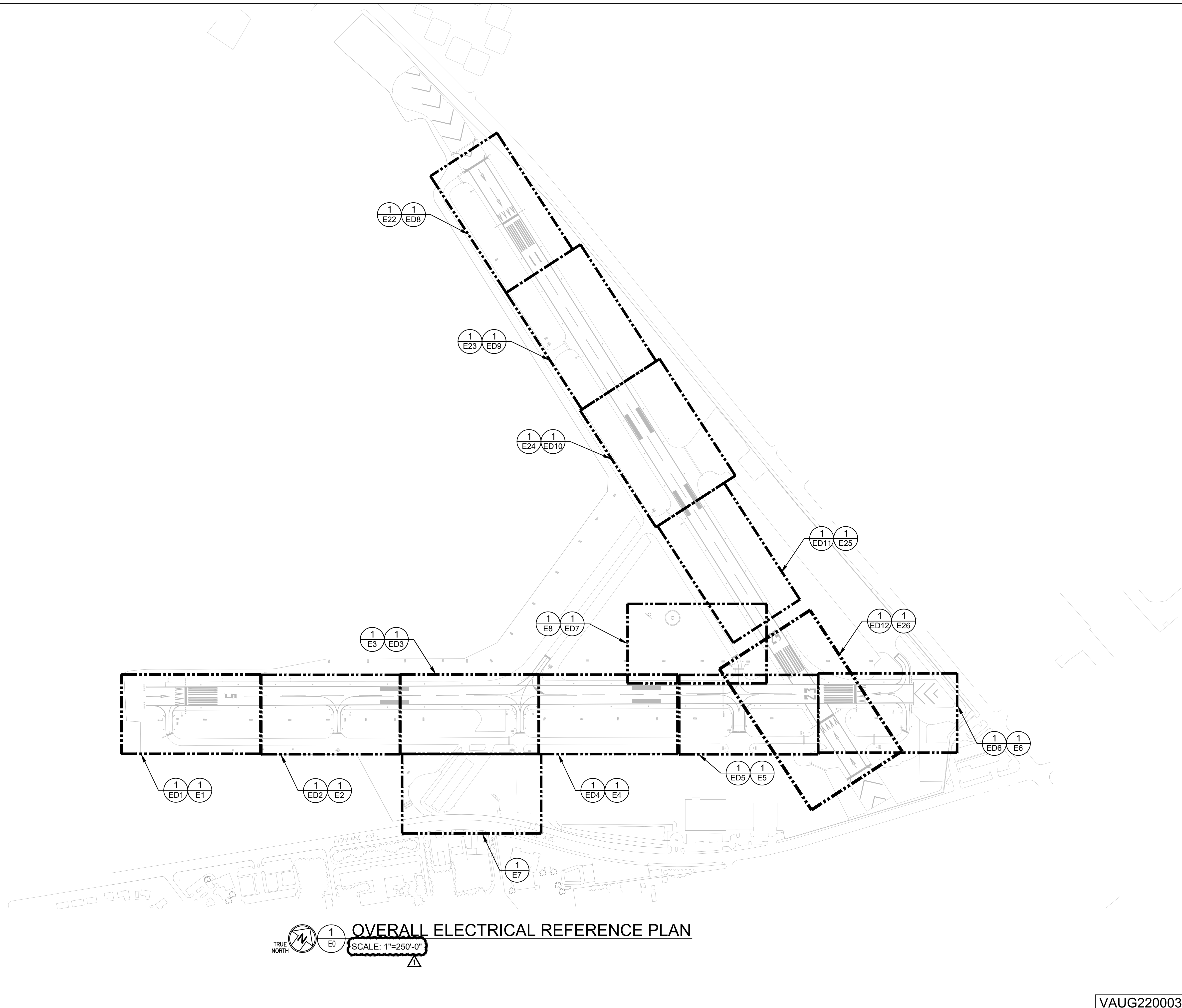
**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: NOT TO SCALE



**ELECTRICAL LEGENDS  
& NOTES**

**GE1**  
Sheet 11 of 52



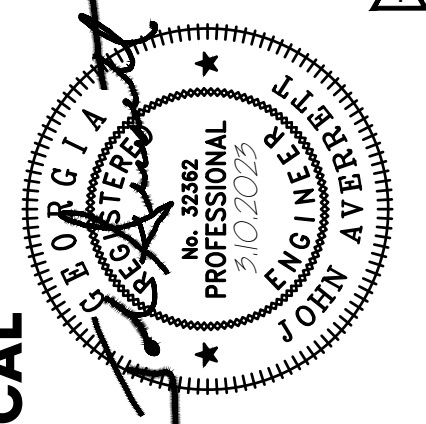


**OVERALL ELECTRICAL REFERENCE PLAN**  
 SCALE: 1"=250'-0"

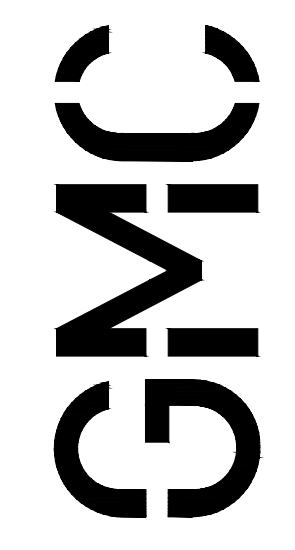
**OVERALL ELECTRICAL REFERENCE PLAN**

**AIRFIELD ELECTRICAL UPGRADE DANIEL FIELD AIRPORT (DNL)**

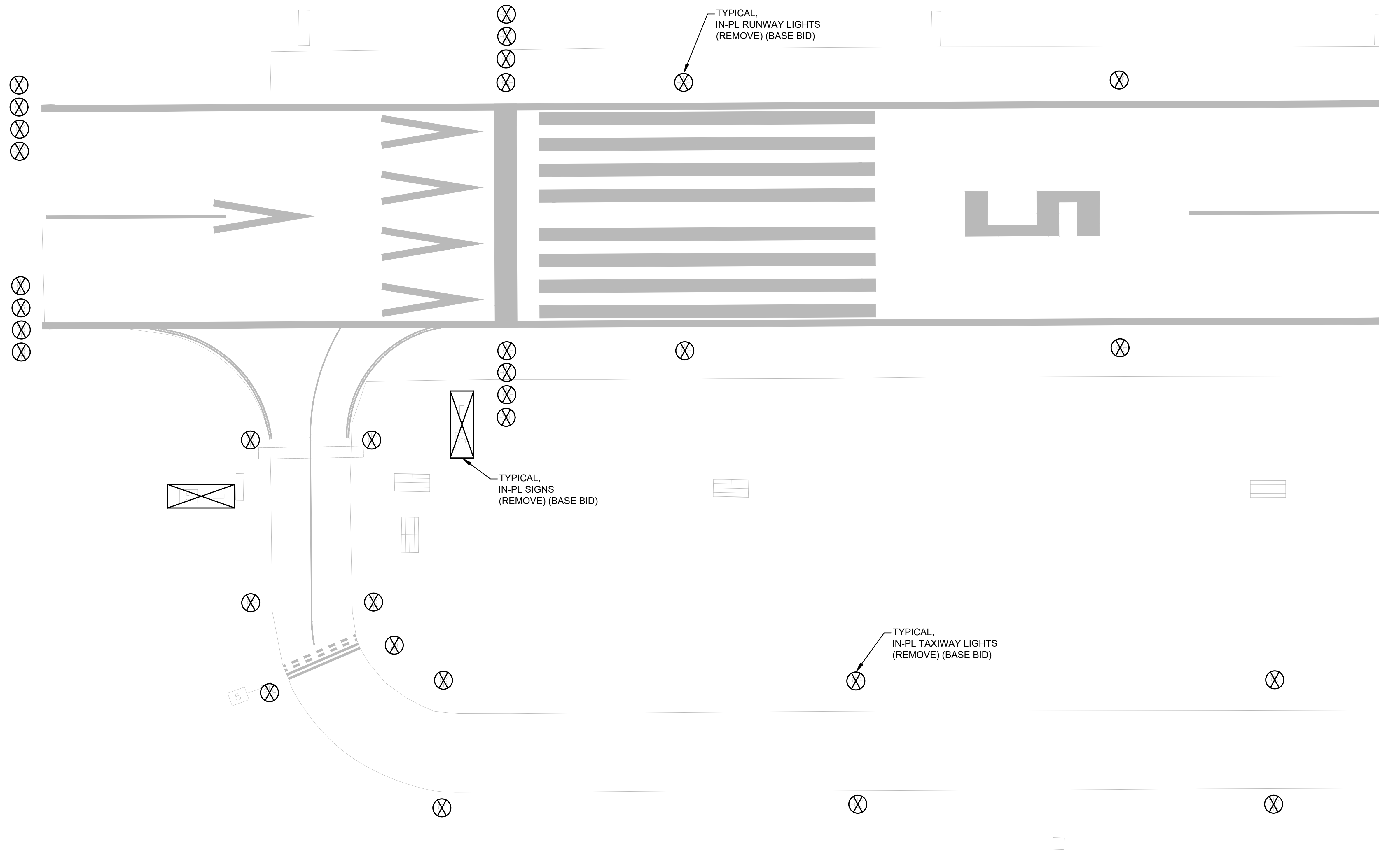
100% SUBMITTAL	1/20/2023	ISSUE DATE
ADDENDUM #1	3/10/2023	
designed by:	JDZ	
drawn by:	JRA, JDZ	
checked by:	JEA	



AUGUSTA, GEORGIA  
 GDOT PID : T007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1" = 250'


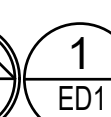


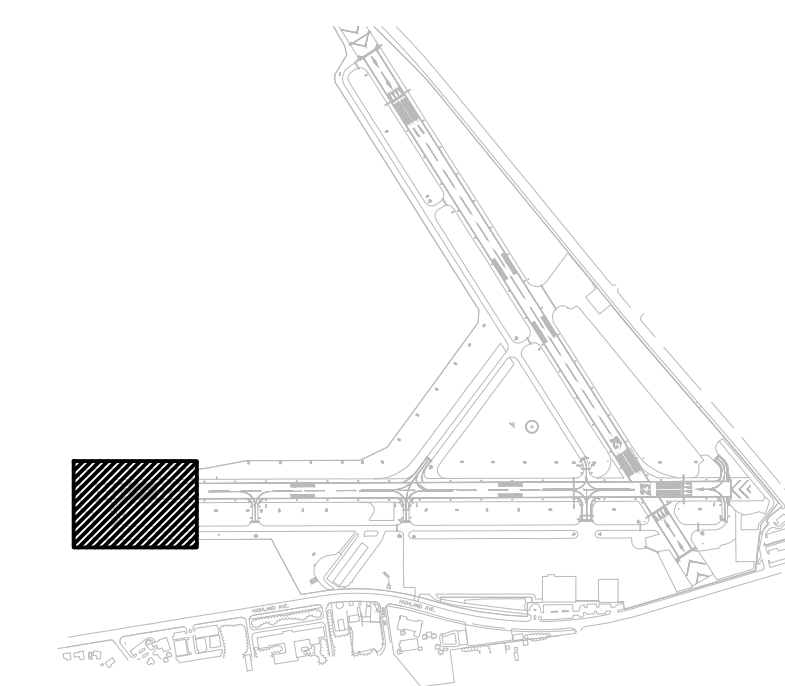
801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM



**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.



**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 5/23 - PART 1**  
 SCALE: 1"=25'-0"

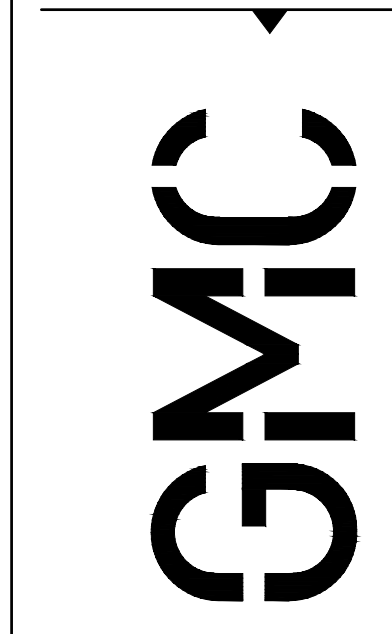



**KEY PLAN**  
 TRUE NORTH NOT TO SCALE

VAUG220003

**AIRFIELD LIGHTING DEMOLITION PLAN**  
**RUNWAY 5/23 - PART 1**

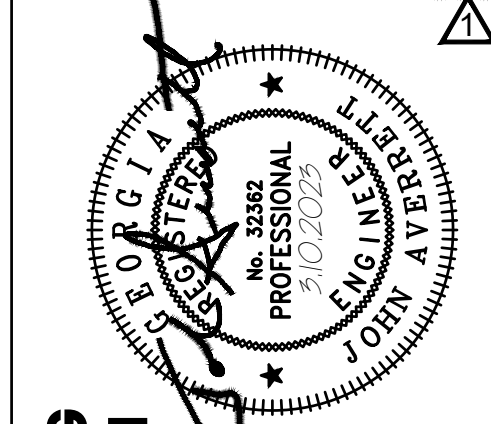
**AIRFIELD ELECTRICAL UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**



801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

AUGUSTA, GEORGIA  
**GDOT PID : T007935**  
**GMC NUMBER : TAUG220004**  
**SCALE: 1"=25'**



**ED1**

Sheet 13 of 52

TYPICAL,  
IN-PL PAPI LIGHT UNIT  
(REMOVE) (BASE BID)


TYPICAL,  
IN-PL RUNWAY LIGHTS  
(REMOVE) (BASE BID)

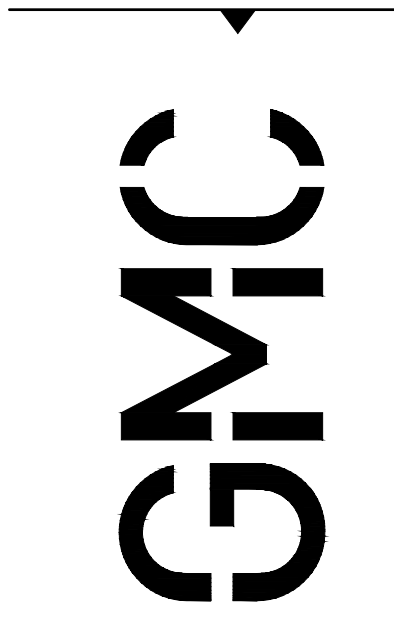
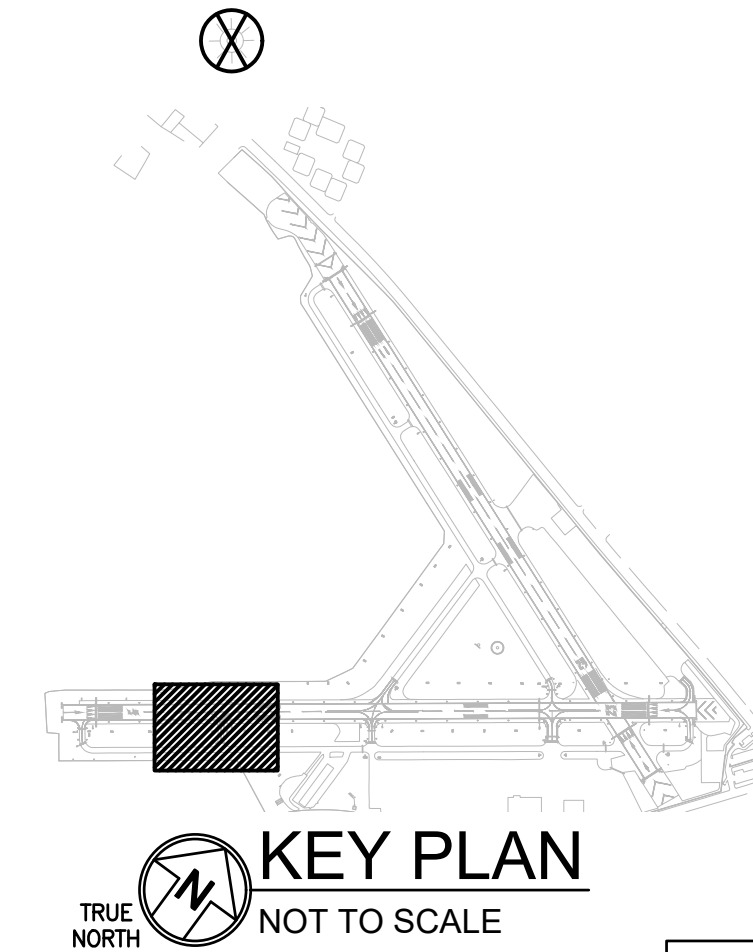
TYPICAL,  
IN-PL SIGNS  
(REMOVE) (BASE BID)

TYPICAL,  
IN-PL TAXIWAY LIGHTS  
(REMOVE) (BASE BID)

**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

PLAN NORTH  1 ED2 **AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 5/23 - PART 2**  
SCALE: 1"=25'-0"

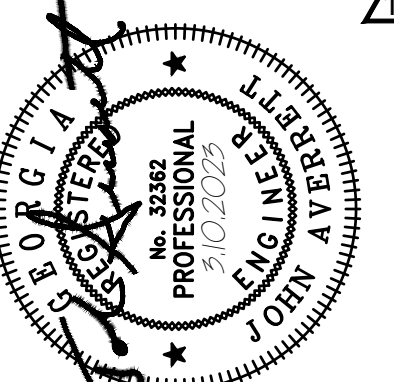


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'



**AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 5/23 -  
PART 2**

**ED2**  
Sheet 14 of 52

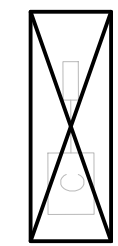
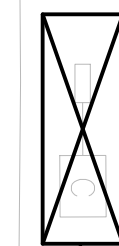
VAUG220003



TYPICAL,  
IN-PL RUNWAY LIGHTS  
(REMOVE) (BASE BID)



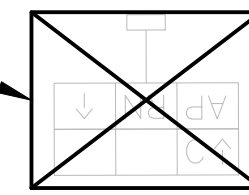
TYPICAL,  
IN-PL SIGNS  
(REMOVE) (BASE BID)



TYPICAL,  
IN-PL TAXIWAY LIGHTS  
(REMOVE) (BASE BID)



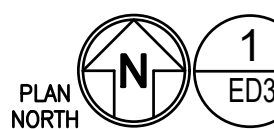
TYPICAL,  
IN-PL SIGNS  
(REMOVE) (BASE BID)



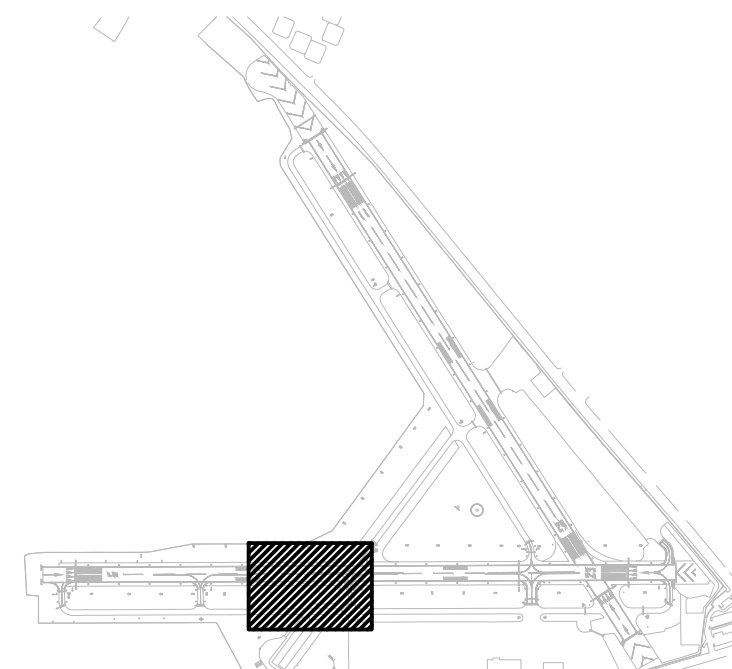
**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

SCALE: 1"=25'-0"

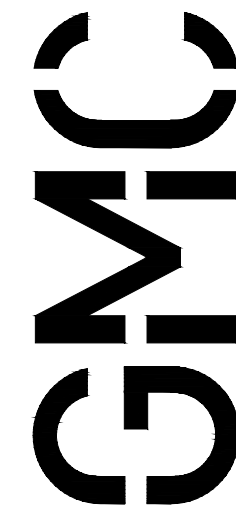


**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 5/23 - PART 3**



KEY PLAN  
NOT TO SCALE

VAUG220003

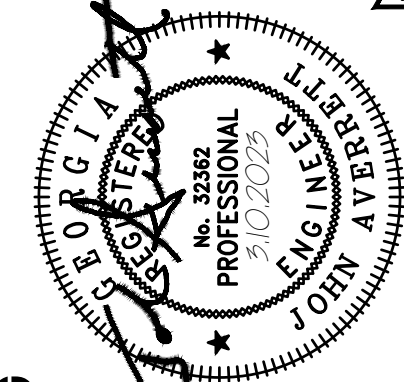


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

100% SUBMITTAL	ISSUE DATE
1/20/2023	
ADDENDUM #1	3/10/2023
designed by: JDZ	
drawn by: JRA, JDZ	
checked by: JEA	

AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'




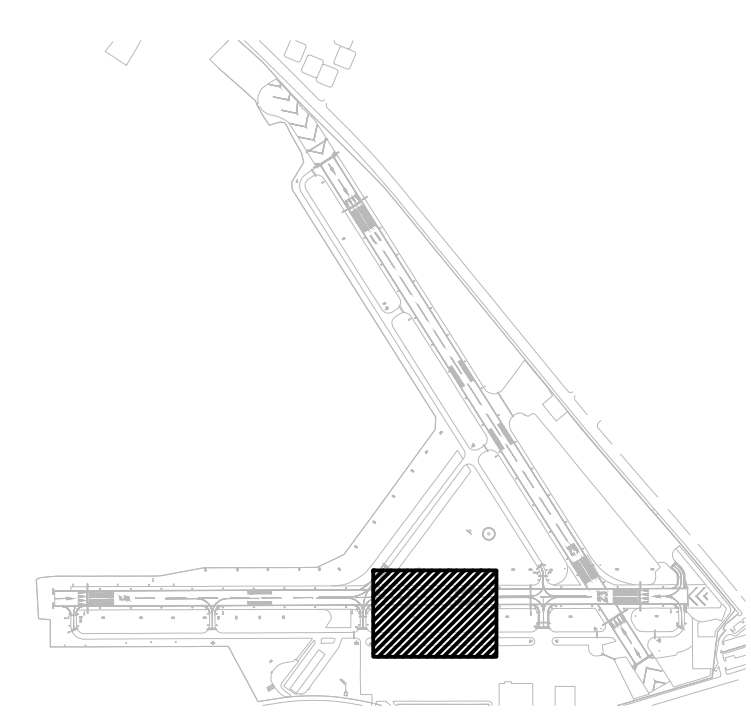
AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 5/23 -  
PART 3

ED3  
Sheet 15 of 52



- GENERAL NOTES:**
1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
  2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
  3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
  4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

PLAN NORTH  1 ED4 SCALE: 1"=25'-0"



TRUE NORTH  KEY PLAN NOT TO SCALE

VAUG220003

AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)

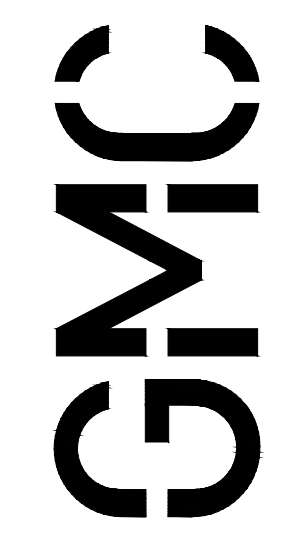
AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

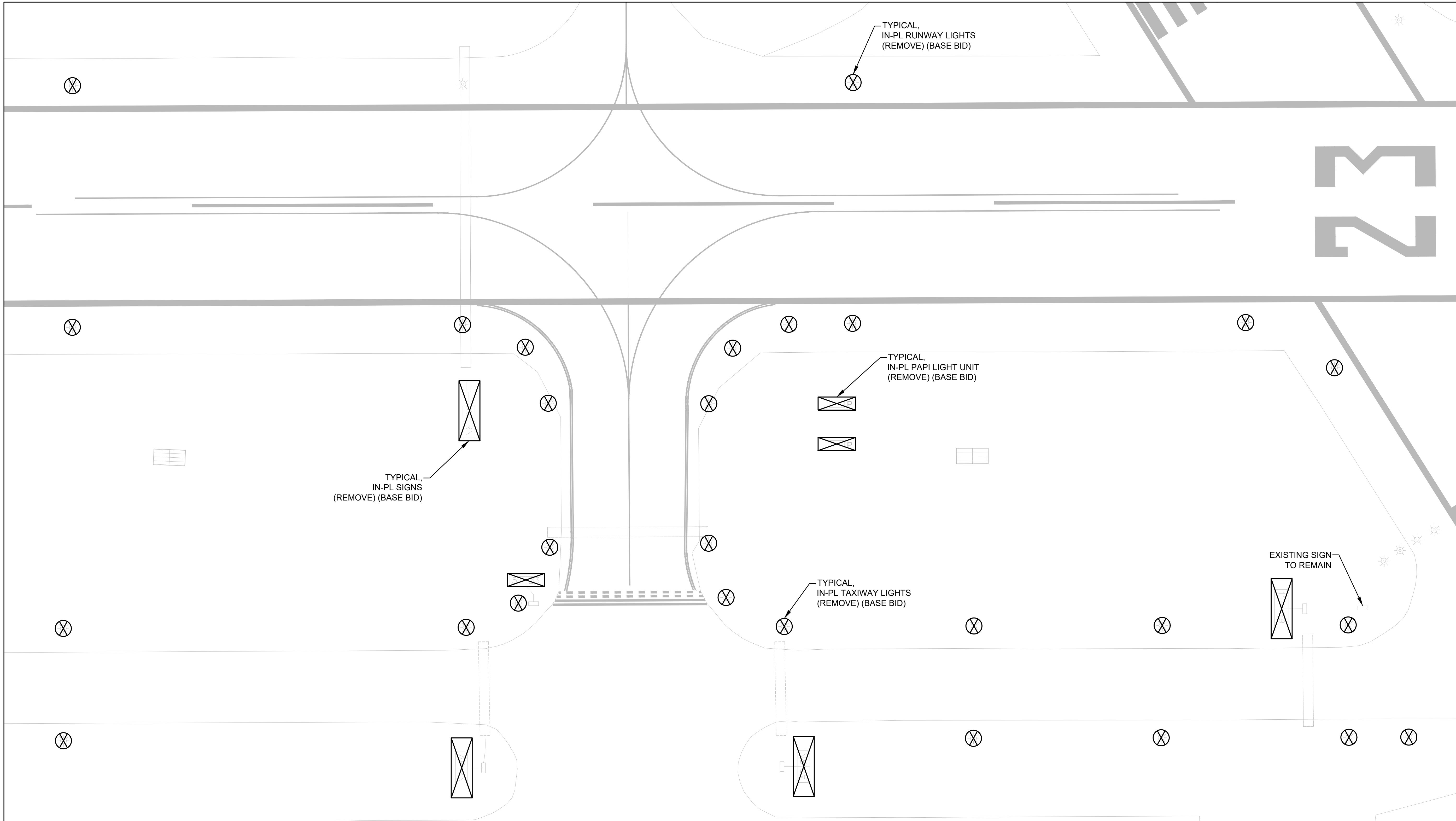
AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 5/23 -  
PART 4

ED4  
Sheet 16 of 52

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

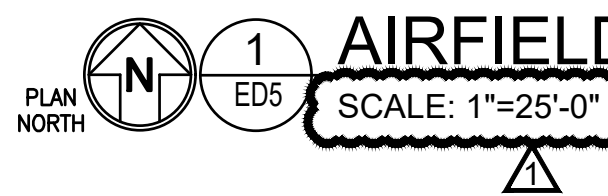
801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM



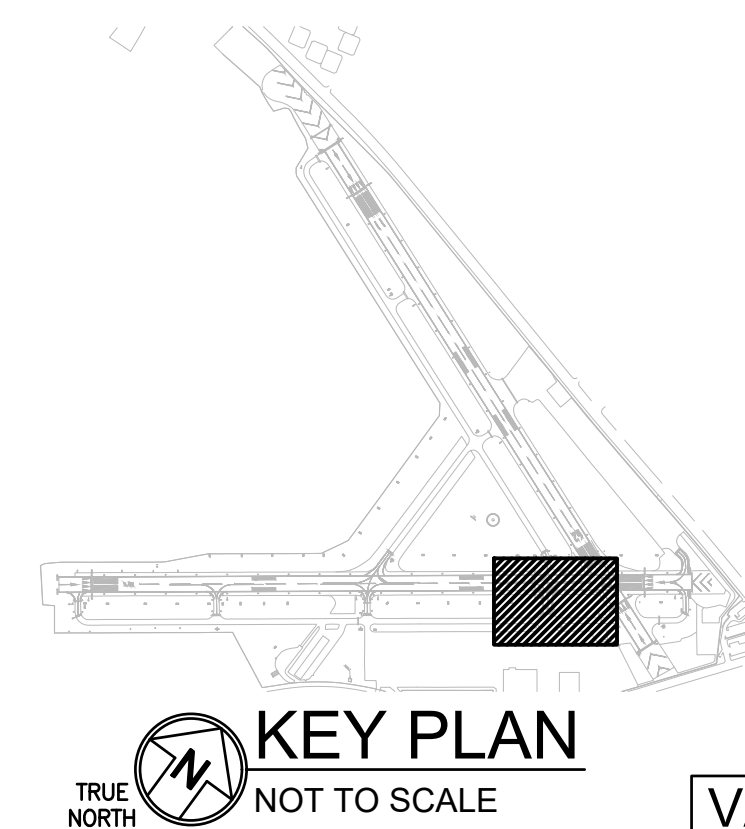


**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.



**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 5/23 - PART 5**



VAUG220003

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

**AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 5/23 -  
PART 5**

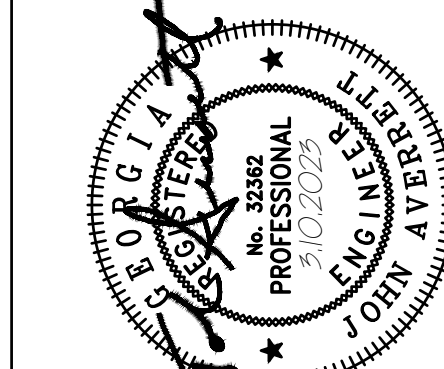
**ISSUE DATE**

100% SUBMITTAL 1/20/2023  
ADDENDUM #1 3/10/2023

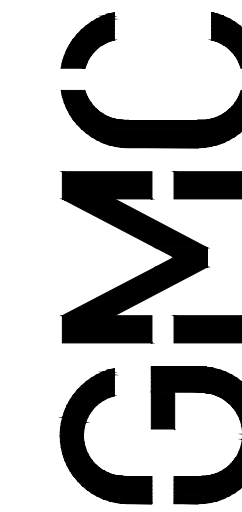
801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

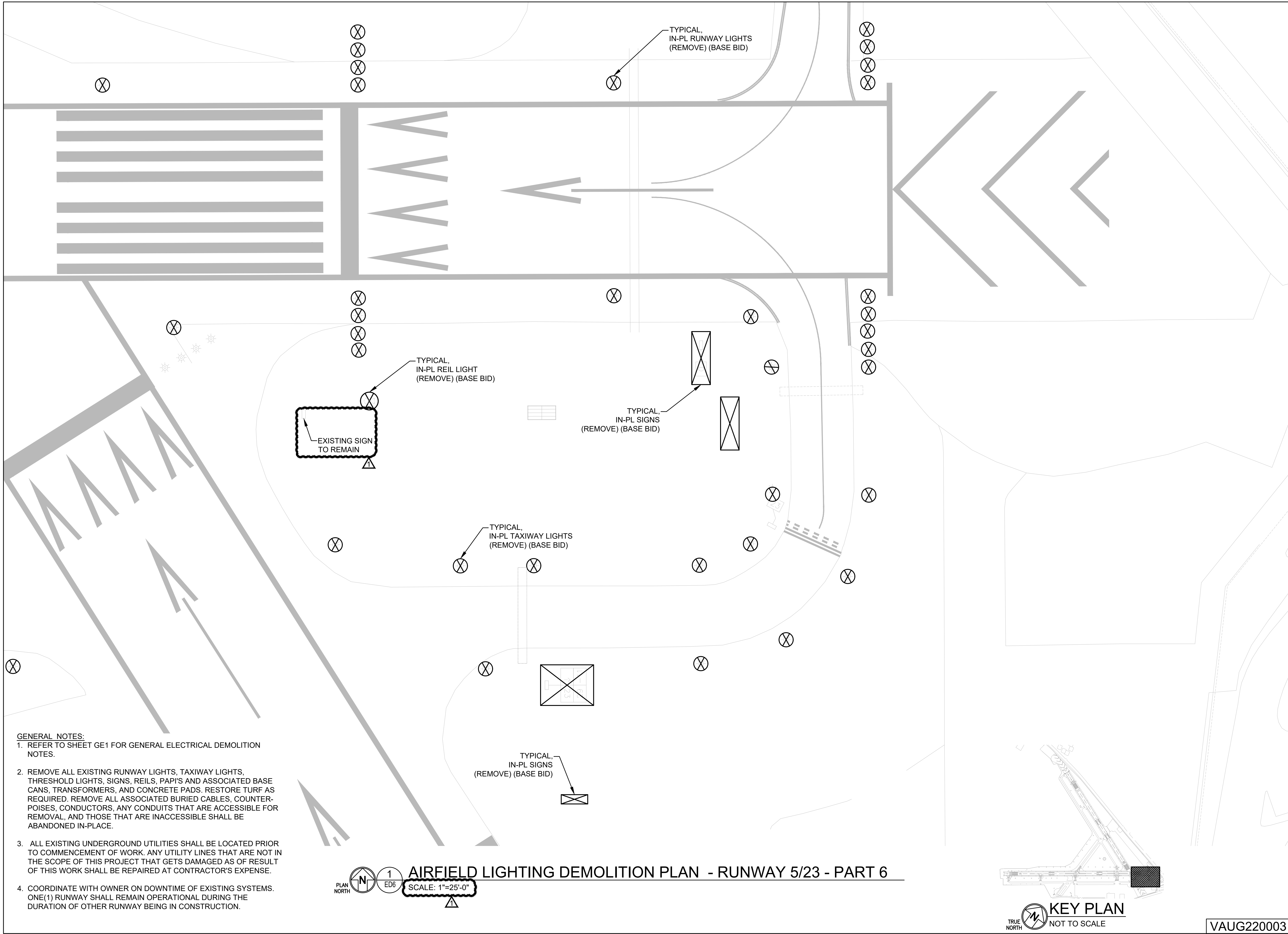
designed by: JDZ  
drawn by: JRA, JDZ  
checked by: JEA

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'



**ED5**  
Sheet 17 of 52

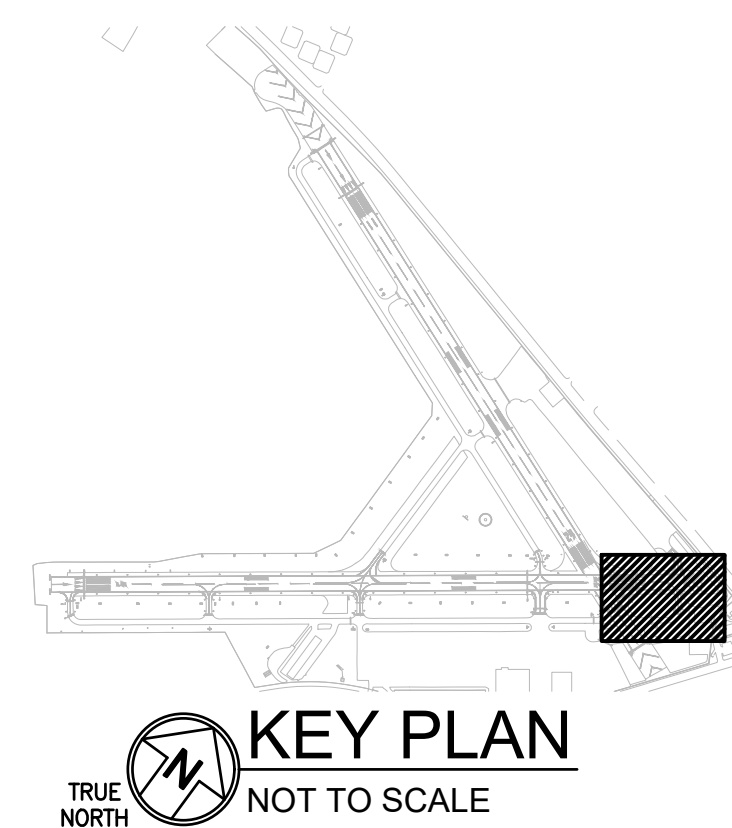




- GENERAL NOTES:**
- REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
  - REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
  - ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
  - COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

PLAN NORTH 1 ED6  
 SCALE: 1"=25'-0"

**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 5/23 - PART 6**



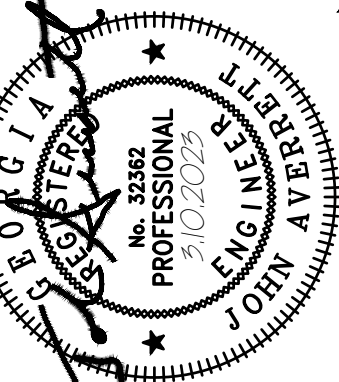
VAUG220003

**AIRFIELD LIGHTING  
 DEMOLITION PLAN  
 RUNWAY 5/23 -  
 PART 6**

**AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)**

100% SUBMITTAL	ISSUE DATE
1/20/2023	
ADDENDUM #1	3/10/2023
designed by: JDZ	
drawn by: JRA, JDZ	
checked by: JEA	

801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM



AUGUSTA, GEORGIA  
 GDOT PID : I007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'



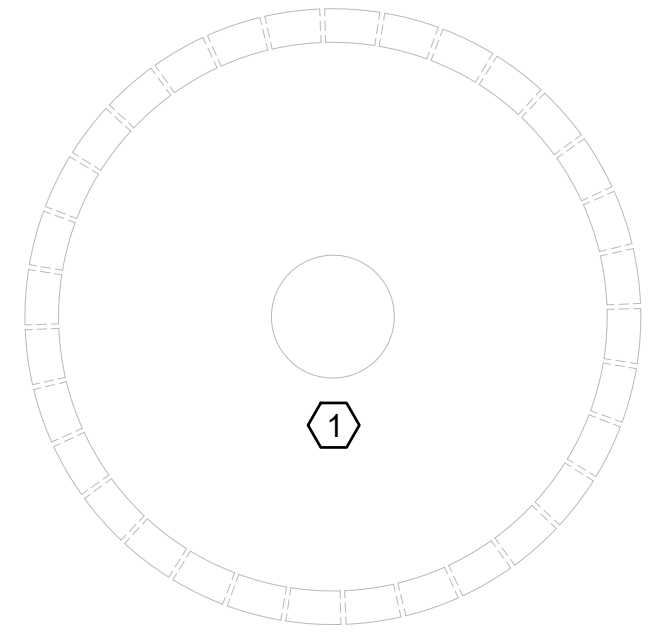
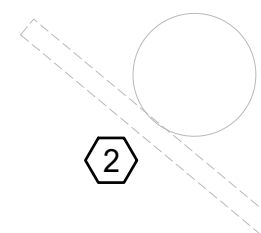
**ED6**  
 Sheet 18 of 52

**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

**KEYED NOTES (#):**

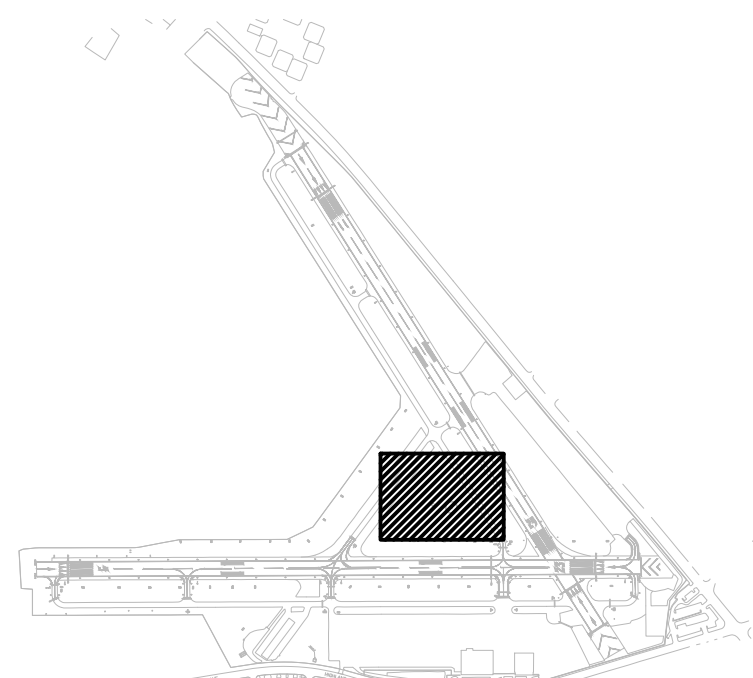
1. EXISTING ELECTRICAL CONNECTION TO WIND CONE TO BE REPLACED WITH NEW. DISCONNECT AND REMOVE ALL ELECTRICAL WIRING AND ELECTRICAL COMPONENTS ASSOCIATED WITH THE WIND CONE.
2. EXISTING AWOS SYSTEM TO REMAIN IN SERVICE - NO WORK REQUIRED.



1  
ED7

**AIRFIELD LIGHTING DEMOLITION PLAN - EXISTING AWOS SYSTEM & WINDCONE**

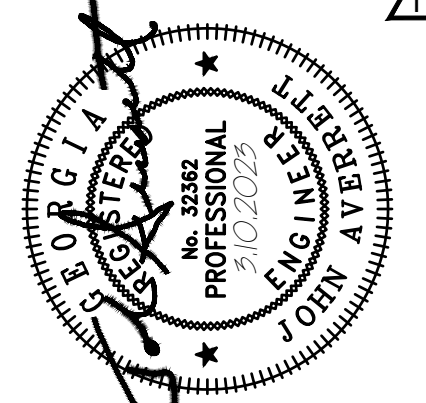
SCALE: 1"=25'-0"



**KEY PLAN**  
TRUE NORTH NOT TO SCALE

VAUG220003

**AIRFIELD LIGHTING  
DEMOLITION PLAN  
EXISTING AWOS &  
WINDCONE**

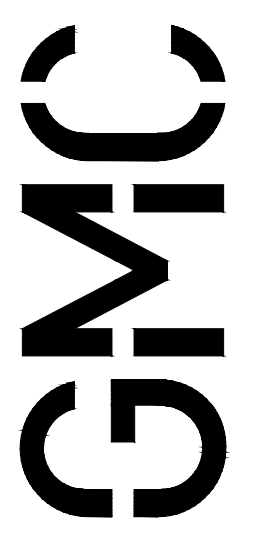


**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
**GDOT PID : T007935**  
**GMC NUMBER : TAUG220004**  
**SCALE: 1"=25'**

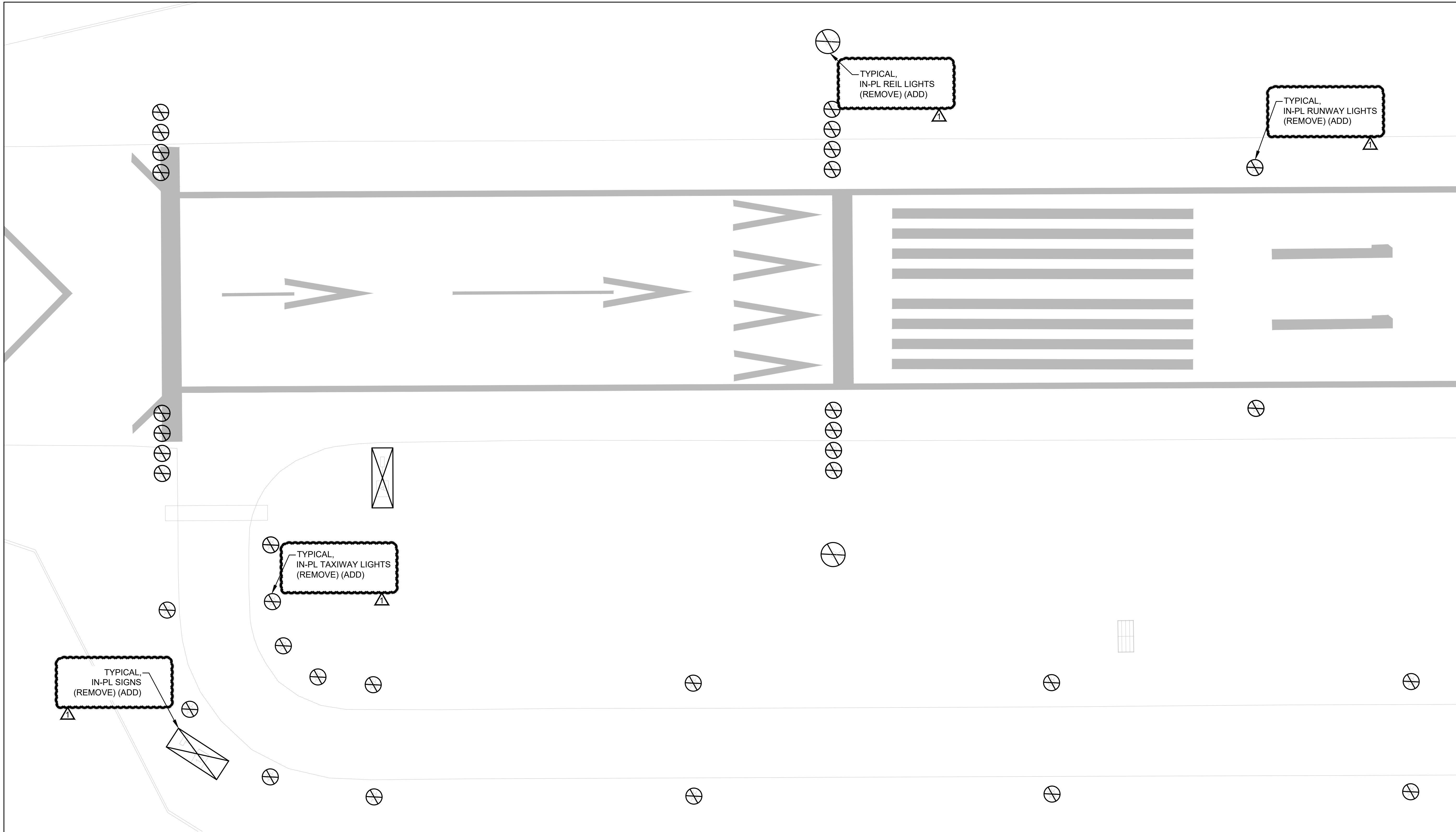
ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/16/2023	3/16/2023
designed by: JDZ	designed by: JDZ
drawn by: JRA, JDZ	drawn by: JRA, JDZ
checked by: JEA	checked by: JEA

801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM



**ED7**

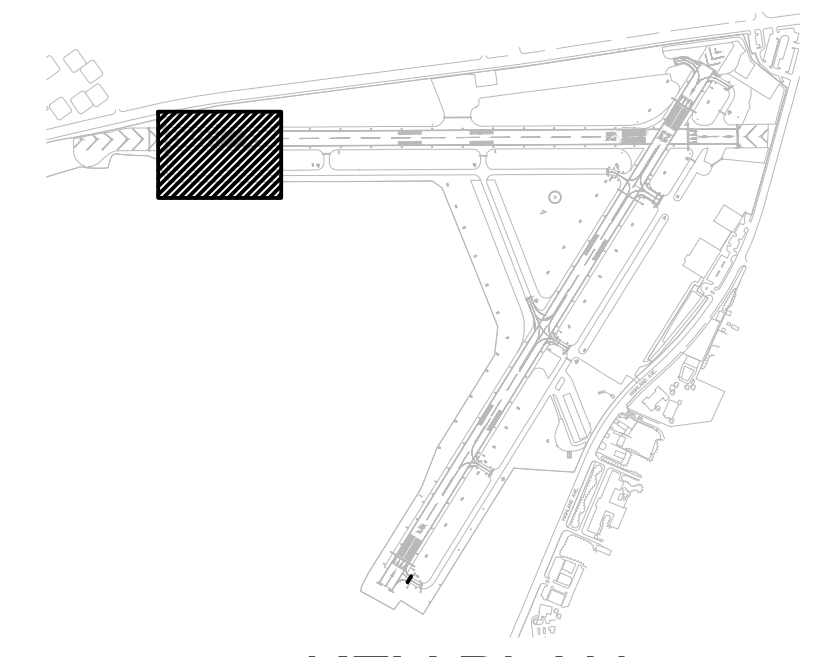
Sheet 19 of 52



- GENERAL NOTES:**
1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
  2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
  3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
  4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

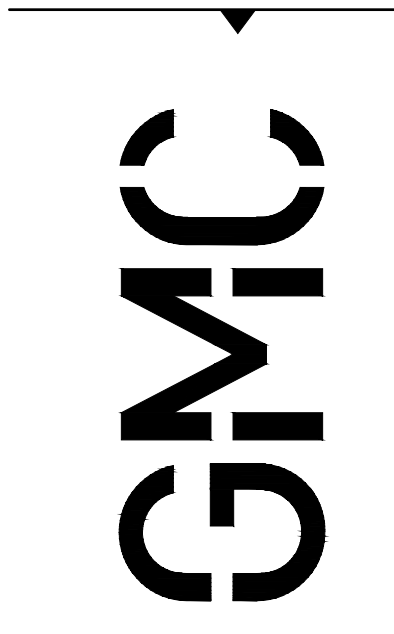
PLAN NORTH  
  
 1  
 ED8  
 SCALE: 1"=25'-0"

**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 11/29 - PART 1 - ADDITIVE BID**



TRUE NORTH  
  
 KEY PLAN  
 NOT TO SCALE

VAUG220003

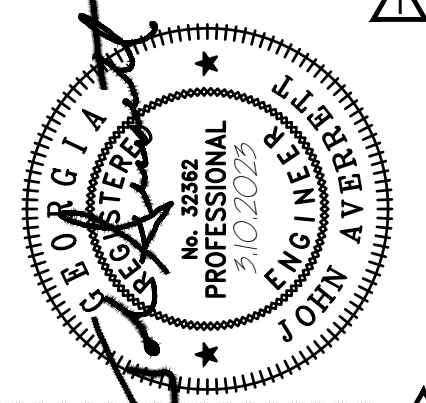


801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)

AUGUSTA, GEORGIA  
 GDOT PID : T007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'

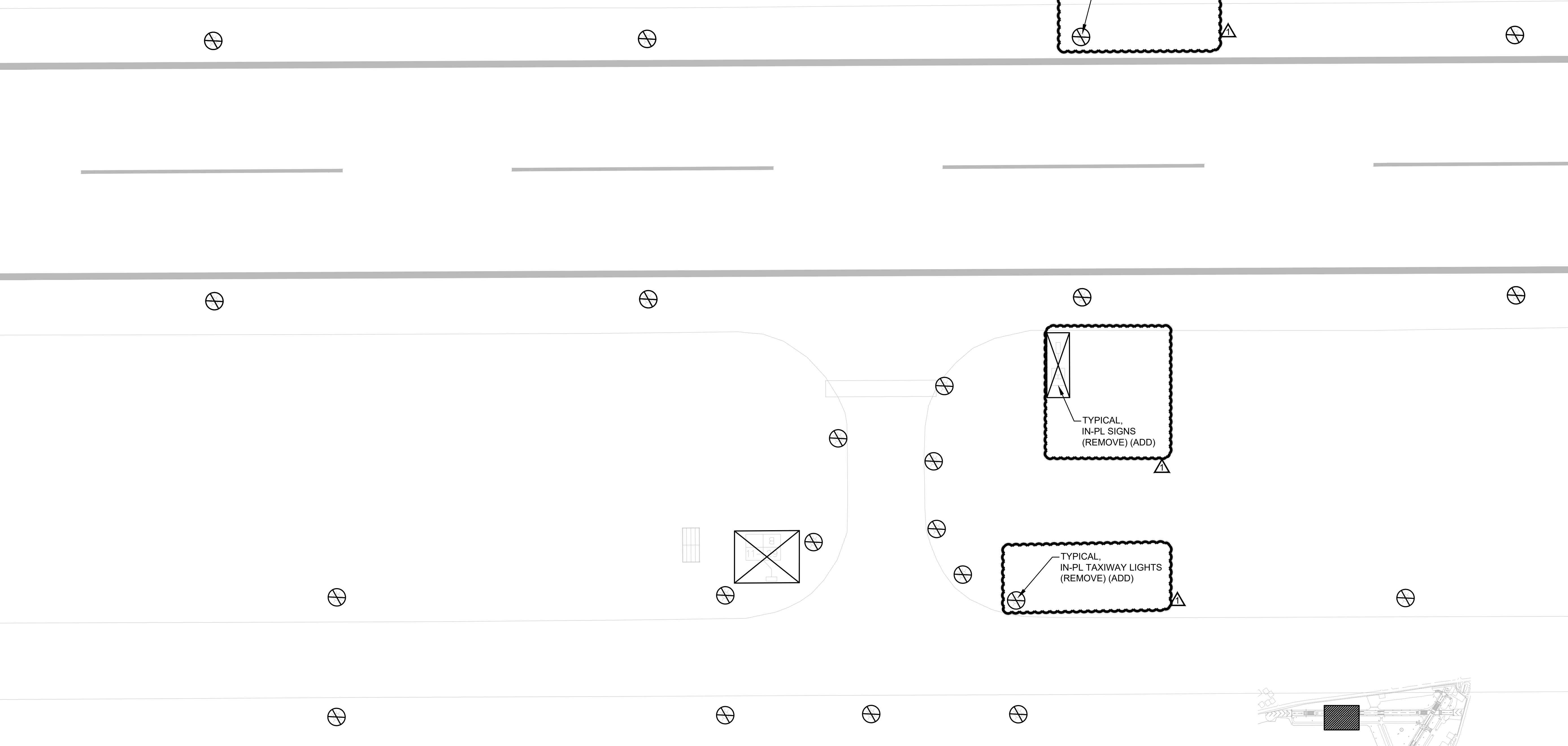
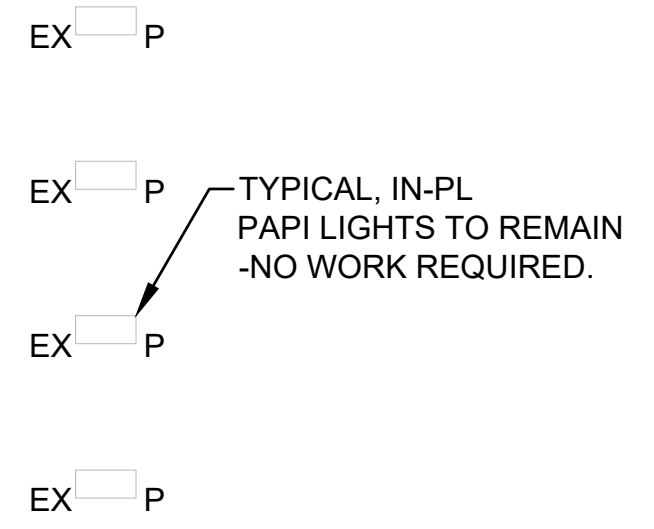


**AIRFIELD LIGHTING  
 DEMOLITION PLAN  
 RUNWAY 11-29 -  
 PART 1 (ADD)**

**ED8**  
 Sheet 20 of 52

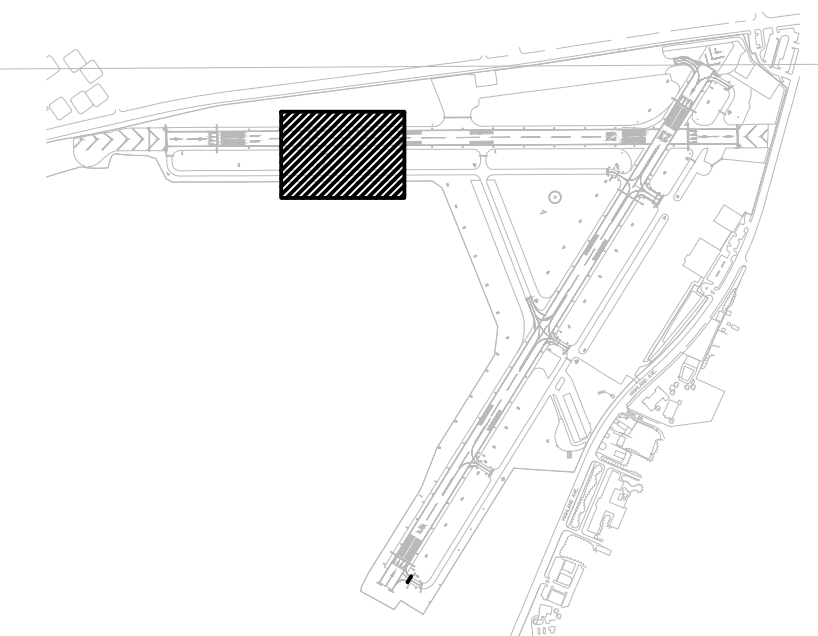
**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.



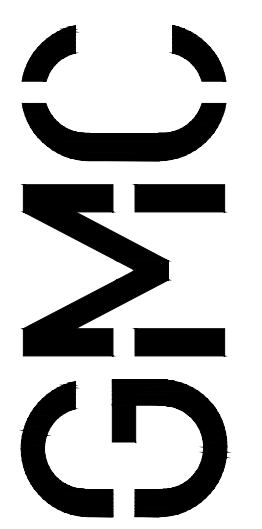
PLAN NORTH 1 ED9 SCALE: 1"=25'-0"

**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 11/29 - PART 2 - ADDITIVE BID**



TRUE NORTH KEY PLAN NOT TO SCALE

VAUG220003



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JAZ	designed by: JAZ
drawn by: JRA, JDZ	drawn by: JRA, JDZ
checked by: JEA	checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

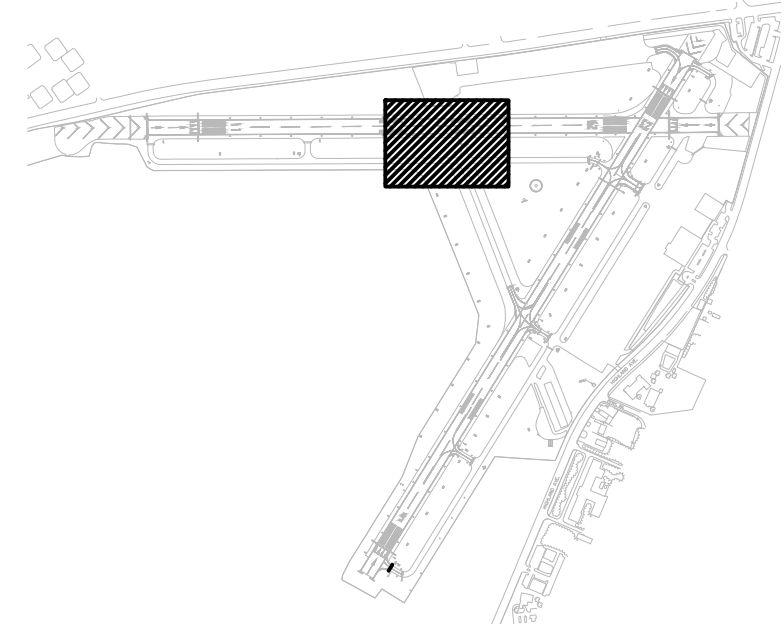
**AIRFIELD LIGHTING DEMOLITION PLAN  
RUNWAY 11-29 - PART 2 (ADD)**

**ED9**

Sheet 21 of 52

**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.



**KEY PLAN**  
TRUE NORTH  
NOT TO SCALE

TYPICAL, IN-PL SIGNS (REMOVE) (ADD)

TYPICAL, IN-PL SIGNS (REMOVE) (ADD)

TYPICAL, IN-PL RUNWAY LIGHTS (REMOVE) (ADD)

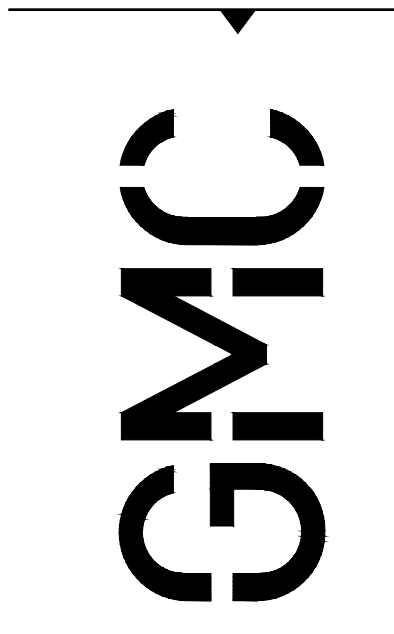
TYPICAL, IN-PL TAXIWAY LIGHTS (REMOVE) (ADD)

TYPICAL, IN-PL SIGNS (REMOVE) (ADD)

**1**  
ED10  
SCALE: 1"=25'-0"

**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 11/29 - PART 3 - ADDITIVE BID**

VAUG220003

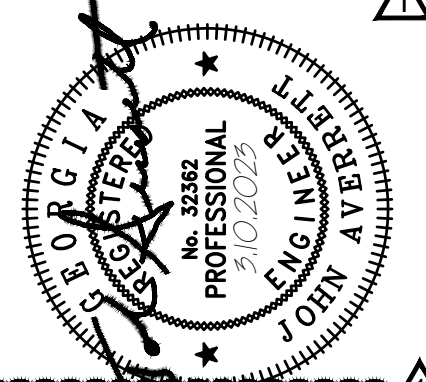


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

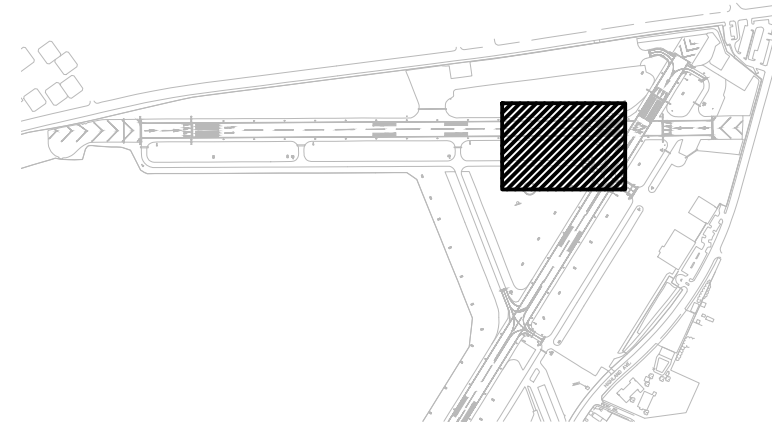


**AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 11-29 -  
PART 3 (ADD)**  
**ED10**  
Sheet 22 of 52

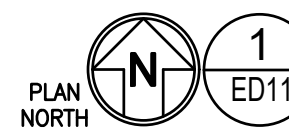
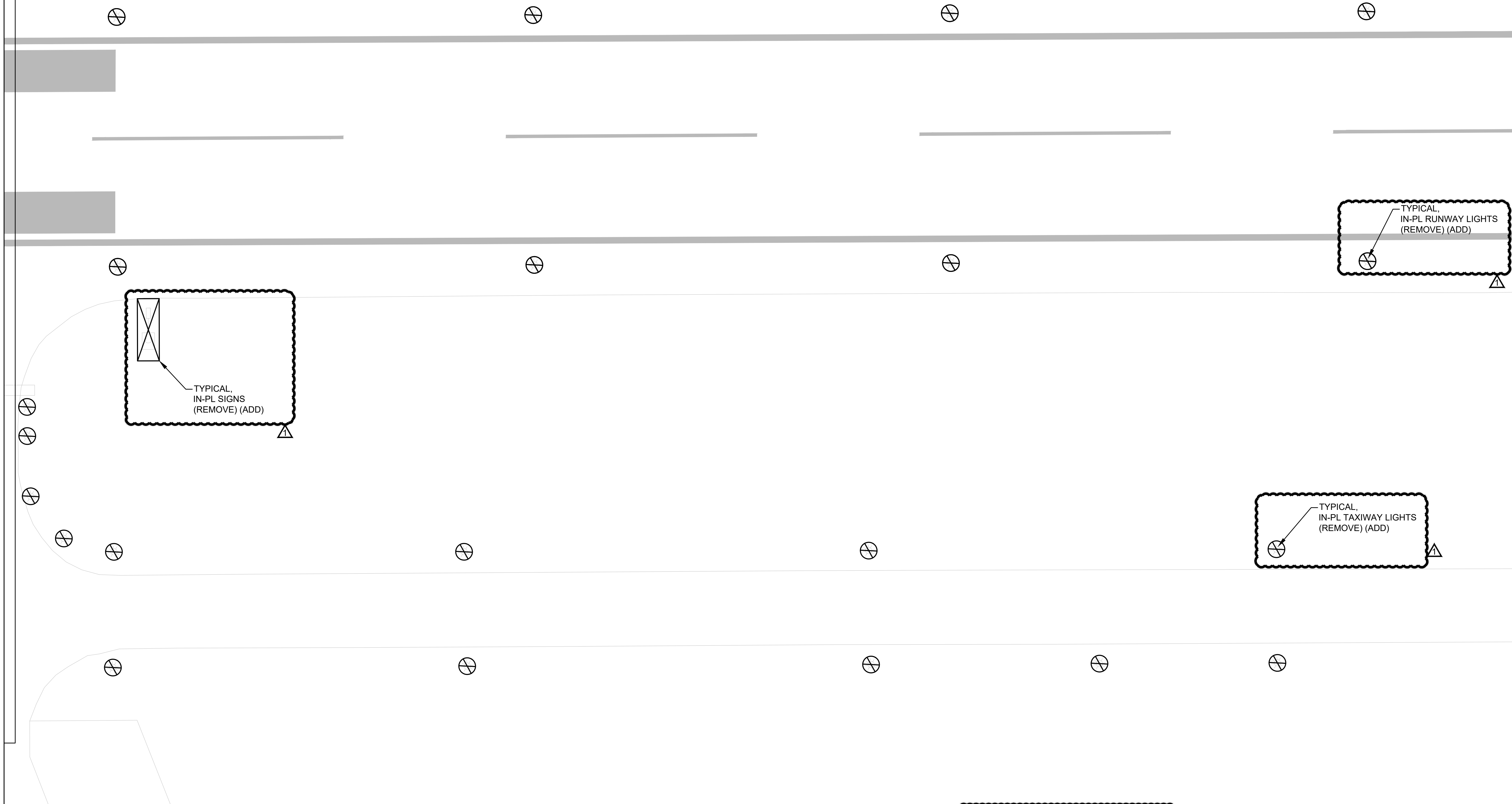


GENERAL NOTES:

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.



**KEY PLAN**  
TRUE NORTH NOT TO SCALE



1  
ED11  
SCALE: 1"=25'-0"

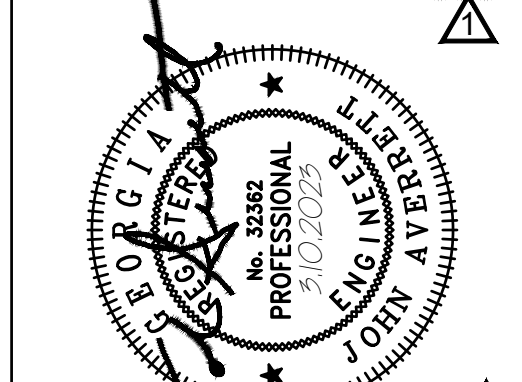
**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 11/29 - PART 4 - ADDITIVE BID**

VAUG220003

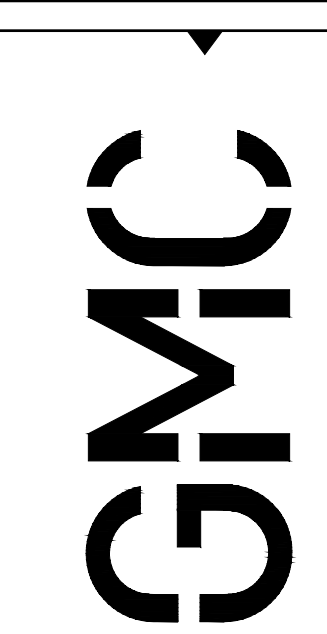
ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	designed by: JDZ
drawn by: JRA, JDZ	drawn by: JRA, JDZ
checked by: JEA	checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'



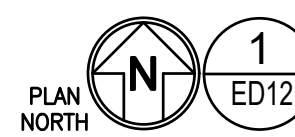
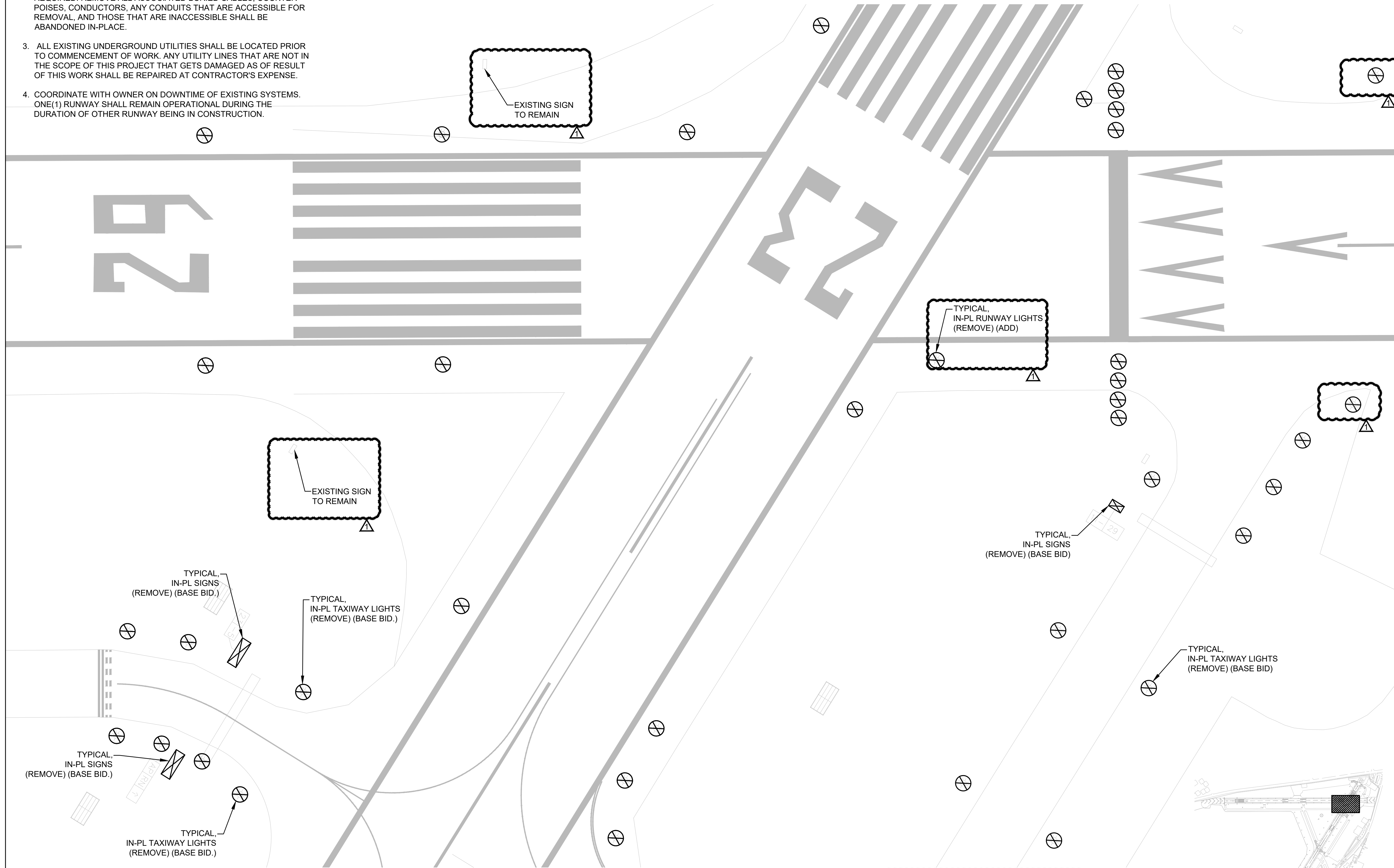
**AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 11-29 -  
PART 4 (ADD)**  
**ED11**  
Sheet 23 of 52



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

**GENERAL NOTES:**

1. REFER TO SHEET GE1 FOR GENERAL ELECTRICAL DEMOLITION NOTES.
2. REMOVE ALL EXISTING RUNWAY LIGHTS, TAXIWAY LIGHTS, THRESHOLD LIGHTS, SIGNS, REILS, PAPI'S AND ASSOCIATED BASE CANS, TRANSFORMERS, AND CONCRETE PADS. RESTORE TURF AS REQUIRED. REMOVE ALL ASSOCIATED BURIED CABLES, COUNTER-POISES, CONDUCTORS, ANY CONDUITS THAT ARE ACCESSIBLE FOR REMOVAL, AND THOSE THAT ARE INACCESSIBLE SHALL BE ABANDONED IN-PLACE.
3. ALL EXISTING UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY LINES THAT ARE NOT IN THE SCOPE OF THIS PROJECT THAT GETS DAMAGED AS OF RESULT OF THIS WORK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
4. COORDINATE WITH OWNER ON DOWNTIME OF EXISTING SYSTEMS. ONE(1) RUNWAY SHALL REMAIN OPERATIONAL DURING THE DURATION OF OTHER RUNWAY BEING IN CONSTRUCTION.

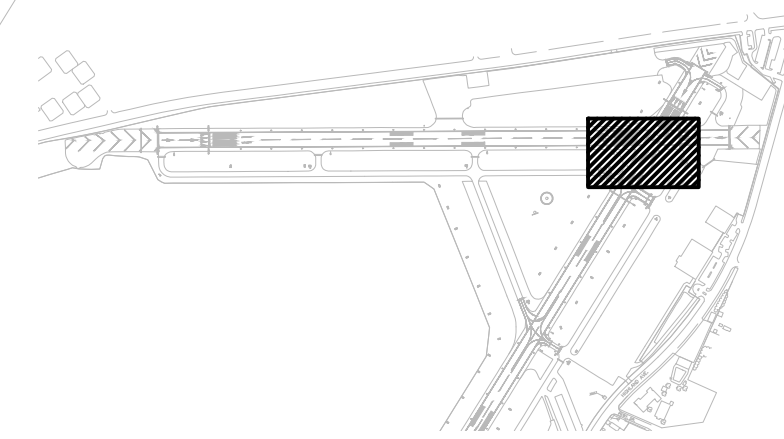


1  
ED12  
SCALE: 1"=25'-0"

**AIRFIELD LIGHTING DEMOLITION PLAN - RUNWAY 11/29 - PART 5 - ADDITIVE BID**



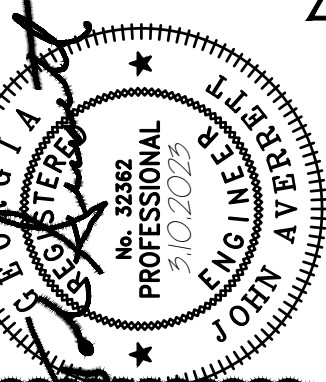
**KEY PLAN**  
NOT TO SCALE



VAUG220003

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

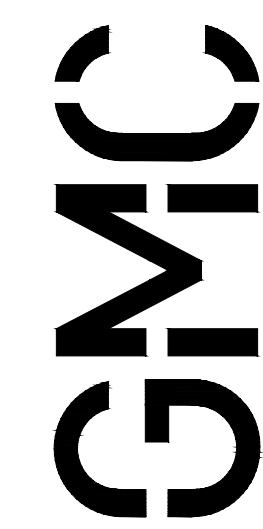


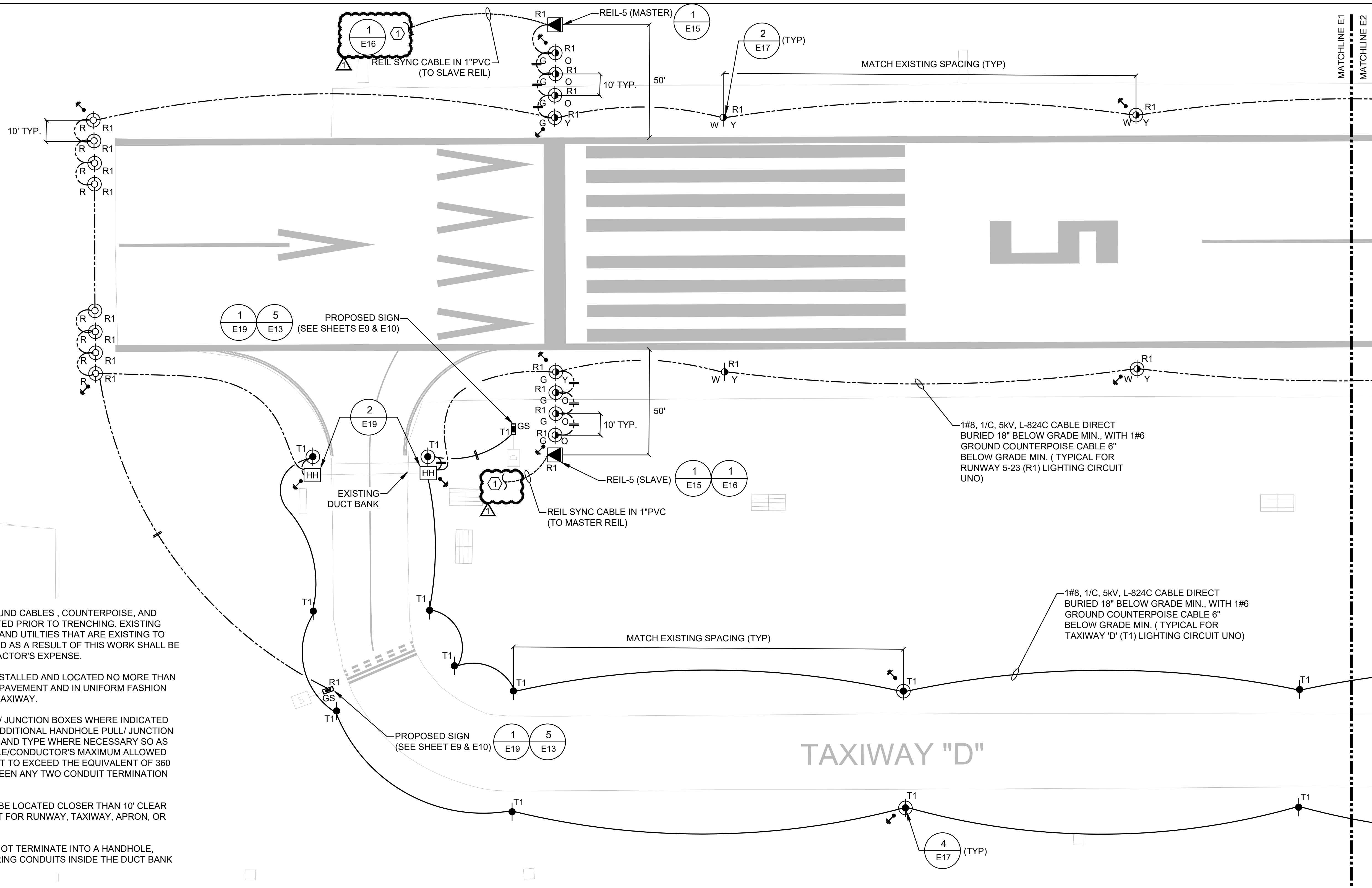
AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

**AIRFIELD LIGHTING  
DEMOLITION PLAN  
RUNWAY 11-29 -  
PART 5 (ADD)**

**ED12**  
Sheet 24 of 52

801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM





- GENERAL NOTES:**
1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
  3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.

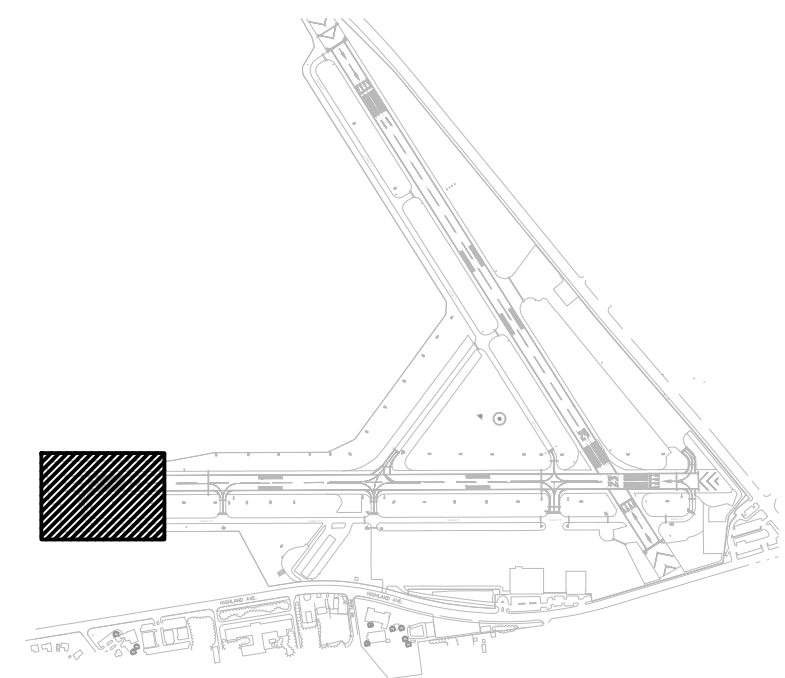
**KEYED NOTES #**

1. PROVIDE 12"x12"x12" HANDHOLES PER HANDHOLE DETAIL 2/E19. FOR REIL SYNC CABLE CONDUIT AS REQUIRED SO AS NOT TO EXCEED THE CABLE'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS. ROUTE AROUND RUNWAY 5 END THRESHOLD AS REQUIRED.

PLAN NORTH 1 E1 SCALE: 1"=25'-0"

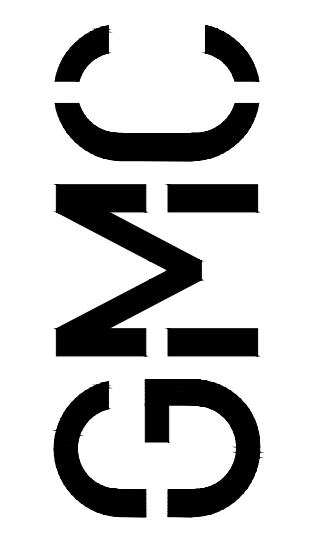
**NOTE:**

1. LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.



**KEY PLAN**  
TRUE NORTH NOT TO SCALE

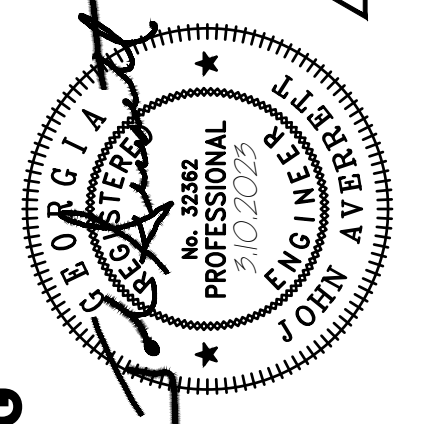
VAUG220003



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

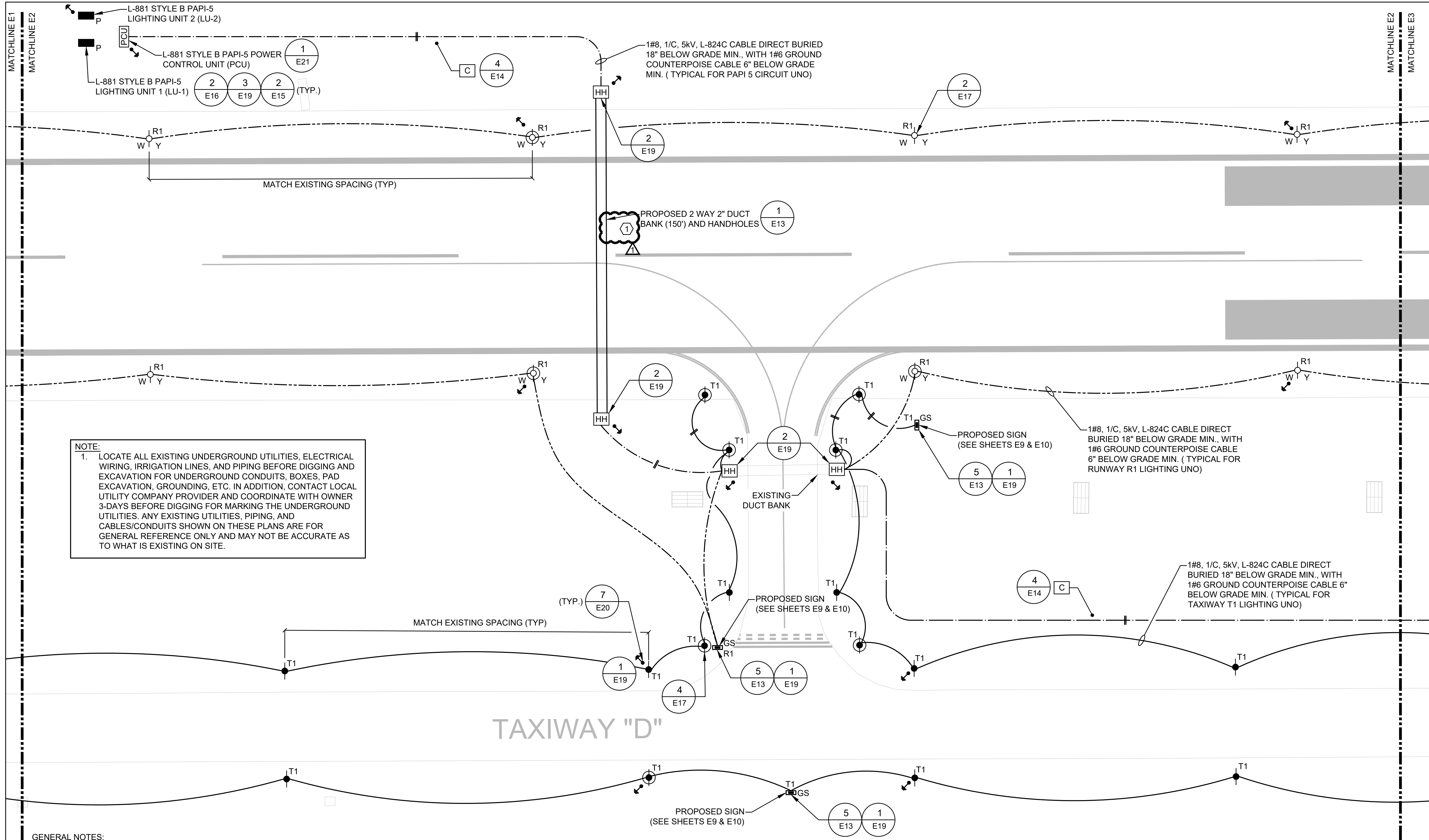
ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
ADDENDUM #2 3/17/2023	3/17/2023
designed by: JDZ	designed by: JDZ
drawn by: JRA, JDZ	drawn by: JRA, JDZ
checked by: JEA	checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
  
**GDOT PID : T007935**  
**GMC NUMBER : TAUG220004**  
**SCALE: 1"=25'**

**AIRFIELD LIGHTING & WIRING PLAN  
- RUNWAY 5/23  
- PART 1**

**E1**  
Sheet 25 of 52



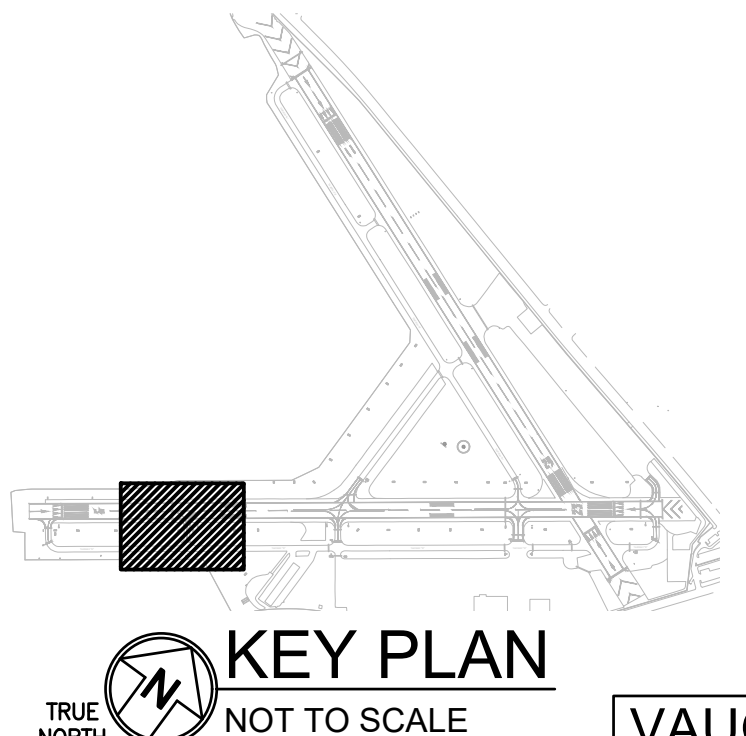
**NOTE:**  
 1. LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.

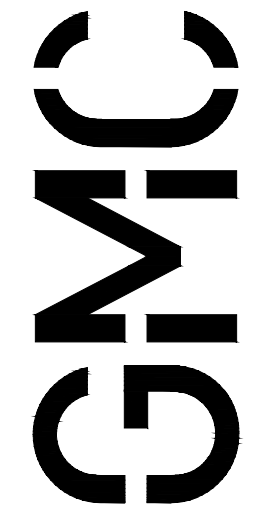
- GENERAL NOTES:**
1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
  3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.

**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 5/23 - PART 2**  
 SCALE: 1"=25'-0"

**KEYED NOTES #**

1. CONTRACTOR TO FIELD VERIFY ANY EXISTING DUCT BANKS THAT CAN BE UTILIZED IN THE AREA FOR THE NEW PAPI-5 CIRCUIT. IF ONE DOES EXIST, CONTRACTOR SHALL SEND IN INFORMATION THROUGH RFI TO ENGINEER FOR APPROVAL. IF NEW DUCT BANK HAS TO BE INSTALLED, BORE UNDER EXISTING RUNWAY AS REQUIRED. COORDINATE WITH OWNER/PROJECT MANAGER PRIOR TO BEGINNING WORK.



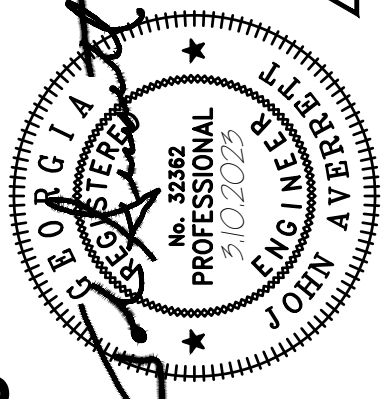


801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	designed by: JDZ
drawn by: JRA, JDZ	drawn by: JRA, JDZ
checked by: JEA	checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)**

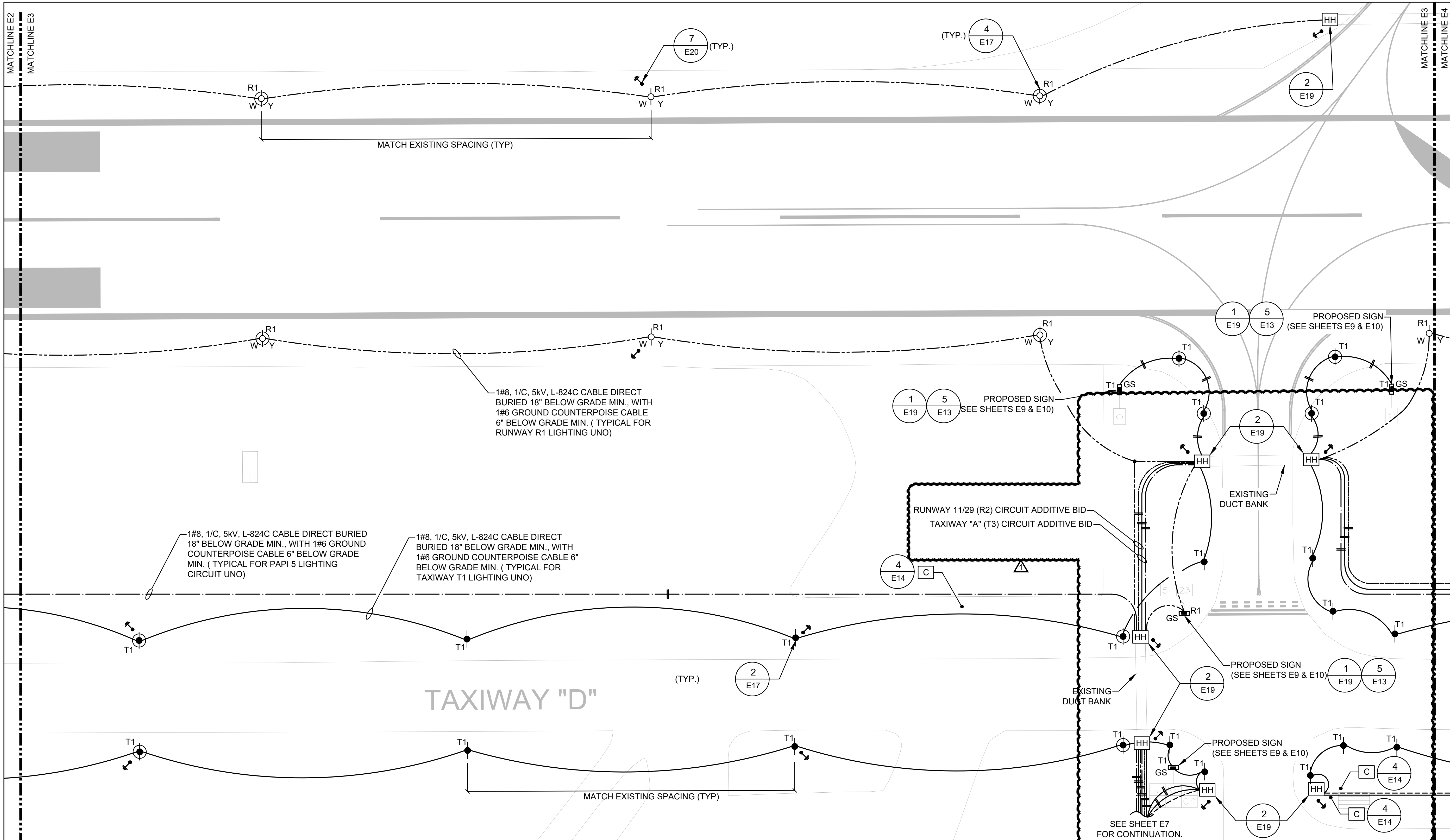
AUGUSTA, GEORGIA  
 GDOT PID : I007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'



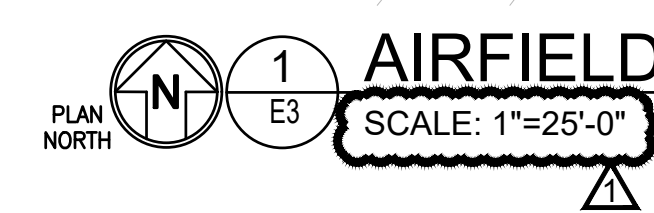
**AIRFIELD LIGHTING & WIRING PLAN  
 - RUNWAY 5/23  
 -PART 2**

**E2**  
 Sheet 26 of 52

VAUG220003



- GENERAL NOTES:**
1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
  3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.



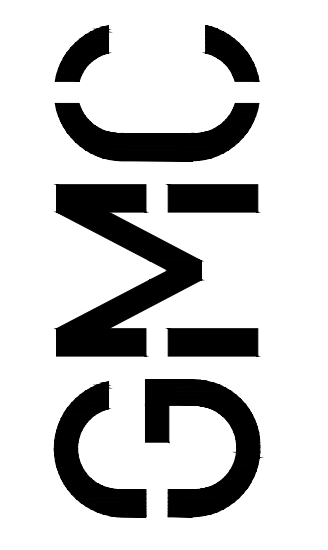
**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 5/23 - PART 3**

**NOTE:**

1. LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.



VAUG220003



801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

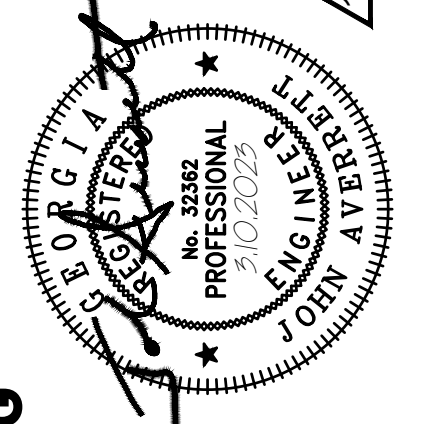
100% SUBMITTAL	ISSUE DATE	ISSUE DATE
1/20/2023	1/20/2023	
ADDENDUM #1	3/10/2023	

designed by: JDZ  
drawn by: JRA, JDZ  
checked by: JEA


---

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

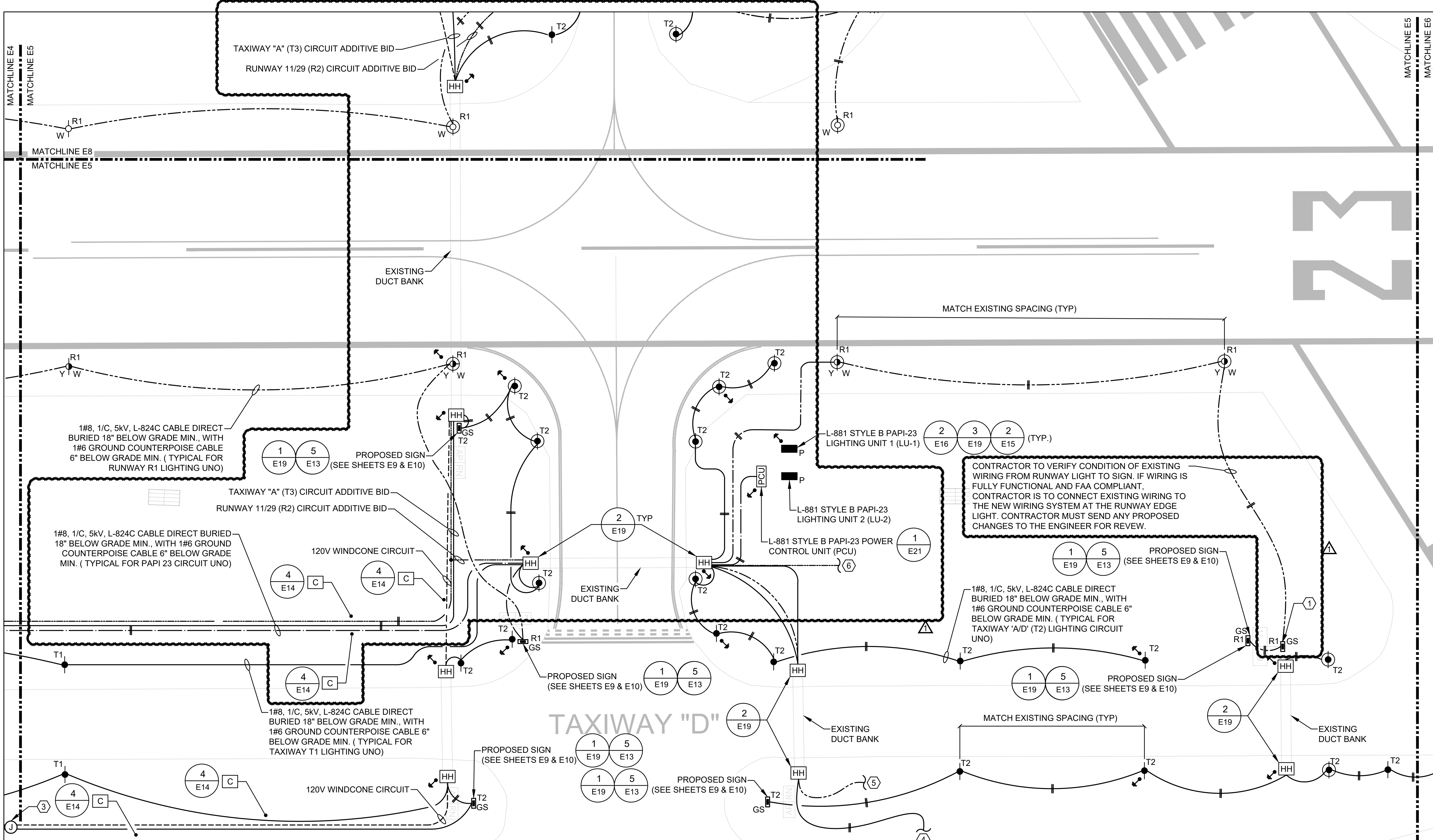


**AIRFIELD LIGHTING & WIRING PLAN  
- RUNWAY 5/23 - PART 3**



Sheet 27 of 52





- GENERAL NOTES:**
- ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  - EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
  - PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  - HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  - WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.

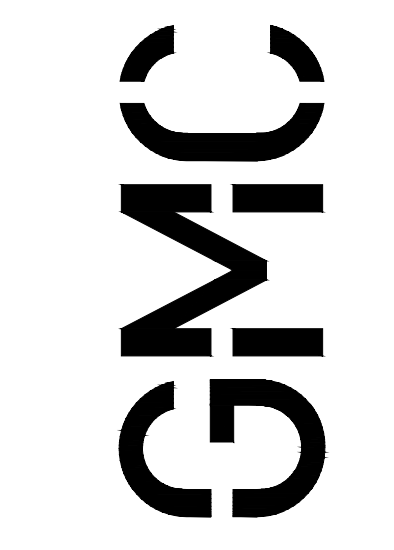
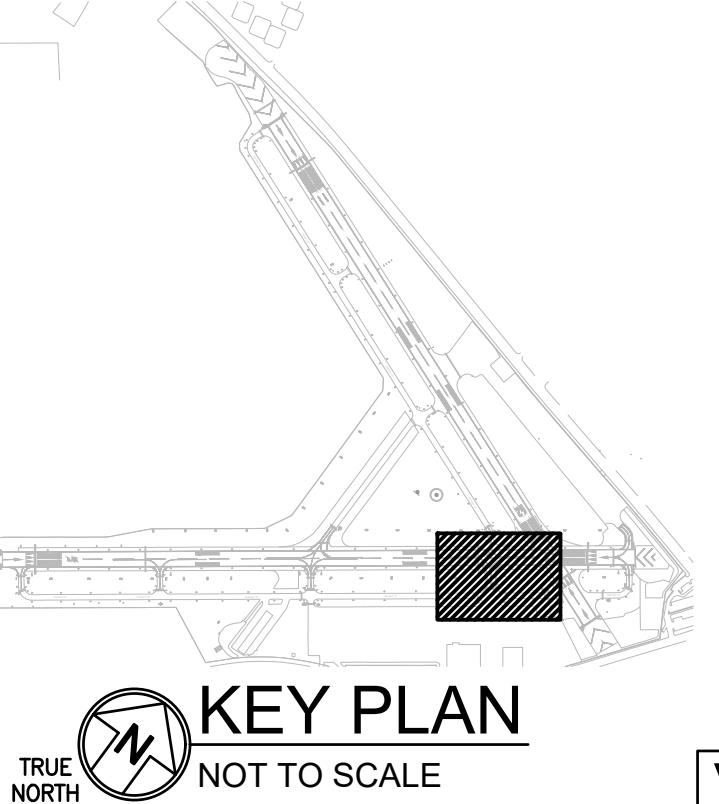
- KEYED NOTES (#)**
- EXISTING SIGN TO REMAIN. CONNECT TO NEW WIRING SYSTEM AS REQUIRED.
  - SEE SHEET E8 FOR CONTINUATION OF 120V WIND CONE CIRCUIT.
  - EXISTING JUNCTION BOX/CAN TO REMAIN.
  - SEE SHEET E6 FOR TAXIWAY T1 CIRCUIT CONTINUATION. MATCH EXISTING ROUTE.
  - SEE SHEET E6 FOR RUNWAY R1 CIRCUIT CONTINUATION. MATCH EXISTING ROUTE.
  - SEE SHEET E26 FOR RUNWAY R2 CIRCUIT CONTINUATION. MATCH EXISTING ROUTE.

**NOTE:**

- LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.

**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 5/23 - PART 5**

SCALE: 1"=25'-0"

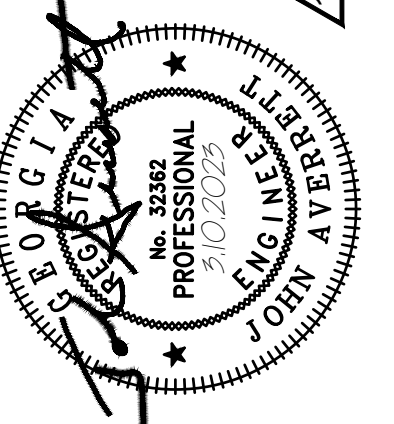


801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
designed by: JDZ	checked by: JEA
drawn by: JRA, JDZ	

AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)

AUGUSTA, GEORGIA  
 GDOT PID : I007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'



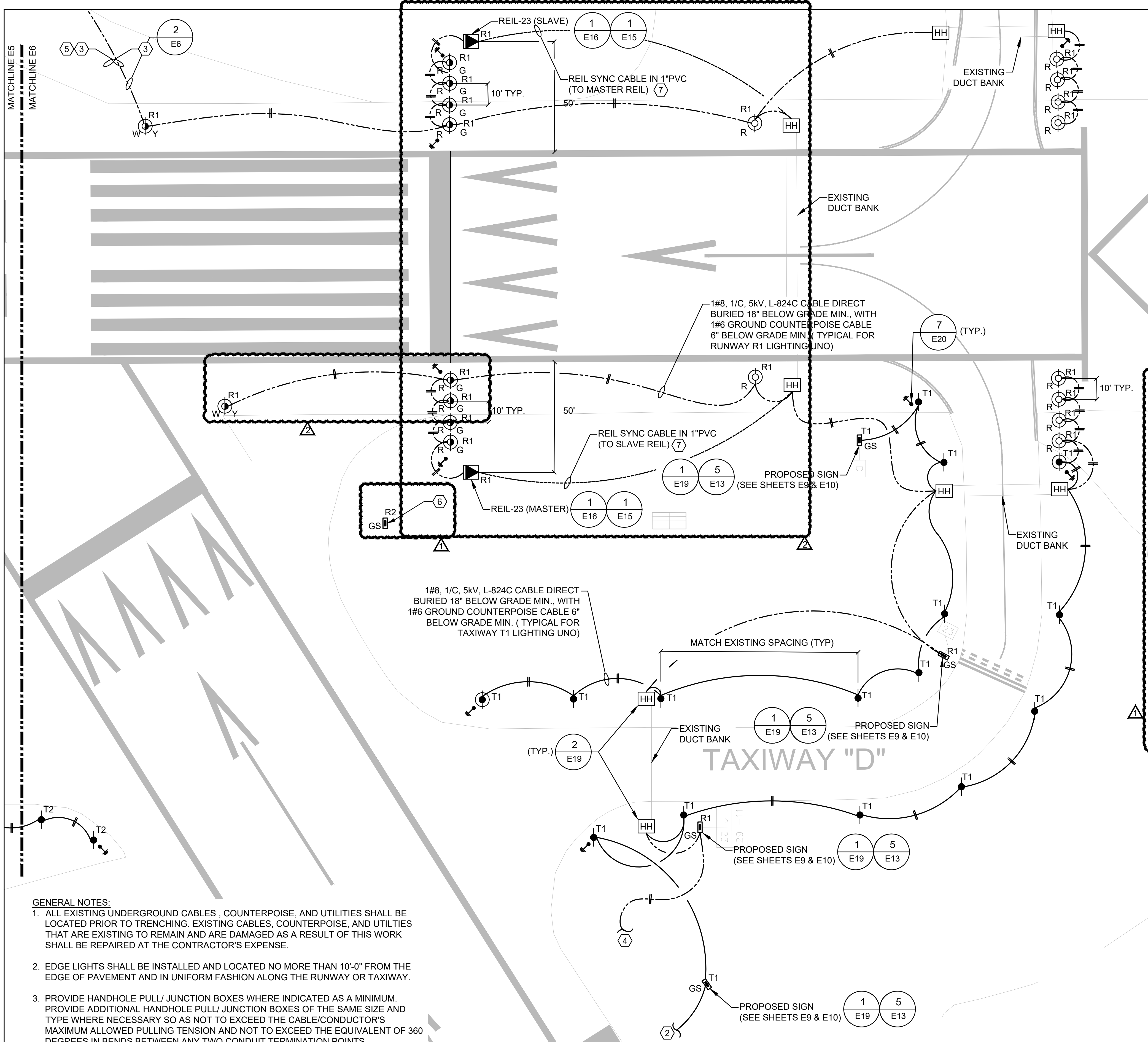
AIRFIELD LIGHTING  
 & WIRING PLAN  
 - RUNWAY 5/23  
 - PART 5

**E5**

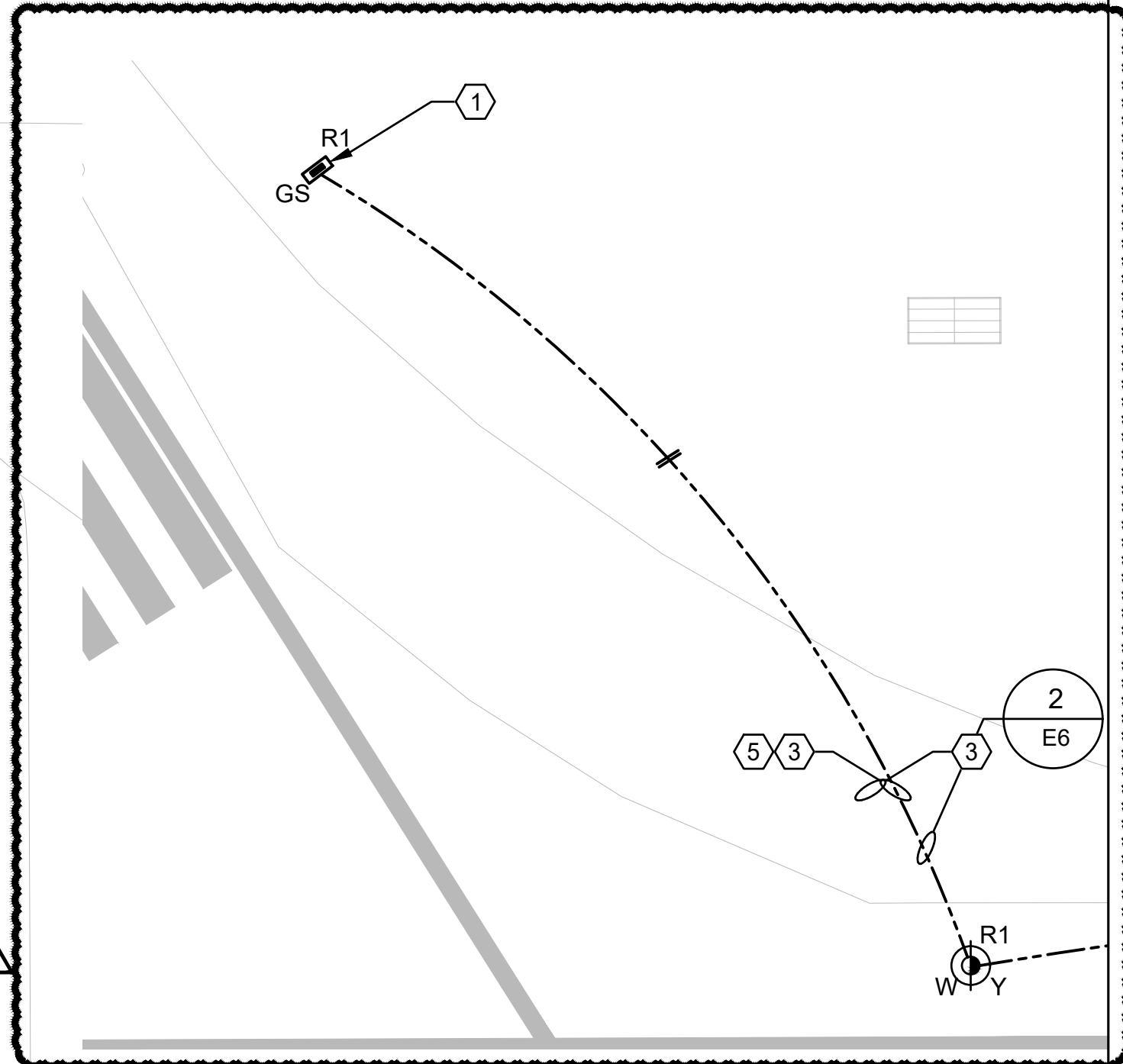
Sheet 29 of 52

VAUG220003

MATCHLINE E5  
MATCHLINE E6



- KEYED NOTES #:**
- EXISTING SIGN TO REMAIN. CONNECT TO NEW WIRING SYSTEM AS REQUIRED.
  - SEE SHEET E5 FOR CONTINUATION OF TAXIWAY 'D' (T1) CIRCUIT. ROUTE CIRCUIT AROUND RUNWAY 11/29 THRESHOLD AS REQUIRED. MATCH EXISTING ROUTE.
  - SEE DETAIL 2/E6 (THIS SHEET) FOR CONTINUATION OF RUNWAY R1 CIRCUIT. MATCH EXISTING ROUTE.
  - SEE SHEET E5 FOR CONTINUATION OF RUNWAY R1 CIRCUIT. ROUTE CIRCUIT AROUND RUNWAY 11/29 THRESHOLD AS REQUIRED. MATCH EXISTING ROUTE.
  - CONTRACTOR TO VERIFY CONDITION OF EXISTING WIRING FROM RUNWAY LIGHT TO SIGN. IF WIRING IS FULLY FUNCTIONAL AND FAA COMPLIANT, CONTRACTOR IS TO CONNECT EXISTING WIRING TO THE NEW WIRING SYSTEM AT THE RUNWAY EDGE LIGHT. CONTRACTOR MUST SEND ANY PROPOSED CHANGES TO THE ENGINEER FOR REVIEW.
  - MANDATORY SIGN 29-11 EXISTING TO REMAIN. SEE SHEET E26 FOR ADDITIONAL INFORMATION.
  - PROVIDE 12"x12"x12" HANDHOLES PER HANDHOLE DETAIL 2/E19. FOR REIL SYNC CABLE CONDUIT AS REQUIRED SO AS NOT TO EXCEED THE CABLE'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS. CONTRACTOR HAS OPTION TO ROUTE IN EXISTING DUCT BANK AS SHOWN IF SPACE ALLOWS.



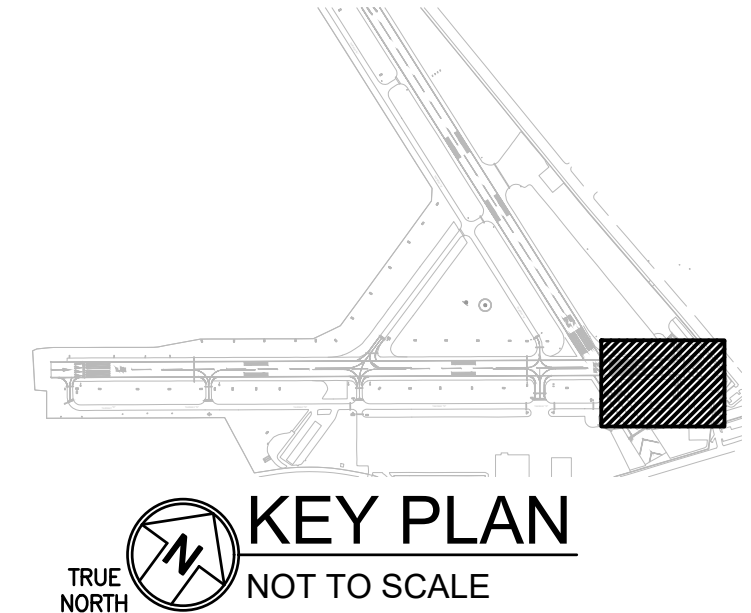
- GENERAL NOTES:**
- ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  - EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
  - PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  - HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  - WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.

**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 5/23 - PART 6**  
SCALE: 1"=25'-0"

**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 5/23 - PART 6**  
SCALE: 1"=50'-0"

**NOTE:**

- LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.



**GMC**

801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023
ADDENDUM #2 3/17/2023	3/17/2023

designed by: JDZ  
drawn by: JRA, JDZ  
checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

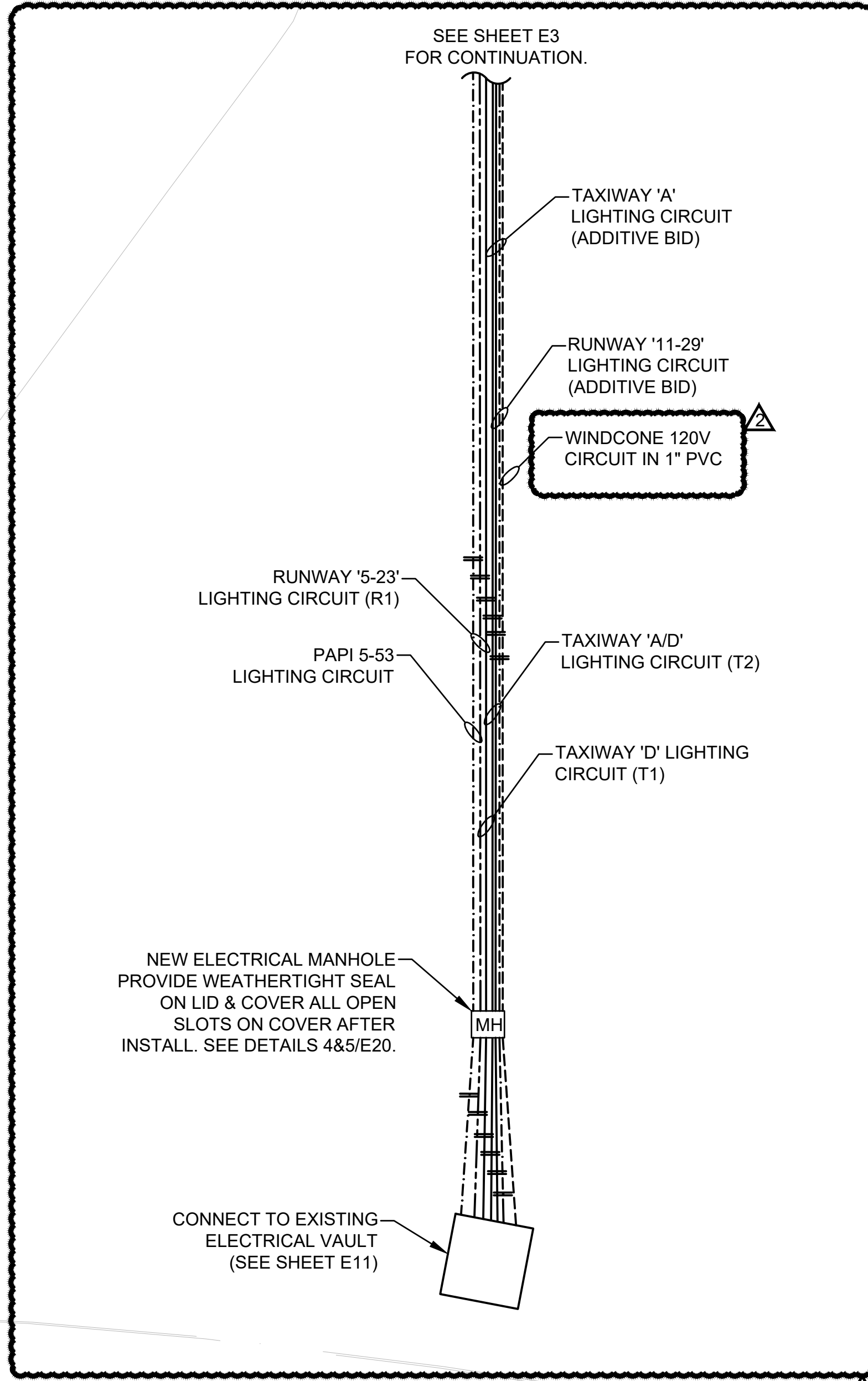
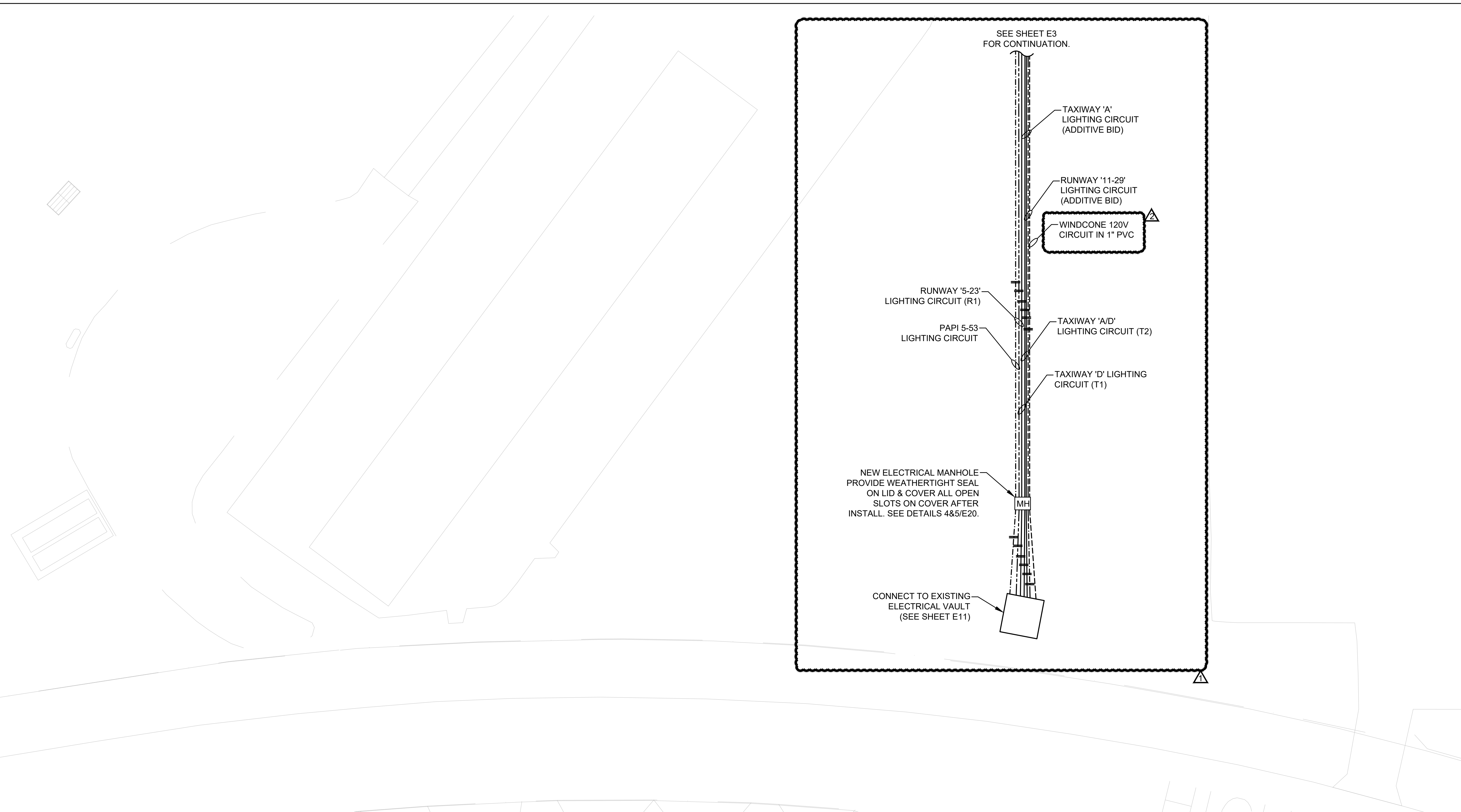
AUGUSTA, GEORGIA  
GDOT PID : I007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

**AIRFIELD LIGHTING & WIRING PLAN  
- RUNWAY 5/23  
- PART 6**

**E6**  
Sheet 30 of 52

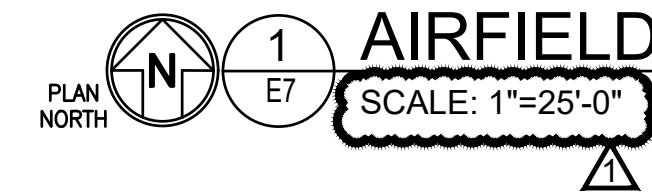
VAUG220003





**GENERAL NOTES:**

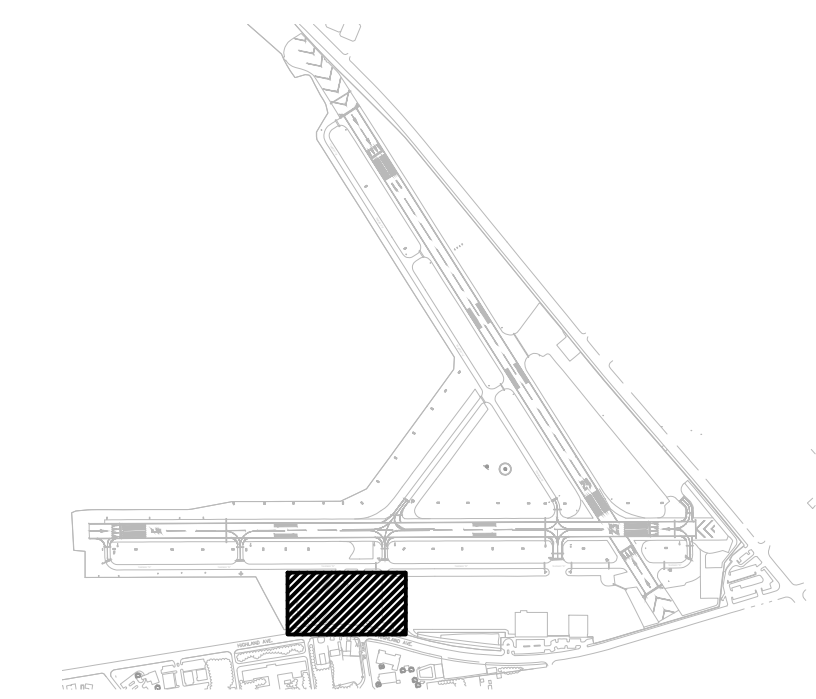
1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.



**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 5/23 - PART 7**

**NOTE:**

1. LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.

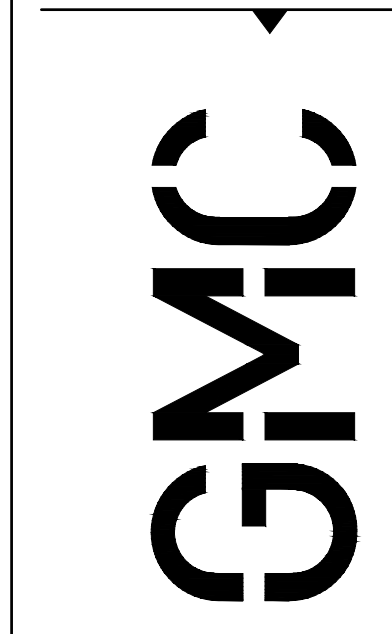


**KEY PLAN**  
NOT TO SCALE

VAUG220003

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

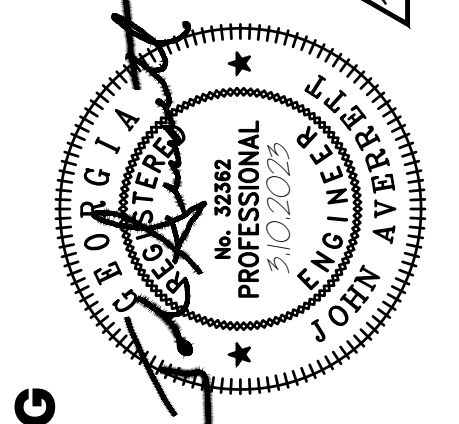
**AIRFIELD LIGHTING  
& WIRING PLAN  
- RUNWAY 5/23  
- PART 7**



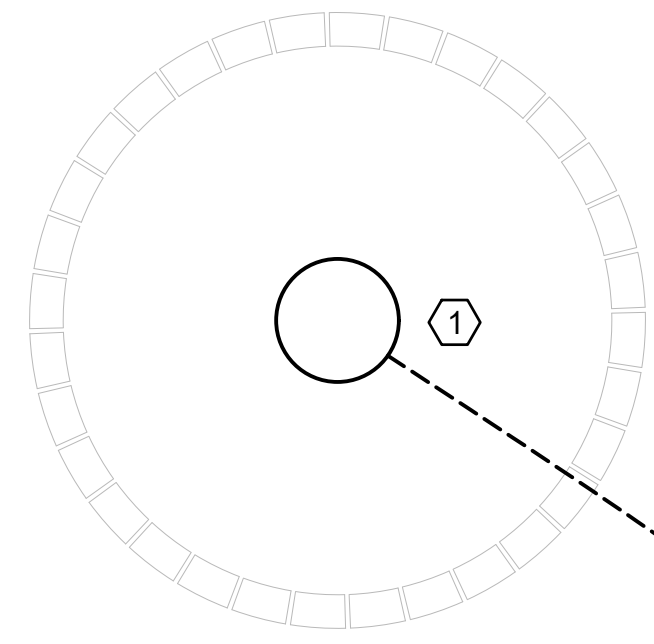
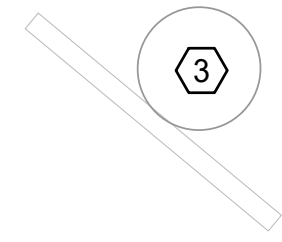
801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	designed by: JDZ
ADDENDUM #1 3/16/2023	drawn by: JRA, JDZ
ADDENDUM #2 3/17/2023	checked by: JEA

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1"=25'

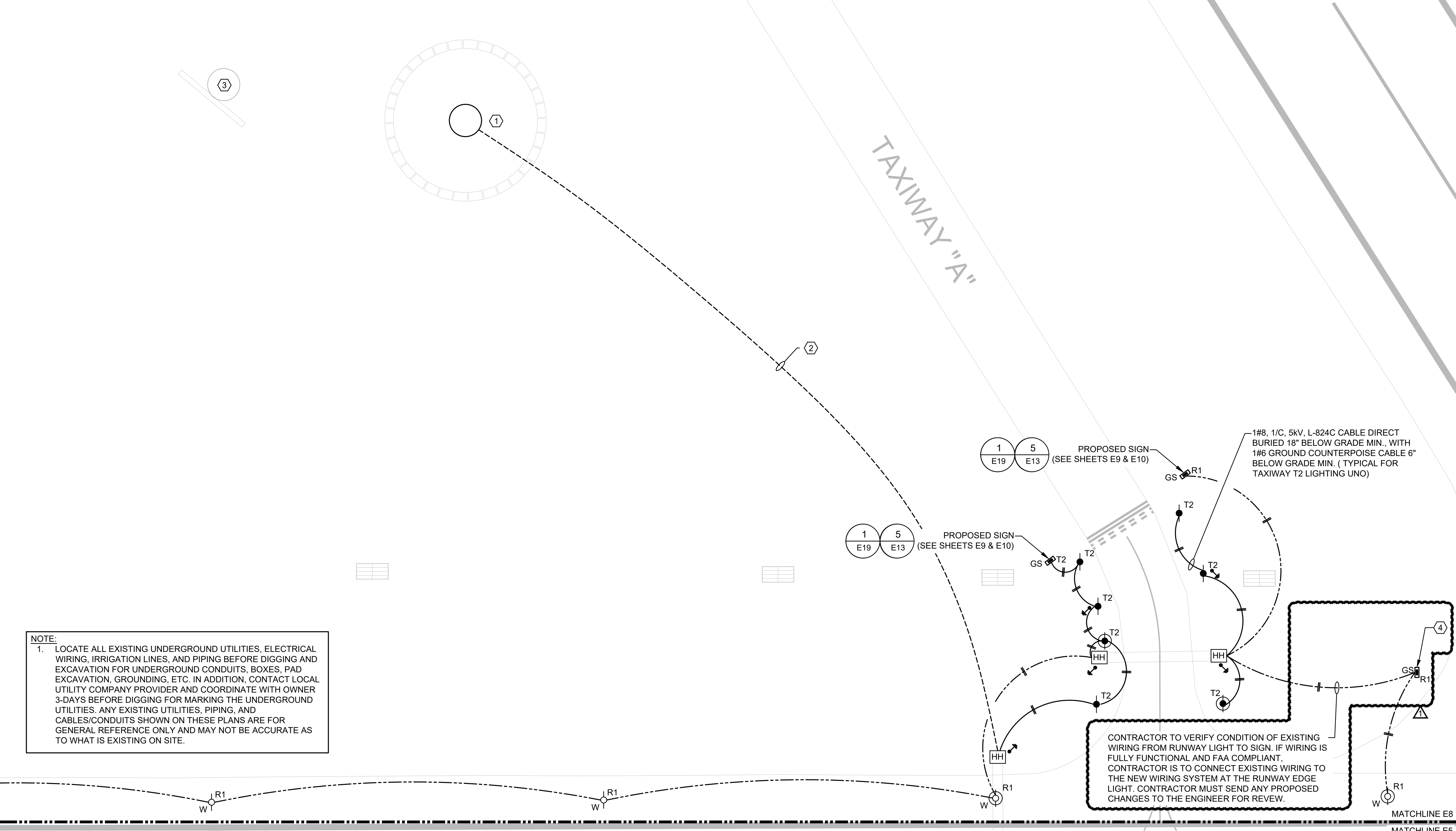


**E7**



TAXIWAY "A"

**NOTE:**  
 1. LOCATE ALL EXISTING UNDERGROUND UTILITIES, ELECTRICAL WIRING, IRRIGATION LINES, AND PIPING BEFORE DIGGING AND EXCAVATION FOR UNDERGROUND CONDUITS, BOXES, PAD EXCAVATION, GROUNDING, ETC. IN ADDITION, CONTACT LOCAL UTILITY COMPANY PROVIDER AND COORDINATE WITH OWNER 3-DAYS BEFORE DIGGING FOR MARKING THE UNDERGROUND UTILITIES. ANY EXISTING UTILITIES, PIPING, AND CABLES/CONDUITS SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT BE ACCURATE AS TO WHAT IS EXISTING ON SITE.



CONTRACTOR TO VERIFY CONDITION OF EXISTING WIRING FROM RUNWAY LIGHT TO SIGN. IF WIRING IS FULLY FUNCTIONAL AND FAA COMPLIANT, CONTRACTOR IS TO CONNECT EXISTING WIRING TO THE NEW WIRING SYSTEM AT THE RUNWAY EDGE LIGHT. CONTRACTOR MUST SEND ANY PROPOSED CHANGES TO THE ENGINEER FOR REVIEW.

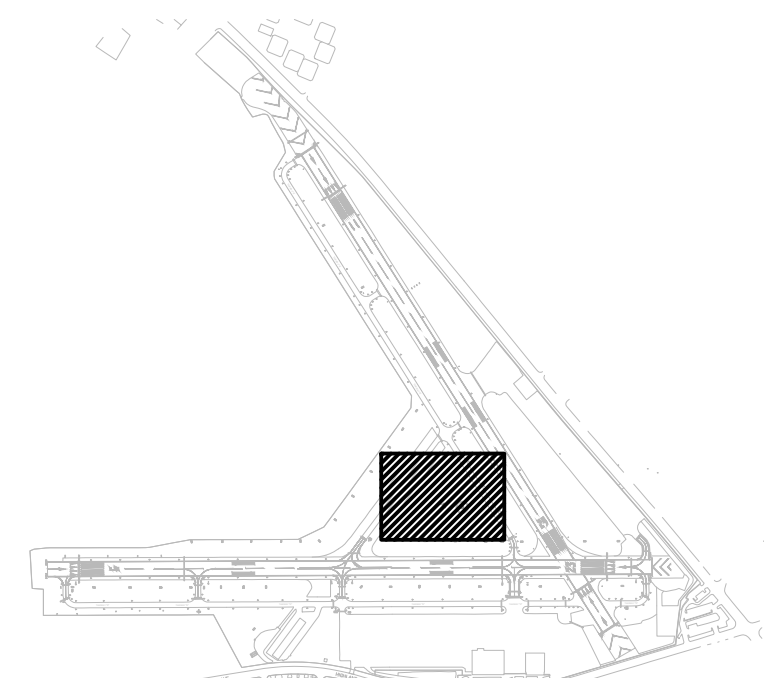
- GENERAL NOTES:**
- ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  - EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT AND IN UNIFORM FASHION ALONG THE RUNWAY OR TAXIWAY.
  - PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE AND TYPE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  - HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  - WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.



**AIRFIELD LIGHTING & WIRING PLAN - EXISTING AWOS SYSTEM & WINDCONE**

SCALE: 1"=25'-0"

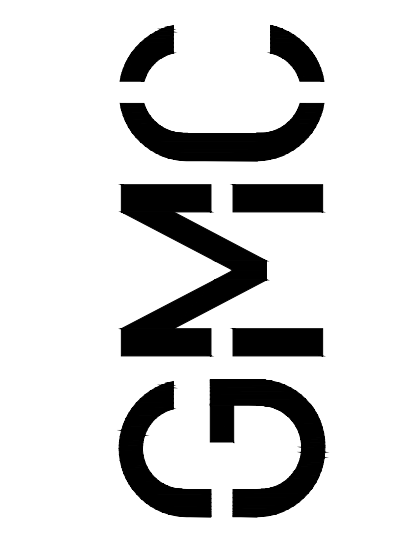
- KEYED NOTES (#):**
- EXISTING 120V CIRCUIT TO WIND CONE TO BE REPLACED WITH NEW. MAKE NEW ELECTRICAL CONNECTION AS PER MANUFACTURER'S REQUIREMENTS. EXISTING WINDCONE IS A HALI-BRITE INC. #L807-S2-IN-120-ON-5. UTILIZE #12 WIRE IN 1" CONDUIT TO ACHIEVE <3% VOLTAGE DROP.
  - 2#12, 1#12(G) - 1"C TO PANEL 'EVP' IN ELECTRICAL VAULT.
  - EXISTING AWOS SYSTEM TO REMAIN IN SERVICE - NO WORK REQUIRED.
  - EXISTING SIGN TO REMAIN. CONNECT SIGN TO NEW WIRING SYSTEM AS REQUIRED.



**KEY PLAN**  
 NOT TO SCALE

MATCHLINE E8  
 MATCHLINE E5

VAUG220003

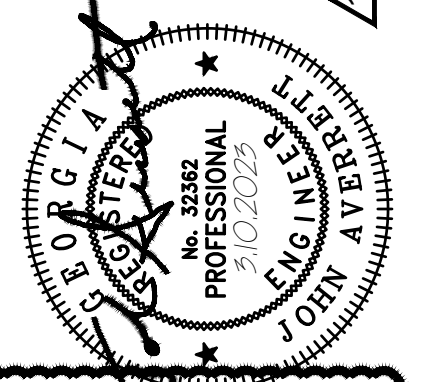


801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/16/2023	3/16/2023
designed by: JDZ	designed by: JDZ
drawn by: JRA, JDZ	drawn by: JRA, JDZ
checked by: JEA	checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
 GDOT PID : T007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'

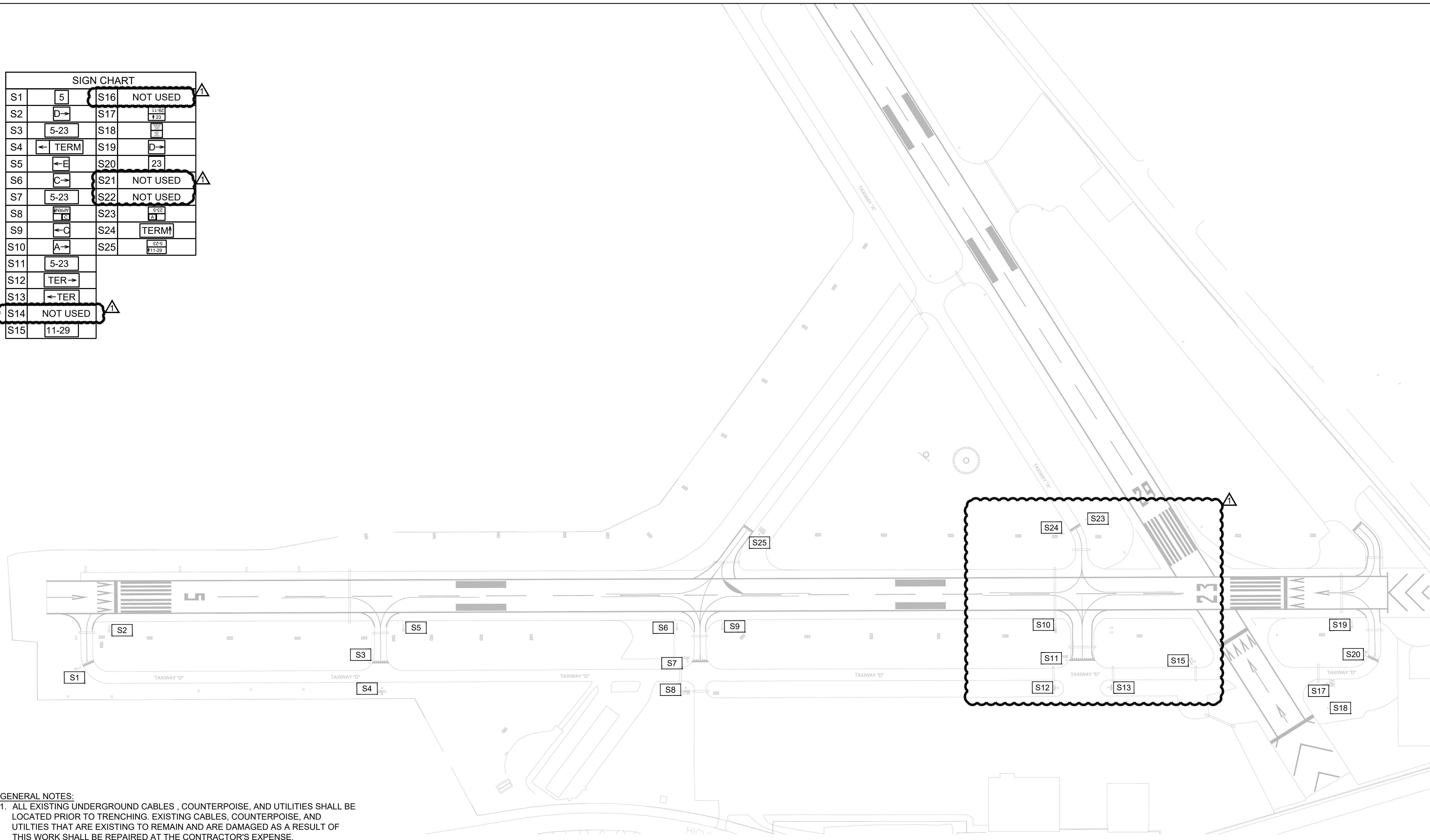


**AIRFIELD LIGHTING  
 & WIRING PLAN  
 - EXISTING AWOS  
 & WINDCONE**

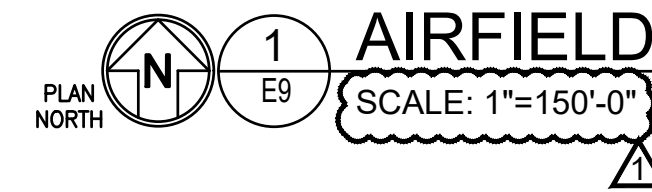
**E8**

Sheet 02 of 02

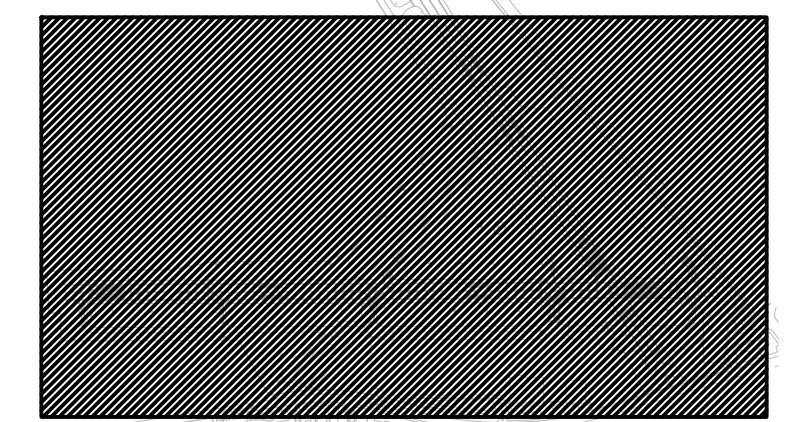
SIGN CHART			
S1	5	S16	NOT USED
S2	D→	S17	11-29 1-23
S3	5-23	S18	
S4	← TERM	S19	D→
S5	← E	S20	23
S6	C→	S21	NOT USED
S7	5-23	S22	NOT USED
S8	INSURV 10	S23	6-22 A
S9	← C	S24	TERM
S10	A→	S25	62-5 11-29
S11	5-23		
S12	TER→		
S13	← TER		
S14	NOT USED		
S15	11-29		



- GENERAL NOTES:**
- ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  - ALL AIRPORT SIGNS SHALL CONFORM TO THE FOLLOWING FAA ADVISORY CIRCULARS:  
150/5340-18F STANDARDS FOR AIRPORT SIGN SYSTEMS  
150/5340-30J DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS  
150/5345-44J SPECIFICATION FOR RUNWAY & TAXIWAY SIGNS.
  - ALL SIGNS SHALL BE SIZE 1, STYLE 2, CLASS 2, MODE 2, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
  - CONTRACTOR SHALL STAKE THE LOCATION OF ALL PROPOSED SIGNS FOR REVIEW BY THE RPR PRIOR TO INSTALLATION.
  - TYPICAL, SEE SHEET E10 FOR SIGN LAYOUTS.

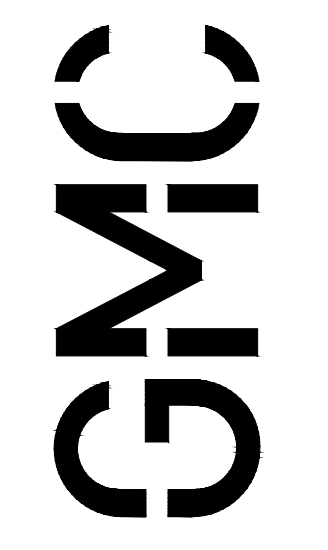


**AIRFIELD SIGN CHART PLAN - RUNWAY 5-23**



**KEY PLAN**  
TRUE NORTH NOT TO SCALE

VAUG220003



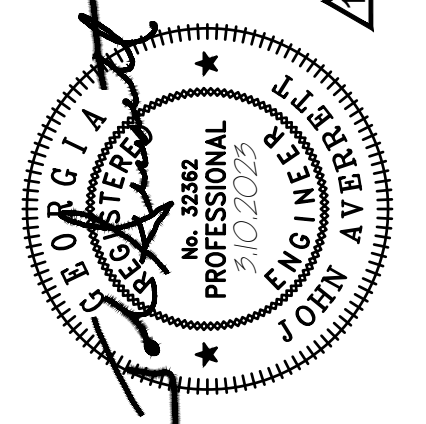
801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023

designed by: JDZ  
drawn by: JRA, JDZ  
checked by: JEA

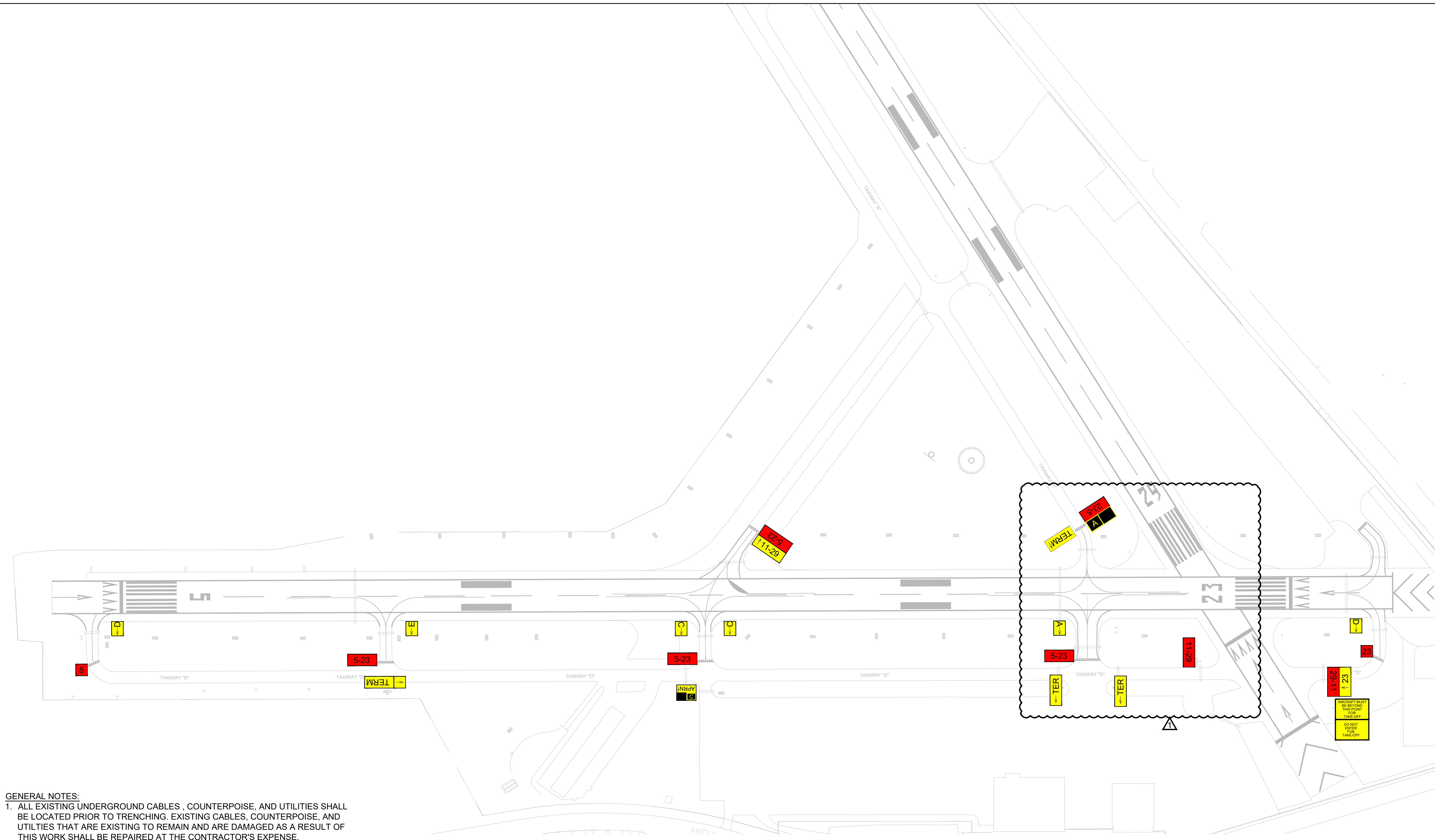
**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: 1" = 150'



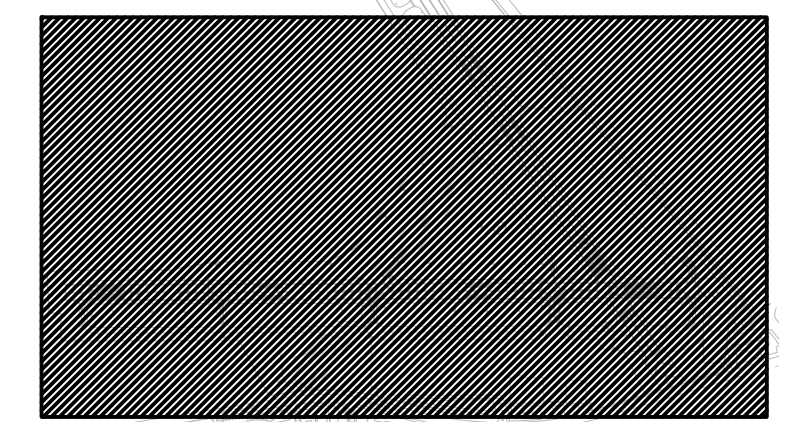
**AIRFIELD SIGN CHART PLAN - RUNWAY 5-23**

**E9**  
Sheet 33 of 52



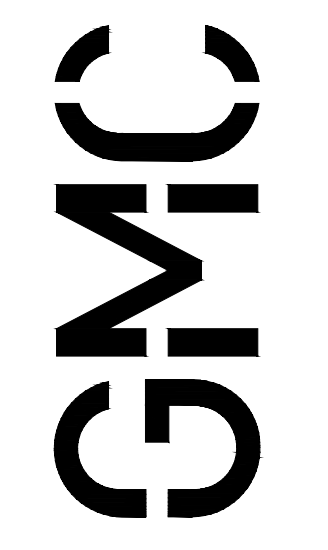
- GENERAL NOTES:**
1. ALL EXISTING UNDERGROUND CABLES , COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  2. ALL AIRPORT SIGNS SHALL CONFORM TO THE FOLLOWING FAA ADVISORY CIRCULARS:  
150/5340-18F STANDARDS FOR AIRPORT SIGN SYSTEMS  
150/5340-30J DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS  
150/5345-44J SPECIFICATION FOR RUNWAY & TAXIWAY SIGNS.
  3. ALL SIGNS SHALL BE SIZE 1, STYLE 2, CLASS 2, MODE 2, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
  4. CONTRACTOR SHALL STAKE THE LOCATION OF ALL PROPOSED SIGNS FOR REVIEW BY THE RPR PRIOR TO INSTALLATION.

**AIRFIELD SIGN LAYOUT PLAN RUNWAY 5-23**  
 PLAN NORTH SCALE: 1"=150'-0"



**KEY PLAN**  
 TRUE NORTH NOT TO SCALE

VAUG220003



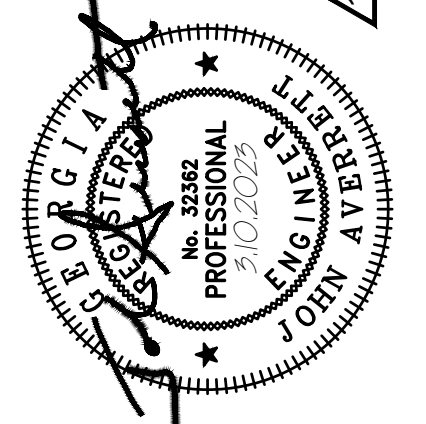
801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

100% SUBMITTAL	ISSUE DATE
1/20/2023	
ADDENDUM #1	3/10/2023

designed by: JAZ  
 drawn by: JRA, JDZ  
 checked by: JEA

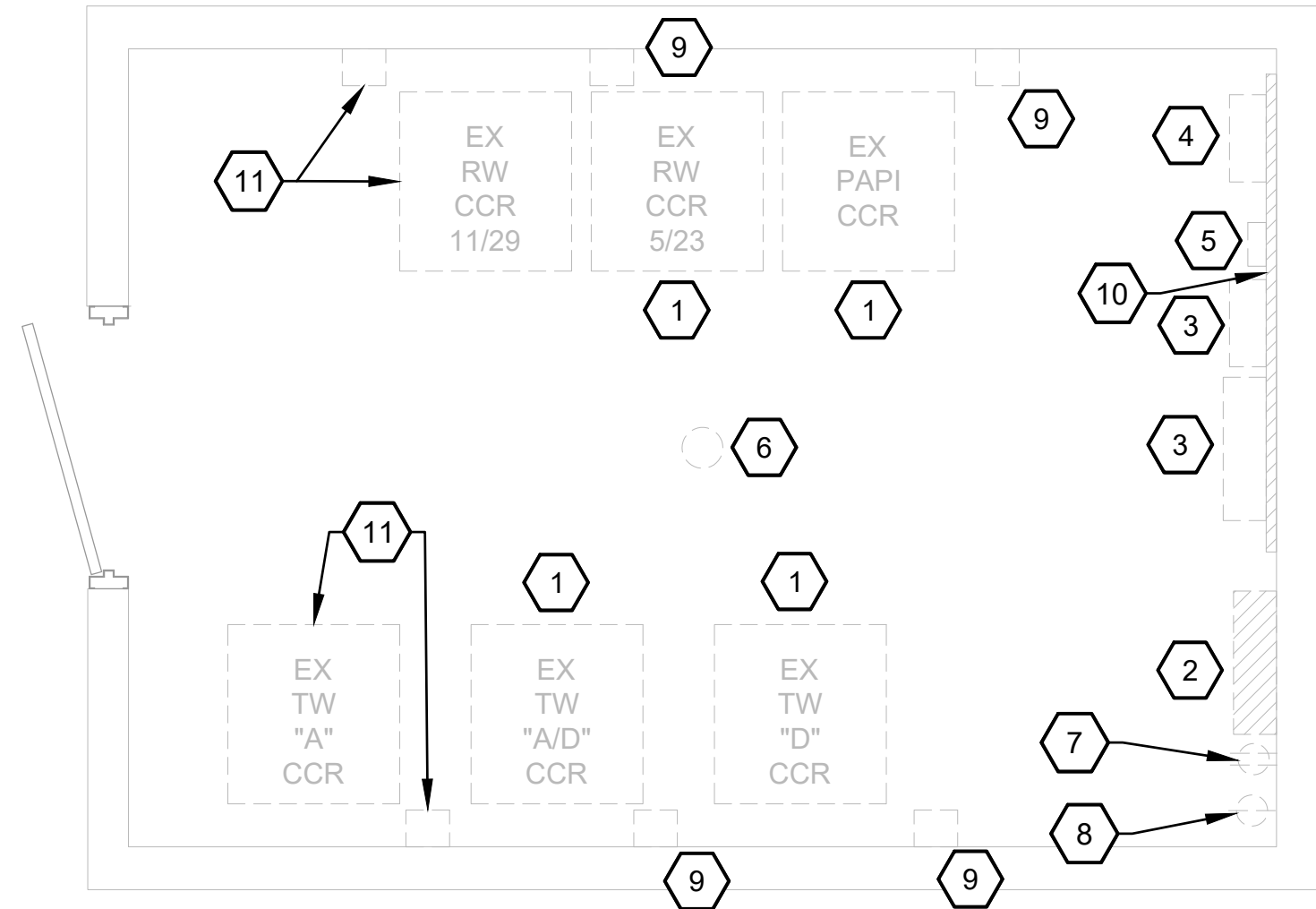
**AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
 GDOT PID : T007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=150'



**AIRFIELD SIGN LAYOUT PLAN - RUNWAY 5-23**

**E10**  
 Sheet 34 of 52



**1 ELECTRICAL VAULT DEMOLITION PLAN**  
SCALE: 1/2"=1'-0"

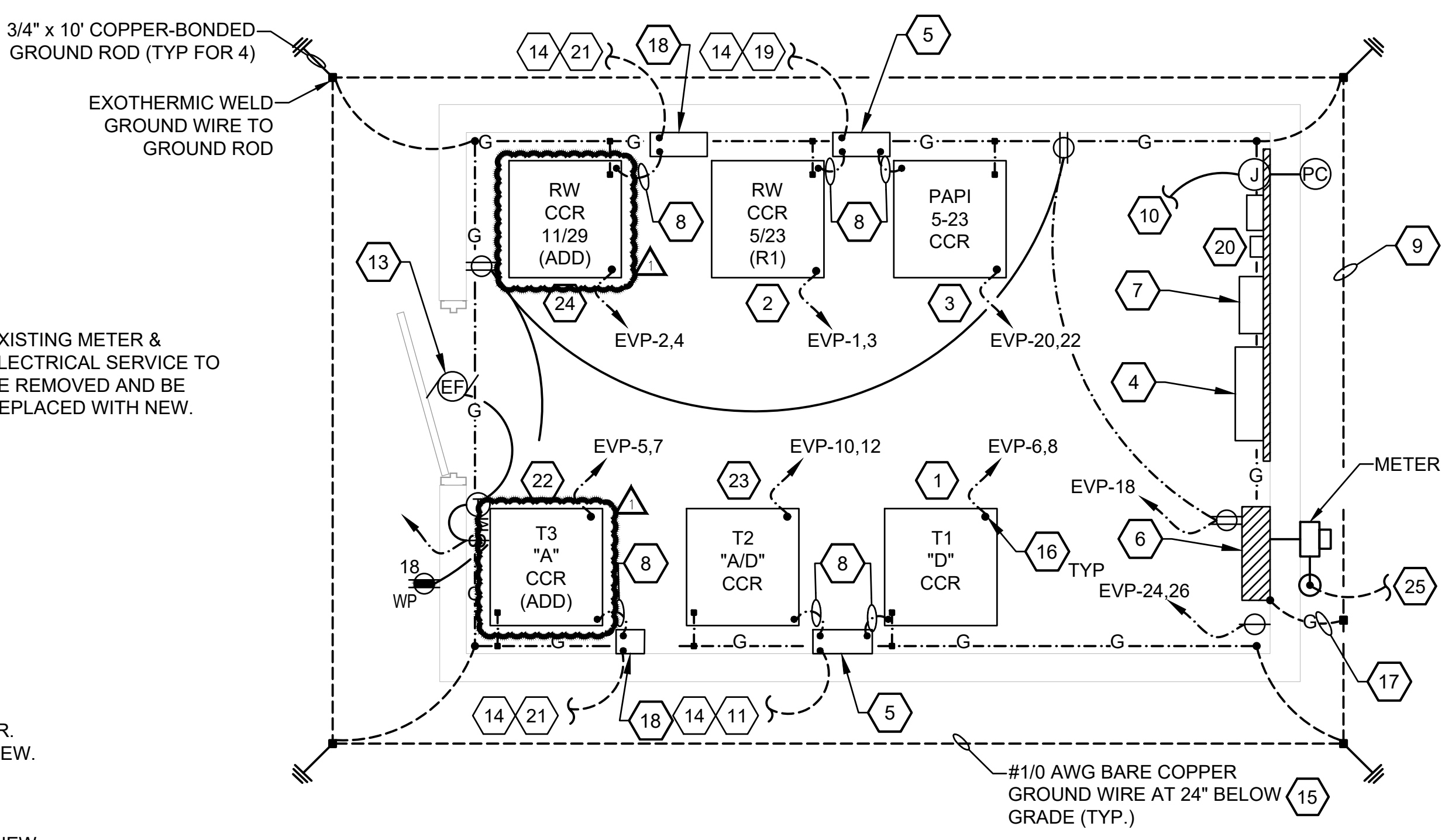
- DEMOLITION KEYED NOTES**
- EXISTING REGULATOR TO BE REPLACED WITH NEW. DISCONNECT AND REMOVE REGULATOR WITH ALL ASSOCIATED COMPONENTS AND TURN IT OVER TO OWNER. CONTRACTOR TO REPLACE ALL UPSTREAM WIRING BACK TO PANEL 'EVP' WITH NEW. DISCONNECT FEEDER WIRING & CONDUIT AND TURN IT OVER TO OWNER. CONTRACTOR HAS OPTION TO REUSE EXISTING CONDUIT IF IT MEETS DESIGN INTENT AND IS CODE COMPLIANT WITH THE NEC.
  - EXISTING 240/120V 1PH 200AMP PANELBOARD TO BE REPLACED WITH NEW. SEE NEW PANEL SCHEDULE 'EVP'. COORDINATE WITH OWNER ON SCHEDULING DOWN TIME OF AIRFIELD LIGHTING SYSTEM DURING CONSTRUCTION.
  - EXISTING LIGHTING CONTROL JUNCTION AND CONTROL BOX TO BE DEMOLISHED AND BE REPLACED WITH NEW.
  - EXISTING RADIO CONTROLLER TO BE REPLACED WITH NEW.
  - EXISTING TIMECLOCK TO BE DEMOLISHED AND BE REPLACED WITH NEW.
  - EXISTING LIGHT FIXTURE TO BE DEMOLISHED. REMOVE ALL ASSOCIATED WIRING, CONDUIT, SWITCHES, AND BOXES.
  - EXISTING RECEPTACLE TO BE DEMOLISHED, REMOVE ALL ASSOCIATED WIRING, CONDUIT, & BOXES.
  - EXISTING 30AMP 120V OUTLET TO REMAIN AND BE RECONNECTED TO NEW PANEL 'EVP'.
  - EXISTING ADB SAFETY CUTOUT TO BE DEMOLISHED, REMOVE ALL ASSOCIATED WIRING & CONDUIT.
  - EXISTING BACKBOARD FOR CONTROLS TO REMAIN.
  - IF 11/29 ADDITIVE BID IS NOT ACCEPTED, EXISTING REGULATOR & SAFETY CUTOUT TO REMAIN IN SERVICE. CONNECT NEW INCOMING POWER (WIRING & CONDUIT) TO NEW PANEL 'EVP' IN VAULT AS REQUIRED.

**PANELBOARD EVP SCHEDULE**

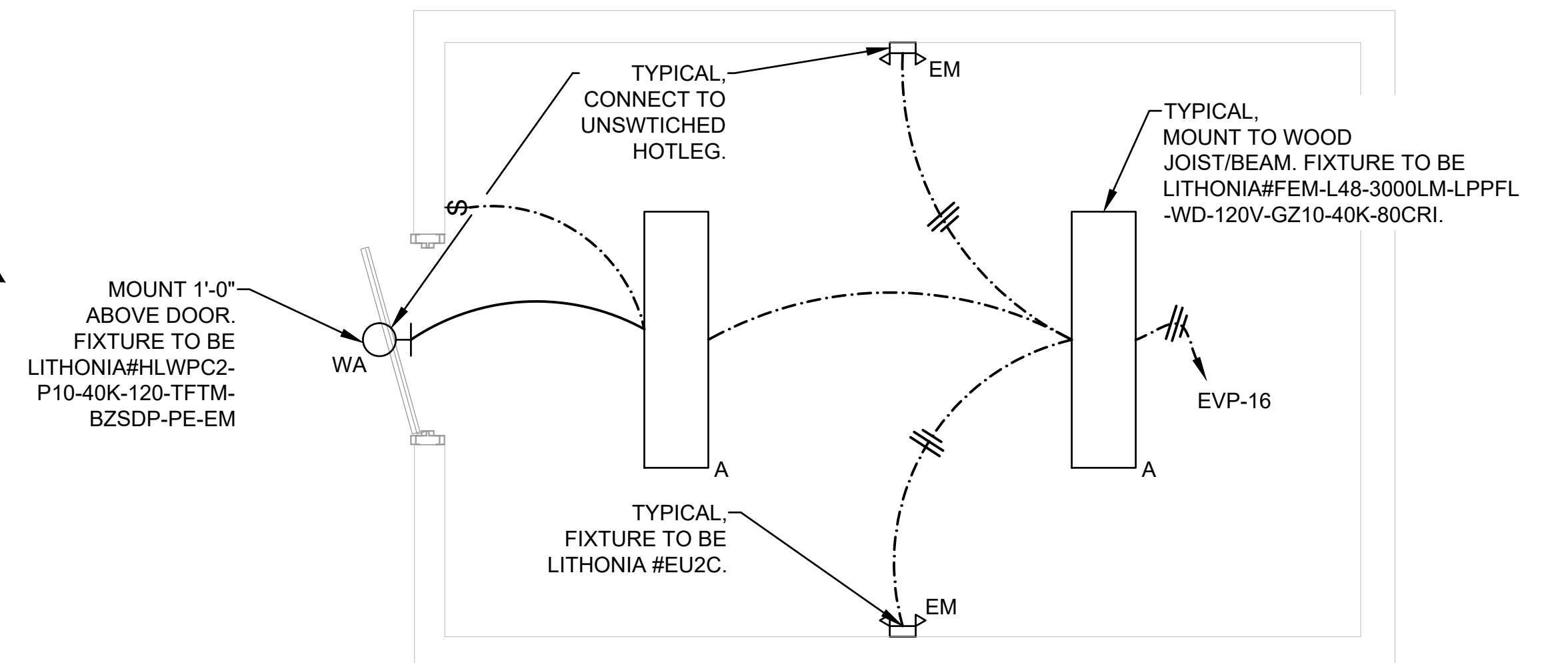
LOCATION ELECTRICAL VAULT		MAIN: 400A MCB		SERVICE ENTRANCE RATED					
VOLTAGE 120/240		SYSTEM: 1Ø, 3 WIRE							
TRIM SURFACE		INTERRUPTING RATING: 22k AIC							
CKT #	LOAD DESCRIPTION	BREAKER P	TRIP	PHASE (KW) A	PHASE (KW) B	BREAKER P	TRIP	LOAD DESCRIPTION	CKT #
1	RUNWAY 5/23 CCR (R1)	2	125	7.50	3.75	60	2	RUNWAY 11/29 CCR	2
3				7.50	3.75				4
5	TAXIWAY A CCR (T3)	2	60	3.75	5.00	80	2	TAXIWAY D CCR (T1)	6
7				3.75	5.00				8
9	WIND CONE	1	20	0.10	2.00			TAXIWAY A/D CCR (T2)	10
11	LIGHTING CONTROL CAB	1	20	0.20	2.00	30	2		12
13	<b>GATE*</b>	1	20	1.50	0.50	20	1	VAULT FAN	14
15	RADIO CONTROLLER	1	20	0.50	0.50	20	1	VAULT LIGHTING	16
17	SPARE	1	20		1.00	20	1	VAULT RECEPTACLES	18
19	SPARE	1	20		2.00			PAPI 5-23	20
21	SPARE	1	20		2.00	30	2		22
23	SPARE	1	20		2.20			RV OUTLET	24
25	AVAILABLE BUSSED SPACE				2.20	30	2		26
27	AVAILABLE BUSSED SPACE							AVAILABLE BUSSED SPACE	28
29	AVAILABLE BUSSED SPACE							AVAILABLE BUSSED SPACE	30
31	AVAILABLE BUSSED SPACE							AVAILABLE BUSSED SPACE	32
33	AVAILABLE BUSSED SPACE							AVAILABLE BUSSED SPACE	34
35	AVAILABLE BUSSED SPACE							AVAILABLE BUSSED SPACE	36
37	AVAILABLE BUSSED SPACE							AVAILABLE BUSSED SPACE	38
39	SPD	2	30	0.10				AVAILABLE BUSSED SPACE	40
41								AVAILABLE BUSSED SPACE	42

NOTES:  
**BOLD** \* TEXT INDICATES EXISTING LOAD TO BE RECONNECTED TO NEW PANEL.  
 12.9 12.0 16.5 15.5  
 TOTAL (kVA) ØA 29.3 ØB 27.4  
 TOTAL CONNECTED LOAD (kVA) 56.7 TOTAL LOAD (AMPS) 236.3

PANELBOARD NOTES:  
 1. PROVIDE A BUS MOUNTED SPD, SQUARE D, EATON, OR APPROVED EQUAL. MATCH MANUFACTURER OF SUPPLIED PANEL.



**2 ELECTRICAL VAULT PLAN**  
SCALE: 1/2"=1'-0"



**3 VAULT LIGHTING PLAN**  
SCALE: 1/2"=1'-0"

NOTE:  
 IF PRICE OR QUOTE FROM GEORGIA POWER IS NOT RECEIVED SUCCESSFULLY PRIOR TO THE BID, CONTRACTOR SHALL PROVIDE AN ALLOWANCE IN BASE BID OF \$15,000.00 TO COVER ANY ASSOCIATED UTILITY COSTS FOR NEW ELECTRICAL SERVICE TO THE VAULT BUILDING.

22. NEW 7.5KW 3-STEP REGULATOR FOR TAXIWAY T3 CIRCUIT UNDER ADDITIVE BID. DIMENSIONS OF REGULATOR ARE BASED ON MANUFACTURER. CONTRACTOR SHALL ADJUST LAYOUT DUE TO REGULATORS OF DIFFERENT SIZES. ROUTE TO NEW L-821 CONTROL PANEL AS REQUIRED. THYRISTOR OR SCR CCR SHALL HAVE TAP SETTING OF 50%.

23. NEW 4KW 3-STEP REGULATOR FOR TAXIWAY T2 CIRCUIT UNDER ADDITIVE BID. DIMENSIONS OF REGULATOR ARE BASED ON MANUFACTURER. CONTRACTOR SHALL ADJUST LAYOUT DUE TO REGULATORS OF DIFFERENT SIZES. ROUTE TO NEW L-821 CONTROL PANEL AS REQUIRED. THYRISTOR OR SCR CCR SHALL HAVE TAP SETTING OF 70%.

24. NEW 7.5KW 3-STEP REGULATOR FOR RUNWAY 11/29 (R2) CIRCUIT UNDER ADDITIVE BID. DIMENSIONS OF REGULATOR ARE BASED ON MANUFACTURER. CONTRACTOR SHALL ADJUST LAYOUT DUE TO REGULATORS OF DIFFERENT SIZES. THYRISTOR OR SCR CCR SHALL HAVE TAP SETTING OF 70%.

25. PROVIDE 3#600 MCM - 3-1/2"Ø FROM NEW PANEL 'EVP' THROUGH METER AND STUBBED UP ABOVE THE ROOF FOR CONNECTION BY UTILITY COMPANY. PROVIDE WEATHER-HEAD AND SUFFICIENT SLACK AS NEEDED. CONTRACTOR IS RESPONSIBLE FOR ANY COORDINATION AND FEES ASSOCIATED WITH THE NEW ELECTRICAL SERVICE. COORDINATE WITH LOCAL GEORGIA POWER COMPANY PRIOR TO BID.

- KEYED NOTES**
- NEW 10KW 3-STEP REGULATOR FOR TAXIWAY T1 CIRCUIT. DIMENSIONS OF REGULATOR ARE BASED ON MANUFACTURER. CONTRACTOR SHALL ADJUST LAYOUT DUE TO REGULATORS OF DIFFERENT SIZES. ROUTE TO NEW L-821 CONTROL PANEL AS REQUIRED. THYRISTOR OR SCR CCR SHALL HAVE TAP SETTING OF 60%.
  - NEW 15KW 3-STEP REGULATOR FOR RUNWAY 5/23 (R1) CIRCUIT. DIMENSIONS OF REGULATOR ARE BASED ON MANUFACTURER. CONTRACTOR SHALL ADJUST LAYOUT DUE TO REGULATORS OF DIFFERENT SIZES. ROUTE TO NEW L-821 CONTROL PANEL AS REQUIRED. THYRISTOR OR SCR CCR SHALL HAVE TAP SETTING OF 60%.
  - NEW 4KW 3-STEP REGULATOR FOR PAPI 5-23 CIRCUIT. DIMENSIONS OF REGULATOR ARE BASED ON MANUFACTURER. CONTRACTOR SHALL ADJUST LAYOUT DUE TO REGULATORS OF DIFFERENT SIZES. THYRISTOR OR SCR CCR SHALL HAVE TAP SETTING OF 50%.
  - NEW L-821 LIGHTING RELAY CABINET. PROVIDE RELAYS AND SWITCHES AS REQUIRED FOR AIRPORT LIGHTING CONTROL SYSTEM AS INDICATED ON DETAIL 2/E12.
  - TYPICAL, PROVIDE HINGED ENCLOSURE WITH TWO CUT-OUTS, EQUAL TO ADB ALCS OR APPROVED EQUAL.
  - NEW PANELBOARD 'EVP'. SEE PANEL SCHEDULE FOR DETAILS. CONTRACTOR TO PROVIDE ALL NEW BREAKERS AS SHOWN IN PANEL SCHEDULE 'EVP'. PANEL TO BE SQUARE D NQOD OR APPROVED EQUAL.
  - NEW L-854 RADIO CONTROLLER. VERIFY FINAL LOCATION AND CONTROLS WITH OWNER PRIOR TO INSTALL. PROVIDE RELAYS AND SWITCHES AS REQUIRED FOR AIRPORT LIGHTING CONTROL SYSTEM. SEE WIRING DIAGRAM 2/E12.
  - 2#8, 5KV, L-824C CABLES IN 2" FLEXIBLE METAL CONDUIT.
  - #1/0 AWG GROUND LOOP AROUND VAULT. BOND REGULATORS, CONTACTORS, AND RELAY ENCLOSURES TO GROUND WITH #4 AWG. EXTEND #1/0 AWG GROUND AND CONNECT TO NEW GROUND LOOP.
  - NEW PHOTOCCELL. EXTEND 3#12, #12(G), 1"Ø AND CONNECT TO RELAY PANEL. SEE DETAILS 2/E12 & 2/E13.
  - PROVIDE 2#8, 5KV L-324C CABLES (TAXIWAY T1) AND 2#8, 5KV L-824C CABLES (TAXIWAY T2) IN 4-1/2"Ø TO NEW MANHOLE. SEE PLAN SHEET E7 FOR LOCATION.
  - NOT USED.
  - WALL MOUNTED EXHAUST FAN TO MATCH EXISTING WITH AUTOMATIC SHUTTER. MOUNT AT EXISTING LOCATION ABOVE ENTRY DOOR.
  - EXTEND CONDUITS AND COUNTERPOISE CABLE TO NEW MANHOLE IN COMMON TRENCH. COUNTERPOISE CABLE FROM SEPARATE TRENCHES SHALL BE BONDED TOGETHER THROUGH AN EXOTHERMIC WELD WHERE TRENCHES MEET. A SINGLE COUNTERPOISE CABLE SHALL PROCEED FROM THERE. PROVIDE SEALING COMPOUND ON ALL CONDUITS BETWEEN MANHOLE AND CUT OUT ENCLOSURES.
  - CONTRACTOR TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO COMMENCEMENT OF TRENCHING. ANY DAMAGED EXISTING UTILITY LINES WILL BE REPAIR AT THE CONTRACTOR'S EXPENSE.
  - MAKE ELECTRICAL CONNECTION TO NEW REGULATOR AS PER MANUFACTURER'S REQUIREMENTS. CONTRACTOR IS TO BE SURE A ON SITE PRE-COMMISSIONING MEETING WITH THE MANUFACTURER TO ENSURE INSTALLATIONS OF ALL SYSTEMS ARE FULLY FUNCTIONAL AND MEET DESIGN INTENT SHOWN IS COMPLETED PRIOR TO COMMENCEMENT OF WORK.
  - EXTEND #2 AWG GROUND IN 1"Ø FROM PANEL 'EVP' AND CONNECT TO NEW GROUND LOOP.
  - IF RUNWAY 11-29 ADDITIVE BID IS ACCEPTED, PROVIDE HINGED ENCLOSURE WITHONE CUT-OUT, EQUAL TO ADB ALCS OR APPROVED EQUAL.
  - PROVIDE 2#8, 5KV, L-824C CABLES (RUNWAY 5-23 (R1)) AND 2#8, 5KV, L-824C CABLES (PAPI 5-23) IN 4-1/2"Ø TO NEW MANHOLE. SEE PLAN SHEET E7 FOR LOCATION.
  - NEW TIMECLOCK. CONNECT TO LIGHTING RELAY CABINET AS REQUIRED. COORDINATE WITH OWNER PRIOR TO INSTALL. SEE WIRING DIAGRAM 2/E12.
  - IF RUNWAY 11-29 ADDITIVE BID IS ACCEPTED, PROVIDE 2#8, 5KV L-324C CABLES (RUNWAY R1) AND 2#8, 5KV L-824C CABLES (TAXIWAY T3) IN 4-1/2"Ø TO NEW MANHOLE. SEE PLAN SHEET E7 FOR LOCATION.

**GMC**

801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/10/2023	3/10/2023

designed by: JDZ  
 drawn by: JRA, JDZ  
 checked by: JEA

AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)

AUGUSTA, GEORGIA  
 GDOT PID : I007935  
 GMC NUMBER : TAUG220004  
 SCALE: NOT TO SCALE

ELECTRICAL VAULT  
 PLAN

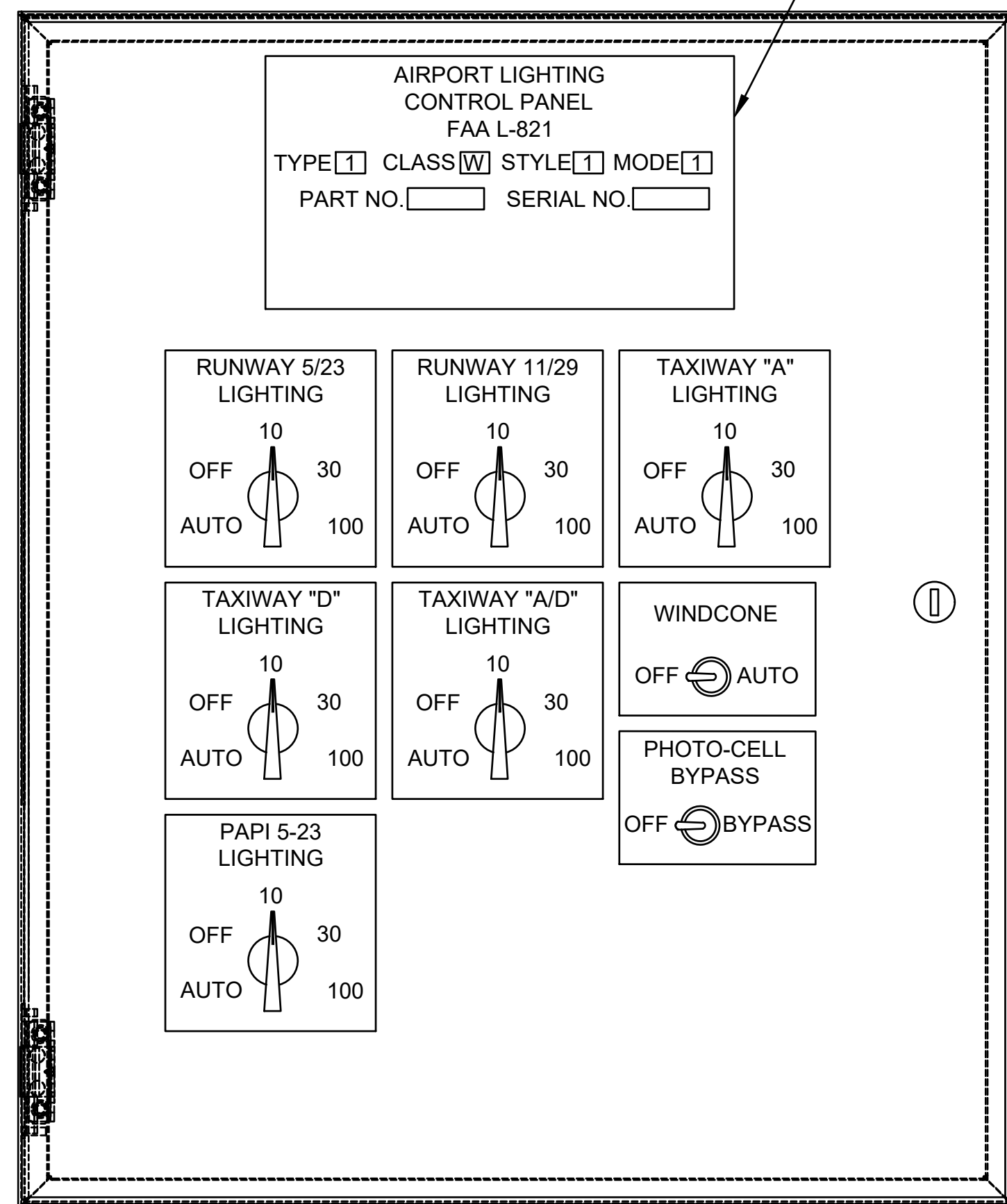
E11  
 Sheet 35 of 52

VAUG220003

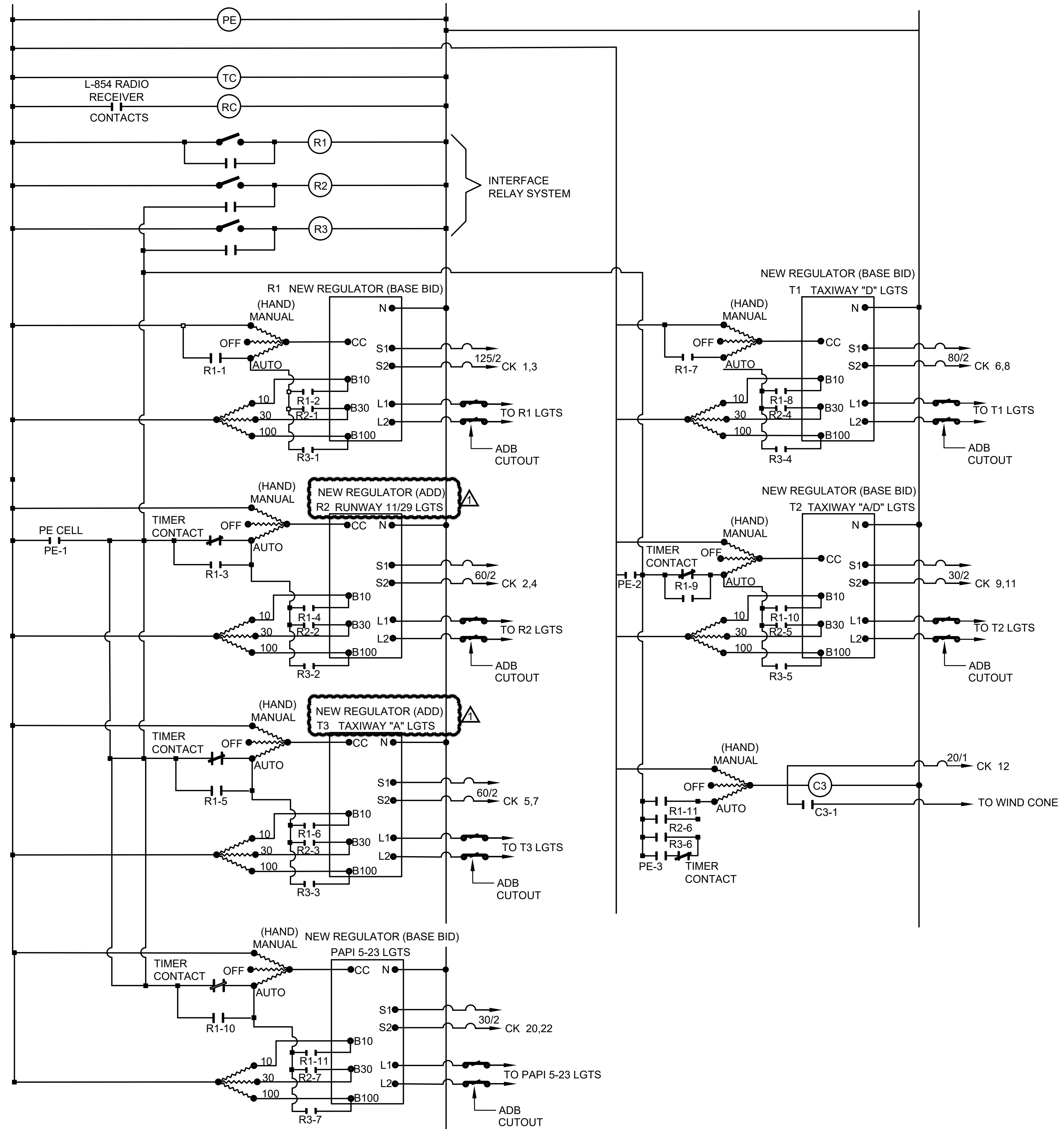
**AIRPORT LIGHTING CONTROL SYSTEM NOTES:**

- BETWEEN DAWN TO DUSK, THE NEW PHOTOCELL LOCATED IN THE NEW VAULT BUILDING SHALL AUTOMATICALLY SET ALL NEW LIGHTING SYSTEMS TO IT'S LOW SETTING.
- BETWEEN DUSK TO DAWN, THE NEW PHOTOCELL LOCATED IN THE NEW VAULT BUILDING SHALL AUTOMATICALLY SET ALL THE NEW LIGHTING SYSTEMS TO IT'S HIGH SETTING.
- THE NEW RADIO CONTROL UNIT LOCATED IN THE VAULT BUILDING SHALL OVERRIDE ALL RUNWAY, TAXIWAY AND PAPI SETTINGS IN "AUTOMATIC" MODE AND SHALL:
  - AT 3 PULSES: 1) TURN THE TAXIWAY REGULATOR ON AT 30%.  
2) TURN THE PAPI REGULATOR ON.  
3) TURN THE RUNWAY REGULATOR ON AT 10%.
  - AT 5 PULSES: 1) LEAVE THE TAXIWAY REGULATOR AT 30%.  
2) LEAVE THE PAPI REGULATOR ON.  
3) TURN THE RUNWAY REGULATOR ON AT 30%.
  - AT 7 PULSES: 1) LEAVE THE TAXIWAY REGULATOR ON AT 30%.  
2) LEAVE THE PAPI REGULATOR ON.  
3) TURN THE RUNWAY REGULATOR ON AT 100%.
- THE NEW L-821 LIGHTING CONTROL PANEL SHALL PROVIDE MANUAL CONTROL OF THE RUNWAY, TAXIWAY AND PAPI REGULATORS.
- THE CONTROL CONTRACTOR SHALL PROVIDE AND SUBMIT FOR APPROVAL THE TERMINATION OF DETAILS OF THE L-821 CONTROL PANEL, AND REGULATORS TO MATCH DESCRIBED CONTROL SCHEME.

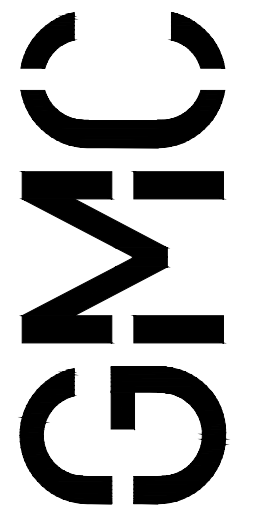
CONTROL PANEL NAMEPLATE ON PHENOLIC TYPE LABEL. BLACK LETTERS ON WHITE BACKGROUND



**1 CONTROL PANEL L-821**  
E12 NOT TO SCALE



**2 WIRING DIAGRAM**  
E12 NOT TO SCALE

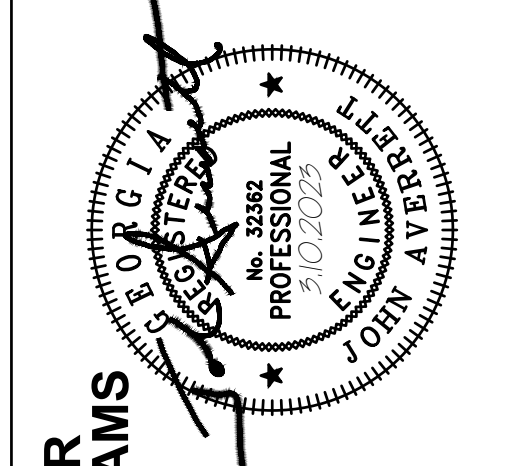


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 2/24/2023	2/24/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

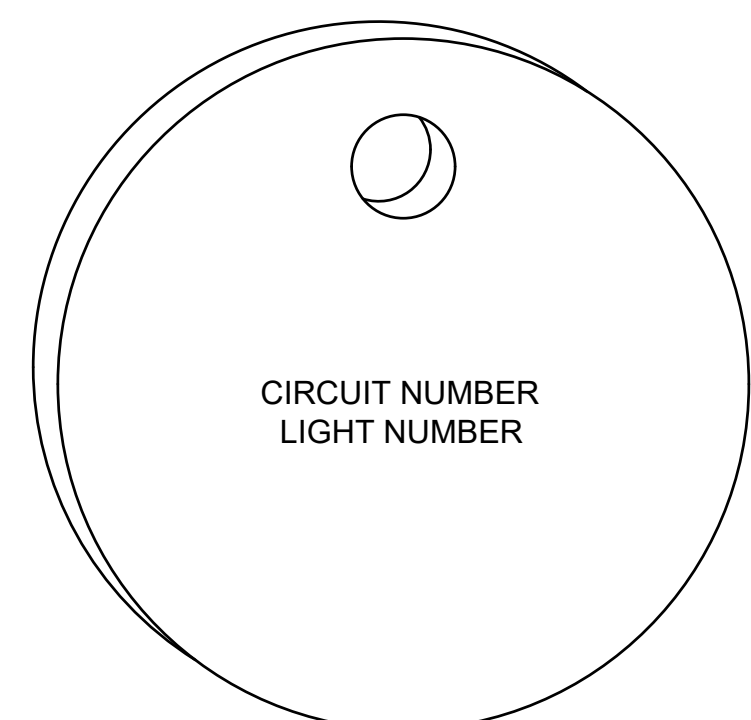
**AIRFIELD ELECTRICAL UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
GDOT PID : I007935  
GMC NUMBER : TAUG220004  
SCALE: NOT TO SCALE



**ELECTRICAL POWER & CONTROL DIAGRAMS**

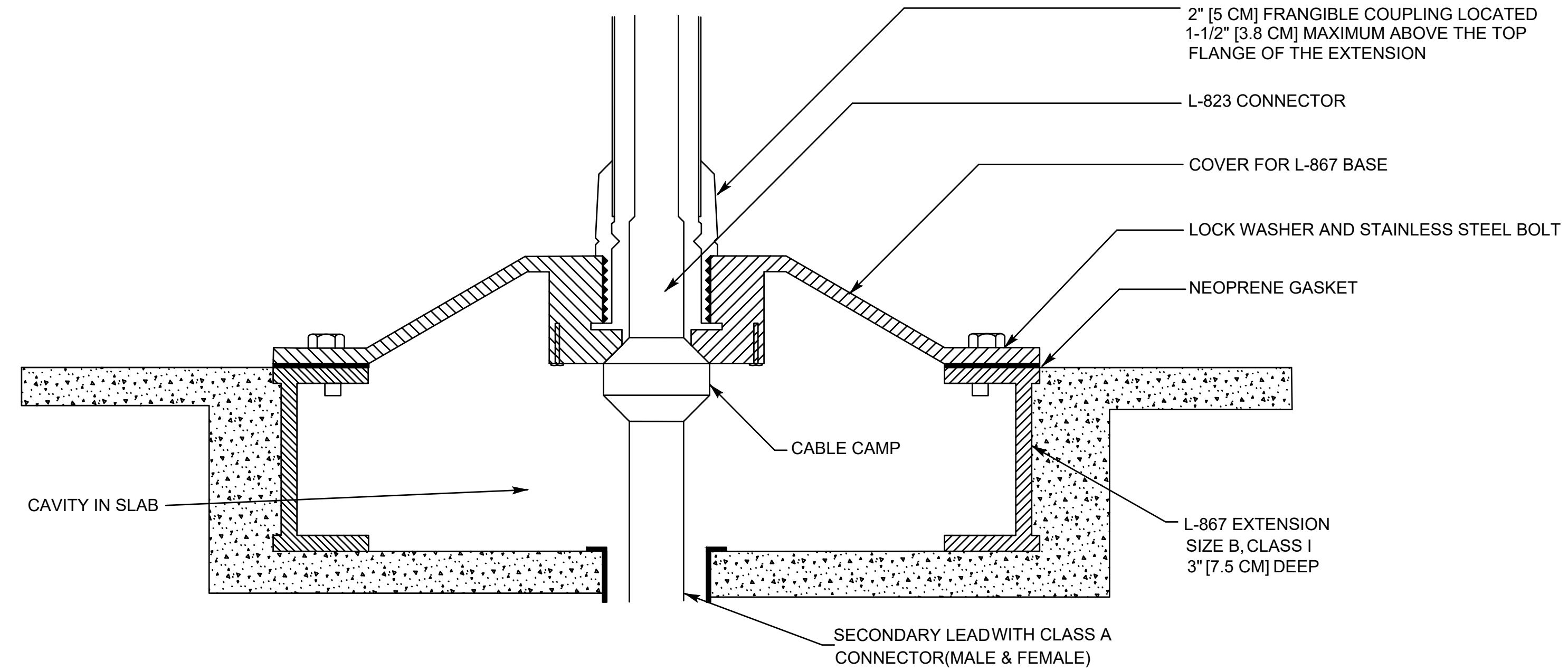




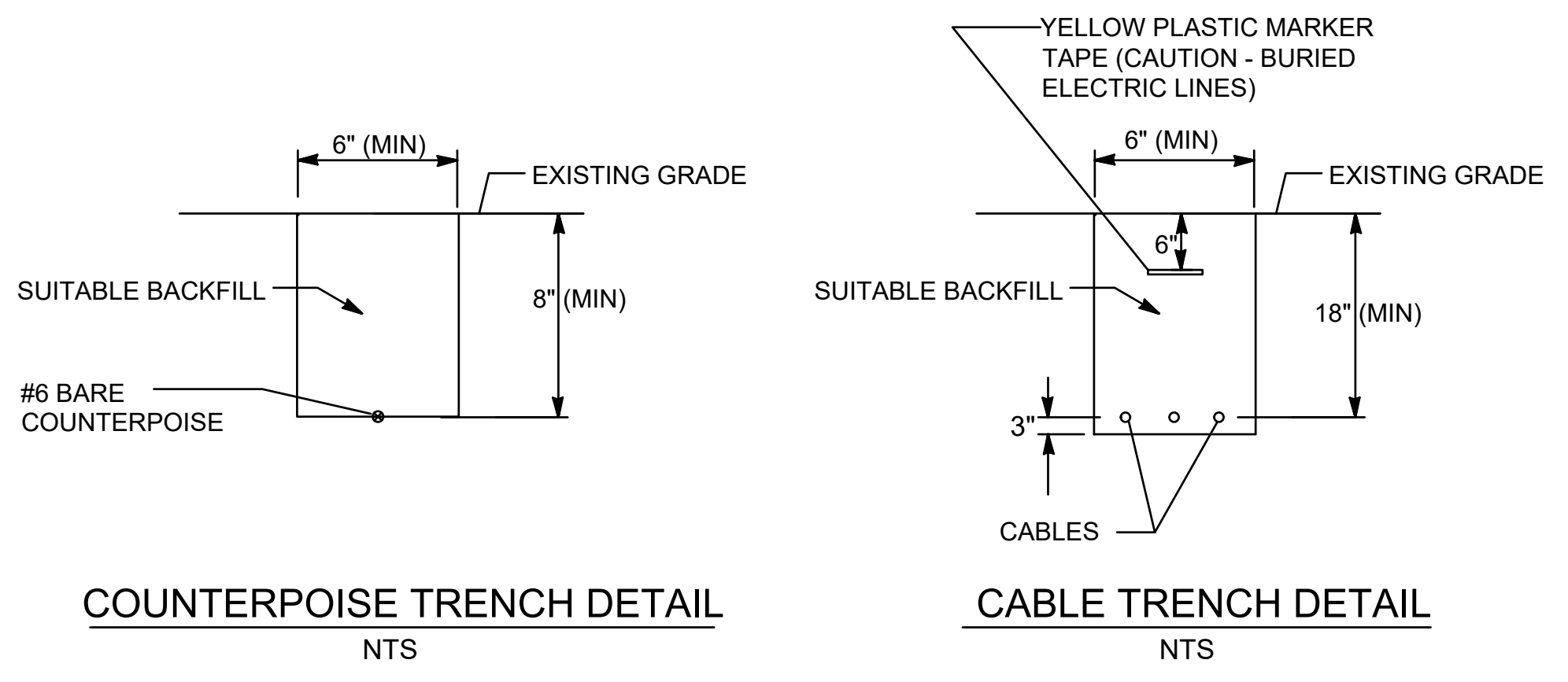
**NOTES:**

1. ALL CABLE ENTERING OR LEAVING A JUNCTION BOX SHALL BE IDENTIFIED WITH AN INDIVIDUAL IDENTIFICATION TAG INDICATING EACH LIGHTING OR POWER CIRCUIT. WHERE A SPLICE IS IN THE BOX, IDENTIFY THE CABLE ON BOTH SIDES OF THE SPLICE.
2. PAYMENT FOR CABLE AND FIXTURE TAGS AND CABLE SPLICES SHALL BE INCLUDED IN THE PRICE OF THE PARTICULAR FIXTURE, JUNCTION BOX OR CABLE RUN AND NO SEPARATE PAY ITEM INCLUDED FOR THESE ITEMS.
3. AN IDENTIFYING NUMBER SHALL BE ASSIGNED TO EACH LIGHT FIXTURE IN ACCORDANCE WITH THE DRAWINGS. THE PLACING OF THESE NUMBERS SHALL BE ACCOMPLISHED BY USE OF 1-1/2" DIAMETER NON-FERROUS METAL TAGS, WITH THE NUMBER APPROXIMATELY 1/4" IN HEIGHT, STAMPED IN, AND FASTENED TO THE CONDUIT RISER WITH A 3/32" STAINLESS STEEL AIRCRAFT CABLE AND GRIPPLE TO THE FIXTURE SO EACH FACES THE RUNWAY.

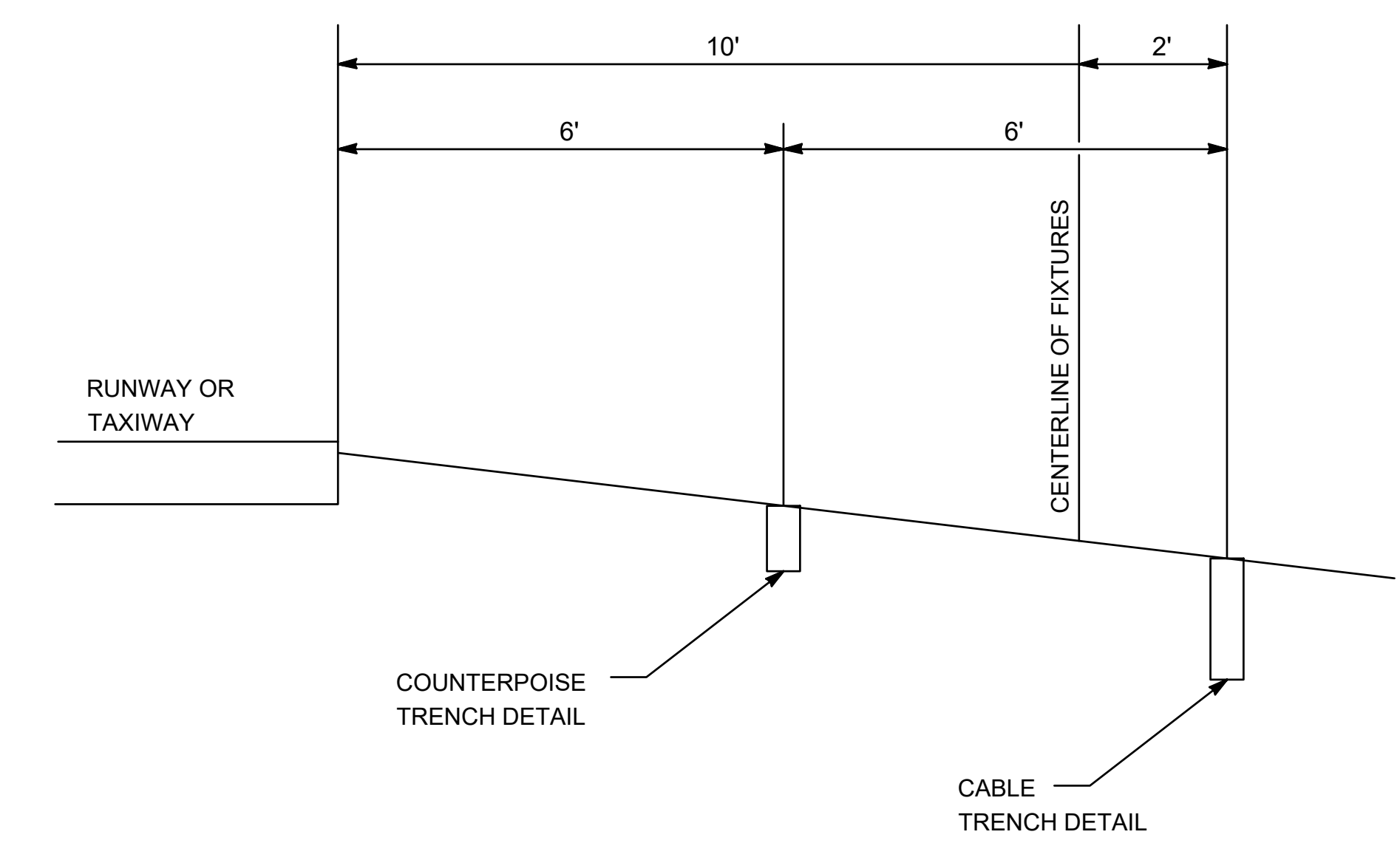
**1** SERIES CABLE TAG DETAIL  
E14 NOT TO SCALE



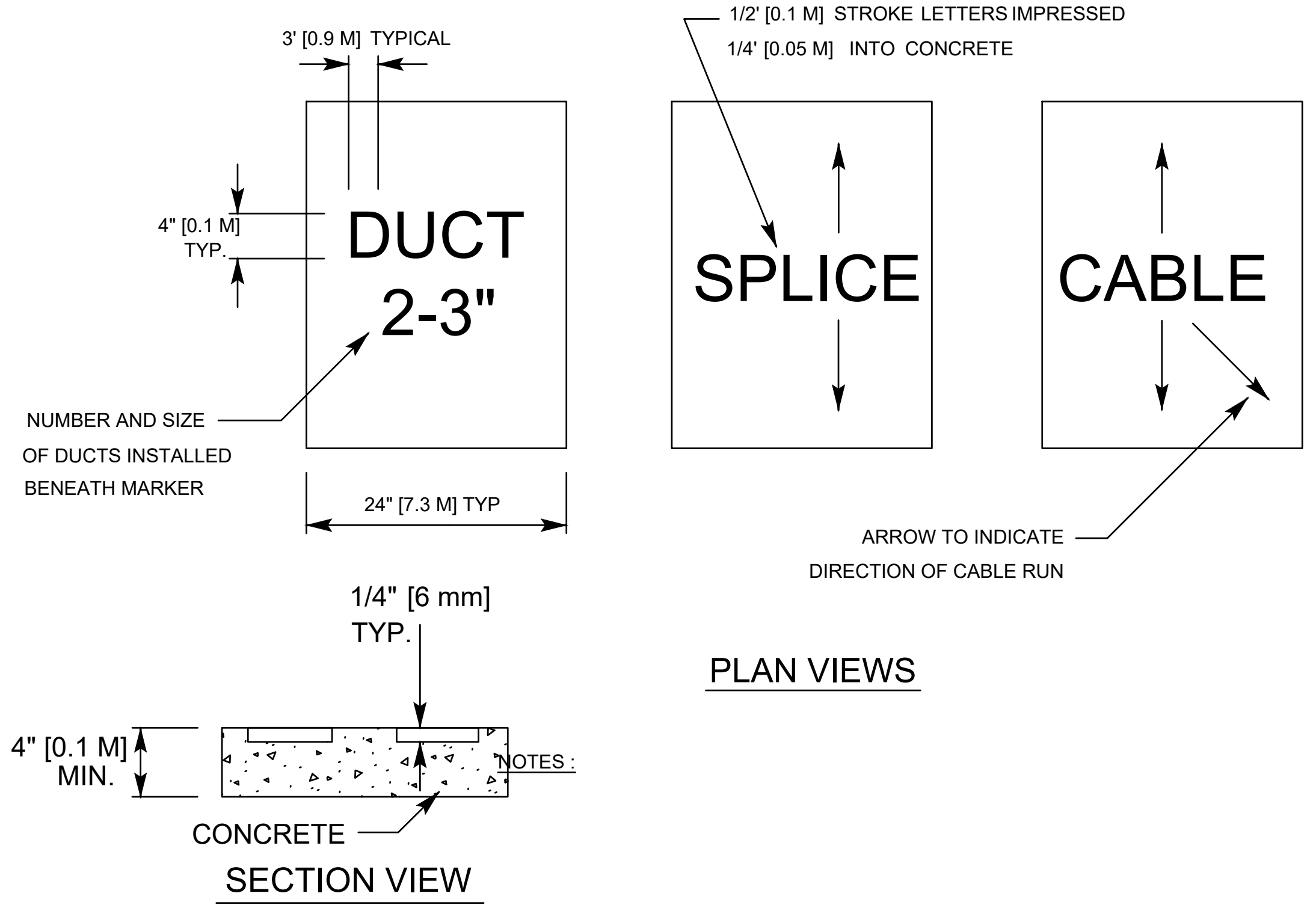
**2** TYPICAL DETAIL FOR TAXIWAY HOLD & GUIDANCE SIGN  
E14 NOT TO SCALE



COUNTERPOISE TRENCH DETAIL NTS  
CABLE TRENCH DETAIL NTS

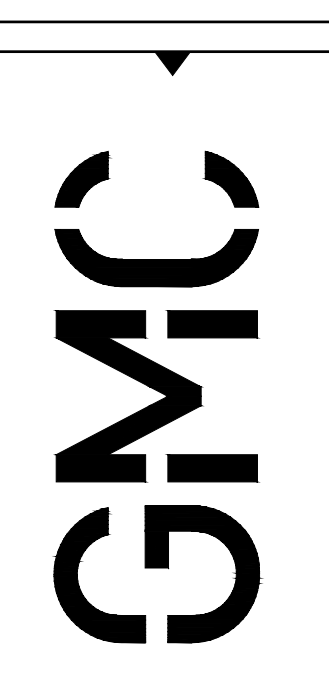


**3** CABLE TRENCH DETAIL  
E14 NOT TO SCALE



- NOTES:**
1. PLACE MARKERS WHERE SHOWN ON PLANS AS DISCUSSED IN APPENDIX E, PARAGRAPH E.1, ELECTRICAL NOTES.
  2. COST OF CONCRETE MARKERS IS INCIDENTAL TO THE ASSOCIATED ITEMS OF DUCT OR CABLE.
  3. EDGE EXPOSED CONCRETE WITH A 1/4" [6 mm] RADIUS TOOL.
  4. EMPLOY THE FOLLOWING METHODS WHERE ADDITIONAL SPACE TO FIT THE LEGEND IS REQUIRED:
    - A. REDUCE LETTER SIZE TO 3" HIGH, 2" WIDE [76 mm HIGH, 51 mm WIDE]
    - B. INCREASE THE MARKER SIZE TO 30" X 30" [0.9 M X 0.9 M] MAX.
    - C. PROVIDE ADDITIONAL MARKERS PLACED SIDE BY SIDE.

**4** CABLE AND DUCT MARKER DETAIL  
E14 NOT TO SCALE

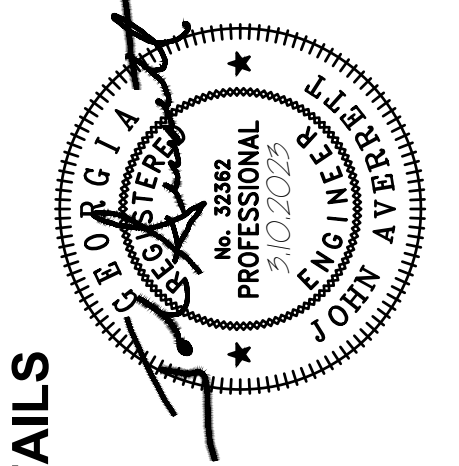


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL	1/20/2023
DESIGNED BY:	JDZ
DRAWN BY:	JRA, JDZ
CHECKED BY:	JEA

AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)

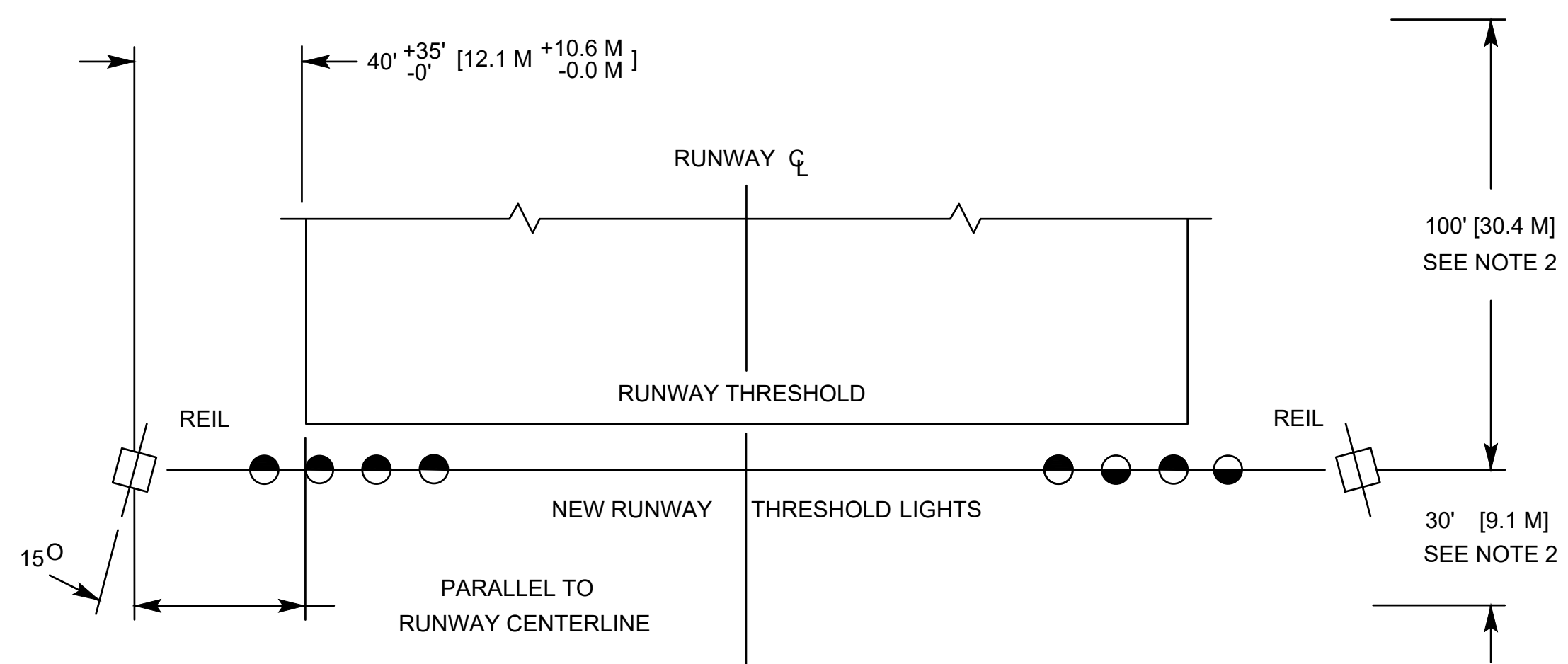
AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: NOT TO SCALE



ELECTRICAL DETAILS

E14  
Sheet 38 of 52



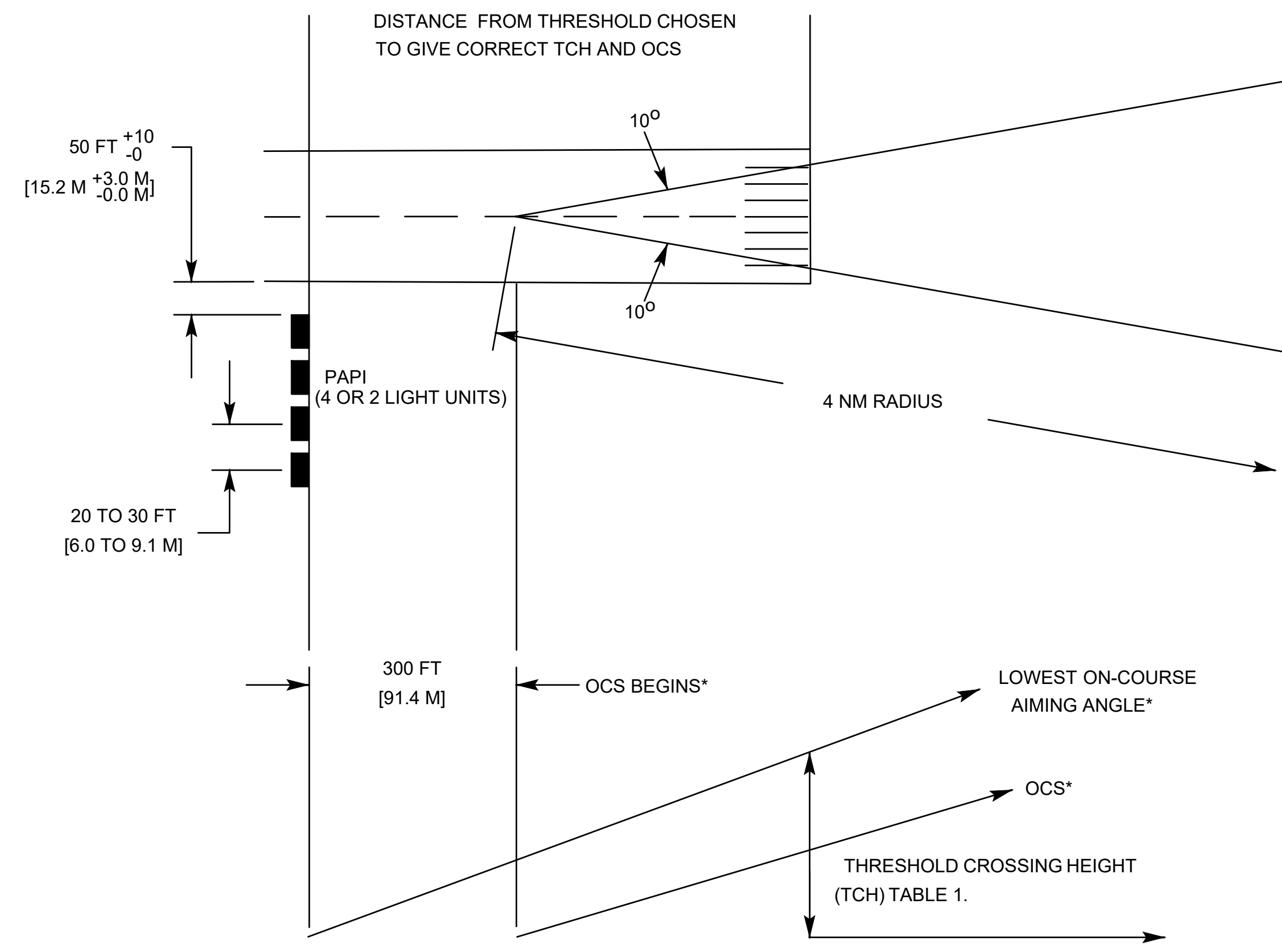


**NOTES**

1. THE OPTIMUM LOCATION FOR EACH LIGHT UNIT IS IN LINE WITH THE RUNWAY THRESHOLD LIGHTS 40 FT [12.1 M] Laterally FROM THE RUNWAY EDGE.
2. A 100 FT [30.4 M] UPWIND AND A 30 FT [9.1 M] DOWNWIND LONGITUDINAL TOLERANCE IS PERMITTED FROM THE RUNWAY THRESHOLD LIGHTS IN LOCATING THE LIGHT UNITS.
3. SPACE THE LIGHT UNITS EQUALLY FROM THE RUNWAY CENTERLINE. WHEN ADJUSTMENTS ARE NECESSARY THE DIFFERENCE IN THE DISTANCE OF THE UNITS FROM THE RUNWAY CENTERLINE MUST NOT EXCEED 10 FT [3 M].
4. THE BEAM CENTERLINE (AIMING ANGLE) OF EACH LIGHT UNIT IS AIMED 15 DEGREES OUTWARD FROM A LINE PARALLEL TO THE RUNWAY CENTERLINE AND INCLINED AT AN ANGLE 10 DEGREES ABOVE THE HORIZONTAL. IF ANGLE ADJUSTMENTS ARE NECESSARY, PROVIDE AN OPTICAL BAFFLE AND CHANGE THE ANGLE TO 10 DEGREES HORIZONTAL AND 20 DEGREES VERTICAL.
5. LOCATE THE REIL EQUIPMENT A MINIMUM DISTANCE OF 40 FT [12.1 M] FROM OTHER RUNWAYS AND TAXIWAYS.
6. IF REILS ARE USED WITH VASI, INSTALL REILS 75 FT [22.8 M] FROM THE RUNWAY EDGE. WHEN INSTALLED WITH OTHER GLIDE SLOPES INDICATORS, INSTALL REILS 40 FT [12.1 M] FROM THE RUNWAY EDGE IF THERE ARE CONCERNS WITH JET BLAST AND WIND VORTICES. SEE FAA ORDER JO 6850.2 FOR ADDITIONAL INFORMATION.
7. BOTH REIL UNITS MUST BE AT THE SAME ELEVATION AND WITHIN 3 FT [0.9 M] OF THE HORIZONTAL PLANE THROUGH THE RUNWAY CENTERLINE.

**SYMBOL:**

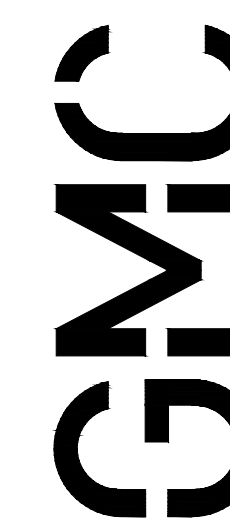
- STEADY BURNING LIGHT, RED
- STEADY BURNING LIGHT, GREEN



PAPI OCS ANGLE = LOWEST ON-COURSE AIMING ANGLE - 1 DEGREE

**NOTES:**

1. THE VISUAL GLIDE PATH ANGLE IS THE CENTER OF THE ON-COURSE ZONE, AND IS A NORMAL 3 DEGREES WHEN MEASURED FROM THE HORIZONTAL SURFACE OF THE RUNWAY.
  - A. FOR NON-JET RUNWAYS, THE GLIDE PATH MAY BE RAISED TO 4 DEGREES MAXIMUM TO PROVIDE OBSTACLE CLEARANCE.
  - B. IF THE PAPI GLIDE PATH IS CHANGED TO A HIGHER ANGLE FROM THE NOMINAL 3 DEGREES, IT MUST BE COMMUNICATED IN A NOTICE TO AIRMAN (NOTAM) AND PUBLISHED IN THE AIRPORT FACILITY DIRECTORY.
2. PAPI OCS.
  - A. THE PAPI OCS PROVIDES THE PILOT WITH A MINIMUM APPROACH CLEARANCE.
  - B. THE PAPI MUST BE POSITIONED AND AIMED SO NO OBSTACLES PENETRATE ITS SURFACE.
    - (1) THE OCS BEGINS 300 FEET [90 M] IN FRONT OF THE PAPI SYSTEM.
    - (2) THE OCS IS PROJECTED INTO THE APPROACH ZONE ONE DEGREE LESS THAN AIMING ANGLE OF THE THIRD LIGHT UNIT FROM THE RUNWAY FOR AN L-880 SYSTEM, OR THE OUTSIDE LIGHT UNIT FOR AN L-881 SYSTEM.

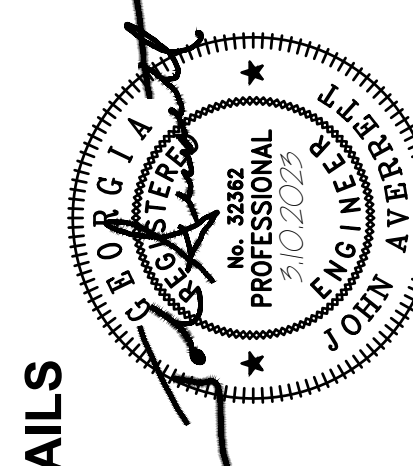


801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL	1/20/2023
designed by:	JDZ
drawn by:	JRA, JDZ
checked by:	JEA

AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)

AUGUSTA, GEORGIA  
GDOT PID : T007935  
GMC NUMBER : TAUG220004  
SCALE: NOT TO SCALE



ELECTRICAL DETAILS



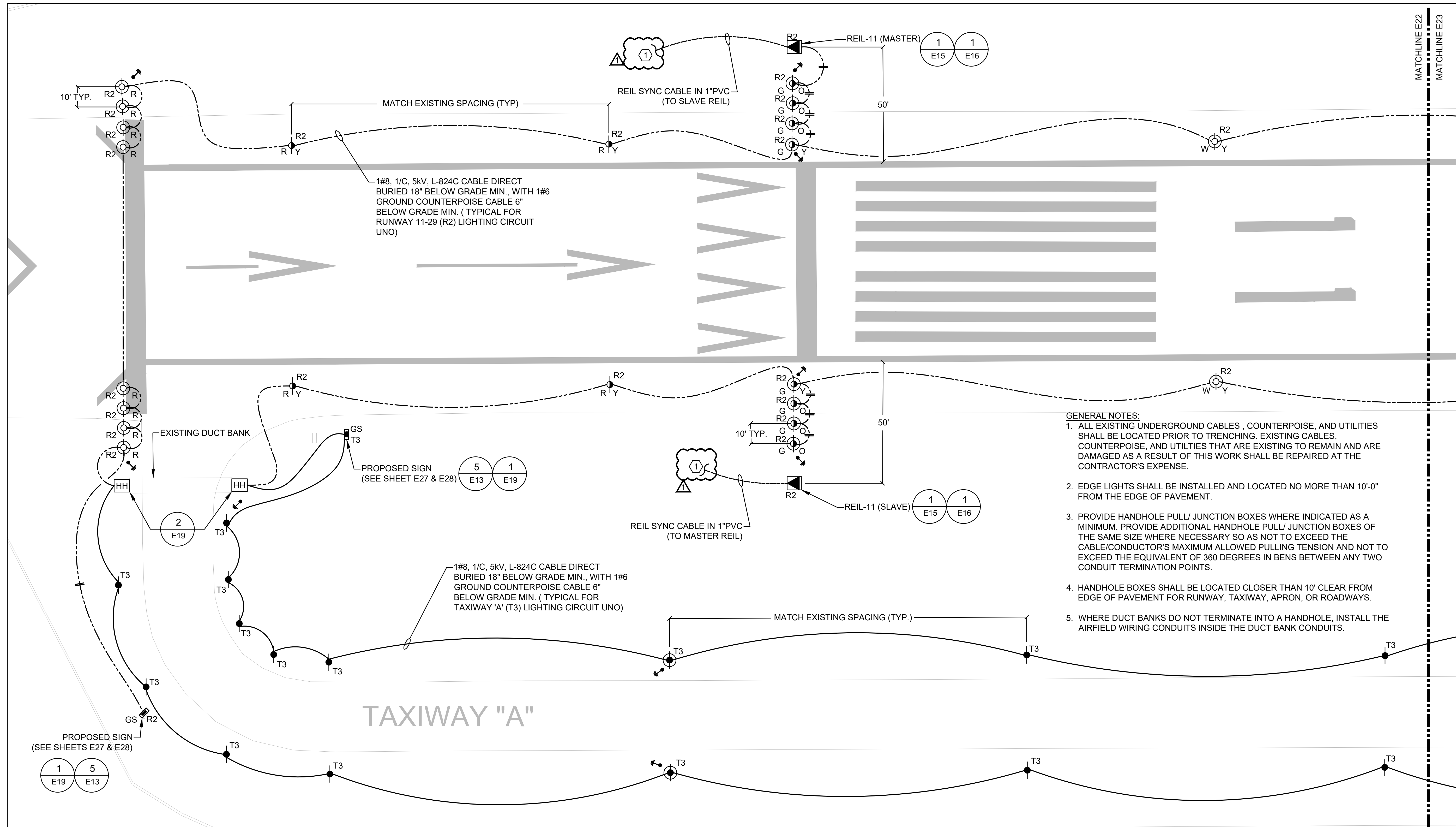












- GENERAL NOTES:**
1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT.
  3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.

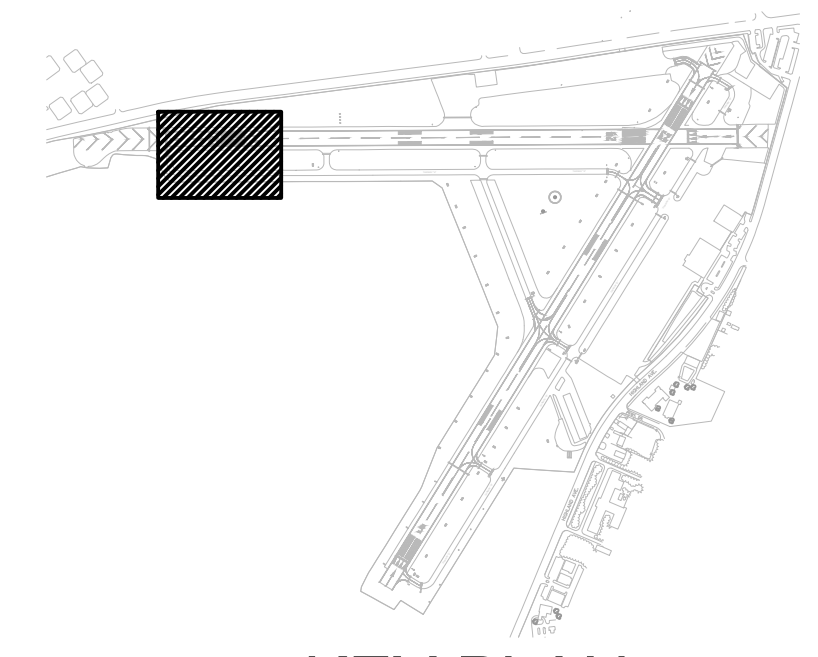
**KEYED NOTES #**

1. PROVIDE 12"x12"x12" HANDHOLES PER HANDHOLE DETAIL 2/E19. FOR REIL SYNC CABLE CONDUIT AS REQUIRED SO AS NOT TO EXCEED THE CABLE'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENDS BETWEEN ANY TWO CONDUIT TERMINATION POINTS. ROUTE CABLE AROUND RUNWAY 11 END THRESHOLD AS REQUIRED.

PLAN NORTH **1** **E22** SCALE: 1"=25'-0"

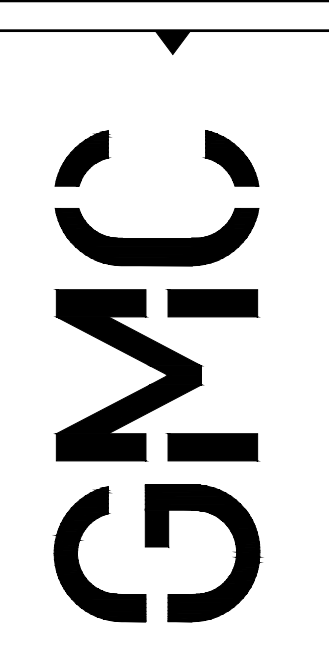
**NOTE:**

1. CONTRACTOR HAS OPTION TO MATCH EXISTING ROUTES AND ROUTE ALL NEW CABLES IN EXISTING TRENCHES, DUCT BANKS, ETC. TO ELECTRICAL VAULT. NEW CABLING CONSIST OF:  
 1#8, 1/C, 5KV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 BSDC COUNTERPOISE CABLE 6" BELOW GRADE MIN. (TYPICAL FOR ONE (1) RUNWAY (R2) LIGHTING CIRCUIT AND ONE (1) TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)



**KEY PLAN**  
TRUE NORTH NOT TO SCALE

VAUG220003

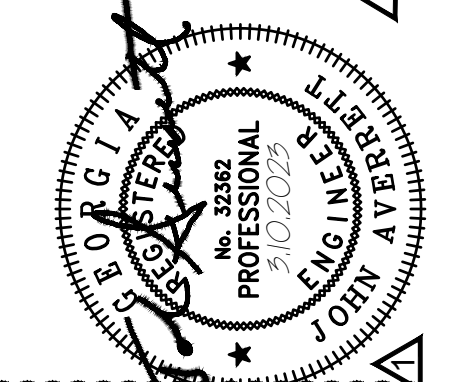


801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/16/2023	3/16/2023
ADDENDUM #2 3/17/2023	3/17/2023
designed by: JDZ	checked by: JEA
drawn by: JRA, JDZ	

**AIRFIELD ELECTRICAL UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
 GDOT PID : I007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'



**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 -PART 1 (ADD)**

**E22**  
 Sheet 46 of 52

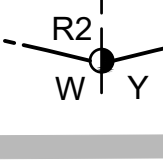
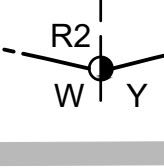
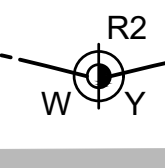
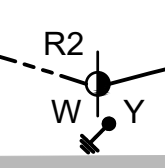
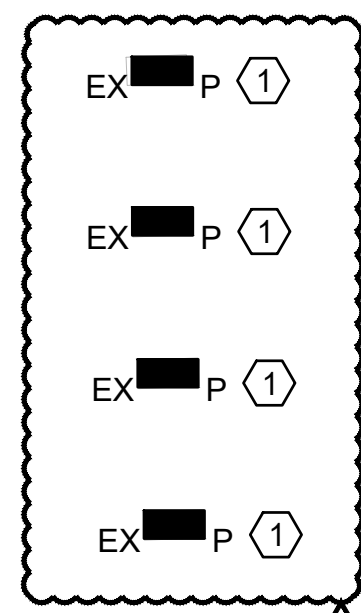


MATCHLINE E22  
MATCHLINE E23

MATCHLINE E23  
MATCHLINE E24

**NOTE:**  
 1. CONTRACTOR HAS OPTION TO MATCH EXISTING ROUTES AND ROUTE ALL NEW CABLES IN EXISTING TRENCHES, DUCT BANKS, ETC. TO ELECTRICAL VAULT. NEW CABLING CONSIST OF:  
 1#8, 1/C, 5KV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. (TYPICAL FOR ONE (1) RUNWAY (R2) LIGHTING CIRCUIT AND ONE (1) TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)

**KEYED NOTES (#):**  
 1. EXISTING PAPI TO REMAIN IN SERVICE - NO WORK REQUIRED.

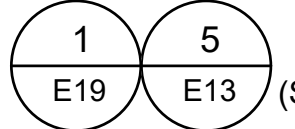


1#8, 1/C, 5KV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. (TYPICAL FOR RUNWAY 11-29 (R2) LIGHTING CIRCUIT UNO)

MATCH EXISTING SPACING (TYP.)

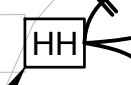
**GENERAL NOTES:**

- ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
- EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT.
- PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
- HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
- WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.



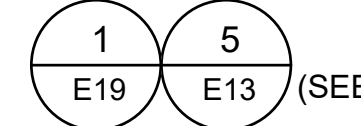
PROPOSED SIGN (SEE SHEETS E27 & E28)

EXISTING DUCT BANK



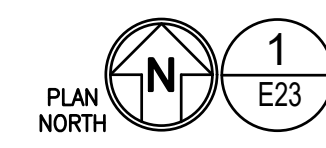
MATCH EXISTING SPACING (TYP.)

TAXIWAY "A"



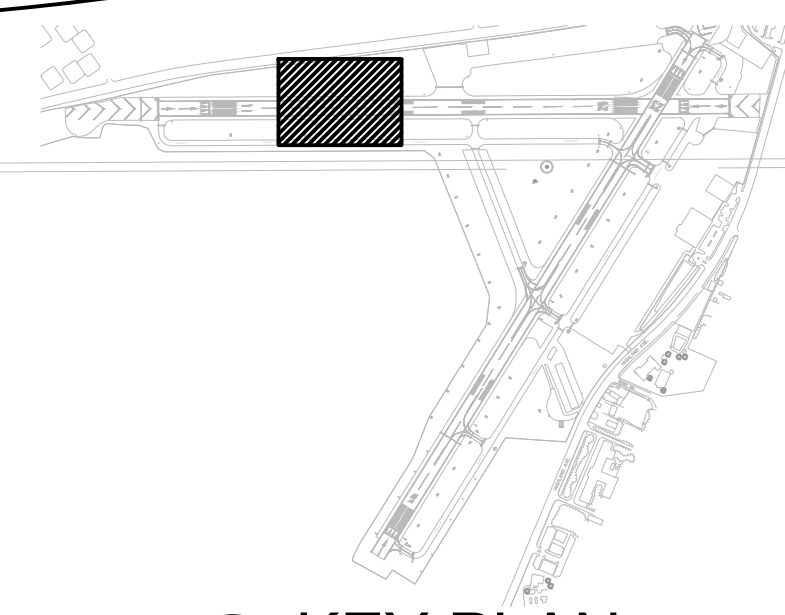
PROPOSED SIGN (SEE SHEETS E27 & E28)

1#8, 1/C, 5KV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. (TYPICAL FOR TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)



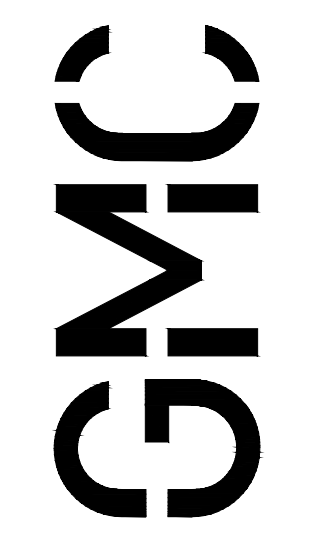
**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 - PART 2 (ADDITIVE BID)**

SCALE: 1"=25'-0"



**KEY PLAN**  
 TRUE NORTH NOT TO SCALE

VAUG220003



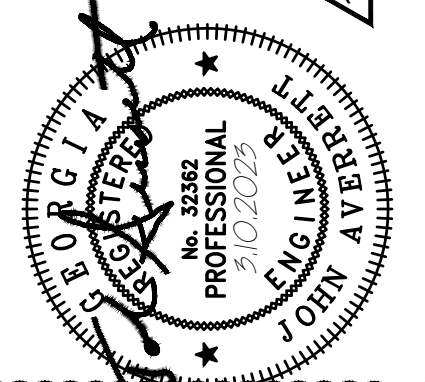
801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/16/2023	3/16/2023
ADDENDUM #2 3/17/2023	3/17/2023

designed by: JDZ  
 drawn by: JRA, JDZ  
 checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
 GDOT PID : T007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'



**JOHN J. BRUBAKER**  
 PROFESSIONAL ENGINEER  
 STATE OF GEORGIA  
 NO. 91020296

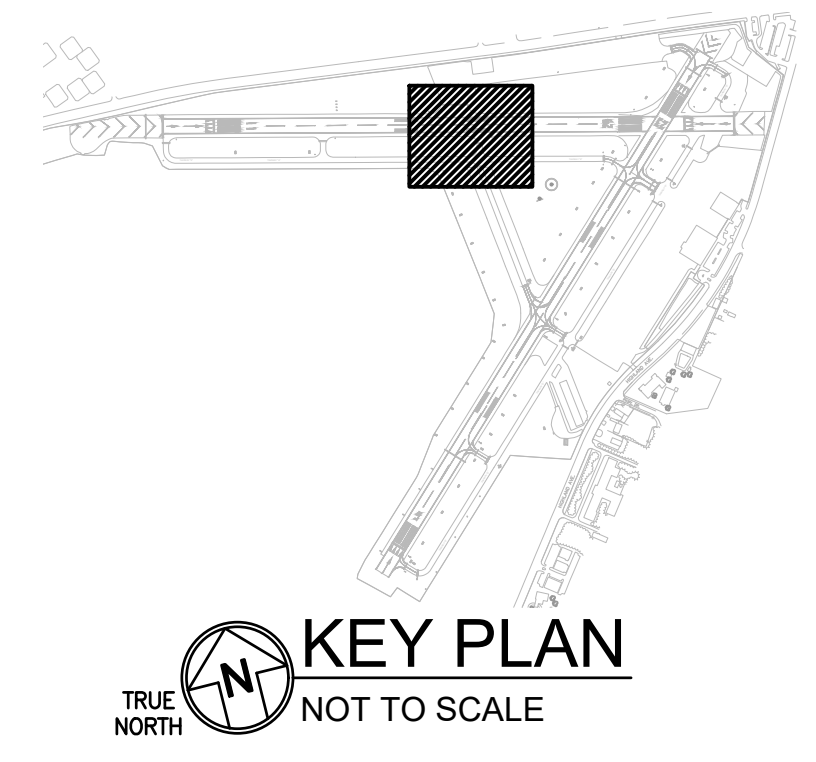
**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 - PART 2 (ADD)**

E23

Sheet 47 of 52

MATCHLINE E23  
MATCHLINE E24

- GENERAL NOTES:**
1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
  2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT.
  3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
  4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
  5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.



1  
E19

5  
E13

PROPOSED SIGN (SEE SHEETS E27 & E28)

R2  
GS

2  
E19 (TYP.)

EXISTING DUCT BANK

2  
E19

HH

1  
E19

5  
E13

PROPOSED SIGN (SEE SHEETS E27 & E28)

R2  
GS

R2  
W Y

R2  
Y W

1#8, 1/C, 5kV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. ( TYPICAL FOR RUNWAY 11-29 (R2) LIGHTING CIRCUIT UNO)

R2  
W Y

R2  
W Y

R2  
W Y

R2  
Y W

MATCH EXISTING SPACING (TYP)

**NOTE:**

1. CONTRACTOR HAS OPTION TO MATCH EXISTING ROUTES AND ROUTE ALL NEW CABLES IN EXISTING TRENCHES, DUCT BANKS, ETC. TO ELECTRICAL VAULT. NEW CABLING CONSIST OF:  
1#8, 1/C, 5kV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 BSDC COUNTERPOISE CABLE 6" BELOW GRADE MIN. (TYPICAL FOR ONE (1) RUNWAY (R2) LIGHTING CIRCUIT AND ONE (1) TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)

1#8, 1/C, 5kV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. ( TYPICAL FOR TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)

MATCH EXISTING SPACING (TYP)

1  
E19

5  
E13

PROPOSED SIGN (SEE SHEETS E27 & E28)

GS  
R2

2  
E19

T3

HH

T3

T3

T3

T3

T3

2  
E19

2  
E19

HH

HH

TAXIWAY "A"

PLAN NORTH

1  
E24

AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 - PART 3 (ADDITIVE BID)

SCALE: 1"=25'-0"

VAUG220003

MATCHLINE E24  
MATCHLINE E25

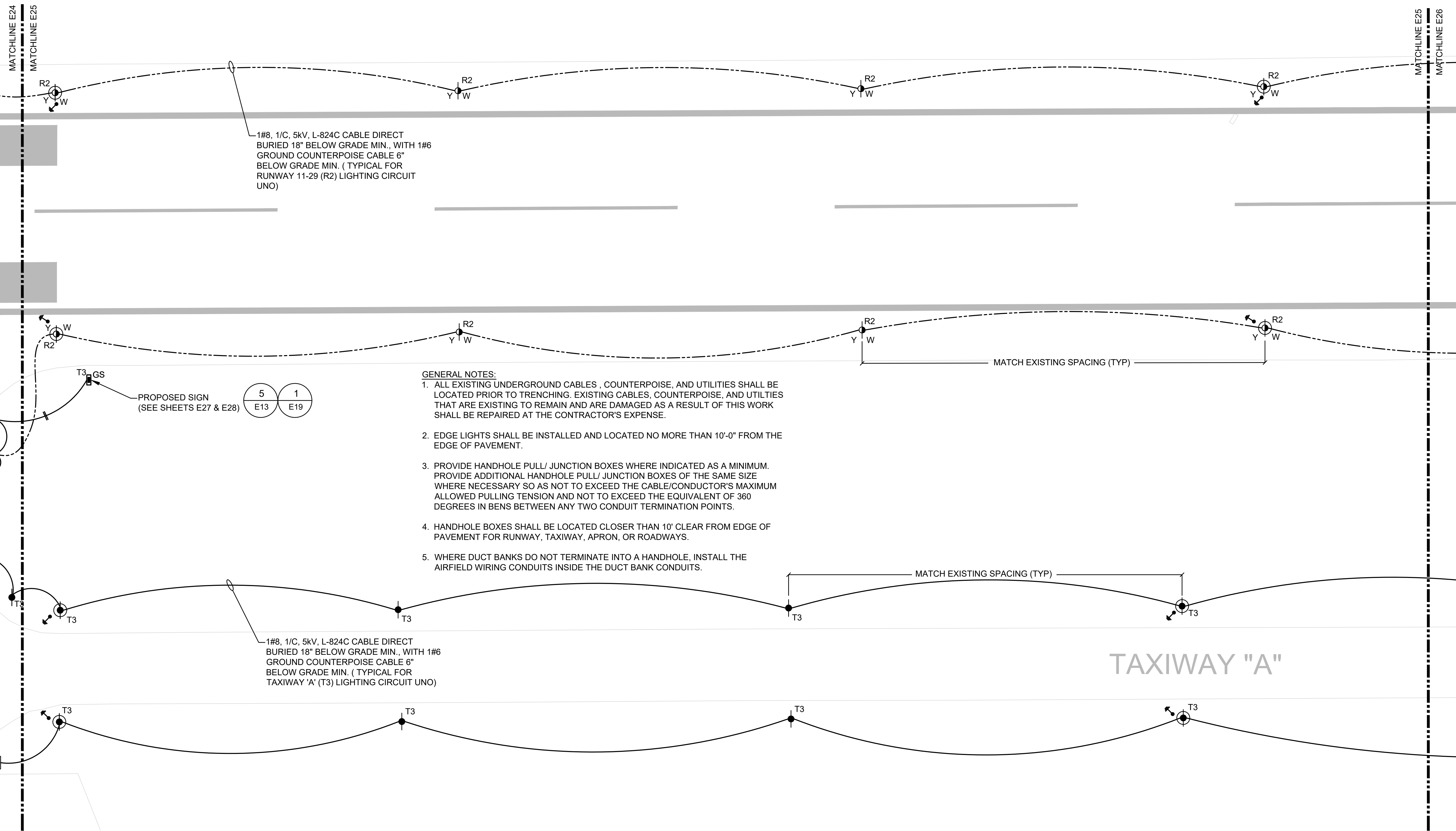
**GMC**

801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	DESIGNED BY: JDZ
ADDENDUM #1 3/16/2023	DRAWN BY: JRA, JDZ
ADDENDUM #2 3/17/2023	CHECKED BY: JEA

**AUGUSTA, GEORGIA**  
**GDOT PID : T007935**  
**GMC NUMBER : TAUG220004**  
**SCALE: 1"=25'**

**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 - PART 3 (ADD)**  
**E24**  
 Sheet 48 of 52



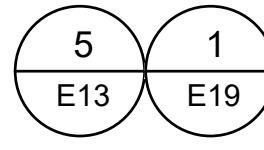
1#8, 1/C, 5kV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. ( TYPICAL FOR RUNWAY 11-29 (R2) LIGHTING CIRCUIT UNO)

1#8, 1/C, 5kV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 GROUND COUNTERPOISE CABLE 6" BELOW GRADE MIN. ( TYPICAL FOR TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)

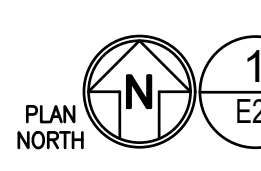
**GENERAL NOTES:**

1. ALL EXISTING UNDERGROUND CABLES, COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. EDGE LIGHTS SHALL BE INSTALLED AND LOCATED NO MORE THAN 10'-0" FROM THE EDGE OF PAVEMENT.
3. PROVIDE HANDHOLE PULL/ JUNCTION BOXES WHERE INDICATED AS A MINIMUM. PROVIDE ADDITIONAL HANDHOLE PULL/ JUNCTION BOXES OF THE SAME SIZE WHERE NECESSARY SO AS NOT TO EXCEED THE CABLE/CONDUCTOR'S MAXIMUM ALLOWED PULLING TENSION AND NOT TO EXCEED THE EQUIVALENT OF 360 DEGREES IN BENS BETWEEN ANY TWO CONDUIT TERMINATION POINTS.
4. HANDHOLE BOXES SHALL BE LOCATED CLOSER THAN 10' CLEAR FROM EDGE OF PAVEMENT FOR RUNWAY, TAXIWAY, APRON, OR ROADWAYS.
5. WHERE DUCT BANKS DO NOT TERMINATE INTO A HANDHOLE, INSTALL THE AIRFIELD WIRING CONDUITS INSIDE THE DUCT BANK CONDUITS.

PROPOSED SIGN (SEE SHEETS E27 & E28)



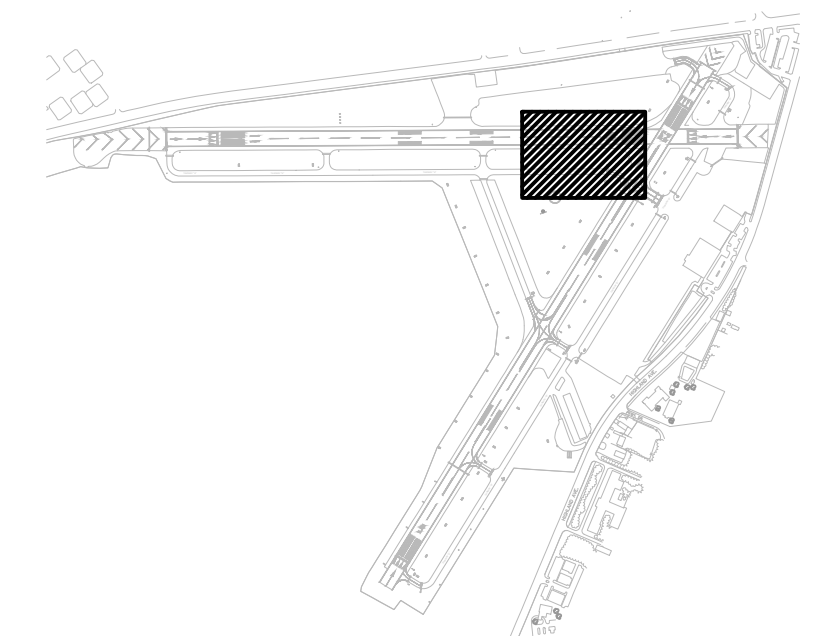
TAXIWAY "A"



**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 -PART 4 (ADDITIVE BID)**

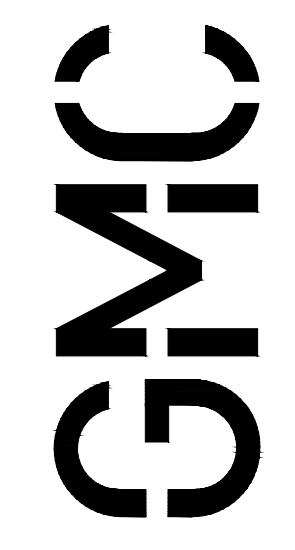
SCALE: 1"=25'-0"

**NOTE:**  
 1. CONTRACTOR HAS OPTION TO MATCH EXISTING ROUTES AND ROUTE ALL NEW CABLES IN EXISTING TRENCHES, DUCT BANKS, ETC. TO ELECTRICAL VAULT. NEW CABLING CONSIST OF:  
 1#8, 1/C, 5kV, L-824C CABLE DIRECT BURIED 18" BELOW GRADE MIN., WITH 1#6 BSDC COUNTERPOISE CABLE 6" BELOW GRADE MIN. (TYPICAL FOR ONE (1) RUNWAY (R2) LIGHTING CIRCUIT AND ONE (1) TAXIWAY 'A' (T3) LIGHTING CIRCUIT UNO)



**KEY PLAN**  
 TRUE NORTH NOT TO SCALE

VAUG220003

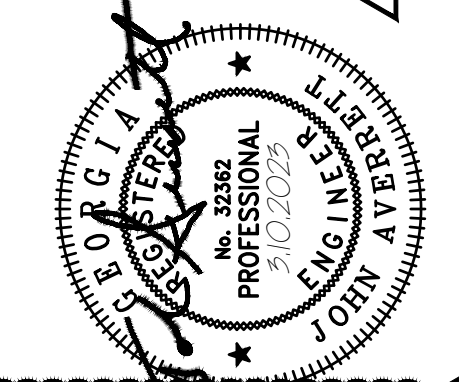


801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

ISSUE DATE	ISSUE DATE
100% SUBMITTAL 1/20/2023	1/20/2023
ADDENDUM #1 3/16/2023	3/16/2023
ADDENDUM #2 3/17/2023	3/17/2023
designed by: JDZ	JDZ
drawn by: JRA, JDZ	JRA, JDZ
checked by: JEA	JEA

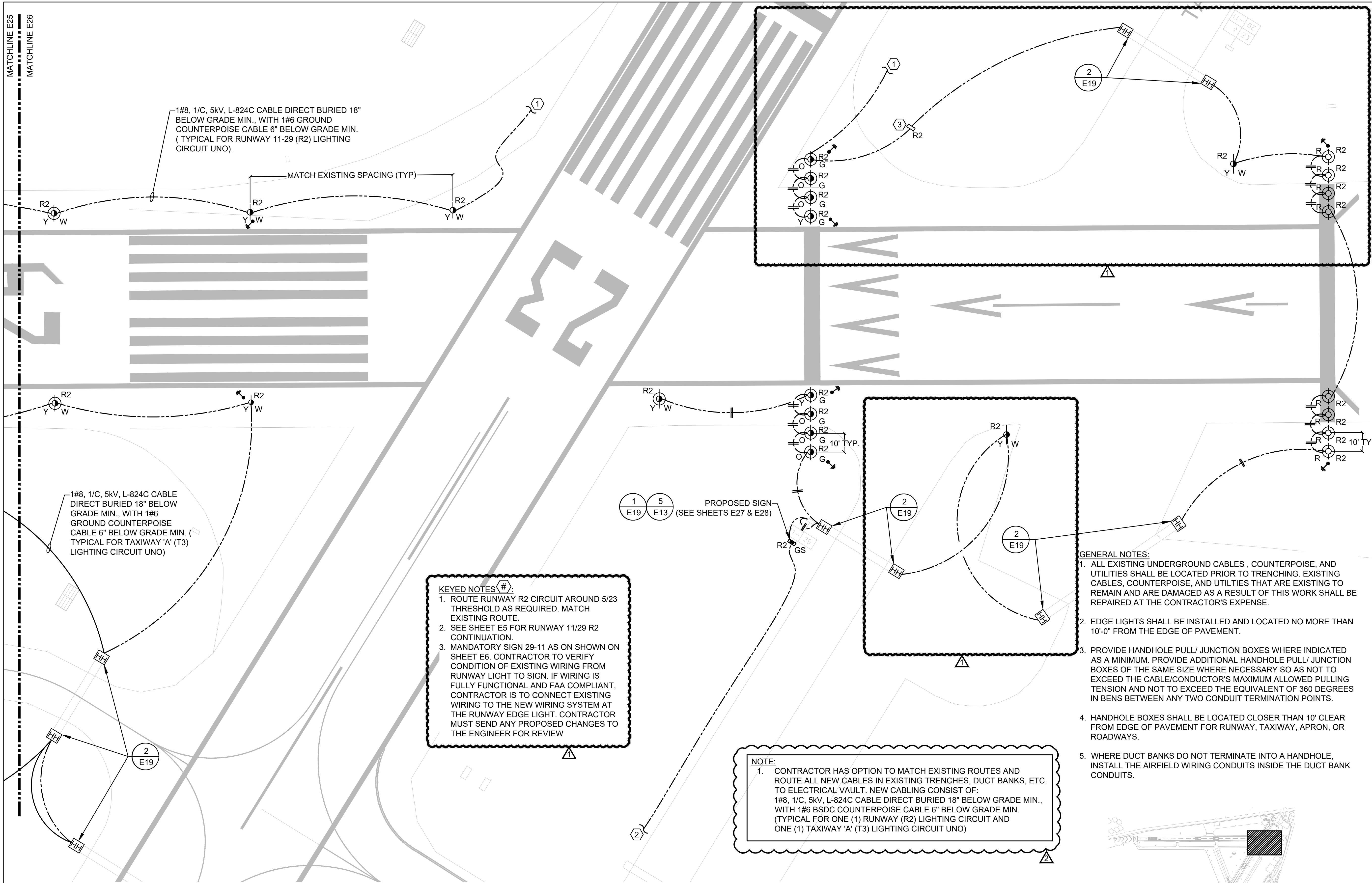
**AIRFIELD ELECTRICAL UPGRADE  
 DANIEL FIELD AIRPORT (DNL)**

AUGUSTA, GEORGIA  
 GDOT PID : I007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=25'

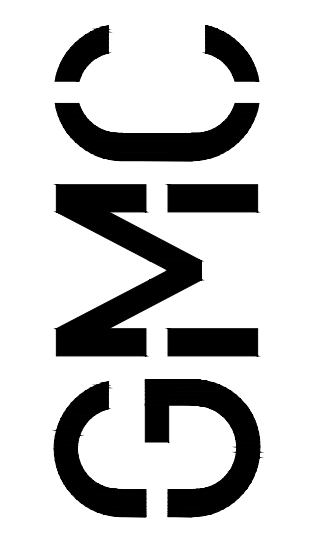
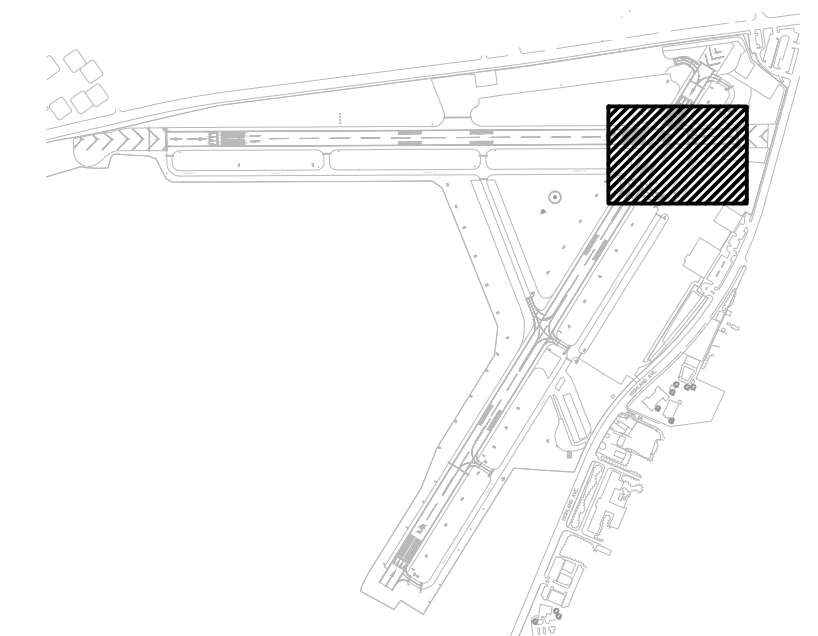


**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 -PART 4 (ADD)**

**E25**  
 Sheet 49 of 52



1
E26
AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 -PART 5 (ADDITIVE BID)
SCALE: 1"=30'-0"



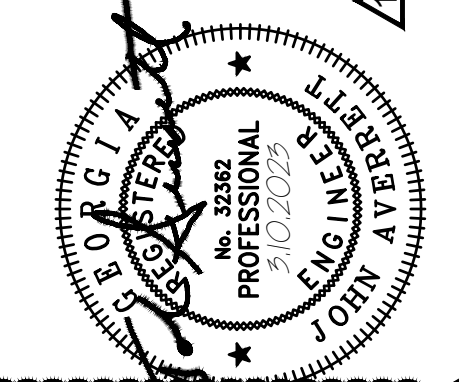
801 Broad Street, Suite 900  
Augusta, GA 30901  
T 607.303.3272  
GMCNETWORK.COM

ISSUE DATE	ISSUE
1/20/2023	100% SUBMITTAL
3/10/2023	ADDENDUM #1
3/17/2023	ADDENDUM #2

designed by: JDZ  
drawn by: JRA, JDZ  
checked by: JEA

**AIRFIELD ELECTRICAL UPGRADE**  
**DANIEL FIELD AIRPORT (DNL)**

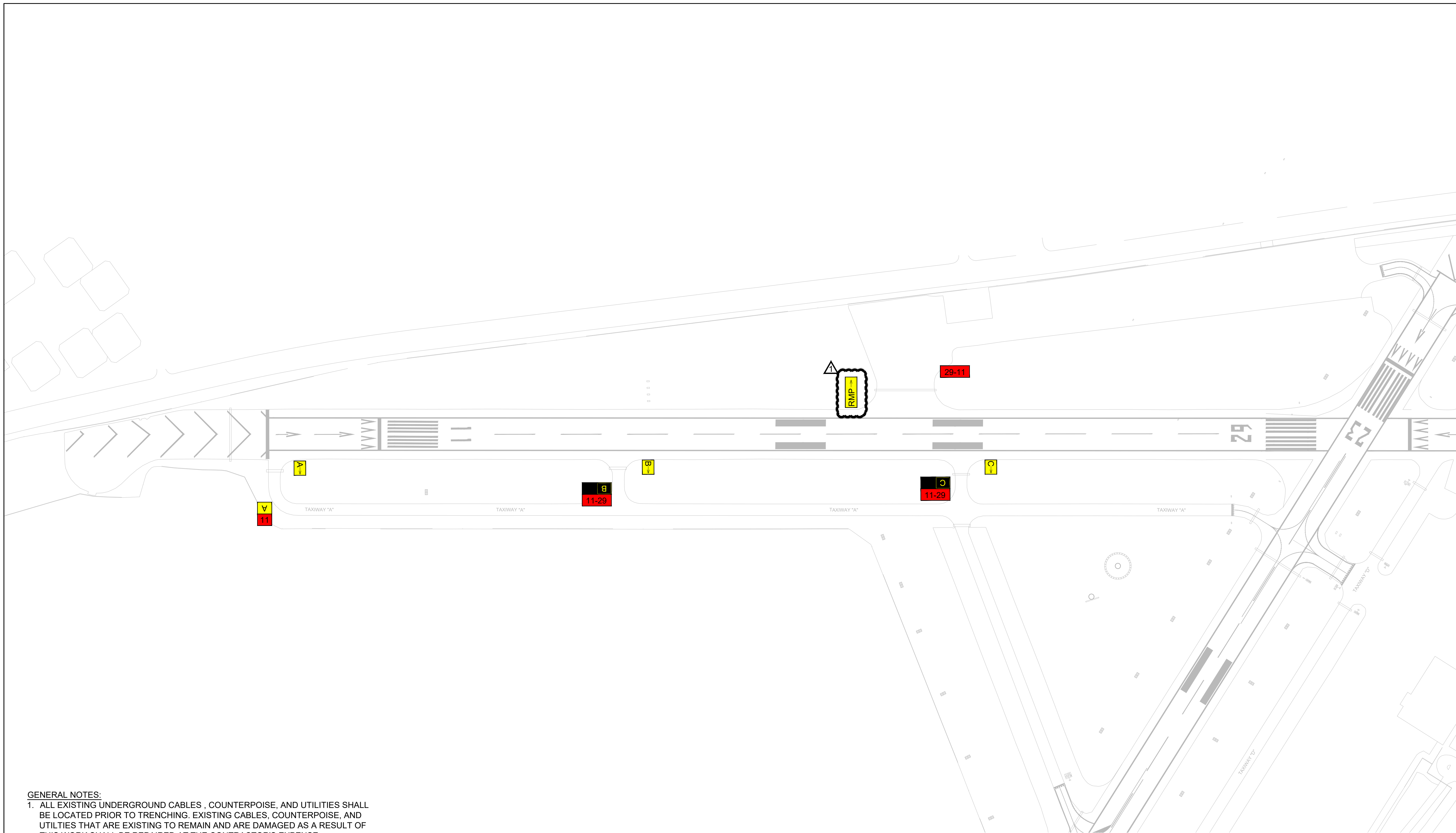
AUGUSTA, GEORGIA  
**GDOT PID : T007935**  
**GMC NUMBER : TAUG220004**  
**SCALE: 1"=30"**



**AIRFIELD LIGHTING & WIRING PLAN - RUNWAY 11/29 -PART 5 (ADD)**  
E26  
 Sheet 50 of 52

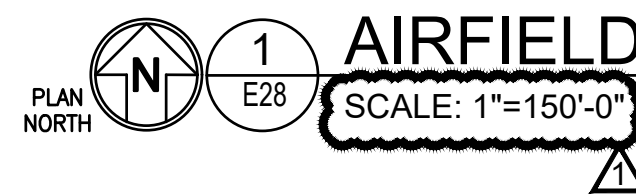
VAUG220003



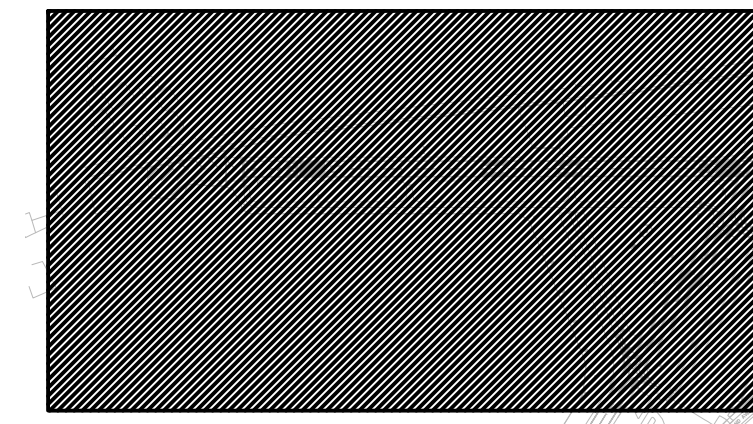


**GENERAL NOTES:**

1. ALL EXISTING UNDERGROUND CABLES , COUNTERPOISE, AND UTILITIES SHALL BE LOCATED PRIOR TO TRENCHING. EXISTING CABLES, COUNTERPOISE, AND UTILITIES THAT ARE EXISTING TO REMAIN AND ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. ALL AIRPORT SIGNS SHALL CONFORM TO THE FOLLOWING FAA ADVISORY CIRCULARS:  
 150/5340-18F STANDARDS FOR AIRPORT SIGN SYSTEMS  
 150/5340-30J DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS  
 150/5345-44J SPECIFICATION FOR RUNWAY & TAXIWAY SIGNS.
3. ALL SIGNS SHALL BE SIZE 1, STYLE 2, CLASS 2, MODE 2, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
4. CONTRACTOR SHALL STAKE THE LOCATION OF ALL PROPOSED SIGNS FOR REVIEW BY THE RPR PRIOR TO INSTALLATION.



**AIRFIELD SIGN LAYOUT PLAN - RUNWAY 11-29 (ADDITIVE BID)**



VAUG220003

**AIRFIELD ELECTRICAL UPGRADE  
DANIEL FIELD AIRPORT (DNL)**

ISSUE DATE

100% SUBMITTAL 1/20/2023  
 ADDENDUM #1 3/10/2023

801 Broad Street, Suite 900  
 Augusta, GA 30901  
 T 607.303.3272  
 GMCNETWORK.COM

designed by: JDZ  
 drawn by: JRA, JDZ  
 checked by: JEA

AUGUSTA, GEORGIA  
 GDOT PID : T007935  
 GMC NUMBER : TAUG220004  
 SCALE: 1"=150'

**AIRFIELD SIGN  
LAYOUT PLAN  
- RUNWAY 11-29  
ADDITIVE BID**

**E28**

Sheet 52 of 52

