

# CONSTRUCTION PLANS

## FOR

# EFFINGHAM COUNTY MEMORIAL AIRPORT

## EFFINGHAM, EFFINGHAM COUNTY, ILLINOIS

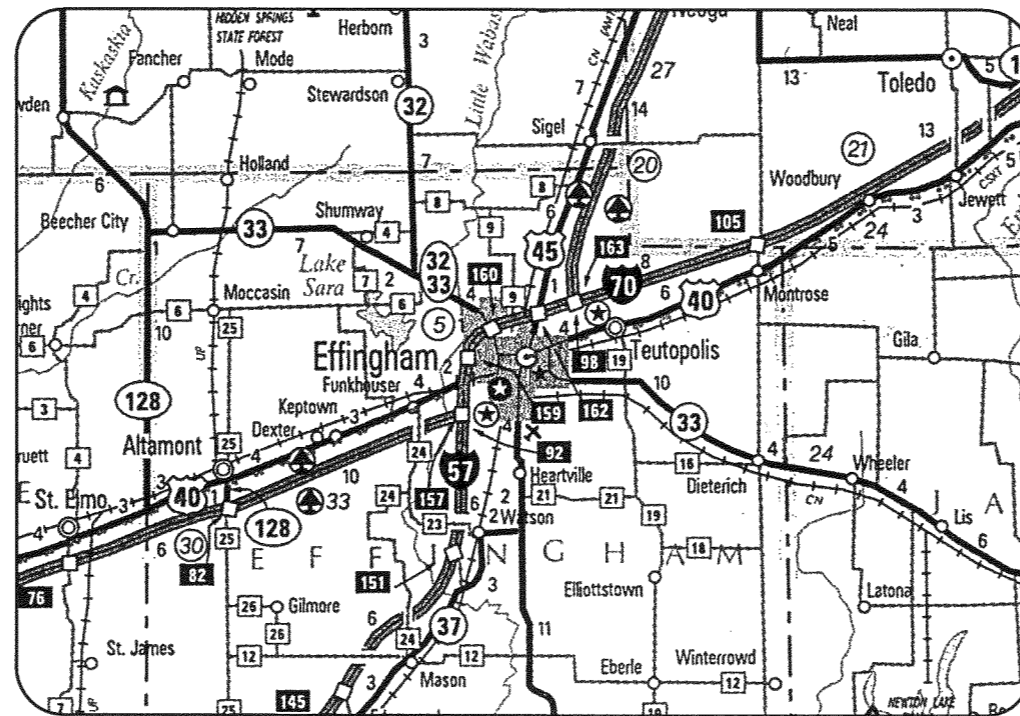
### REPLACE ELECTRICAL VAULT AND EQUIPMENT

**SCOPE OF WORK**

THIS PROJECT CONSISTS OF THE REMOVAL OF THE EXISTING ELECTRICAL VAULT AND REPLACING IT WITH A NEW ELECTRICAL VAULT WITH ASSOCIATED EQUIPMENT, HANDHOLES, DUCTS AND CABLING. EXISTING CONSTANT CURRENT REGULATORS WILL BE RELOCATED TO THE NEW VAULT. THE EXISTING PLASI UNITS ON RUNWAY 1-19 WILL BE REFURBISHED.

**ADDITIVE ALTERNATE NO. 1**

REPLACEMENT OF THE AIRPORT ROTATING BEACON WITH A REFURBISHED UNIT, AND ADDITION OF OBSTRUCTION LIGHTS ON THE EXISTING AIRPORT ROTATING BEACON TOWER.



### LOCATION

ILL. PROJ.: 1H2-4031  
 A.I.P. PROJ.: 3-17-0040-B12  
 LATITUDE: 39° 04' 15"  
 LONGITUDE: 88° 32' 15"  
 ELEVATION: 585.0' M.S.L.  
 DATE: AUGUST 14, 2010



REVISED: 02/01/2011



**HANSON**  
 Hanson Professional Services Inc.  
 ELECTRICAL ENGINEER

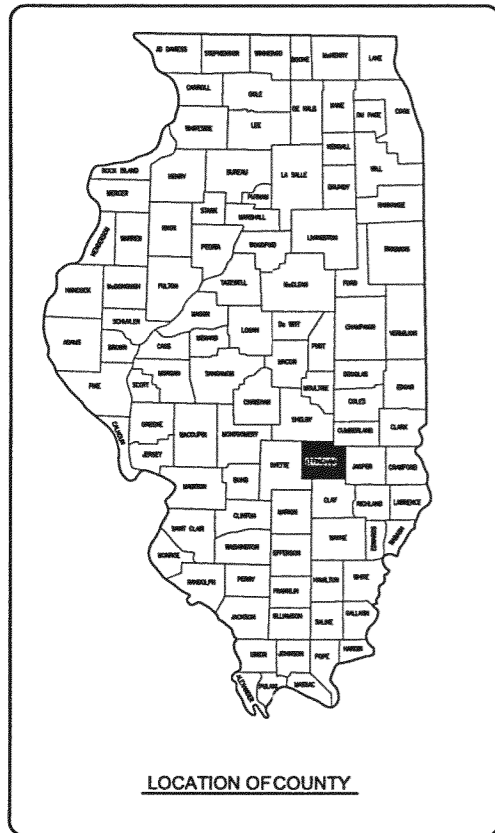
Submitted by *Kevin N. Lightfoot* ENGR

Date Submitted FEBRUARY 02, 2011

Lics. Exp. Date NOVEMBER 30, 2011

**EFFINGHAM COUNTY AIRPORT  
 COMMISSION**

Approved *[Signature]*  
 AIRPORT SUPERINTENDENT  
 Date 1/31/2011



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DATE	REVISION		
02/01/11	Revised as per IDA review - KNL		
EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS			
A.I.P. PROJ.: 3-17-0040-B12 IL PROJ.: 1H2-4031			
Hanson Proj. No. 1040078	Effingham_R-001CVR.DWG	Scale	Date
	NTD TO SCALE		
LAYOUT	BAK	06/03/10	
DRAWN	BAK	06/03/10	
REVIEWED	CAH	06/03/10	
<p>© Copyright Hanson Professional Services Inc. 2011                  Hanson Professional Services Inc.                  1525 South Sixth Street                  Springfield, Illinois 62703-2888                  Ph: (217) 788-2450 Fax: (217) 788-2503                  www.hanson-inc.com                  Chicago, Nationalwide</p>			
REPLACE ELECTRICAL VAULT AND EQUIPMENT	COVER SHEET		1
1 of 33 sheets			

REVISION	DATE

SUMMARY OF QUANTITIES - BASE BID

ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITIES	AS BUILT QUANTITIES
AR109110	ERECT PREFABRICATED VAULT	L.S.	1	
AR109200	INSTALL ELECTRICAL EQUIPMENT	L.S.	1	
AR109901	REMOVE ELECTRICAL VAULT	L.S.	1	
AR110014	4" DIRECTIONAL BORE	L.F.	70	
AR110610	ELECTRICAL HANDHOLE	EACH	2	
AR125989	REFURBISH PLASI	EACH	2	
AR150510	ENGINEER'S FIELD OFFICE	L.S.	1	
AR150520	MOBILIZATION	L.S.	1	
AR800507	FIELD LIGHTNING ARRESTOR	EACH	8	
AR800590	4/C #6 600V UG CABLE IN UD	L.F.	525	

SUMMARY OF QUANTITIES - ADDITIVE ALTERNATE NO. 1

ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITIES	AS BUILT QUANTITIES
AS101580	REFURBISH 36" BEACON	L.S.	1	
AS800591	UPGRADE AIRPORT ROTATING BEACON	L.S.	1	

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EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

A.I.P. PROJ.: 3-17-0040-B12  
IL PROJ.: 1H2-4031

Hanson Proj. No. 10A0078	DATE	06/03/10
Filename R-002ELP.DWG	DRAWN	BAK
Scale NOT TO SCALE	REVIEWED	CAH/KNL
Date		08/11/10



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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

SUMMARY OF QUANTITIES  
AND INDEX TO SHEETS

**UTILITY NOTE**

THE LOCATION, SIZE, AND TYPE OF MATERIAL OF EXISTING UNDERGROUND AND/OR ABOVEGROUND UTILITIES INDICATED ON THE PLANS ARE NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY WHATEVER IN RESPECT TO THE ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION. THERE IS NO GUARANTEE, EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED IN THE CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES OF HIS OPERATIONAL PLANS AND SHALL OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULE OF THE COMPANIES FOR REMOVAL OR ADJUSTMENT WHERE REQUIRED. IN THE EVENT AN UNEXPECTED UTILITY INTERFERENCE IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY COMPANY OF JURISDICTION. THE OWNER'S REPRESENTATIVE AND/OR THE RESIDENT ENGINEER SHALL ALSO BE IMMEDIATELY NOTIFIED. ANY DAMAGE TO SUCH MAINS AND SERVICES SHALL BE RESTORED TO SERVICE AT ONCE AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT. ALL UTILITY CABLES AND LINES SHALL BE LOCATED BY THE RESPECTIVE UTILITY. **CONTACT JULIE (JOINT UTILITY LOCATION INFORMATION FOR EXCAVATORS) FOR UTILITY INFORMATION, PHONE: 1-800-892-0123.** CONTACT THE FAA (FEDERAL AVIATION ADMINISTRATION) FOR ASSISTANCE IN LOCATING FAA CABLES AND UTILITIES. LOCATION OF FAA POWER, CONTROL, AND COMMUNICATION CABLES SHALL BE COORDINATED WITH AND/OR LOCATED BY THE FAA. ALSO CONTACT AIRPORT DIRECTOR/MANAGER AND AIRPORT PERSONNEL FOR ASSISTANCE IN LOCATING UNDERGROUND AIRPORT CABLES AND/OR UTILITIES. ALSO COORDINATE WORK WITH ALL ABOVEGROUND UTILITIES.

**150-ENGINEER'S FIELD OFFICE NOTES**

THE CONTRACTOR WILL FURNISH A WIRELESS PHONE TO THE RESIDENT ENGINEER FOR HIS EXCLUSIVE USE FOR THE DURATION OF THIS PROJECT. THE RESIDENT ENGINEER WILL USE THIS PHONE FOR PROJECT BUSINESS ONLY. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CHARGES ASSOCIATED WITH THIS CELL PHONE.

THE PROPOSED ENGINEER'S FIELD OFFICE WILL BE PAID FOR UNDER ITEMS: AR150510 ENGINEER'S FIELD OFFICE \_\_\_\_ 1 L.S.

**CONTRACTOR RESPONSIBILITIES**

THE CONTRACTOR'S EQUIPMENT PARKING AND STORAGE AREA WILL BE IN THE GENERAL CONSTRUCTION AREA. THE CONTRACTOR'S EMPLOYEES WILL PARK THEIR VEHICLES IN THE AIRPORT AUTO PARKING LOT. ONLY CONTRACTOR VEHICLES WILL BE ALLOWED OUTSIDE THIS AREA.

THE CONTRACTOR AND HIS EMPLOYEES WILL BE RESTRICTED TO THE WORK AREA AND ALL OTHER AREAS OF THE AIRPORT ARE "OFF LIMITS" TO THEM.

THE CONTRACTOR SHALL KEEP ONE RUNWAY OPEN AT ALL TIMES AND MAINTAIN CONTINUOUS TAXIWAY ACCESS TO ALL HANGARS AND ADMINISTRATIVE AREAS.







ALL WORK PERFORMED SHALL BE DONE IN A ORDERLY AND EFFECTIVE MANNER TO MINIMIZE RUNWAY CLOSURE.

NO TRENCHES OR HOLES WILL REMAIN OPEN OVERNIGHT.

NO RUNWAY SHALL BE CLOSED OVERNIGHT.

ALL CONSTRUCTION OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH FAA ADVISORY CIRCULAR 150/5370-2E "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

**LEGEND**

-  EXISTING IMPROVEMENTS
-  PROPOSED IMPROVEMENTS
-  EXISTING BUILDINGS
-  PROPOSED HAUL ROUTE AND EQUIPMENT PARKING AREA
-  PROPOSED BENCHMARK
-  PROPOSED BARRICADES OR TRAFFIC CONES

**SCOPE OF WORK**

THIS PROJECT CONSISTS OF THE REMOVAL OF THE EXISTING ELECTRICAL VAULT AND REPLACING IT WITH A NEW ELECTRICAL VAULT WITH ASSOCIATED EQUIPMENT, HANDHOLES, DUCTS AND CABLING. EXISTING CONSTANT CURRENT REGULATORS WILL BE RELOCATED TO THE NEW VAULT. THE EXISTING PLASI UNITS ON RUNWAY 1-29 WILL BE REFURBISHED.

**ADDITIVE ALTERNATE NO. 1**

REPLACEMENT OF THE AIRPORT ROTATING BEACON WITH A REFURBISHED UNIT, AND ADDITION OF OBSTRUCTION LIGHTS ON THE EXISTING AIRPORT ROTATING BEACON TOWER.

**AIRPORT SECURITY NOTE**

AIRPORT SECURITY WILL BE MAINTAINED AT ALL TIMES. THE CONTRACTOR WILL CLOSE AND LOCK THE EXISTING GATE IN THE HAUL ROUTE AT THE END OF EACH WORKING DAY.

**CERTIFIED PAYROLLS**

THE RESIDENT ENGINEER **CANNOT** FORWARD CONSTRUCTION REPORTS TO THE ILLINOIS DIVISION OF AERONAUTICS FOR PROCESSING UNTIL ALL **CERTIFIED PAYROLLS** FOR THE PERIOD HAVE BEEN RECEIVED.

**MATERIAL CERTIFICATION**

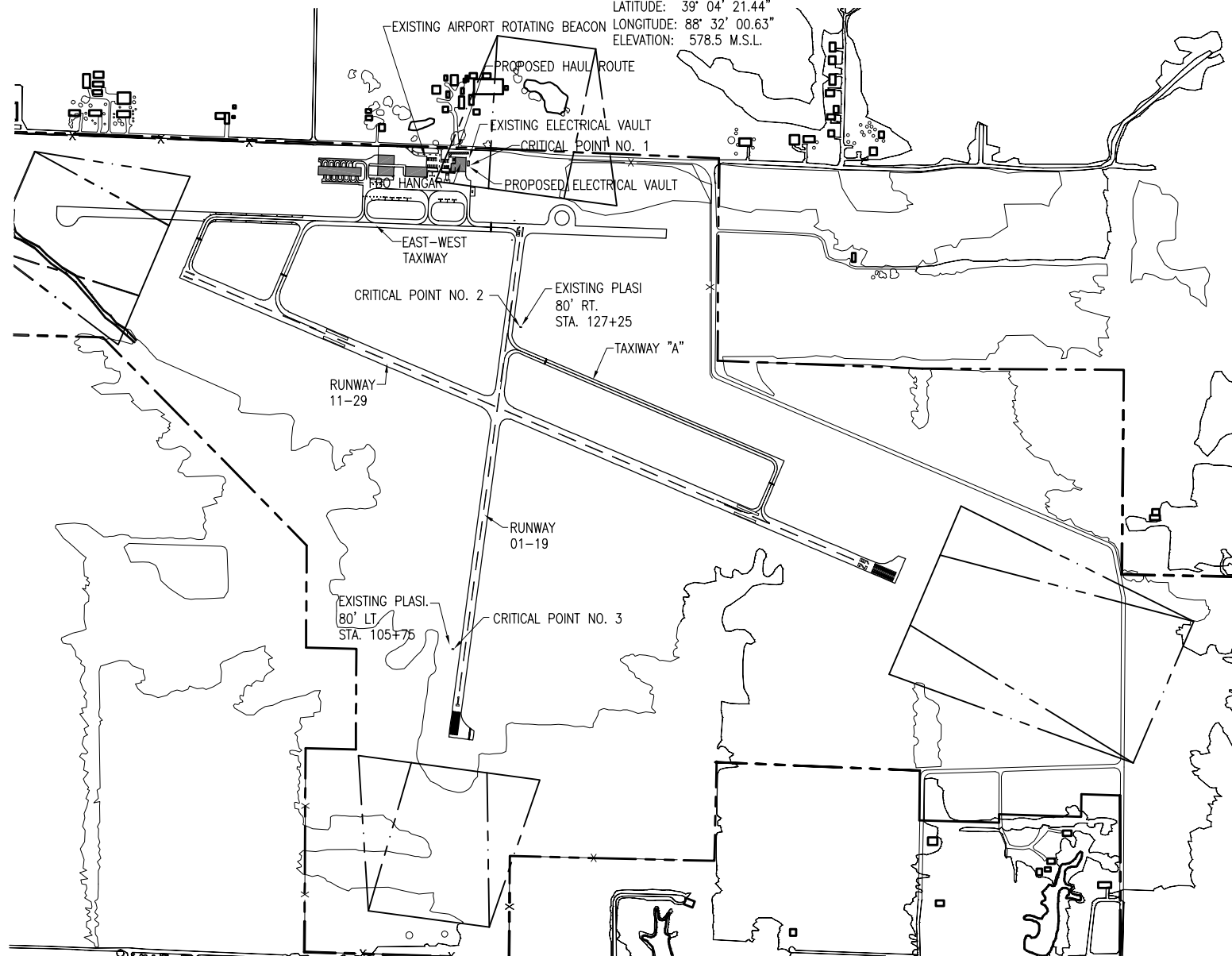
COMPLETED WORK **CANNOT** BE PLACED ON A CONSTRUCTION REPORT UNTIL ALL MATERIAL CERTIFICATIONS FOR THAT PAY ITEM HAVE BEEN RECEIVED, REVIEWED AND ACCEPTED BY THE RESIDENT ENGINEER.

**CRITICAL POINT DATA**

POINT NO. 1  
PROPOSED ELECTRICAL VAULT  
LATITUDE: 39° 04' 31.84"  
LONGITUDE: 88° 32' 04.86"  
ELEVATION: 585.00 M.S.L.

POINT NO. 2  
NORTH VADI UNIT  
LATITUDE: 39° 04' 21.44"  
LONGITUDE: 88° 32' 00.63"  
ELEVATION: 578.5 M.S.L.

POINT NO. 3  
SOUTH VADI UNIT  
LATITUDE: 39° 04' 00.55"  
LONGITUDE: 88° 32' 06.04"  
ELEVATION: 572.8 M.S.L.



**BARRICADES AND TRAFFIC CONES**

BARRICADES SHALL BE PLACED AND MAINTAINED IN SUCH A WAY AS TO PREVENT AIRCRAFT ACCESS TO THE PROPOSED WORK AREAS WHILE MAINTAINING AIRCRAFT ACCESS TO ACTIVE AIRFIELD PAVEMENTS. PAVEMENT CLOSURES SHALL BE SCHEDULED THROUGH AND WILL REQUIRE THE APPROVAL OF THE AIRPORT MANAGER. THE BARRICADES WILL BE EQUIPPED WITH RED FLASHING OR RED STEADY-BURN LIGHTS AND 20" SQUARE ORANGE FLAGS. THE BARRICADES, THEIR MAINTENANCE, PLACEMENT AND REMOVAL WILL BE CONSIDERED AS AN INCIDENTAL ITEM TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

**HAUL ROUTE AND VEHICLE PARKING**

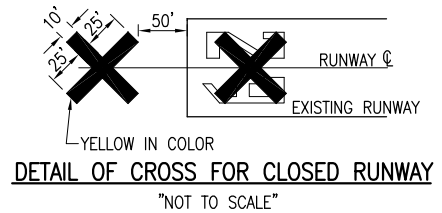
THE CONTRACTOR WILL USE THE DESIGNATED HAUL ROUTE AS SHOWN ON THIS SHEET. THE PROPOSED PARKING AREA WILL BE IN THE GENERAL CONSTRUCTION AREA. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN THE PROPOSED HAUL ROUTE AND PARKING AREA THROUGHOUT THE COURSE OF THE PROJECT. ANY AREAS DAMAGED OUTSIDE OF THESE AREAS WILL BE REPAIRED BY THE CONTRACTOR AND AT THE CONTRACTOR'S OWN EXPENSE. AT THE CONCLUSION OF THE PROJECT THE CONTRACTOR WILL GRADE, FERTILIZE, SEED AND MULCH THE HAUL ROUTE AND PARKING AREA AS NEEDED TO RESTORE IT TO ITS' ORIGINAL STATE. RESTORATION OF THE HAUL ROUTE AND PARKING AREA WILL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

**HEIGHT OF CONSTRUCTION EQUIPMENT**

THE MAXIMUM ANTICIPATED HEIGHT OF THE CONSTRUCTION EQUIPMENT WILL BE 70 FEET, WHICH IS EXPECTED TO BE A CRANE TO REPLACE THE BEACON AND TO SET THE NEW VAULT SHELTER. THE CRANE BOOM SHALL BE IN THE LOWERED POSITION WHEN NOT IN USE. THE MAXIMUM ANTICIPATED HEIGHT OF THE CONSTRUCTION EQUIPMENT AT THE OTHER LOCATIONS WILL BE 25 FEET, WHICH IS EXPECTED TO BE A CONCRETE TRUCK OR A LINE TRUCK.

**EROSION CONTROL**

THIS PROJECT WILL DISTURB LESS THAN 1 ACRE OF LAND, THEREFORE NO N.P.D.E.S. PERMIT WILL BE REQUIRED.



**NOTE:**

COST OF CONSTRUCTING, PLACING, MAINTAINING AND REMOVING CROSSES WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED. THE CROSSES WILL BE YELLOW IN COLOR AND SHALL BE MADE OF A SUITABLE MATERIAL AS APPROVED BY THE AIRPORT MANAGER. THE CROSSES WILL BE PLACED OVER THE NUMERALS AND SECURED IN A MANNER APPROVED BY THE MANAGER. THE PROPOSED CROSSES WILL BE PLACED EACH DAY THE RUNWAY IS CLOSED AND REMOVED WHEN THE RUNWAY IS RE-OPENED. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE PLACEMENT AND REMOVAL OF THE CROSSES. NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

**J.U.L.I.E. INFORMATION**

COUNTY: EFFINGHAM  
CITY: EFFINGHAM  
TOWNSHIP: WATSON  
SECTION NO.: 8 & 9  
ADDRESS: EFFINGHAM COUNTY MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS 62401

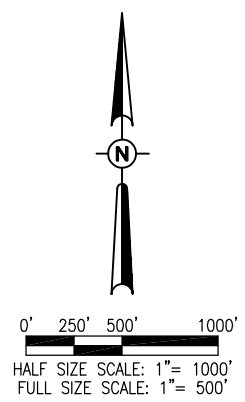
**PROPOSED SAFETY PLAN**

GENERAL - THE EFFINGHAM COUNTY MEMORIAL AIRPORT IS COMPRISED OF TWO RUNWAYS. THE PROPOSED CONSTRUCTION WILL NECESSITATE CLOSING RUNWAY 1-19 WHENEVER THE CONTRACTOR IS WORKING WITHIN 200' OF THE RUNWAY CENTERLINE. THE RUNWAY WILL BE CLOSED ONLY DURING THE CONSTRUCTION DAY. AT THE END OF EACH CONSTRUCTION DAY THE CONTRACTOR WILL SMOOTH GRADE ALL AREAS WITHIN THE SAFETY AREA TO THE SATISFACTION OF THE RESIDENT ENGINEER AND RE-OPEN THE RUNWAY. ALL WORK INCLUDED IN OPENING AND CLOSING THE RUNWAY WILL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

IDENTIFICATION - WHEN THE CONTRACTORS VEHICLES AND EQUIPMENT ARE ON THE AIRPORT THEY SHALL BE PROPERLY MARKED WITH THREE (3') FOOT SQUARE CHECKERED FLAGS (INTERNATIONAL ORANGE AND WHITE). THE CONTRACTOR WILL ALSO PROVIDE WORKERS WITH SOME TYPE OF TAG OR GARMENT TO IDENTIFY THE PERSON AS BEING PART OF THE CONSTRUCTION CREW.

RADIO CONTROL - THE CONTRACTOR WILL BE REQUIRED TO BE IN TWO-WAY RADIO CONTACT (122.8 MHz.) WITH THE AIRPORT UNICOM. THIS WILL KEEP THE CONTRACTOR IN CONSTANT CONTACT WITH THE EFFINGHAM COUNTY MEMORIAL AIRPORT AND ENABLE THE AIRPORT TO IMMEDIATELY CONTACT THE CONTRACTOR IN CASE OF AN AERONAUTIC EMERGENCY THAT WOULD REQUIRE ACTION BY THE CONTRACTOR AND/OR HIS PERSONNEL.

WHEN THE CONTRACTOR IS WORKING ON THE EXISTING PLASI UNITS HE WILL HAVE TO CLOSE RUNWAY 1-19 AND USE THE RUNWAY AS HIS ACCESS TO THE EXISTING PLASI UNITS. IN ORDER TO WORK ON THE SOUTHERN PLASI UNIT THE CONTRACTOR WILL HAVE TO CROSS RUNWAY 11-29 WHILE IT IS OPEN TO AIRCRAFT OPERATIONS. THE CONTRACTOR WILL BE IN TWO-WAY RADIO CONTACT WITH THE AIRPORT WHEN HE IS READY TO CROSS THE ACTIVE RUNWAY 11-29. THE CONTRACTOR WILL COME TO A COMPLETE HALT AT LEAST 200' FROM THE EDGE OF RUNWAY 11-29, CHECK THE AIRWAYS FOR INCOMING AIRCRAFT, AND CHECK THE TWO-WAY RADIO FOR ANY AIRCRAFT RADIOING THEIR INTENT TO LAND OR TAKEOFF. IF THERE ARE NO AIRCRAFT IN THE APPROACHES TO RUNWAY 11-29 AND/OR PREPARING TO TAKE OFF, THEN THE CONTRACTOR MAY PROCEED ACROSS THE RUNWAY. IF THERE IS A PLANE ON APPROACH OR TAKING OFF, THEN HE WILL WAIT UNTIL THEY PASS THE INTERSECTION AND THEN CROSS THE RUNWAY.



REVISION	DATE	DESCRIPTION
02/07/11	02/07/11	Revised as per IDA review - KNL

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

A.I.P. PROJ.: 3-17-0040-B12  
IL PROJ.: 1H2-4031

Hanson Proj. No. 10A0078	BAK	06/03/10
Filename: R-003SEY.DWG	BAK	06/03/10
Scale: 1" = 500'	CAH	08/17/10
Date		
LAYOUT		
DRAWN		
REVIEWED		

**HANSON**  
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REPLACE ELECTRICAL VAULT AND EQUIPMENT

PROPOSED SAFETY PLAN

ELECTRICAL LEGEND – ONE-LINE DIAGRAM	
	CABLE TERMINATOR/LUG
	TRANSFORMER
	DISCONNECT SWITCH
	FUSIBLE DISCONNECT SWITCH
	CIRCUIT BREAKER
	THERMAL MAGNETIC CIRCUIT BREAKER
	FUSE
	TRANSIENT VOLTAGE SURGE SUPPRESSOR OR SURGE PROTECTOR DEVICE
	GROUND – GROUND ROD, GROUNDING ELECTRODE, OR AT EARTH POTENTIAL
	INDICATING LIGHT
	MOTOR
	LOAD, MOTOR, # = HORSEPOWER
	ELECTRIC UTILITY METER BASE
	JUNCTION BOX WITH SPLICE
	EQUIPMENT, XXX = DEVICE DESCRIPTION
	GROUND BUS OR TERMINAL
	NEUTRAL BUS
	PANELBOARD WITH MAIN LUGS
	PANELBOARD WITH MAIN BREAKER
	FUSE PANEL WITH MAIN FUSE PULLOUT
	DUPLEX RECEPTACLE 120V SINGLE PHASE GROUNDING TYPE
	CONTROL STATION
	TRANSFER SWITCH
	ENGINE GENERATOR SET

ELECTRICAL LEGEND – SCHEMATIC	
	NORMALLY OPEN (N.O.) CONTACT
	NORMALLY CLOSED (N.C.) CONTACT
	STARTER COIL, * = STARTER NUMBER
	OVERLOAD RELAY CONTACT
	CONTROL RELAY, * = CONTROL RELAY NUMBER
	RELAY, * = RELAY NUMBER
	TOGGLE SWITCH / 2 POSITION SWITCH
	2-POSITION SELECTOR SWITCH
	3-POSITION SELECTOR SWITCH (H-O-A SHOWN)
	2 POLE DISCONNECT SWITCH
	3 POLE DISCONNECT SWITCH
	PHOTOCELL
	TERMINAL BLOCK, * = TERMINAL NUMBER
	DEVICE TERMINAL, * = DEVICE TERMINAL NUMBER
	INTERNAL PANEL WIRING
	FIELD WIRING
	FUSE
	GROUND BUS OR TERMINAL
	NEUTRAL BUS
	GROUND, GROUND ROD, GROUND BUS
	INDUSTRIAL CONTROL RELAY OR LIGHTING CONTACTOR
	S1 CUTOUT HANDLE REMOVED
	S1 CUTOUT HANDLE INSERTED
	N.O. THERMAL SWITCH
	N.C. THERMAL SWITCH
	L-830 SERIES ISOLATION TRANSFORMER

ELECTRICAL ABBREVIATIONS	
A.F.F.	ABOVE FINISHED FLOOR
A, AMP	AMPERES
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CR	CONTROL RELAY
CU	COPPER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EP	EXPLOSION PROOF
ES	EMERGENCY STOP
ETL	INTERTEK – ELECTRICAL TESTING LABS
ETM	ELAPSE TIME METER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GRSC	GALVANIZED RIGID STEEL CONDUIT
HID	HIGH INTENSITY DISCHARGE
HOA	HAND OFF AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
J	JUNCTION BOX
KVA	KILOVOLT AMPERE(S)
KW	KILOWATTS
LC	LIGHTING CONTACTOR
LTFCM	LIQUID TIGHT FLEXIBLE METAL CONDUIT (UL LISTED)
LTG	LIGHTING
LP	LIGHTING PANEL
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCM	THOUSAND CIRCUAR MIL
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MH	METAL HALIDE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
NEC	NATIONAL ELECTRICAL CODE (NFPA 70)
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OHE	OVERHEAD ELECTRIC
OL	OVERLOAD

ELECTRICAL ABBREVIATIONS (CONTINUED)	
PB	PULL BOX
PC	PHOTO CELL
PDB	POWER DISTRIBUTION BLOCK
PNL	PANEL
RCPT	RECEPTACLE
R	RELAY
S	STARTER
SPD	SURGE PROTECTION DEVICE
SPST	SINGLE POLE SINGLE THROW
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
UL	UNDERWRITER'S LABORATORIES
V	VOLTS
W/	WITH
W/O	WITHOUT
WP	WEATHER PROOF
XFER	TRANSFER
XFMR	TRANSFORMER

AIRPORT EQUIPMENT/FACILITY ABBREVIATIONS	
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
ATCT	AIR TRAFFIC CONTROL TOWER
AWOS	AUTOMATED WEATHER OBSERVING SYSTEM
CCR	CONSTANT CURRENT REGULATOR
DME	DISTANCE MEASURING EQUIPMENT
FAR	FEDERAL AVIATION REGULATION
GS	GLIDE SLOPE FACILITY
HIRL	HIGH INTENSITY RUNWAY LIGHT
ILS	INSTRUMENT LANDING SYSTEM
IM	INNER MARKER
LIR	LOW IMPACT-RESISTANT
LOC	LOCALIZER FACILITY
MALS	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATING LIGHTS
MIRL	MEDIUM INTENSITY RUNWAY LIGHT
MTL	MEDIUM INTENSITY TAXIWAY LIGHT
NDB	NON-DIRECTIONAL BEACON
PAPI	PRECISION APPROACH PATH INDICATOR
PLASI	PULSE LIGHT APPROACH SLOPE INDICATOR
RAIL	RUNWAY ALIGNMENT INDICATING LIGHTS
REIL	RUNWAY END IDENTIFIER LIGHT
RVR	RUNWAY VISUAL RANGE
VADI	VISUAL APPROACH DESCENT INDICATOR
VASI	VISUAL APPROACH SLOPE INDICATOR
VOR	VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE FACILITY
WC	WIND CONE

- NOTES:
- ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 70 – NATIONAL ELECTRICAL CODE (NEC) MOST CURRENT ISSUE IN FORCE, THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES, AND REQUIREMENTS IN FORCE. ANY INSTALLATIONS WHICH VOID THE U.L. LISTING, ETL LISTING (OR OTHER THIRD PARTY LISTING) AND/OR THE MANUFACTURER'S WARRANTY OF A DEVICE WILL NOT BE PERMITTED.
  - ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT SUPERINTENDENT AND THE AIRPORT FBO MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
  - COLOR CODE PHASE AND NEUTRAL CONDUCTOR INSULATION FOR NO. 6 AWG OR SMALLER. PROVIDE COLORED INSULATION OR COLORED MARKING TAPE FOR PHASE AND NEUTRAL CONDUCTORS FOR NO. 4 AWG AND LARGER. INSULATED GROUND CONDUCTORS SHALL HAVE GREEN COLORED INSULATION FOR ALL CONDUCTOR AWG AND/OR KCMIL TO COMPLY WITH NEC 250.119. NEUTRAL CONDUCTORS SHALL HAVE WHITE COLORED INSULATION FOR NO. 6 AWG AND SMALLER TO MEET THE REQUIREMENTS OF NEC 200.6. STANDARD COLORS FOR POWER WIRING AND BRANCH CIRCUITS SHALL BE AS FOLLOWS:  

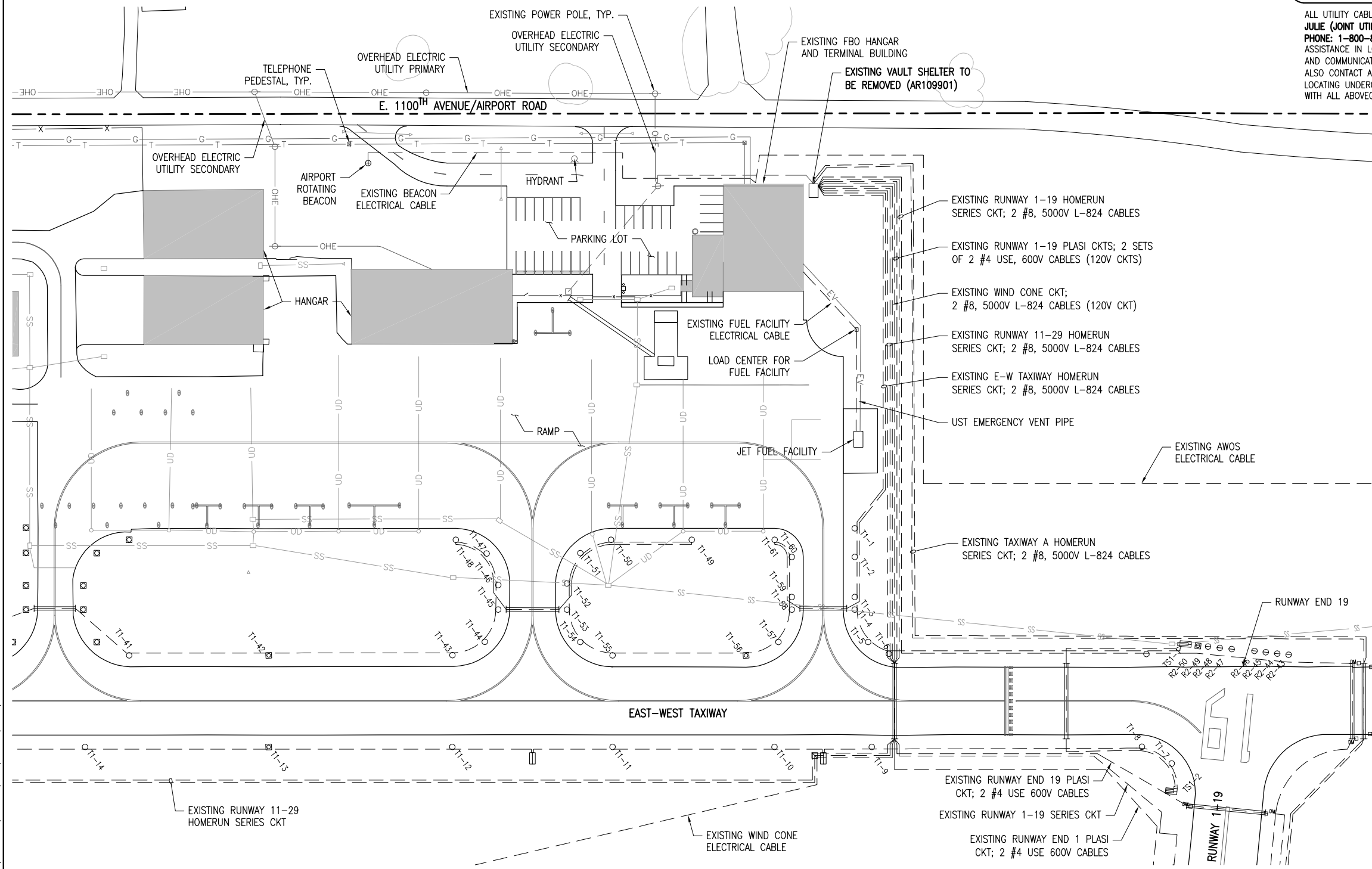
120/240 VAC, 1 PHASE, 3 WIRE  
 PHASE A      BLACK  
 PHASE B      RED  
 NEUTRAL      WHITE  
 GROUND      GREEN
  - SEE RESPECTIVE SITE PLANS FOR SITE LEGEND INFORMATION.
  - LTFCM DENOTES LIQUID TIGHT FLEXIBLE METAL CONDUIT UL LISTED, SUNLIGHT RESISTANT, & SUITABLE FOR GROUNDING. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LTFCM THAT IS NOT UL LISTED. CONFIRM LTFCM BEARS THE UL LABEL PRIOR TO INSTALLATION.
  - PER NEC 513 THE ENTIRE AREA OF THE HANGAR INCLUDING ANY ADJACENT AND COMMUNICATING AREAS NOT SUITABLY CUT OFF FROM THE HANGAR, SHALL BE CLASSIFIED AS A CLASS 1, DIVISION 2 HAZARDOUS LOCATION UP TO A LEVEL 18 INCHES ABOVE THE FLOOR. PER NEC 513.3(C) "VICINITY OF AIRCRAFT", THE AREA WITHIN 5 FT. HORIZONTALLY FROM AIRCRAFT POWER PLANTS OR AIRCRAFT FUEL TANKS SHALL BE CLASSIFIED AS A CLASS 1, DIVISION 2 LOCATION THAT SHALL EXTEND UPWARD FROM THE FLOOR TO A LEVEL 5 FT. ABOVE THE UPPER SURFACE OF WINGS AND OF ENGINE ENCLOSURES. ALL ELECTRICAL INSTALLATIONS IN CLASSIFIED HAZARDOUS LOCATIONS SHALL BE AVOIDED UNLESS SPECIFICALLY APPROVED FOR SUCH LOCATIONS AND INSTALLED IN CONFORMANCE WITH NEC 500, 501, AND 513 AS WELL AS OTHER APPLICABLE CODES AND REQUIREMENTS.

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REVISION					
DATE					
EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS					
A.I.P. PROJ.: 3-17-0040-B12					
IL PROJ.: 1H2-4031					
Hanson Proj. No.	10A0078	LAYOUT	KNL	07/30/10	
Filename	E-001.DWG	DRAWN	RL	08/05/10	
Scale	NONE	REVIEWED	KNL/CAH	08/17/10	
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REPLACE ELECTRICAL VAULT AND EQUIPMENT			ELECTRICAL LEGEND AND ABBREVIATIONS		
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4 of 33 sheets					

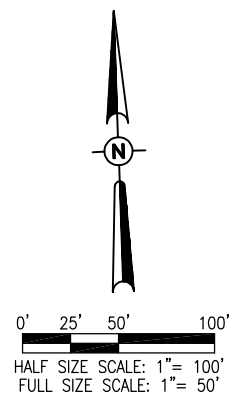
THE LOCATION, SIZE, AND TYPE OF MATERIAL OF EXISTING UNDERGROUND AND/OR ABOVEGROUND UTILITIES INDICATED ON THE PLANS ARE NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY WHATSOEVER IN RESPECT TO THE ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION. THERE IS NO GUARANTEE, EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED IN THE CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES OF HIS OPERATIONAL PLANS AND SHALL OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULE OF THE COMPANIES FOR REMOVAL OR ADJUSTMENT WHERE REQUIRED. IN THE EVENT AN UNEXPECTED UTILITY INTERFERENCE IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY COMPANY OF JURISDICTION. THE OWNER'S REPRESENTATIVE AND/OR THE RESIDENT ENGINEER SHALL ALSO BE IMMEDIATELY NOTIFIED. ANY DAMAGE TO SUCH MAINS AND SERVICES SHALL BE RESTORED TO SERVICE AT ONCE AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT.

ALL UTILITY CABLES AND LINES SHALL BE LOCATED BY THE RESPECTIVE UTILITY. CONTACT JULIE (JOINT UTILITY LOCATION INFORMATION FOR EXCAVATORS) FOR UTILITY INFORMATION, PHONE: 1-800-892-0123. CONTACT THE FAA (FEDERAL AVIATION ADMINISTRATION) FOR ASSISTANCE IN LOCATING FAA CABLES AND UTILITIES. LOCATION OF FAA POWER, CONTROL, AND COMMUNICATION CABLES SHALL BE COORDINATED WITH AND/OR LOCATED BY THE FAA. ALSO CONTACT AIRPORT DIRECTOR/MANAGER AND AIRPORT PERSONNEL FOR ASSISTANCE IN LOCATING UNDERGROUND AIRPORT CABLES AND/OR UTILITIES. ALSO COORDINATE WORK WITH ALL ABOVEGROUND UTILITIES.



**LEGEND**

- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING ELECTRICAL DUCT
- EXISTING ELECTRICAL CABLES
- EXISTING UNDERDRAIN
- EXISTING STORM SEWER
- EXISTING OVERHEAD ELECTRICAL SERVICE
- EXISTING TELEPHONE LINE
- EXISTING GAS LINE
- EXISTING UST EMERGENCY VENT PIPE
- EXISTING FENCE
- EXISTING STAKE MOUNTED TAXIWAY LIGHT
- EXISTING BASE MOUNTED TAXIWAY LIGHT
- EXISTING STAKE MOUNTED RUNWAY THRESHOLD LIGHT
- EXISTING BASE MOUNTED RUNWAY THRESHOLD LIGHT
- EXISTING TAXI GUIDANCE SIGN
- EXISTING INLET
- EXISTING BEACON
- EXISTING DUCT MARKER
- EXISTING END SECTION
- EXISTING POWER POLE



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REVISION	
DATE	
EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS	
A.I.P. PROJ.: 3-17-0040-B12 IL PROJ.: 1H2-4031	

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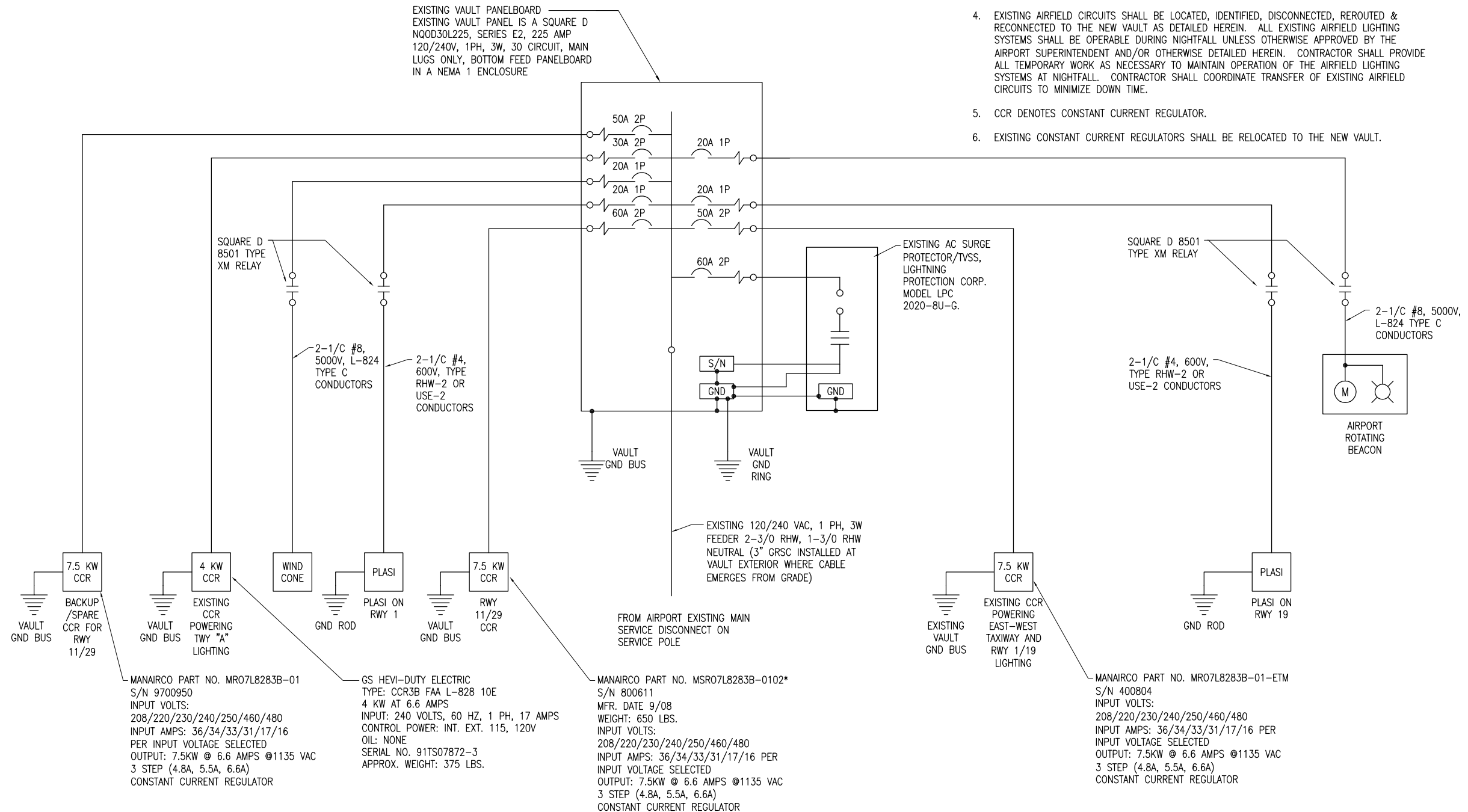
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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

EXISTING AIRPORT VAULT  
SITE PLAN

NOTES

1. THE EXISTING VAULT AND ELECTRICAL DISTRIBUTION SYSTEM HAS APPARENT N.E.C. VIOLATIONS WHICH MIGHT CAUSE UNSAFE WORKING CONDITIONS. APPARENT N.E.C. VIOLATIONS INCLUDE, BUT ARE NOT LIMITED TO, NO MAIN DISCONNECT AT VAULT SHELTER, INCORRECT CIRCUIT IDENTIFICATION, INCORRECT CONSTANT CURRENT REGULATOR IDENTIFICATION, IN ADEQUATE WORKING CLEARANCES, AND INCORRECT IDENTIFICATION OF FEEDER BRANCH CIRCUIT AND NEUTRAL CONDUCTORS. CONTRACTOR WILL NEED TO EXERCISE CAUTION WHEN WORKING AT THE AIRPORT.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS TO CONFIRM POWER AND CONTROL CIRCUITS.
3. ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT SUPERINTENDENT AND AIRPORT FBO MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
4. EXISTING AIRFIELD CIRCUITS SHALL BE LOCATED, IDENTIFIED, DISCONNECTED, REROUTED & RECONNECTED TO THE NEW VAULT AS DETAILED HEREIN. ALL EXISTING AIRFIELD LIGHTING SYSTEMS SHALL BE OPERABLE DURING NIGHTFALL UNLESS OTHERWISE APPROVED BY THE AIRPORT SUPERINTENDENT AND/OR OTHERWISE DETAILED HEREIN. CONTRACTOR SHALL PROVIDE ALL TEMPORARY WORK AS NECESSARY TO MAINTAIN OPERATION OF THE AIRFIELD LIGHTING SYSTEMS AT NIGHTFALL. CONTRACTOR SHALL COORDINATE TRANSFER OF EXISTING LIGHTING CIRCUITS TO MINIMIZE DOWN TIME.
5. CCR DENOTES CONSTANT CURRENT REGULATOR.
6. EXISTING CONSTANT CURRENT REGULATORS SHALL BE RELOCATED TO THE NEW VAULT.



EXISTING ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD

REVISION	DATE

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

A.I.P. PROJ.: 3-17-0040-B12  
IL PROJ.: 1H2-4031

Hanson Proj. No. 10A0078	7/30/2010
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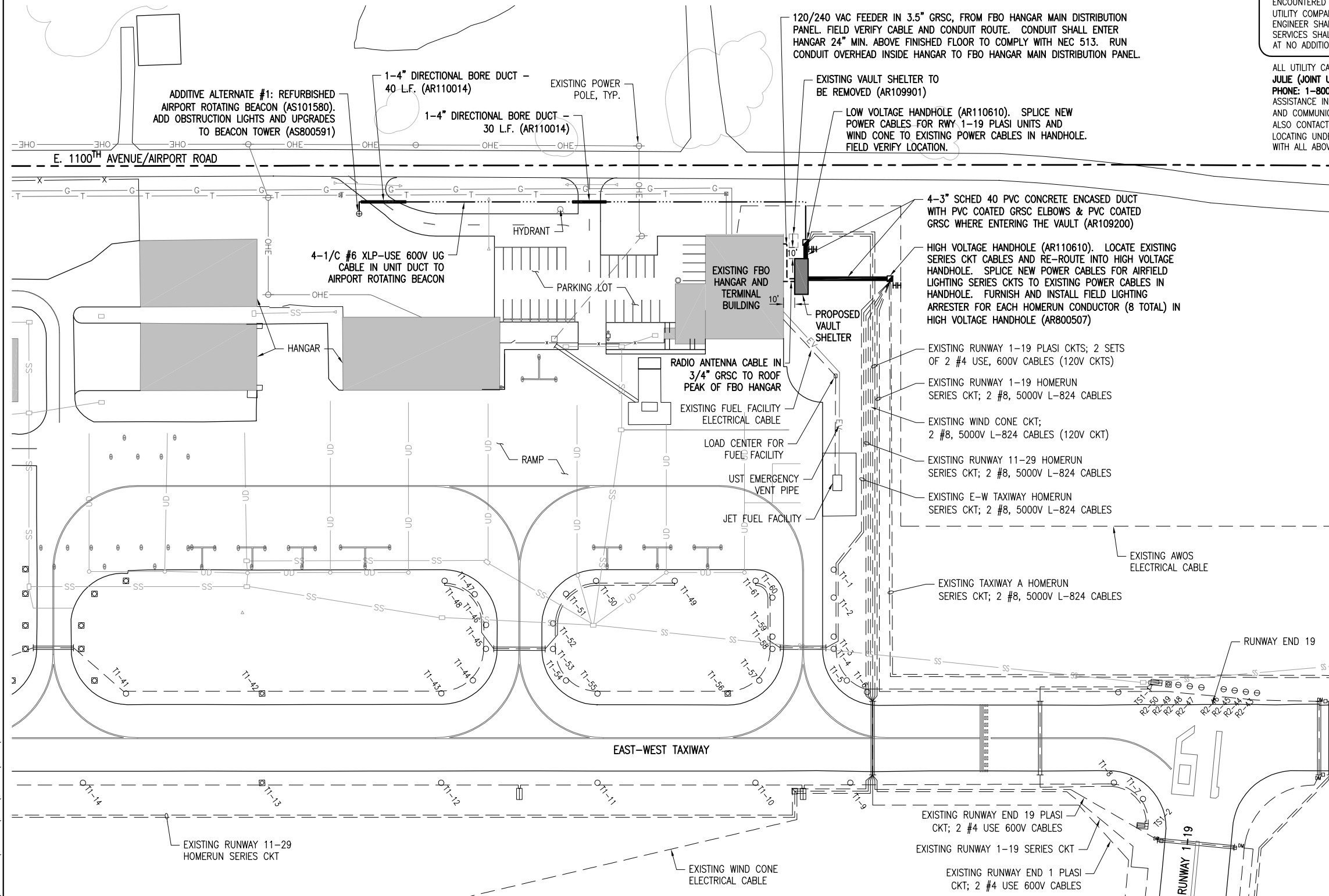
REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

EXISTING ELECTRICAL  
ONE-LINE FOR VAULT  
AND AIRFIELD

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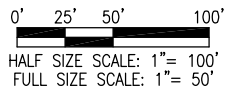
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**LEGEND**

	EXISTING PAVEMENT
	EXISTING BUILDING
	EXISTING ELECTRICAL DUCT
	PROPOSED ELECTRICAL DUCT
	PROPOSED 4-1/C #6 XLP-USE 600V UG CABLE IN UNIT DUCT
	PROPOSED ELECTRICAL CABLE
	EXISTING ELECTRICAL CABLES
	EXISTING UNDERDRAIN
	EXISTING STORM SEWER
	EXISTING OVERHEAD ELECTRICAL SERVICE
	EXISTING TELEPHONE LINE
	EXISTING GAS LINE
	EXISTING UST EMERGENCY VENT PIPE
	EXISTING FENCE
	EXISTING STAKE MOUNTED TAXIWAY LIGHT
	EXISTING BASE MOUNTED TAXIWAY LIGHT
	EXISTING STAKE MOUNTED RUNWAY THRESHOLD LIGHT
	EXISTING BASE MOUNTED RUNWAY THRESHOLD LIGHT
	EXISTING TAXI GUIDANCE SIGN
	EXISTING INLET
	EXISTING BEACON
	EXISTING DUCT MARKER
	EXISTING END SECTION
	EXISTING POWER POLE
	PROPOSED HANDHOLE



REVISION	DATE

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

IL PROJ.: 1H2-4031  
A.I.P. PROJ.: 3-17-0040-B12

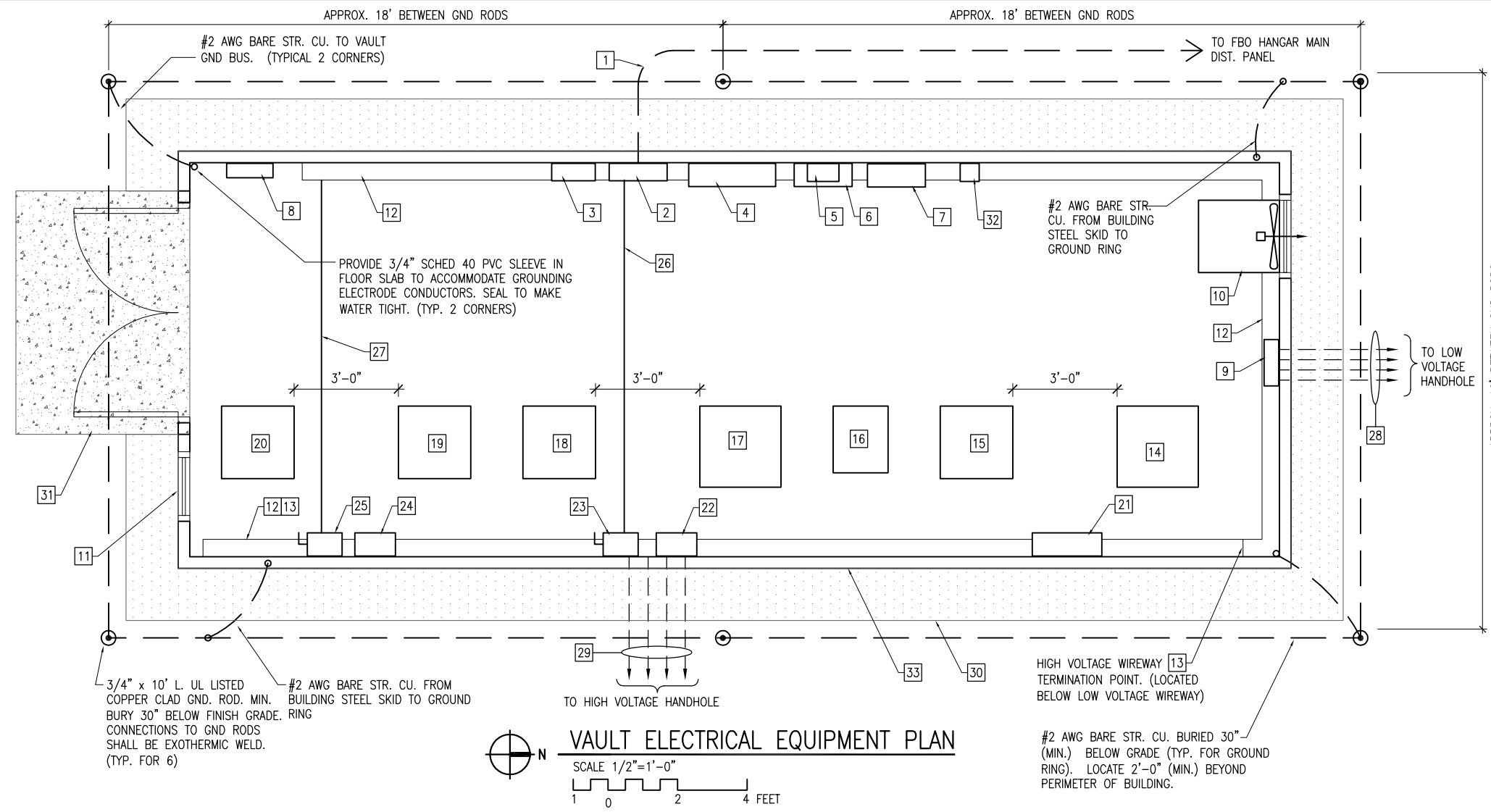
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DATE 08/17/10	DRAWN	REVIEWED
DATE 08/17/10	KNL/CAH	

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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

PROPOSED AIRPORT VAULT  
SITE PLAN

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**VAULT BUILDING NOTES**

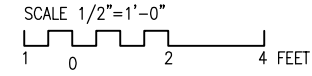
THE PROPOSED ELECTRICAL VAULT BUILDING SHALL CONSIST OF A PRE-FABRICATED, PRE-ENGINEERED EQUIPMENT ENCLOSURE BUILDING WITH A CONCRETE FLOOR, STEEL SKID STRUCTURE AND FOUNDATION PIERS OR WITH CONCRETE SLAB FOUNDATION.

THE PROPOSED ELECTRICAL VAULT BUILDING SHALL HAVE A NOMINAL 12 FOOT WIDE EXTERIOR (INTERIOR WIDTH SHALL NOT BE LESS THAN 11 FEET, ADJUST EXTERIOR WIDTH AS APPLICABLE) BY NOMINAL 32 FEET IN LENGTH (INTERIOR LENGTH SHALL NOT BE LESS THAN 31 FEET, ADJUST EXTERIOR LENGTH AS APPLICABLE) BY NOMINAL 9 FEET HIGH INTERIOR (FLOOR TO CEILING).

**GENERAL NOTES**

1. SEE "PROPOSED ELECTRICAL ONE-LINE FOR VAULT AND AIRFIELD" FOR LOW VOLTAGE INPUT POWER WIRING REQUIREMENTS TO CCR'S (CONSTANT CURRENT REGULATORS). SEE "HIGH VOLTAGE WIRING SCHEMATIC" FOR CCR OUTPUT WIRING REQUIREMENTS. SEE "AIRFIELD LIGHTING CONTROL WIRING SCHEMATIC" AND "TAXIWAY LIGHTING CONTROL WIRING SCHEMATIC" FOR CCR CONTROL WIRING REQUIREMENTS. PROVIDE 5 FEET MINIMUM CLEAR WORKING SPACE IN FRONT OF EACH CCR AND EACH SERIES PLUG CUTOUT.
2. CONSTANT CURRENT REGULATORS AND THEIR RESPECTIVE SERIES PLUG CUTOUTS SHALL BE CLEARLY LABELED TO IDENTIFY THE RESPECTIVE REGULATOR DESIGNATION, AND RUNWAY OR TAXIWAY SERVED.
3. SEE ELEVATION VIEWS FOR ADDITIONAL INFORMATION ON PROPOSED EQUIPMENT LAYOUTS.
4. COORDINATE CONDUIT & SLEEVE ENTRANCES THROUGH FLOOR SLAB AND WALLS.

**VAULT ELECTRICAL EQUIPMENT PLAN**



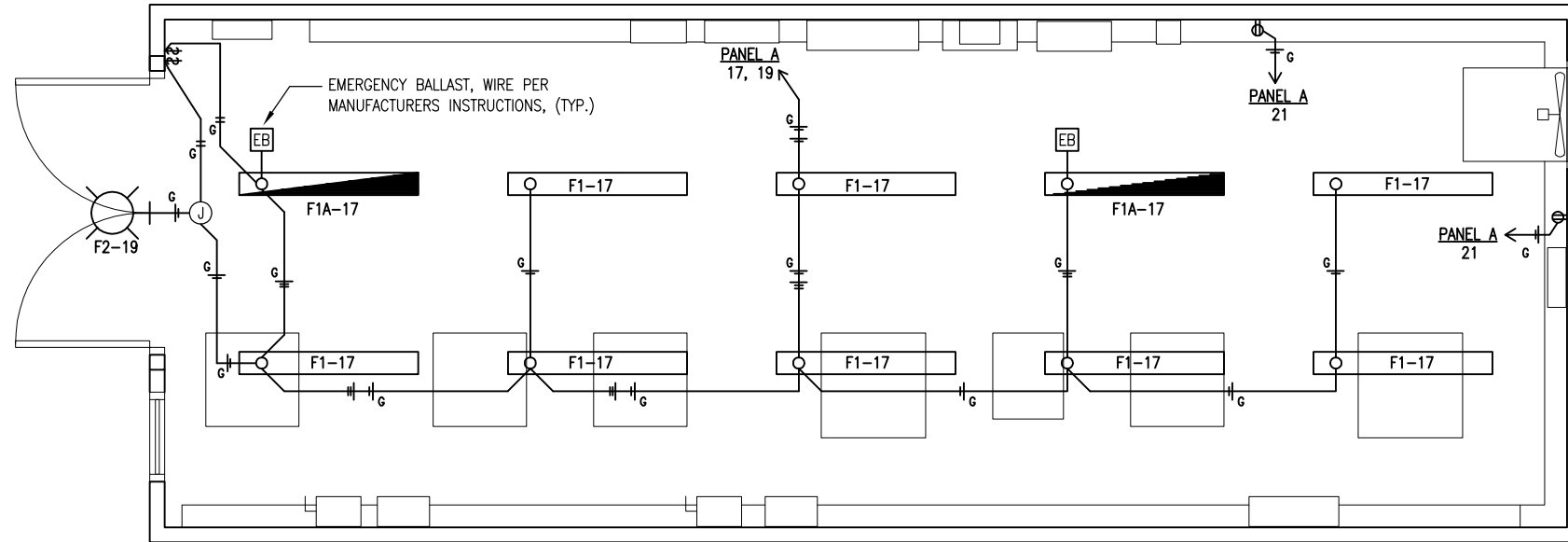
**KEYED NOTES**

- |  |   |  |
|--|---|--|
| <p>1 120/240 VAC, SINGLE PHASE FEEDER CONDUCTORS IN GRSC FROM FBO HANGAR MAIN DISTRIBUTION PANEL TO VAULT DISTRIBUTION PANEL. SEE "PROPOSED ELECTRICAL ONE-LINE FOR VAULT AND AIRFIELD".</p> <p>2 VAULT MAIN DISTRIBUTION PANEL A. SEE SCHEDULE.</p> <p>3 AC SURGE PROTECTOR/TVSS</p> <p>4 LIGHTING CONTACTOR PANEL. SEE "LIGHTING CONTACTOR PANEL DETAIL".</p> <p>5 L-854 RADIO CONTROL UNIT. EXTEND RADIO ANTENNA CABLE IN 3/4" GRSC AND MOUNT ANTENNA ON ROOF PEAK OF FBO HANGAR FOR PROPER OPERATION. PROVIDE SCHED 40 PVC NIPPLE AT ENTRY TO VAULT FOR ISOLATION. BOND EXTERIOR METAL CONDUIT TO GND RING WITH PIPE CLAMP AND #2 AWG BARE CU BONDING CONDUCTOR.</p> <p>6 RADIO RELAY INTERFACE PANEL WITH PHOTOCCELL BYPASS SWITCH FOR AIRFIELD LIGHTING SYSTEM. SEE "AIRFIELD LIGHTING CONTROL WIRING SCHEMATIC" FOR WIRING REQUIREMENTS. MOUNT PHOTOCCELL ABOVE ROOF LEVEL. FIELD VERIFY LOCATION FOR PROPER CONTROL AND OPERATION. PROVIDE SCHED 40 PVC NIPPLE AT ENTRY TO VAULT FOR ISOLATION. BOND EXTERIOR METAL CONDUIT TO GND RING WITH PIPE CLAMP AND #2 AWG CU BONDING CONDUCTOR.</p> <p>7 RADIO RELAY INTERFACE PANEL FOR TAXIWAY LIGHTING SYSTEM. SEE "TAXIWAY LIGHTING CONTROL WIRING SCHEMATIC" FOR WIRING REQUIREMENTS.</p> <p>8 ELECTRIC WALL HEATER EH-1, 4000 WATT, 240 VAC, 1 PHASE, SUITABLE FOR SURFACE MOUNTING WITH INTEGRAL THERMOSTAT, Q-MARK MODEL CWH3404, OR APPROVED EQUAL. HEATER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, &amp; THE "BUY AMERICAN ACT". LOCATED HEATER SUCH THAT IT IS NOT LESS THAN 8" FROM ADJACENT WALLS OR EQUIPMENT.</p> <p>9 ELECTRIC WALL HEATER EH-2 4000 WATT, 240 VAC, 1 PHASE, SUITABLE FOR SURFACE MOUNTING WITH INTEGRAL THERMOSTAT, Q-MARK MODEL CWH3404 OR APPROVED EQUAL. HEATER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, &amp; "BUY AMERICAN ACT". BOTTOM OF HEATER SHALL BE 8" (MIN.) ABOVE THE UPPER ELECTRICAL WIREWAY. COORDINATE WITH CCR INSTALLATION &amp; FAN INSTALLATION. LOCATE HEATER ON WALL SUCH THAT IT IS NOT DIRECTLY BEHIND CCR. LOCATE HEATER SUCH THAT IT IS NOT LESS THAN 8" FROM ADJACENT WALLS OR EQUIPMENT.</p> | <p>10 EXHAUST FAN EF-1, 3100 CFM (MINIMUM) AT .25" STATIC PRESSURE WITH 1/3 HP (MINIMUM), 120 VAC MOTOR, COOK MODEL 20S10D, OR APPROVED EQUAL. INCLUDE WALL HOUSING WITH GUARD, HEAVY DUTY BACK DRAFT DAMPER, ALUMINUM WEATHER-HOOD PAINTED TO MATCH BUILDING EXTERIOR, STAINLESS STEEL INSECT SCREEN, AND FRACTIONAL HP ELECTRICAL DISCONNECT. INSTALL FAN AS HIGH AS POSSIBLE. PROVIDE 120 VAC THERMOSTAT, AT 48" AFF. SEE EXHAUST FAN CONTROL SCHEMATIC FOR WIRING REQUIREMENTS. FAN SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, &amp; THE "BUY AMERICAN ACT".</p> <p>11 INTAKE LOUVER L-1, 24" WIDE BY 48" HIGH INTAKE LOUVER WITH STAINLESS STEEL INSECT SCREEN, FLANGED FRAME, 120 VAC LOW LEAK MOTORIZED DAMPER WITH LIMIT SWITCH, KYNAR FINISH MATCHING BUILDING EXTERIOR, RUSKIN MODEL ELF375DX, OR APPROVED EQUAL. SEE EXHAUST FAN CONTROL SCHEMATIC FOR WIRING REQUIREMENTS. LOUVER / DAMPER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, &amp; THE "BUY AMERICAN ACT".</p> <p>12 6" BY 6" LOW VOLTAGE WIREWAY. LABEL "LOW VOLTAGE" EVERY 6 FEET. INSTALL ABOVE HIGH VOLTAGE WIREWAY.</p> <p>13 6" BY 6" HIGH VOLTAGE WIREWAY. LABEL "HIGH VOLTAGE" EVERY 6 FEET. INSTALL BELOW LOW VOLTAGE WIREWAY.</p> <p>14 NEW EAST-WEST TAXIWAY REGULATOR (CCR #1). SEE GENERAL NOTE 1.</p> <p>15 RELOCATED MANAIRCO MR07L8283B-01, 7.5 KW REGULATOR FOR BACKUP/SPARE FOR TAXIWAY CIRCUITS (CCR #2). SEE GENERAL NOTE 1.</p> <p>16 RELOCATED HEVI-DUTY 4 KW REGULATOR FOR TAXIWAY "A" (CCR #3). SEE GENERAL NOTE 1.</p> <p>17 RELOCATED MANAIRCO MSR07L8283B-0102, 7.5 KW REGULATOR FOR RUNWAY 11-29 (CCR #4). SEE GENERAL NOTE 1.</p> <p>18 RELOCATED MANAIRCO MR07L8283B-01, 7.5 KW REGULATOR FOR BACKUP/SPARE FOR RUNWAY 11-29 (CCR #5). SEE GENERAL NOTE 1.</p> <p>19 RELOCATED MANAIRCO 4 KW REGULATOR FOR RUNWAY 1-19 (CCR #6). SEE GENERAL NOTE 1.</p> <p>20 RELOCATED MANAIRCO 4 KW REGULATOR FOR BACKUP/SPARE FOR RUNWAY 1-19 (CCR #7). SEE GENERAL NOTE 1.</p> <p>21 TAXIWAY CIRCUITS SERIES PLUG CUTOUTS (TYPE S-1) WITH ENCLOSURE.</p> | <p>22 TRANSFER PAIR SERIES PLUG CUTOUTS (TYPE S-1) WITH ENCLOSURE, FOR RUNWAY 11-29</p> <p>23 60 AMP, 240 VAC, 2P DOUBLE THROW FUSIBLE SAFETY SWITCH FOR RUNWAY 11-29 CCR'S</p> <p>24 TRANSFER PAIR SERIES PLUG CUTOUTS (TYPE S-1) WITH ENCLOSURE, FOR RUNWAY 1-19</p> <p>25 60 AMP, 240 VAC, 2P DOUBLE THROW NOT FUSIBLE SAFETY SWITCH FOR RUNWAY 1-19 CCR'S</p> <p>26 2 #6 THWN, 1 #8 GND IN 1" GRSC</p> <p>27 2 #8 THWN, 1 #8 GND IN 1" GRSC</p> <p>28 4-3" SCHEDULE 40 PVC DUCTS WITH CONCRETE ENCASEMENT AND 4-3" PVC COATED GRSC ELBOWS AND PVC COATED GRSC WHERE ENTERING THE VAULT FROM LOW VOLTAGE WIREWAY TO LOW VOLTAGE HANDHOLE</p> <p>29 4-3" SCHEDULE 40 PVC DUCTS WITH CONCRETE ENCASEMENT AND 4-3" PVC COATED GRSC ELBOWS AND PVC COATED GRSC WHERE ENTERING THE VAULT FROM HIGH VOLTAGE WIREWAY TO HIGH VOLTAGE HANDHOLE</p> <p>30 VEGETATION BARRIER CONSISTING OF A MIN. 6" PEA GRAVEL SURFACE OVER FILTER OR LANDSCAPING FABRIC. PROPOSED SURFACE TREATMENT WILL COVER ENTIRE AREA BENEATH VAULT STRUCTURE AS WELL AS 18" AROUND THE PERIMETER OF THE BUILDING EDGE. THE STONE AND FABRIC AS WELL AS ANY EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS TASK WILL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE PROPOSED ELECTRICAL VAULT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.</p> <p>31 ENTRANCE PAD CONSTRUCTED OF 6" MIN. CONCRETE SLAB W/ 6X6-W5XW5 WELDED WIRE FABRIC ON A COMPACTED SUBGRADE. MINIMUM DIMENSIONS OF PAD WILL BE 7'Wx5'Dx6"H, SLOPED AT A MIN. OF 0.5"/FT AWAY FROM THE VAULT ENTRANCE. THE CONCRETE PAD WILL BE PLACED AT LEAST 3" INTO THE EXISTING GRADE. STEP INTO VAULT BUILDING WILL NOT EXCEED 7". PCC USED TO CONSTRUCT THE PAD WILL CONFORM TO ITEM 610. ALL MATERIALS, LABOR AND EQUIPMENT USED TO CONSTRUCT THE PAD INCLUDING ANY GRADING REQUIRED WILL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE PROPOSED ELECTRICAL VAULT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.</p> <p>32 BOOSTER XFMR FOR RWY 1 PLASI.</p> <p>33 THE NUMBER, SIZE, DEPTH, REINFORCEMENT, AND LOCATION OF THE PROPOSED CONCRETE PIERS WILL BE COORDINATED WITH THE MANUFACTURER OF THE PROPOSED ELECTRICAL VAULT BUILDING. THE TOP OF THE PROPOSED PIERS WILL BE AT LEAST 4" ABOVE THE EXISTING GRADE.</p> |
|--|---|--|

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DATE									
<p><b>EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS</b></p> <p style="text-align: right;">A.I.P. PROJ.: 3-17-0040-B12 IL PROJ.: 1H2-4031</p>									
Hanson Proj. No. 10A00078	Filename EP-101.DWG	Scale NONE	Date	LAYOUT	KML 07/30/10	DRAWN	RLL 08/05/10	REVIEWED	KML/CAH 08/17/10
<p><b>HANSON</b> Professional Services Inc. 2011 1525 South Sixth Street Springfield, Illinois 62703-2886 Ph: (217) 788-2450 Fax: (217) 788-2503 www.hanson-inc.com Offices Nationwide</p>									
REPLACE ELECTRICAL VAULT AND EQUIPMENT					PROPOSED AIRPORT VAULT EQUIPMENT PLAN				
<p style="font-size: 2em; font-weight: bold;">8</p> <p style="text-align: right;">8 of 33 sheets</p>									

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NOTES

1. 15 AMP & 20 AMP BRANCH CIRCUITS FOR LIGHTING AND RECEPTACLES SHALL USE #12 AWG THWN (MIN.)
2. LIGHT FIXTURES SHALL BE MANUFACTURED IN THE UNITES STATES OF AMERICA TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWINGS SUBMITTAL.
3. ADJUST RECEPTACLE LOCATIONS WHERE NECESSARY TO ACCOMMODATE EQUIPMENT LAYOUT.
4. TEST EMERGENCY LIGHTING AND CONFIRM PROPER OPERATION WITH RESIDENT ENGINEER.

 **VAULT LIGHTING AND RECEPTACLE PLAN**  
SCALE 1/2"=1'-0"  


LIGHTING FIXTURE SCHEDULE						
FIXT. TYPE	DESCRIPTION	MANUFACTURER AND CATALOG NO.	LAMPS/WATTS	VOLTS	MOUNTING	REMARKS
F1	4 FT. WET LOCATION LISTED ENCLOSED AND GASKETED INDUSTRIAL FLUORESCENT LIGHT FIXTURE. IMPACT RESISTANT, UV RESISTANT, REINFORCED POLYESTER FIBERGLASS HOUSING, HIGH IMPACT ACRYLIC DIFFUSER, RAPID START, COLD WEATHER 0 DEG. F. ELECTRONIC BALLAST WITH LESS THAN OR EQUAL TO 10% THD	LITHONIA: DMW-2-32-AR-120-CW-GEB10RS-WLF-USPOM, OR APPROVED EQUAL	2-32W T8 4100K 59 TOTAL INPUT WATTS	120	SURFACE TO HARD CEILING	PROVIDE WET LOCATION FITTINGS INSTALLED IN TOP OF FIXTURE
F1A	SAME AS F1 EXCEPT PROVIDE AN EMERGENCY BALLAST CAPABLE OF OPERATING 2 LAMPS FOR 90 MINUTES AT 1100-1200 TOTAL LUMENS, BODINE #B50ST. NOTE: CONFIRM WITH LIGHT FIXTURE MFR. IF BALLAST WILL HAVE TO BE REMOTE MOUNTED NEAR FIXTURE AS INDICATED ON THE PLANS.	LITHONIA: DMW-2-32-AR-120-CW-GEB10RS-WLF-USPOM, OR APPROVED EQUAL	2-32W T8 4100K 59 TOTAL INPUT WATTS	120	SURFACE TO HARD CEILING	PROVIDE WET LOCATION FITTINGS INSTALLED IN TOP OF FIXTURE
F2	COMPACT FLUORESCENT WALL-PAK, ONE PIECE INJECTION MOLDED UV STABILIZED POLYCARBONATE HOUSING. HIGH PERFORMANCE SPECULAR ANODIZED SEGMENTED REFLECTOR, ONE PIECE HIGH TEMPERATURE SILICONE GASKET, MEDIUM BRONZE FINISH. HIGH POWER FACTOR ELECTRONIC BALLAST WITH LESS THAN OR EQUAL TO 10% THD, UL LISTED FOR WET LOCATIONS	LITHONIA: TWA-42TRT-120-SF-CR-DMB-LPI-USPOM, OR APPROVED EQUAL	1-42W TRT 4100K 47 TOTAL INPUT WATTS	120	SURFACE TO WALL ABOVE EXTERIOR DOOR APPROX. 4" ABOVE TOP OF DOOR FRAME	CONNECT TO WALL SWITCH LOCATED ON THE INSIDE OF THE BUILDING

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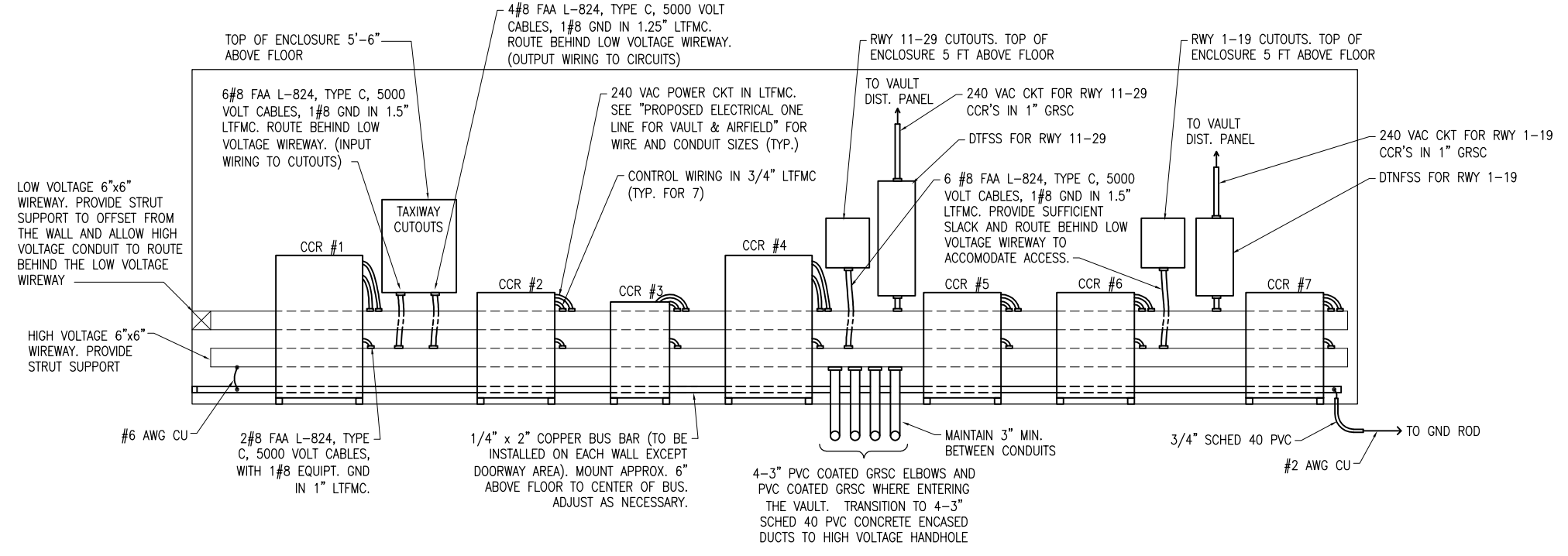
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MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS  
A.I.P. PROJ.: 3-17-0040-B12  
IL PROJ.: 1H2-4031

Hanson Proj. No. 10A00078	EL-101.DWG	AS SHOWN	07/30/10
Scale	AS SHOWN	AS SHOWN	08/05/10
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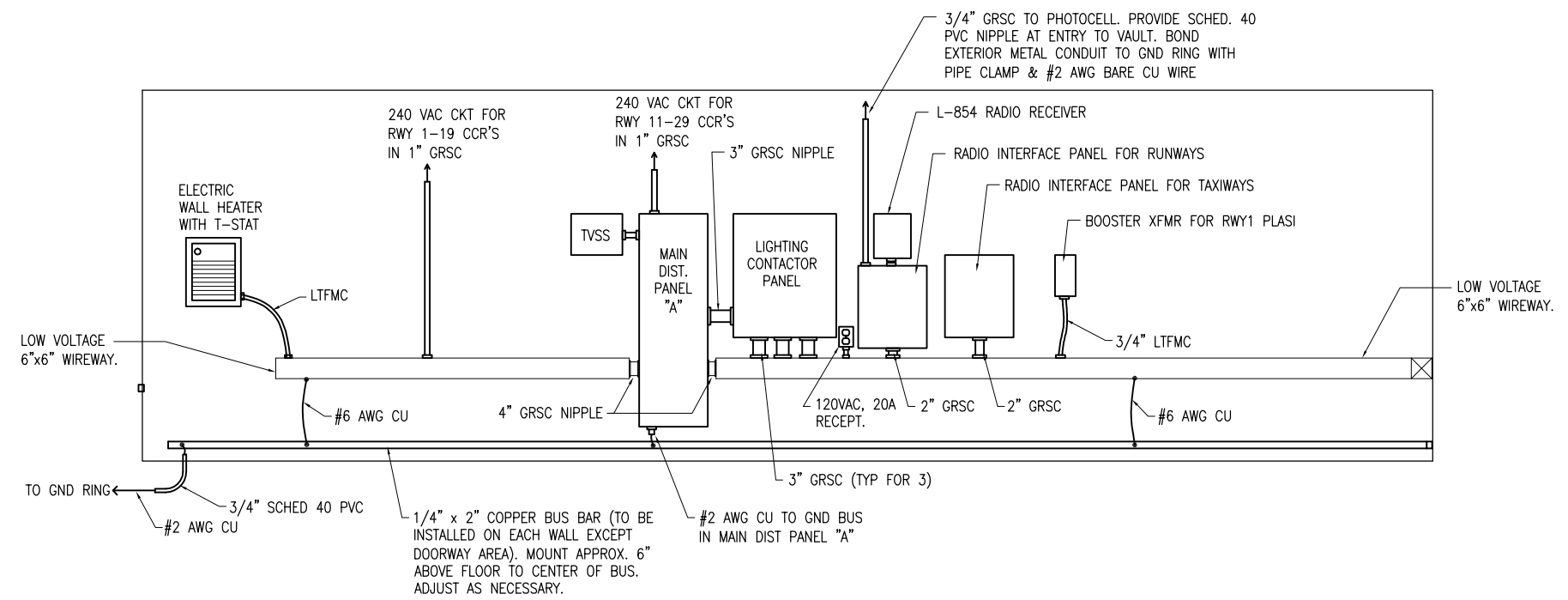
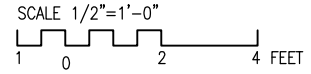
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REPLACE ELECTRICAL  
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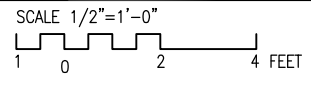
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VAULT EAST WALL ELEVATION



VAULT WEST WALL ELEVATION



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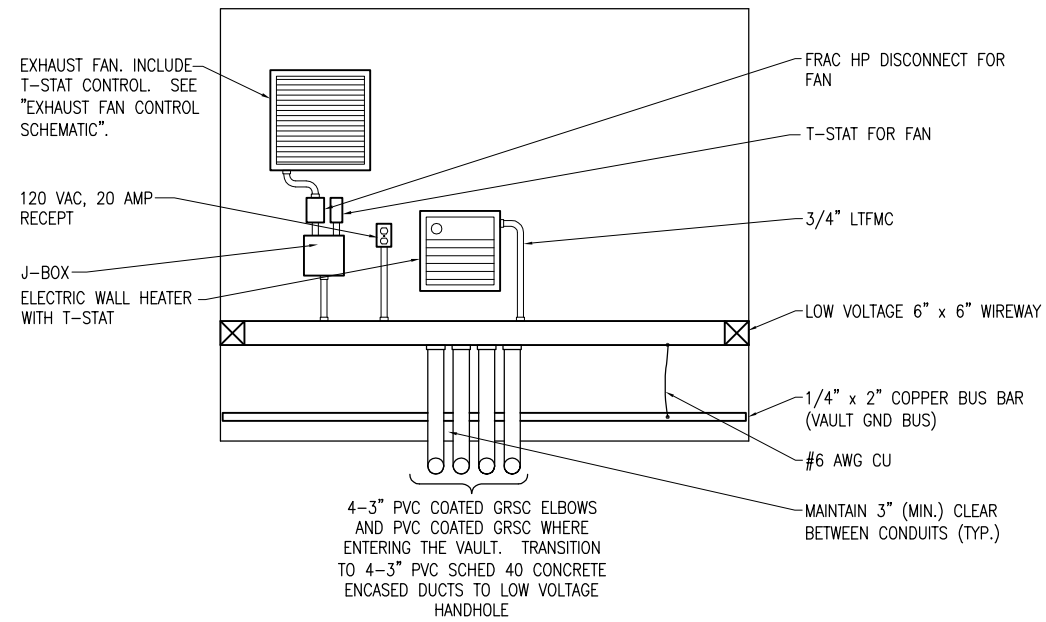
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REPLACE ELECTRICAL VAULT AND EQUIPMENT

PROPOSED AIRPORT VAULT WALL ELEVATIONS (SHEET 1)

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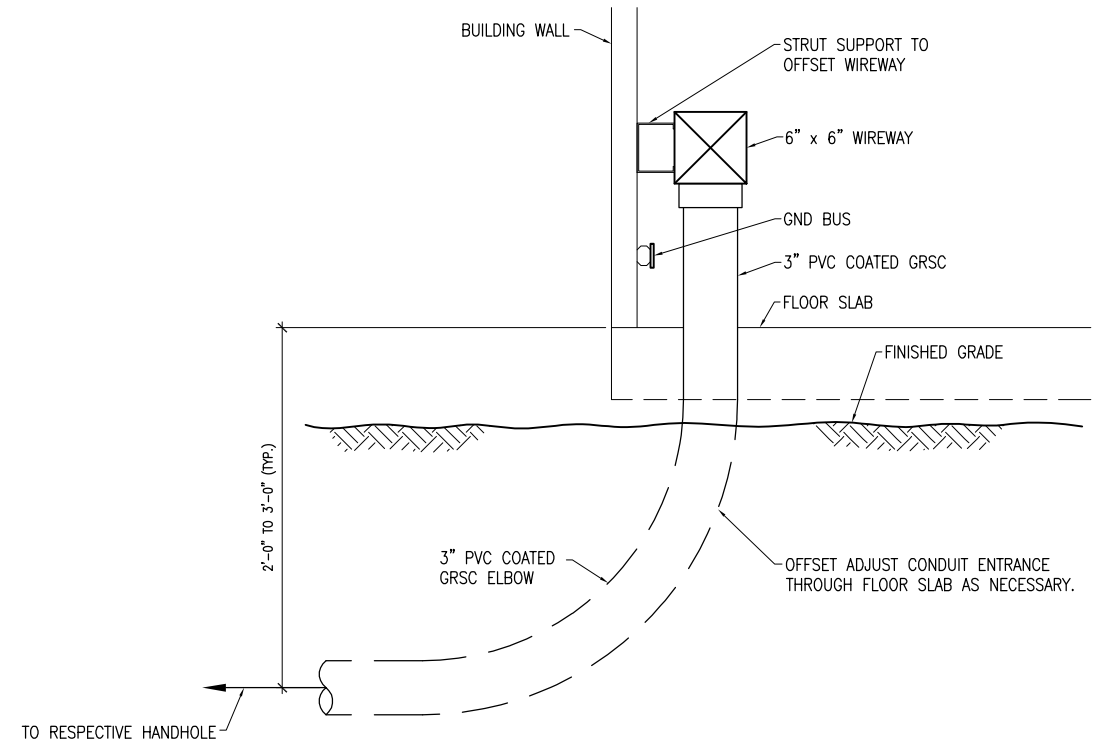


VAULT NORTH WALL ELEVATION

SCALE 1/2"=1'-0"  
 1 0 2 4 FEET

NOTES:

- CONDUITS EXITING THE VAULT FOR AIRFIELD LIGHTING AND NAVAIDS CIRCUITS SHALL BE PVC COATED GALVANIZED RIGID STEEL CONDUITS, AND SHALL TRANSITION TO SCHED 40 PVC CONCRETE ENCASED DUCT BELOW GRADE. THIS REQUIREMENT IS TO COMPLY WITH FAA AC 150/5340-30D, CHAPTER 13, PART 13.2 POWER DISTRIBUTION, ITEM e, WHICH STATES IN THE LAST SENTENCE, "BRING THE PRIMARY SERIES CABLES FROM THE REGULATORS AND VARIOUS OTHER FEEDERS OUT OF THE VAULT IN COATED RIGID STEEL GALVANIZED CONDUIT OR PVC CONDUIT, A MINIMUM OF 2 FEET BELOW GRADE."



CONDUIT ENTRANCE DETAIL

SCALE 1 1/2"=1'-0"  
 0.5 0 1 2 FEET

REVISION

DATE

EFFINGHAM COUNTY  
 MEMORIAL AIRPORT  
 EFFINGHAM, ILLINOIS

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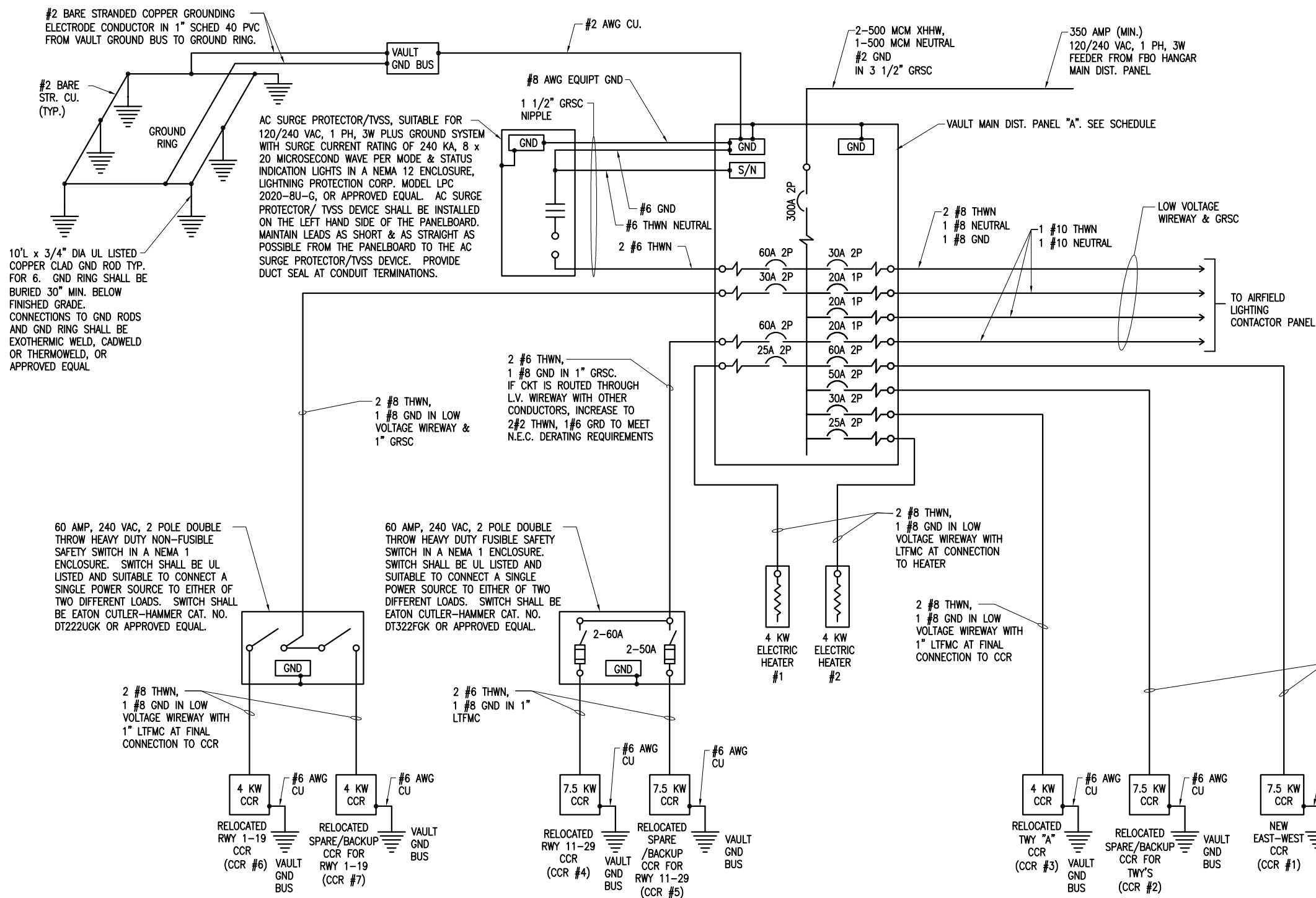
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REPLACE ELECTRICAL  
 VAULT AND EQUIPMENT

PROPOSED AIRPORT VAULT  
 WALL ELEVATIONS (SHEET 2)

NOTES

1. ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT SUPERINTENDENT AND THE AIRPORT FBO MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
2. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 70 - NATIONAL ELECTRICAL CODE (NEC) MOST CURRENT ISSUE IN FORCE, THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES AND REQUIREMENTS IN FORCE. ANY INSTALLATIONS WHICH VOID THE U.L. LISTING, ETL LISTING, (OR OTHER THIRD PARTY LISTING) AND/OR THE MANUFACTURER'S WARRANTY OF A DEVICE WILL NOT BE PERMITTED.
3. ALL CONDUCTORS/WIRING SHALL BE COPPER.
4. CONTRACTOR SHALL CONFIRM POWER REQUIREMENTS WITH THE ACTUAL NAMEPLATE ON EACH CONSTANT CURRENT REGULATOR (OR OTHER RESPECTIVE EQUIPMENT) AND ADJUST CIRCUIT BREAKER, WIRE SIZES & CONDUIT SIZES TO CONFORM WITH NEC & MANUFACTURER'S RECOMMENDATIONS WHERE APPLICABLE. WIRE SIZES SHOWN ON THE PLANS ARE MINIMUM.
5. HIGH VOLTAGE & LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME WIREWAY, CONDUIT, HANDHOLE, JUNCTION BOX, OR RACEWAY.
6. LTFMC DENOTES LIQUID TIGHT FLEXIBLE METAL CONDUIT UL LISTED, SUNLIGHT RESISTANT, & SUITABLE FOR GROUNDING. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LTFMC THAT IS NOT UL LISTED. CONFIRM LTFMC BEARS THE UL LABEL PRIOR TO INSTALLATION.



PROPOSED ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD

REVISION	DATE

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

IL PROJ.: 1H2-4031 A.I.P. PROJ.: 3-17-0040-B12

Hanson Proj. No. 10A0078	Filename E-602.DWG	Scale NONE	Date 07/30/10
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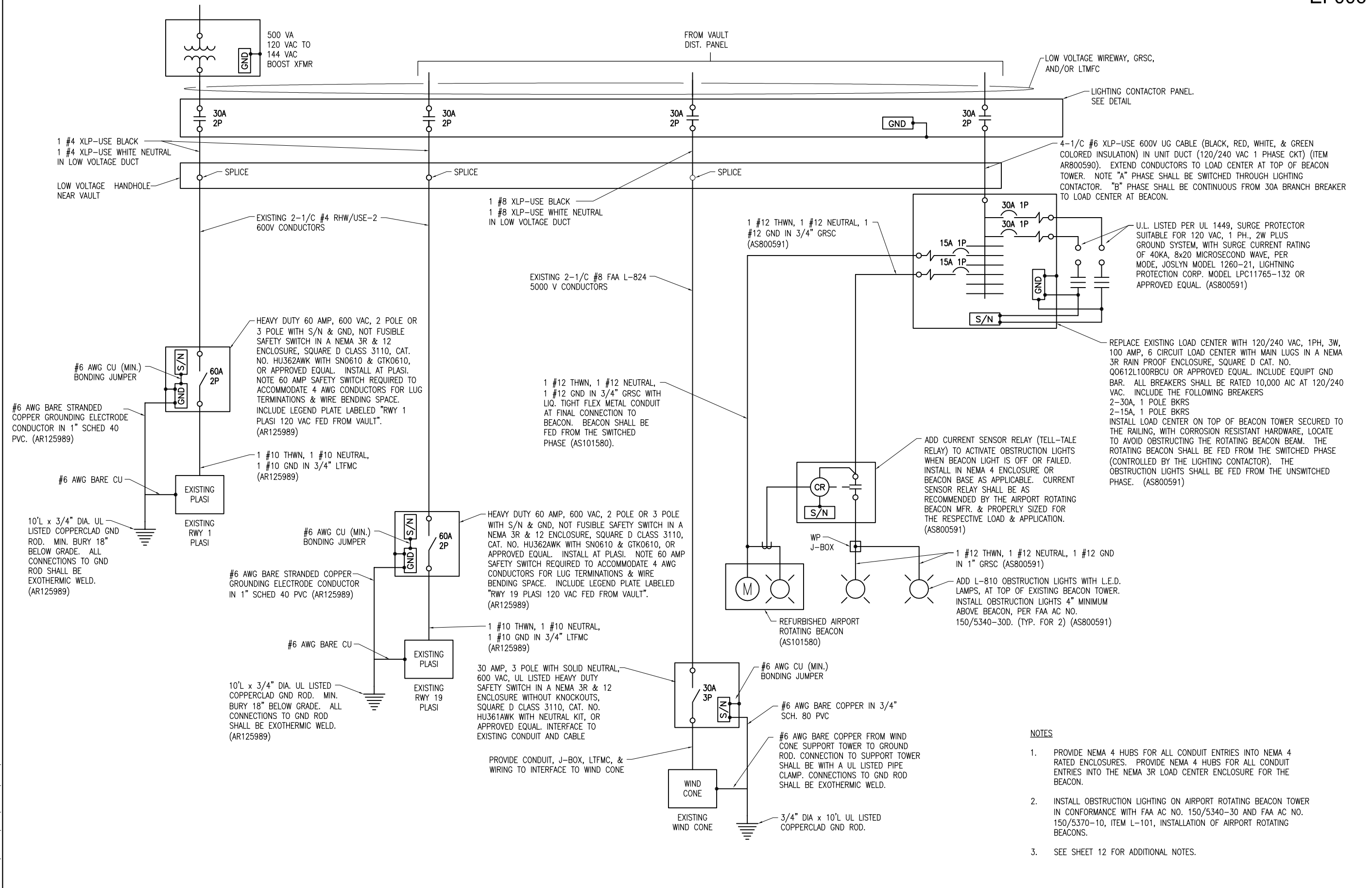
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REPLACE ELECTRICAL  
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PROPOSED ELECTRICAL  
ONE-LINE FOR VAULT AND  
AIRFIELD (SHEET 1)

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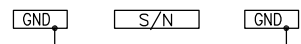
**NOTES**

1. PROVIDE NEMA 4 HUBS FOR ALL CONDUIT ENTRIES INTO NEMA 4 RATED ENCLOSURES. PROVIDE NEMA 4 HUBS FOR ALL CONDUIT ENTRIES INTO THE NEMA 3R LOAD CENTER ENCLOSURE FOR THE BEACON.
2. INSTALL OBSTRUCTION LIGHTING ON AIRPORT ROTATING BEACON TOWER IN CONFORMANCE WITH FAA AC NO. 150/5340-30 AND FAA AC NO. 150/5370-10, ITEM L-101, INSTALLATION OF AIRPORT ROTATING BEACONS.
3. SEE SHEET 12 FOR ADDITIONAL NOTES.

**PROPOSED ELECTRICAL ONE-LINE FOR VAULT & AIRFIELD (CONTINUED)**

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DATE			
Hanson Proj. No. 10A0078 Filename E-603.DWG Scale NONE Date	LAYOUT 07/30/10 DRAWN KNL REVIEWED KNL/CAH		
<p style="font-size: 8px; margin: 0;">© Copyright Hanson Professional Services Inc. 2011 Hanson Professional Services Inc. 1525 South Sixth Street Springfield, Illinois 62703-2986 Ph: (217) 788-2450 Fax: (217) 788-2503 www.hanson-inc.com Offices Nationwide</p>		<p style="font-weight: bold; margin: 0;">REPLACE ELECTRICAL VAULT AND EQUIPMENT</p> <p style="font-weight: bold; margin: 0;">PROPOSED ELECTRICAL ONE-LINE FOR VAULT AND AIRFIELD (SHEET 2)</p>	13
			13 of 33 sheets

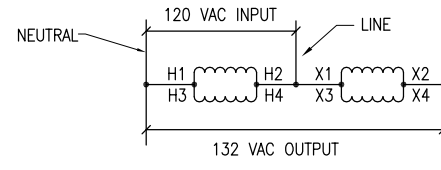
VAULT MAIN DISTRIBUTION PANEL "A" SCHEDULE						
CKT #	DUTY	SIZE		SIZE	DUTY	CKT #
1	AC SURGE PROTECTOR / TVSS	60A		30A	AIRPORT ROTATING BEACON	2
3		2P		2P		4
5	RUNWAY 1/19 CCR'S	30A		20A 1P	WIND CONE	6
7		2P		20A 1P	RUNWAY 1 PLASI	8
9	RUNWAY 11/29 CCR'S	60A		20A 1P	RUNWAY 19 PLASI	10
11		2P		10A 1P	L-854 RADIO & CONTROL POWER	12
13	ELECTRIC HEATER #1	25A		60A	EAST-WEST TAXIWAY CCR	14
15		2P		2P		16
17	INTERIOR LIGHTS	15A 1P		50A	BACKUP CCR FOR TAXIWAYS	18
19	EXTERIOR LIGHTS	15A 1P		2P		20
21	RECEPTACLES	20A 1P		30A	TAXIWAY A CCR	22
23	SPARE	15A 1P		2P		24
25	SPARE	20A 1P		25A	ELECTRIC HEATER #2	26
27	SPARE	20A 1P		2P		28
29	BLANK			20A 1P	EXHAUST FAN	30
31	BLANK			25A 1P	SPARE	32
33	BLANK			30A 1P	SPARE	34
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39	BLANK			----	BLANK	40
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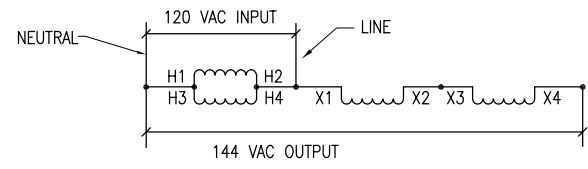
400 AMP, 120/240 VAC, 1 PHASE, 3 WIRE, 42 CIRCUIT PANELBOARD WITH 300 AMP, 2 POLE MAIN BREAKER WITH 22,000 AIC AT 240 VAC IN A NEMA 1 ENCLOSURE, UL LISTED SUITABLE FOR SERVICE ENTRANCE. INCLUDE TWO SEPARATE COPPER GROUND BAR KITS. ALL FEEDER AND BRANCH BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC RATING AT 120/240 VAC. PANELBOARD SHALL BE SQUARE D NQ TYPE OR APPROVED EQUAL.

**NOTES**

- PANELBOARD BUSES SHALL BE COPPER. NEUTRAL SHALL BE COPPER. EQUIPMENT GROUND BAR SHALL BE COPPER.
- ALL BRANCH CIRCUIT & FEEDER BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC AT 120/240 VAC.
- INCLUDE ENGRAVED, PHENOLIC OR PLASTIC LEGEND PLATE LABELED "VAULT MAIN DIST. PANEL A, 120/240 VAC, 1PH, 3W". INCLUDE ADDITIONAL LEGEND PLATE FOR THE MAIN BREAKER LABELED "MAIN DISCONNECT".
- PANELBOARD SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.
- CIRCUIT BREAKERS AND WIRING SHALL BE SIZED FOR THE ACTUAL EQUIPMENT FURNISHED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S RECOMMENDATION AND N.E.C. CONTRACTOR SHALL ADJUST CIRCUIT BREAKER SIZES & WIRING WHERE APPLICABLE TO CONFORM WITH THE MANUFACTURER'S RECOMMENDATIONS AND N.E.C.



**120 VAC TO 132 VAC BOOST TRANSFORMER CONNECTION DIAGRAM**  
**120 x 240 VAC PRIMARY, 12/24 VAC SECONDARY TRANSFORMER**



**120 VAC TO 144 VAC BOOST TRANSFORMER CONNECTION DIAGRAM**  
**120 x 240 VAC PRIMARY, 12/24 VAC SECONDARY TRANSFORMER**

**NOTES**

- WIRING DIAGRAM SHOWN IS TYPICAL FOR MULTIPLE 120 x 240 VAC PRIMARY, 12/24 VAC SECONDARY BUCK-BOOST TRANSFORMERS FROM VARIOUS MANUFACTURERS. WIRING MAY VARY BETWEEN MANUFACTURERS. CONFIRM WIRING WITH RESPECTIVE TRANSFORMER MFR.
- PROVIDE BOOST TRANSFORMER AT VAULT WHERE VOLTAGE DROP FROM VAULT TO RESPECTIVE PLASI UNIT EXCEEDS 5% (6 VOLTS FOR 120 VAC NORMAL SUPPLY). MEASURE VOLTAGE AT PLASI UNIT WITH PLASI OPERATING. ADJUST CONNECTIONS TO BOOST TRANSFORMER TO PROVIDE VOLTAGE WITHIN 5% OF 120 VAC AT RESPECTIVE PLASI UNIT.
- BOOST TRANSFORMER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT AND THE "BUY AMERICAN ACT".

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 EFFINGHAM, ILLINOIS  
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REPLACE ELECTRICAL  
 VAULT AND EQUIPMENT

PANELBOARD SCHEDULES  
 AND DETAILS

CONSTANT CURRENT REGULATOR SCHEDULE		
REGULATOR DESIGNATION	NAMEPLATE DATA	COMMENTS
CCR #1 EAST-WEST TAXIWAY CCR	CONSTANT CURRENT REGULATOR FOR EAST-WEST TAXIWAY SHALL BE A 7.5 KW, L-828 CONSTANT CURRENT REGULATOR, 240 VAC, SINGLE-PHASE, 60 HERTZ INPUT, 6.6-AMPS OUTPUT, WITH THREE OUTPUT BRIGHTNESS STEPS (4.8, 5.5, AND 6.6-AMPS). SEE SPECIAL PROVISION SPECS FOR REQUIREMENTS.	THIS WILL BE A NEW REGULATOR FURNISHED AND INSTALLED BY THE CONTRACTOR.
CCR #2 SPARE CCR FOR TAXIWAYS	FAA L-828 MANAIRCO PART NO. MR07L8283B-01-ETM SERIAL NO. 400804 MFR. DATE: 10/04 WEIGHT: 700 LBS ONE PHASE INPUT: 208/220/230/240/250/460/480 VOLTS, 60 HZ INPUT AMPERES: 36/34/33/32/30/17/16 PER INPUT VOLTAGE SELECTED INTERNAL/EXTERNAL CONTROL: 120 VOLTS, 60 HZ OUTPUT RATING: 7.5 KW AT 6.6 AMPS AT 1135 VOLTS OUTPUT CURRENT STEPS: 4.8/5.5/6.6 AMPERES	THIS REGULATOR WAS CONNECTED TO EAST-WEST TAXIWAY AND RUNWAY 1/19 CIRCUITS (TWO CIRCUITS) AS OF 7/7/2010. REGULATOR SHALL BE RELOCATED TO THE NEW VAULT.
CCR #3 TAXIWAY "A" CCR	GS HEVI-DUTY ELECTRIC TYPE: CCR3B FAA L-828 10E 4 KW AT 6.6 AMPS INPUT: 240 VOLTS, 60 HZ, 1 PH, 17 AMPS CONTROL POWER: INT. EXT. 115. 120 V OIL: NONE SERIAL NO. 91TS07872-3 APPROXIMATE WEIGHT: 375 LBS	THIS REGULATOR WAS CONNECTED TO TAXIWAY "A" LIGHTING AS OF 7/7/2010. REGULATOR SHALL BE RELOCATED TO THE NEW VAULT.
CCR #4 RUNWAY 11/29 CCR	FAA L-828 MANAIRCO PART NO. MSR07L8283B-0102* SERIAL NO. 800611 MFR. DATE: 9/08 WEIGHT: 650 LBS ONE PHASE INPUT: 208/240 VOLTS, 60 HZ INPUT AMPERES: 36/34 INTERNAL/EXTERNAL CONTROL: 120 VOLTS, 60 HZ OUTPUT RATING: 7.5/3.8 KW AT 6.6 AMPS AT 1135/575 VOLTS AC OUTPUT CURRENT STEPS: 4.8/5.5/6.6 AMPS * WITH ELAPSED TIME METER AND OUTPUT VOLTMETER	THIS REGULATOR WAS CONNECTED TO RUNWAY 11-29 LIGHTING AS OF 7/7/2010. REGULATOR SHALL BE RELOCATED TO THE NEW VAULT.
CCR #5 SPARE FOR RUNWAY 11/29	FAA L-828 MANAIRCO PART NO. MR07L8283B-01 SERIAL NO. 9700950 MFR. DATE: 9/97 WEIGHT: 700 LBS ONE PHASE INPUT: 208/220/230/240/250/460/480 VOLTS, 60 HZ INPUT AMPERES: 36/34/33/32/30/17/16 PER INPUT VOLTAGE SELECTED INTERNAL/EXTERNAL CONTROL: 120 VOLTS, 60 HZ OUTPUT RATING: 7.5 KW AT 6.6 AMPS AT 1135 VOLTS OUTPUT CURRENT STEPS: 4.8/5.5/6.6 AMPERES	THIS REGULATOR WAS CONNECTED TO RUNWAY 11-29 LIGHTING FOR USE AS A BACKUP/SPARE UNIT AS OF 7/7/2010. REGULATOR SHALL BE RELOCATED TO THE NEW VAULT.
CCR #6 RUNWAY 1/19 CCR	FAA L-828 MANAIRCO PART NO. MSR04L8283B-0102 SERIAL NO. 1000246-1 MFR. DATE: 4-2010 WEIGHT: 400 LBS ONE PHASE INPUT: 208/240 VOLTS, 60 HZ INPUT AMPERES: 21/19 INTERNAL/EXTERNAL CONTROL: 120 VOLTS, 60 HZ OUTPUT RATING: 4 / 2 KW AT 6.6 AMPS AT 606/303 VOLTS AC OUTPUT CURRENT STEPS: 4.8/5.5/6.6 AMPS * WITH ELAPSED TIME METER, OUTPUT CURRENT INDICATOR, & OUTPUT WATTMETER	THIS IS A REGULATOR STORED IN FBO HANGAR. REGULATOR SHALL BE RELOCATED TO THE NEW VAULT.
CCR #7 SPARE FOR RUNWAY 1/19	FAA L-828 MANAIRCO PART NO. MSR04L8283B-0102 SERIAL NO. 1000246-2 MFR. DATE: 4-2010 WEIGHT: 400 LBS ONE PHASE INPUT: 208/240 VOLTS, 60 HZ INPUT AMPERES: 21/19 INTERNAL/EXTERNAL CONTROL: 120 VOLTS, 60 HZ OUTPUT RATING: 4 / 2 KW AT 6.6 AMPS AT 606/303 VOLTS AC OUTPUT CURRENT STEPS: 4.8/5.5/6.6 AMPS * WITH ELAPSED TIME METER, OUTPUT CURRENT INDICATOR, & OUTPUT WATTMETER	THIS IS A REGULATOR STORED IN FBO HANGAR. REGULATOR SHALL BE RELOCATED TO THE NEW VAULT.

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REVISION		DATE	
EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS			
Hanson Proj. No. 10A0078		A.I.P. PROJ.: 3-17-0040-B12	
Filename: E-615.DWG		IL PROJ.: 1H2-4031	
Scale: NONE			
Date:			
LAYOUT	KNL	07/30/10	
DRAWN	RL	08/10/10	
REVIEWED	KNL/CAH	08/17/10	
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REPLACE ELECTRICAL VAULT AND EQUIPMENT		CONSTANT CURRENT REGULATOR SCHEDULE	
<span style="font-size: 24pt; font-weight: bold;">15</span> 15 of 33 sheets			

LEGEND PLATE SCHEDULE	
DEVICE	LABEL
MAIN DISTRIBUTION VAULT PANELBOARD "A"	PANEL "A" 120/240 VAC, 1 PH, 3W
MAIN BREAKER IN VAULT PANEL "A"	MAIN DISCONNECT
EAST-WEST TAXIWAY CCR	CCR #1 EAST-WEST TAXIWAY
BACKUP/SPARE CCR FOR TAXIWAYS	CCR #2 SPARE CCR FOR TAXIWAYS
TAXIWAY "A" CCR	CCR #3 TAXIWAY "A"
RUNWAY 11-29 CCR	CCR #4 RUNWAY 11-29
BACKUP/SPARE CCR FOR RUNWAY 11-29	CCR #5 SPARE FOR RUNWAY 11-29
RUNWAY 1-19 CCR	CCR #6 RUNWAY 1-19
BACKUP/SPARE CCR FOR RUNWAY 1-19	CCR #7 SPARE FOR RUNWAY 1-19
CUTOUT ENCLOSURE FOR TAXIWAYS	TAXIWAY CUTOUTS
TAXIWAY CUTOUT #1	#1
TAXIWAY CUTOUT #2	#2
TAXIWAY CUTOUT #3	#3
TAXIWAY CUTOUT #4	#4
TAXIWAY CUTOUT #5	#5
EACH TAXIWAY CUTOUT INPUT SIDE CONNECTION (5 LEGEND PLATES)	INPUT
EACH TAXIWAY CUTOUT OUTPUT SIDE CONNECTION (5 LEGEND PLATES)	OUTPUT
CUTOUT ENCLOSURE FOR RUNWAY 11-29	RUNWAY 11-29 CUTOUTS
NORMAL CUTOUT INPUT SIDE CONNECTION FOR RUNWAY 11-29	NORMAL CCR INPUT
SPARE CUTOUT INPUT SIDE CONNECTION FOR RUNWAY 11-29	SPARE CCR INPUT
EACH CUTOUT (RUNWAY 11-29) OUTPUT SIDE CONNECTION (2 LEGEND PLATES)	OUTPUT
CUTOUT ENCLOSURE FOR RUNWAY 1-19	RUNWAY 1-19 CUTOUTS
NORMAL CUTOUT INPUT SIDE CONNECTION FOR RUNWAY 1-19	NORMAL CCR INPUT
SPARE CUTOUT INPUT SIDE CONNECTION FOR RUNWAY 1-19	SPARE CCR INPUT
EACH CUTOUT (RUNWAY 1-19) OUTPUT SIDE CONNECTION (2 LEGEND PLATES)	OUTPUT

LEGEND PLATE SCHEDULE CONTINUED	
DEVICE	LABEL
EACH CUTOUT ENCLOSURE (3 LEGEND PLATES)	CAUTION OPERATE CUTOUTS WITH CCR'S SHUT OFF
PLASI RUNWAY 1 BOOST TRANSFORMER LOCATE ABOVE TRANSFORMER	RWY 1 PLASI
RADIO RELAY INTERFACE PANEL	RADIO RELAY INTERFACE PANEL
MANUAL TRANSFER SWITCH FOR RUNWAY 11-29 NORMAL CCR AND SPARE/BACKUP CCR	TRANSFER SWITCH FOR RUNWAY 11-29 CONSTANT CURRENT REGULATORS
MANUAL TRANSFER SWITCH FOR RUNWAY 11-29 NORMAL CCR AND SPARE/BACKUP CCR - NORMAL SWITCH POSITION	NORMAL CCR
MANUAL TRANSFER SWITCH FOR RUNWAY 11-29 NORMAL CCR AND SPARE/BACKUP CCR - BACKUP SWITCH POSITION	SPARE/BACKUP CCR
MANUAL TRANSFER SWITCH FOR RUNWAY 1-19 NORMAL CCR AND SPARE/BACKUP CCR	TRANSFER SWITCH FOR RUNWAY 1-19 CONSTANT CURRENT REGULATORS
MANUAL TRANSFER SWITCH FOR RUNWAY 1-19 NORMAL CCR AND SPARE/BACKUP CCR - NORMAL SWITCH POSITION	NORMAL CCR
MANUAL TRANSFER SWITCH FOR RUNWAY 1-19 NORMAL CCR AND SPARE/BACKUP CCR - BACKUP SWITCH POSITION	SPARE/BACKUP CCR
CONTROL PANEL FOR AIRFIELD NAVAIDS AND VAULT FAN	CONTACTOR PANEL FOR AIRFIELD NAVAIDS, & VAULT FAN
CONTACTOR PANEL FOR AIRFIELD NAVAIDS AND VAULT FAN	NOTICE CONTACTORS HAVE REMOTE LOCATED CONTROLS AND MAY ACTIVATE AT ANY TIME
LOW VOLTAGE WIREWAY (PROVIDE 9 LEGEND PLATES 1/2" HIGH BLACK LETTERS WHITE BACKGROUND)	LOW VOLTAGE
HIGH VOLTAGE WIREWAY (PROVIDE 6 LEGEND PLATES 1/2" HIGH BLACK LETTERS WHITE BACKGROUND)	HIGH VOLTAGE
VAULT GROUND BUS (PROVIDE 4 LEGEND PLATES 1/2" HIGH WHITE LETTERS GREEN BACKGROUND; INSTALL ABOVE OR BELOW GROUND BUS)	VAULT GROUND BUS
GROUNDING ELECTRODE CONDUCTORS TERMINATED ON VAULT GROUND BUS. (PROVIDE 3 LEGEND PLATES & SECURE TO CONDUCTORS WITH NYLON STRING OR CABLE TIES)	DO NOT DISCONNECT
RWY 1 PLASI DISCONNECT	RWY 1 PLASI 120VAC, FED FROM VAULT
RWY 19 PLASI DISCONNECT	RWY 19 PLASI 120VAC, FED FROM VAULT

DIRECTIONS TO TRANSFER RUNWAY 1-19 LIGHTING FROM NORMAL CCR TO SPARE/BACKUP CCR.

- SHUT OFF INPUT POWER (CIRCUIT BREAKER) TO BOTH RWY 1-19 CCR'S & TURN CCR SELECTOR SWITCHES TO OFF.
- OPERATE MANUAL TRANSFER SWITCH FOR RWY 1-19 AND MOVE HANDLE FROM "NORMAL" POSITION TO "SPARE/BACKUP" POSITION.
- PULL CUTOUT HANDLE FROM NORMAL CCR UNIT & INSERT INTO SPARE CCR CUTOUT.
- GO TO RADIO RELAY INTERFACE PANEL & TURN "RWY 1-19 CCR TRANSFER" SELECTOR SWITCH FROM "NORMAL" TO "SPARE" POSITION.
- TURN ON INPUT POWER (CIRCUIT BREAKER) TO SPARE RWY 1-19 CCR.
- TURN SELECTOR SWITCH ON SPARE CCR TO "REMOTE" POSITION.

PROVIDE PLACARD OR LEGEND PLATE FOR RUNWAY CONSTANT CURRENT REGULATOR PAIR AS NOTED ABOVE: LETTERING TO BE MIN. 1/4" HIGH, BLACK ON WHITE BACKGROUND. LOCATE PLACARD ABOVE OR ADJACENT TO CUTOUT ENCLOSURE FOR RESPECTIVE RUNWAY.

**RUNWAY 1-19 CCR TRANSFER PROCEDURE  
PLACARD DETAIL**



"DANGER - HIGH VOLTAGE KEEP OUT" SIGN

PROVIDE WARNING SIGN ON VAULT EXTERIOR DOORS LABELED "DANGER - HIGH VOLTAGE - KEEP OUT" PER THE REQUIREMENTS OF NEC 110.34 (C). PROVIDE MINIMUM OF 2 SIGNS (ONE ON EACH DOOR TO THE VAULT).

DIRECTIONS TO TRANSFER RUNWAY 11-29 LIGHTING FROM NORMAL CCR TO SPARE/BACKUP CCR.

- SHUT OFF INPUT POWER (CIRCUIT BREAKER) TO BOTH RWY 11-29 CCR'S & TURN CCR SELECTOR SWITCHES TO OFF.
- OPERATE MANUAL TRANSFER SWITCH FOR RWY 11-29 AND MOVE HANDLE FROM "NORMAL" POSITION TO "SPARE/BACKUP" POSITION.
- PULL CUTOUT HANDLE FROM NORMAL CCR UNIT & INSERT INTO SPARE CCR CUTOUT.
- GO TO RADIO RELAY INTERFACE PANEL & TURN "RWY 11-29 CCR TRANSFER" SELECTOR SWITCH FROM "NORMAL" TO "SPARE" POSITION.
- TURN ON INPUT POWER (CIRCUIT BREAKER) TO SPARE RWY 11-29 CCR.
- TURN SELECTOR SWITCH ON SPARE CCR TO "REMOTE" POSITION.

PROVIDE PLACARD OR LEGEND PLATE FOR RUNWAY CONSTANT CURRENT REGULATOR PAIR AS NOTED ABOVE: LETTERING TO BE MIN. 1/4" HIGH, BLACK ON WHITE BACKGROUND. LOCATE PLACARD ABOVE OR ADJACENT TO CUTOUT ENCLOSURE FOR RESPECTIVE RUNWAY.

**RUNWAY 11-29 CCR TRANSFER PROCEDURE  
PLACARD DETAIL**



"DANGER - HIGH VOLTAGE" SIGN

FURNISH AND INSTALL "DANGER - HIGH VOLTAGE" LABELS/SIGNS FOR EACH CUTOUT ENCLOSURE, EACH CONSTANT CURRENT REGULATOR, AND THE HIGH VOLTAGE WIREWAY, TO COMPLY WITH FAA AC 150/5340-26B "MAINTENANCE OF AIRPORT VISUAL AID FACILITIES".

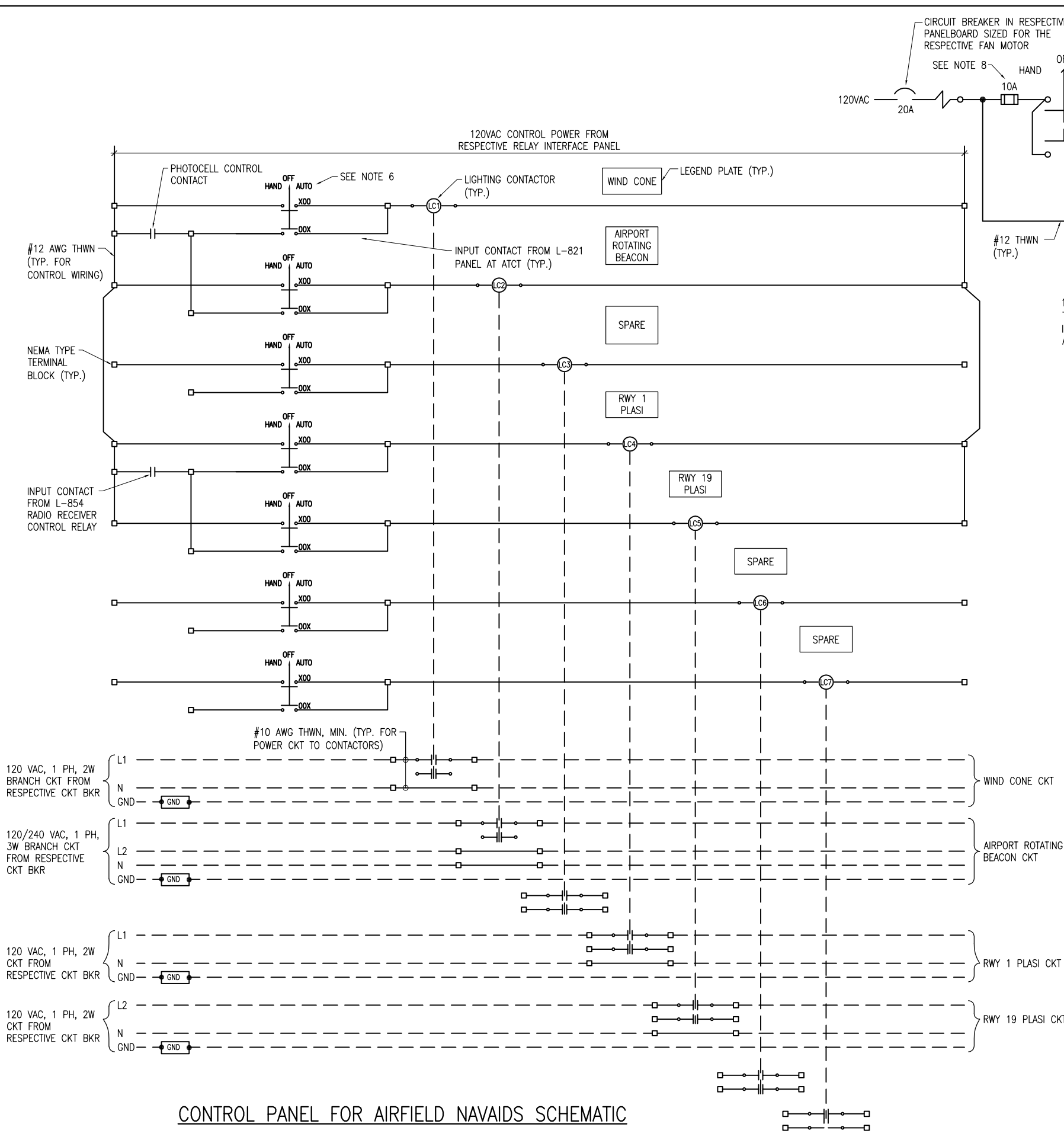
NOTE: LEGEND PLATES SHALL BE WEATHERPROOF ENGRAVED PLASTIC OR PHENOLIC MATERIAL, 1/4" HIGH BLACK LETTERS ON A WHITE BACKGROUND UNLESS NOTED OTHERWISE. SECURE WITH WEATHERPROOF ADHESIVE AND MACHINE SCREWS. FURNISH ADDITIONAL LEGEND PLATES WHERE REQUIRED BY CODE, FOR ADDITIONAL EQUIPMENT, AS DETAILED HEREIN ON THE PLANS, AND AS NOTED IN THE SPECIAL PROVISION SPECIFICATIONS.

FURNISH & INSTALL A WEATHERPROOF WARNING LABEL FOR EACH SAFETY SWITCH, PANELBOARD, LOAD CENTER, CUTOUT, & CONTROL PANEL TO WARN PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS, PER THE REQUIREMENTS OF NEC 110.16 "FLASH PROTECTION". LABELS SHALL BE HAZARD COMMUNICATION SYSTEMS, LLC (190 OLD MILFORD RD., BOX 1174, MILFORD, PA 18337, PHONE: 1-877-748-0244) PART NO. H6010-9WVHBJ OR APPROVED EQUAL.

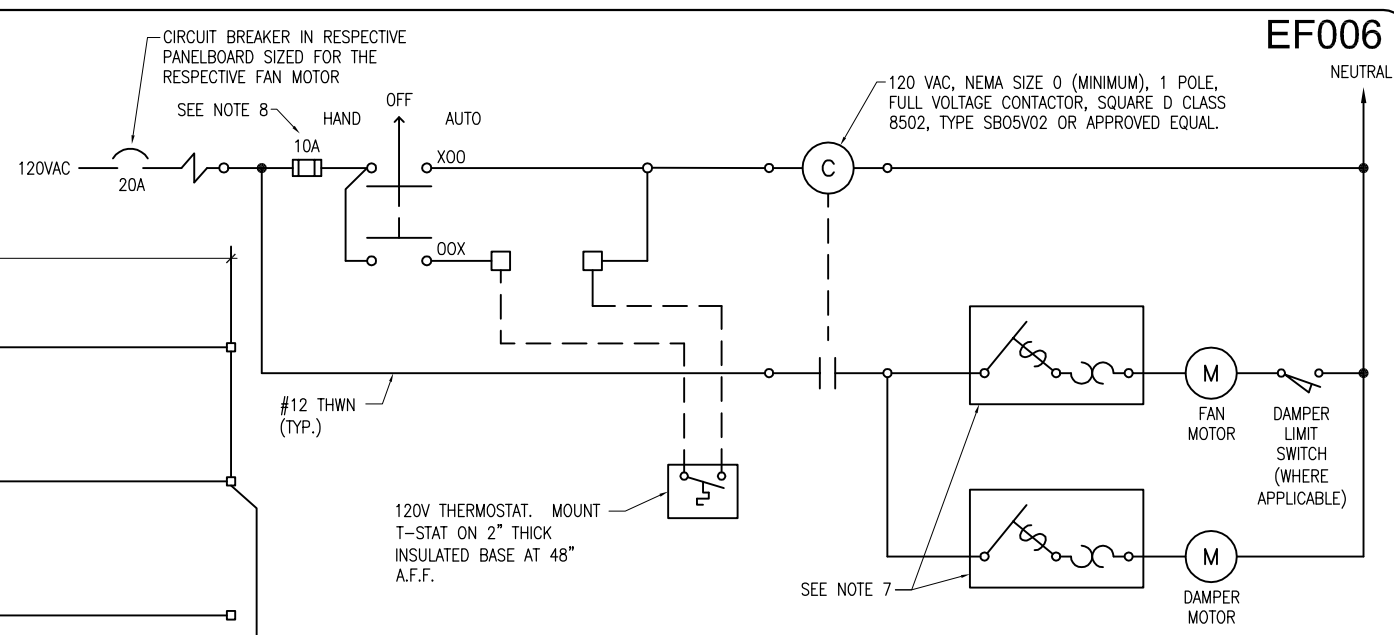
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EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS			
A.I.P. PROJ.: 3-17-0040-B12 IL PROJ.: 1H2-4031			
Hanson Proj. No. 1040078	Filename E-605.DWG	Scale NONE	Date
LAYOUT	KNL	07/30/10	
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REVIEWED	KNL/CAH	08/17/10	
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REPLACE ELECTRICAL VAULT AND EQUIPMENT		LEGEND PLATE SCHEDULES	
16			
16 of 33 sheets			





CONTROL PANEL FOR AIRFIELD NAVAIDS SCHEMATIC



EXHAUST FAN CONTROL SCHEMATIC

NOTES

- 15 AMP & 20 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #10 AWG COPPER THWN FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR/RELAY PANEL. 25 AMP AND 30 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #8 AWG COPPER THWN (MIN.) FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR/RELAY PANEL.
- INPUT CONTROL CIRCUITS SHALL BE #12 AWG COPPER THWN.
- FOR 120 VAC BRANCH CIRCUITS THE NEUTRAL CONDUCTOR SHALL NOT BE SWITCHED THROUGH THE RELAY CONTACTS. USE TERMINAL BLOCKS TO TRANSITION FROM VAULT BRANCH CIRCUIT WIRING TO FIELD WIRING.
- THE AIRPORT ROTATING BEACON CIRCUIT SHALL HAVE PHASE "A" SWITCHED THROUGH THE LIGHTING CONTACTOR. PHASE "B" SHALL BE UNSWITCHED FROM THE POWER SOURCE TO THE LOAD CENTER AT THE AIRPORT ROTATING BEACON.
- PROVIDE #10 AWG COPPER BONDING JUMPER FROM PANEL ENCLOSURE FRAME TO ENCLOSURE DOOR.
- PROVIDE 3-POSITION MAINTAINED CONTACT "HAND-OFF-AUTO" SELECTOR SWITCH FOR EACH LIGHTING CONTACTOR & MOUNT ON LIGHTING CONTACTOR PANEL ENCLOSURE DOOR. SELECTOR SWITCH SHALL BE SQUARE D CLASS 9001, TYPE KS43FBH13, OR APPROVED EQUAL. INCLUDE LEGEND PLATE TO IDENTIFY THE DEVICE CONTROLLED (EX: "WIND CONE" OR "AIRPORT ROTATING BEACON").
- PROVIDE FRACTIONAL HORSEPOWER MOTOR MANUAL STARTER, SQUARE D MANUAL STARTER WITH HANDLE/GUARD/LOCK OFF, IN NEMA 4 ENCLOSURE CLASS 2510, TYPE FG5 OR APPROVED EQUAL FOR FAN MOTOR & DAMPER MOTOR. INCLUDE MELTING ALLOY TYPE THERMAL OVERLOADS SIZED AS REQUIRED TO PROTECT THE RESPECTIVE MOTOR. 120 VAC MOTORS SHALL HAVE SINGLE POLE STARTERS.
- FUSING FOR CONTROL WIRING SHALL BE 10 AMP, 600 VAC, BUSSMANN CATALOG FNQ-R-10, OR APPROVED EQUAL, WITH FUSE BLOCKS, WITH BOX LUG TERMINALS, SIZED AS REQUIRED FOR THE RESPECTIVE APPLICATION. INCLUDE HARDWARE FOR MOUNTING. PROVIDE ONE BOX (5 MINIMUM QUANTITY) OF EACH TYPE AND SIZE OF FUSE, UPON COMPLETION OF THE JOB FOR USE AS SPARES.

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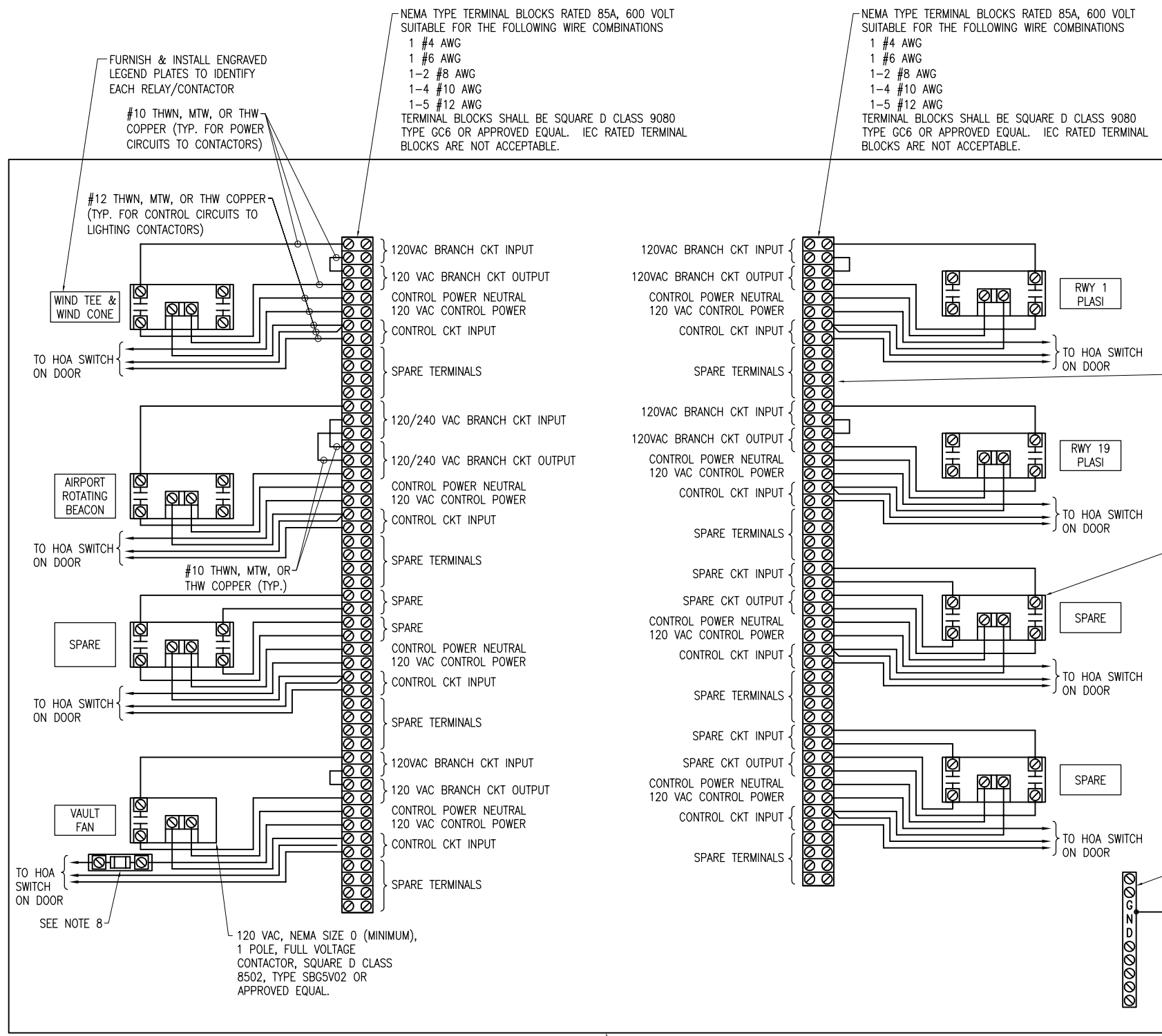
EFFINGHAM COUNTY  
 MEMORIAL AIRPORT  
 EFFINGHAM, ILLINOIS  
 A.I.P. PROJ.: 3-17-0040-B12  
 ILL. PROJ.: 1H2-4031

Hanson Proj. No. 10A0078	FILENAME E-606.DWG	Scale NONE	Date 07/30/10
LAYOUT	KNL	RL	08/02/10
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REPLACE ELECTRICAL  
 VAULT AND EQUIPMENT  
 LIGHTING CONTACTOR  
 SCHEMATIC

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NEMA TYPE TERMINAL BLOCKS RATED 85A, 600 VOLT SUITABLE FOR THE FOLLOWING WIRE COMBINATIONS  
 1 #4 AWG  
 1 #6 AWG  
 1-2 #8 AWG  
 1-4 #10 AWG  
 1-5 #12 AWG  
 TERMINAL BLOCKS SHALL BE SQUARE D CLASS 9080 TYPE GC6 OR APPROVED EQUAL. IEC RATED TERMINAL BLOCKS ARE NOT ACCEPTABLE.

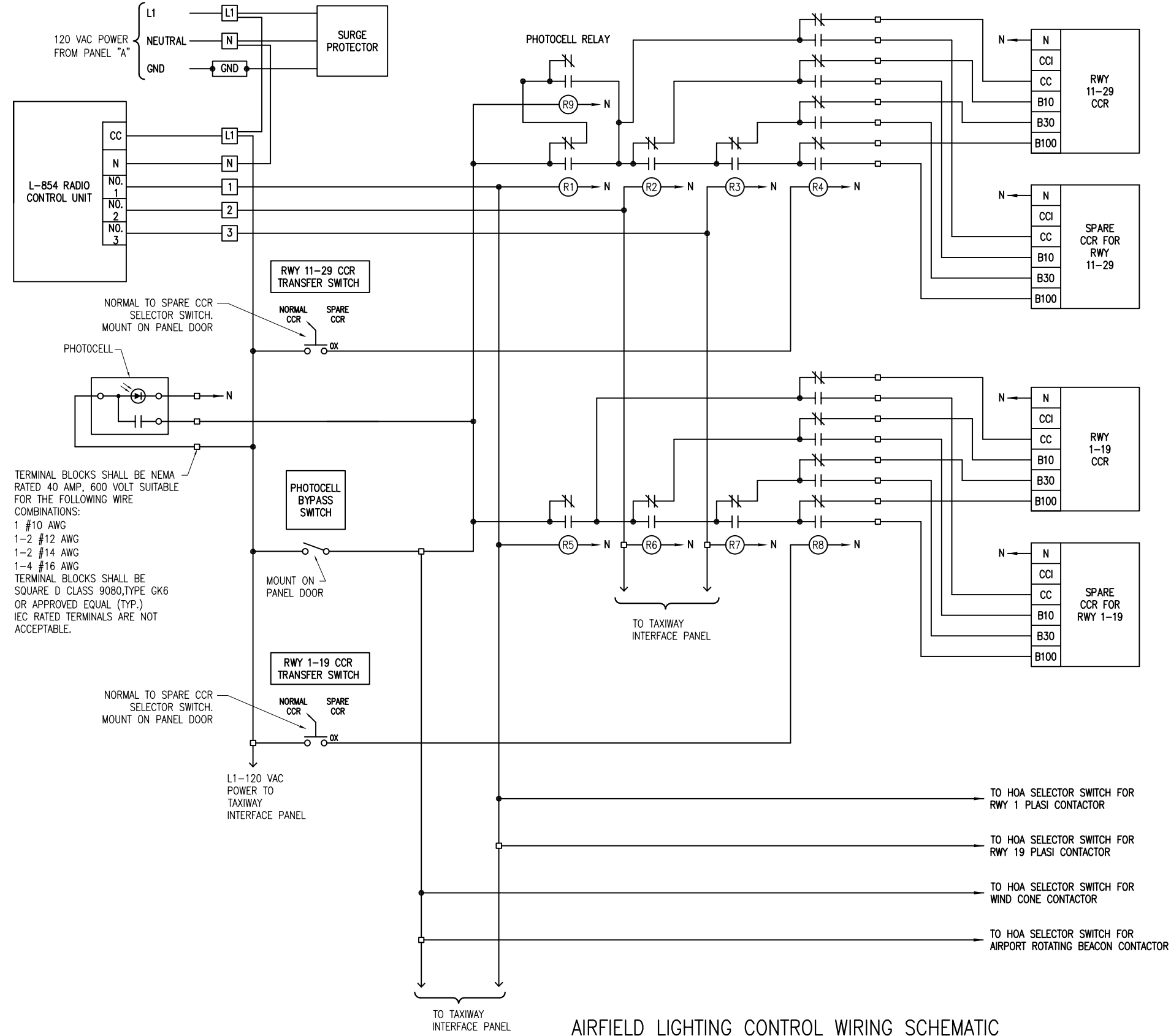
NEMA TYPE TERMINAL BLOCKS RATED 85A, 600 VOLT SUITABLE FOR THE FOLLOWING WIRE COMBINATIONS  
 1 #4 AWG  
 1 #6 AWG  
 1-2 #8 AWG  
 1-4 #10 AWG  
 1-5 #12 AWG  
 TERMINAL BLOCKS SHALL BE SQUARE D CLASS 9080 TYPE GC6 OR APPROVED EQUAL. IEC RATED TERMINAL BLOCKS ARE NOT ACCEPTABLE.

- NOTES**
- 15 AMP & 20 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #10 AWG COPPER THWN FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR PANEL. 30 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #8 AWG COPPER THWN (MIN.) FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR PANEL.
  - INPUT CONTROL CIRCUITS SHALL BE #12 AWG COPPER THWN.
  - FOR 120 VAC BRANCH CIRCUITS THE NEUTRAL CONDUCTOR SHALL NOT BE SWITCHED THROUGH THE RELAY CONTACTS. USE TERMINAL BLOCKS TO TRANSITION FROM VAULT BRANCH CIRCUIT WIRING TO FIELD WIRING.
  - THE AIRPORT ROTATING BEACON CIRCUIT SHALL HAVE PHASE "A" SWITCHED THROUGH THE LIGHTING CONTACTOR. PHASE "B" SHALL BE UNSWITCHED FROM THE POWER SOURCE TO THE LOAD CENTER AT THE AIRPORT ROTATING BEACON.
  - PROVIDE #10 AWG COPPER BONDING JUMPER FROM PANEL ENCLOSURE FRAME TO ENCLOSURE DOOR.
  - PROVIDE 3-POSITION MAINTAINED CONTACT "HAND-OFF-AUTO" SELECTOR SWITCH FOR EACH LIGHTING CONTACTOR & MOUNT ON LIGHTING CONTACTOR PANEL ENCLOSURE DOOR. SELECTOR SWITCH SHALL BE SQUARE D CLASS 9001, TYPE KS43FBH13, OR APPROVED EQUAL. INCLUDE LEGEND PLATE TO IDENTIFY THE DEVICE CONTROLLED (EX: "WIND CONE" OR "AIRPORT ROTATING BEACON").
  - SEE "LIGHTING CONTACTOR SCHEMATIC" AND "EXHAUST FAN CONTROL SCHEMATIC" FOR ADDITIONAL INFORMATION ON WIRING.
  - FUSING FOR FAN CIRCUIT CONTROL WIRING SHALL BE 10 AMP, 600 VAC, BUSSMANN CATALOG FNQ-R-10, OR APPROVED EQUAL, WITH FUSE BLOCKS, WITH BOX LUG TERMINALS, SIZED AS REQUIRED FOR THE RESPECTIVE APPLICATION. INCLUDE HARDWARE FOR MOUNTING. PROVIDE ONE BOX (5 MINIMUM QUANTITY) OF EACH TYPE AND SIZE OF FUSE, UPON COMPLETION OF THE JOB FOR USE AS SPARES.
  - INCLUDE LEGEND PLATE ON CONTROL PANEL ENCLOSURE OUTER DOOR LABELED "NOTICE: CONTACTORS HAVE REMOTE LOCATED CONTROLS AND MAY ACTIVATE AT ANY TIME".
  - 120/240 VAC PHASE "A" CONDUCTORS SHALL HAVE BLACK COLORED INSULATION. 120/240 VAC PHASE "B" CONDUCTORS SHALL HAVE RED COLORED INSULATION. NEUTRAL CONDUCTORS SHALL HAVE WHITE COLORED INSULATION. INSULATED EQUIPMENT GROUND WIRES SHALL HAVE GREEN COLORED INSULATION.
  - CONTROL PANEL FOR AIRFIELD NAVAIDS & VAULT FAN SHALL BE MANUFACTURED BY A UL 508 INDUSTRIAL CONTROL PANEL BUILDER OR AN FAA APPROVED L-821 PANEL BUILDER, AND SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT AND THE "BUY AMERICAN ACT". GUS BERTHOLD ELECTRIC (1900 WEST CARROLL AVENUE, CHICAGO, IL 60612, PHONE: 312-243-5767) IS AN APPROVED UL 508 INDUSTRIAL CONTROL PANEL BUILDER.

NEMA 12 ENCLOSURE WITH HINGED DOOR SIZED AS REQUIRED TO HOUSE LIGHTING CONTACTORS, TERMINAL BLOCKS, WIRING & INTERFACE TO EXISTING CONDUITS, MINIMUM 36"Hx24"Wx18"D AS MANUFACTURED BY HOFFMAN OR APPROVED EQUAL.

**CONTROL PANEL FOR AIRFIELD NAVAIDS AND VAULT FAN**

REVISION									
DATE									
EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS A.I.P. PROJ.: 3-17-0040-B12 I.L. PROJ.: 1H2-4031									
Hanson Proj. No. 10A0078	Filename E-607.DWG	Scale NONE	Date	KNI 07/30/10	RLL 08/04/10	KNI/CAH 08/17/10			
© Copyright Hanson Professional Services Inc. 2011 Hanson Professional Services Inc. 1525 South Sixth Street Springfield, Illinois 62703-2866 Ph: (217) 788-2450 Fax: (217) 788-2503 www.hanson-inc.com Offices Nationwide				REPLACE ELECTRICAL VAULT AND EQUIPMENT LIGHTING CONTACTOR PANEL DETAIL					
				18					
18 of 33 sheets									




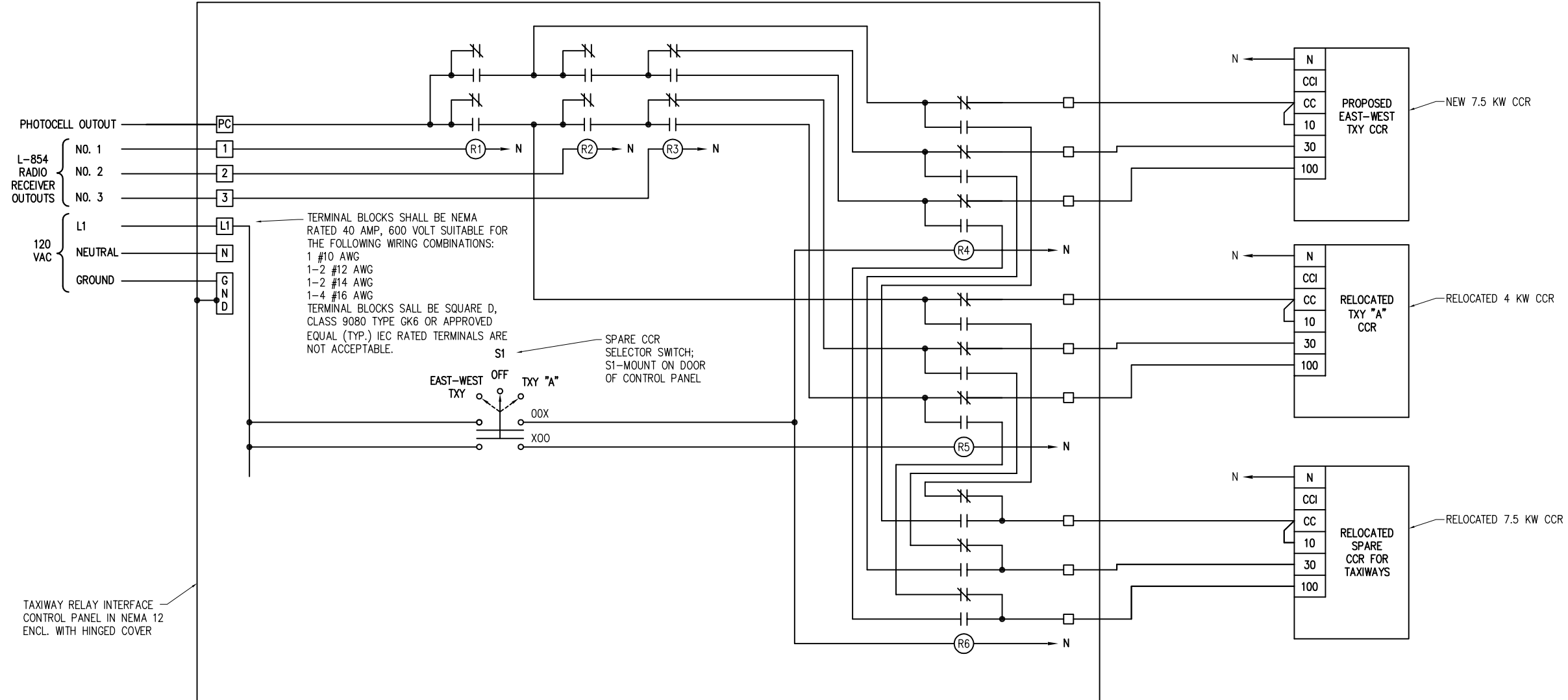
AIRFIELD LIGHTING CONTROL WIRING SCHEMATIC

NOTES:

- RELAY INTERFACE CONTROL PANEL SHALL BE MANUFACTURED BY AN FAA APPROVED L-821 PANEL BUILDER OR A UL 508 INDUSTRIAL CONTROL PANEL BUILDER, AND SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT AND THE "BUY AMERICAN ACT".
- PANEL SHALL BE IN A NEMA 12 ENCLOSURE WITH HINGED COVER. DRILL HOLE IN BOTTOM OF ENCLOSURE TO ALLOW CONDENSATION TO ESCAPE.
- EXTERNAL CONTROL CABLE SHALL BE NO. 12 AWG COPPER, 600 VOLT CABLE. ALL PANEL INTERIOR CONTROL CABLE SHALL BE MINIMUM 16 AWG, COPPER, 600 VOLT CABLE.
- IN THE AUTOMATIC MODE OF OPERATION THE RUNWAY 11-29 CONSTANT CURRENT REGULATORS (PRIMARY UNIT & SPARE UNIT) SHALL BE CONTROLLED BY THE PHOTOCELL & THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:  
 PHOTOCELL - 10% BRIGHTNESS & ACTIVATE RADIO CONTROL  
 5 CLICKS - 30% BRIGHTNESS  
 7 CLICKS - 100% BRIGHTNESS
- IN THE AUTOMATIC MODE OF OPERATION THE RUNWAY 1-19 CONSTANT CURRENT REGULATORS (PRIMARY UNIT & SPARE UNIT) SHALL BE CONTROLLED BY THE PHOTOCELL & THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:  
 PHOTOCELL -ACTIVATE RADIO CONTROL  
 3 CLICKS -10% BRIGHTNESS  
 5 CLICKS -30% BRIGHTNESS  
 7 CLICKS -100% BRIGHTNESS
- IN THE AUTOMATIC MODE OF OPERATION THE WIND CONE, & AIRPORT ROTATING BEACON SHALL BE ACTIVATED BY THE PHOTOCELL OR PHOTOCELL BYPASS SWITCH.
- IN THE AUTOMATIC MODE OF OPERATION THE RWY 1-19 PLASI UNITS WILL BE CONTROLLED BY THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:  
 3 CLICKS - ON  
 5 CLICKS - REMAIN ON  
 7 CLICKS - REMAIN ON.
- EQUIPMENT GROUND WIRES SHALL BE INCLUDED WITH EACH BRANCH CIRCUIT & EACH CONTROL CIRCUIT.
- INCLUDE PHOTOCELL BYPASS SWITCH.
- SURGE PROTECTOR SHALL BE UL LISTED PER UL 1449, SUITABLE FOR 120 VAC, 1PH, 2 WIRE PLUS GROUND SYSTEM WITH SURGE CURRENT RATING OF 40 KA (MIN.), 8x20 MICROSECOND WAVE, AND STATUS INDICATION LIGHTS IN A WEATHERPROOF HOUSING, JOSLYN MODEL 1260-21, OR APPROVED EQUAL. MAINTAIN LEADS AS SHORT & AS STRAIGHT AS POSSIBLE. INCLUDE MOUNTING BRACKET.
- INCLUDE EQUIPMENT GROUND BAR, ILSCO D167-12 OR APPROVED EQUAL.
- CONTROL RELAYS SHALL HAVE 10 AMP CONTACT RATINGS AT 240 VAC WITH 120 VAC COILS. PROVIDE 3 SPARE RELAYS FOR EACH TYPE USED IN THE RELAY INTERFACE PANEL.
- COLOR CODING FOR THE CONTROL WIRING TO EACH CONSTANT CURRENT REGULATOR SHALL BE AS FOLLOWS:  
 CC -RED  
 10% -ORANGE  
 30% -YELLOW  
 100% -BLUE  
 NEUTRAL -WHITE  
 EQUIPT. GND -GREEN  
 ALSO TAG THE CONTROL WIRES WITH THE RESPECTIVE DESIGNATION (CC, 10%, 30%, 100%)
- "N" DESIGNATES NEUTRAL CONNECTION OR NEUTRAL CONDUCTOR.
- CONTROL SYSTEM IS DESIGNED TO ACCOMMODATE L-828 CONSTANT CURRENT REGULATORS AND/OR L-812 CONSTANT CURRENT REGULATORS.

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REVISION 02/01/11 Revised as per IDA review - KNL	DATE 02/01/11	EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS
A.I.P. PROJ.: 3-17-0040-B12 I.L. PROJ.: 1H2-4031		
Hanson Proj. No. 10A0078 Filename E-608.DWG Scale NONE Date	LAYOUT KNL 07/30/10 RLL 08/04/10 DRAWN REVIEWED KNL/CAH 08/17/10	<div style="text-align: center;">  <p>© Copyright Hanson Professional Services Inc. 2011                  Hanson Professional Services Inc.                  1525 South Sixth Street                  Springfield, Illinois 62703-2886                  Ph: (217) 788-2450 Fax: (217) 788-2503                  www.hanson-inc.com                  Offices Nationwide</p> </div>
REPLACE ELECTRICAL VAULT AND EQUIPMENT		AIRFIELD LIGHTING CONTROL WIRING SCHEMATIC
<div style="font-size: 2em; font-weight: bold;">19</div> 19 of 33 sheets		



TAXIWAY LIGHTING CONTROL WIRING SCHEMATIC

NOTES:

- RELAY INTERFACE CONTROL PANEL SHALL BE MANUFACTURED BY AN FAA APPROVED L-821 PANEL BUILDER, OR A UL 508 INDUSTRIAL CONTROL PANEL BUILDER, AND SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM, BUY AMERICAN REQUIREMENT, AND THE "BUY AMERICAN ACT"
- PANEL SHALL BE IN A NEMA 12 ENCLOSURE WITH HINGED COVER. DRILL HOLE IN BOTTOM OF ENCLOSURE TO ALLOW CONDENSATE TO ESCAPE.
- EXTERNAL CONTROL CABLE SHALL BE NO. 12 AWG COPPER, 600 VOLT CABLE. ALL PANEL INTERIOR CONTROL CABLE SHALL BE A MINIMUM OF 16 AWG COPPER, 600 VOLT CABLE
- IN THE AUTOMATIC MODE OF OPERATION THE TAXIWAY CIRCUITS SHALL BE CONTROLLED BY THE PHOTOCELL & THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:  
 PHOTOCELL - ACTIVATE RADIO CONTROL  
 3 CLICKS - 10% BRIGHTNESS  
 5 CLICKS - 30% BRIGHTNESS  
 7 CLICKS - 100% BRIGHTNESS
- EQUIPMENT GROUND WIRES SHALL BE INCLUDED WITH EACH BRANCH CIRCUIT & EACH CONTROL CIRCUIT
- INCLUDE EQUIPMENT GROUND BAR, ILSCO D167-12 OR APPROVED EQUAL
- CONTROL RELAYS SHALL HAVE 10 AMP CONTACT RATINGS AT 240 VAC WITH 120 VAC COILS. PROVIDE 3 SPARE RELAYS FOR EACH TYPE USED IN THE RELAY INTERFACE PANEL.
- COLOR CODING FOR THE CONTROL WIRING TO EACH CONSTANT CURRENT REGULATOR SHALL BE CONSISTENT FOR ALL REGULATORS. COLOR CODING SHALL BE AS FOLLOWS:  
 CC - RED  
 10% - ORANGE (WHERE APPLICABLE)  
 30% - YELLOW  
 100% - BLUE  
 NEUTRAL - WHITE  
 EQUIPT. GND. - GREEN  
 ALSO TAG THE CONTROL WIRES WITH THE RESPECTIVE DESIGNATION (CC, 10%, 30%, 100%)
- "N" DESIGNATES NEUTRAL CONNECTION OR NEUTRAL CONDUCTOR
- TAXIWAY CONTROL SYSTEM IS DESIGNED TO ACCOMMODATE L-828 CONSTANT CURRENT REGULATORS

REVISION	02/01/11 Revised as per IDA review - KNIL
DATE	

EFFINGHAM COUNTY  
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IL PROJ.: 1H2-4031

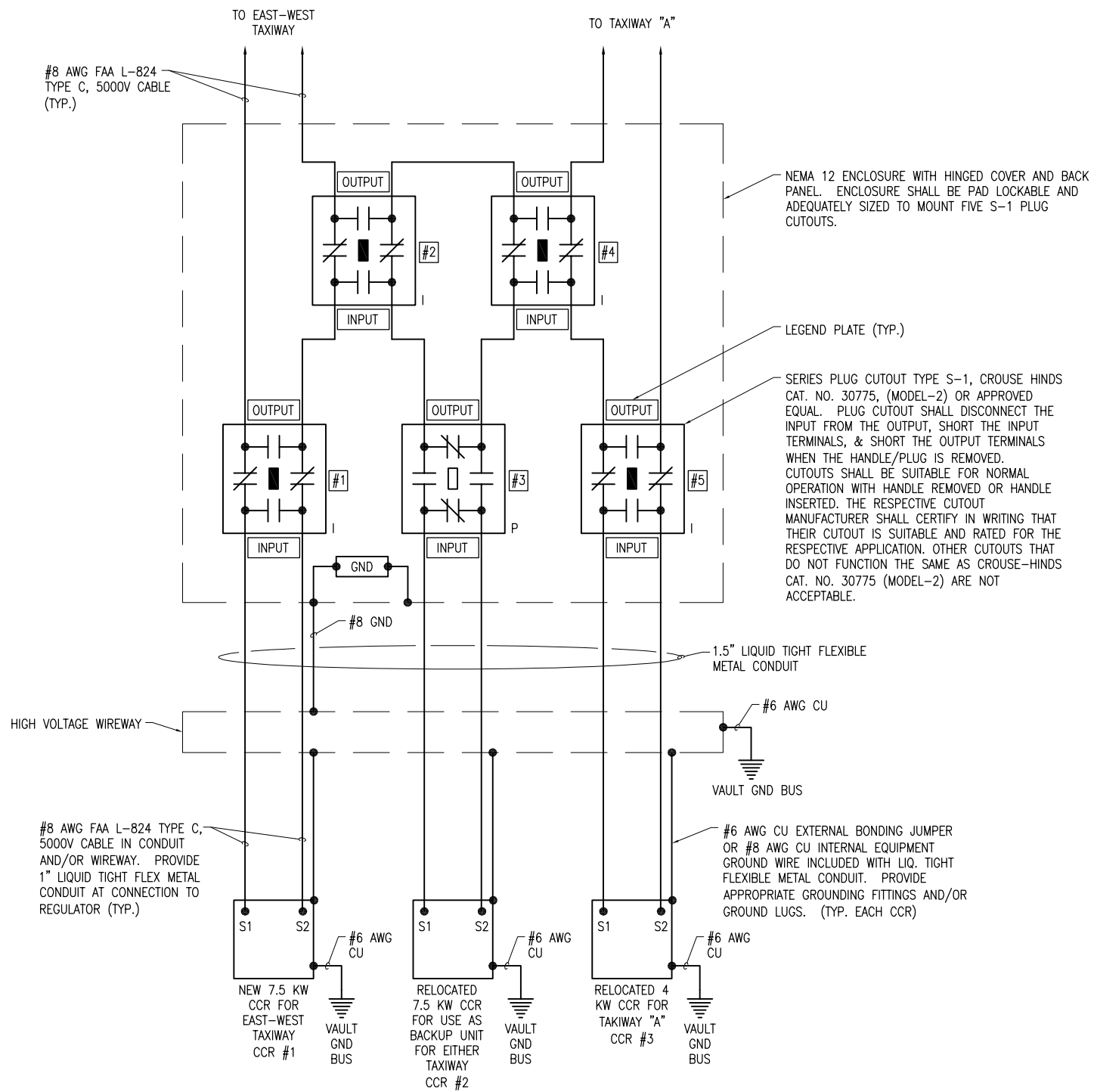
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REPLACE ELECTRICAL VAULT AND EQUIPMENT

TAXIWAY LIGHTING CONTROL WIRING SCHEMATIC

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NOTES

1. PROVIDE PHENOLIC ENGRAVED LEGEND PLATES FOR EACH CONSTANT CURRENT REGULATOR NOTING THE REGULATOR DESIGNATION, AND THE RUNWAY OR TAXIWAY SERVED.
2. PLUG CUTOUT CABINET SHALL BE FURNISHED WITH A PHENOLIC ENGRAVED LEGEND PLATE THAT IDENTIFIES THE RESPECTIVE CIRCUITS.
3. PROVIDE PHENOLIC ENGRAVED LEGEND PLATES FOR EACH CUTOUT TO IDENTIFY THE RESPECTIVE CUTOUT INPUT CONNECTION AND THE RESPECTIVE CUTOUT OUTPUT CONNECTION. INCLUDE LEGEND PLATES TO IDENTIFY CUTOUT NUMBER.
4. PROVIDE ADEQUATE WORKING SPACE IN FRONT OF CUTOUT ENCLOSURE TO MEET NEC CLEARANCE REQUIREMENTS.
5. BOND EACH REGULATOR FRAME TO VAULT GROUND BUS WITH A DEDICATED #6 AWG COPPER BONDING JUMPER
6. PROVIDE WARNING SIGN ON VAULT DOOR LABELED "DANGER - HIGH VOLTAGE - KEEP OUT" PER THE REQUIREMENTS OF NEC 110.34 (C).
7. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6, SUITABLE FOR GROUNDING AND SUNLIGHT RESISTANT. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS NOT UL LISTED. CONFIRM LIQUID TIGHT FLEXIBLE METAL CONDUIT BEARS THE UL LABEL PRIOR TO INSTALLATION.
8. INCLUDE LEGEND PLATE FOR CUTOUT ENCLOSURE. LABELED: "CAUTION OPERATE CUTOUTS WITH ALL REGULATORS SHUT OFF".
9. HIGH VOLTAGE & LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME WIREWAY.

LEGEND

- "I" DENOTES PLUG CUTOUT WITH PLUG INSERTED
- "P" DENOTES PLUG CUTOUT WITH PLUG PULLED
- "CCR" DENOTES CONSTANT CURRENT REGULATOR

HIGH VOLTAGE WIRING SCHEMATIC FOR TAXIWAYS

REVISION	DATE

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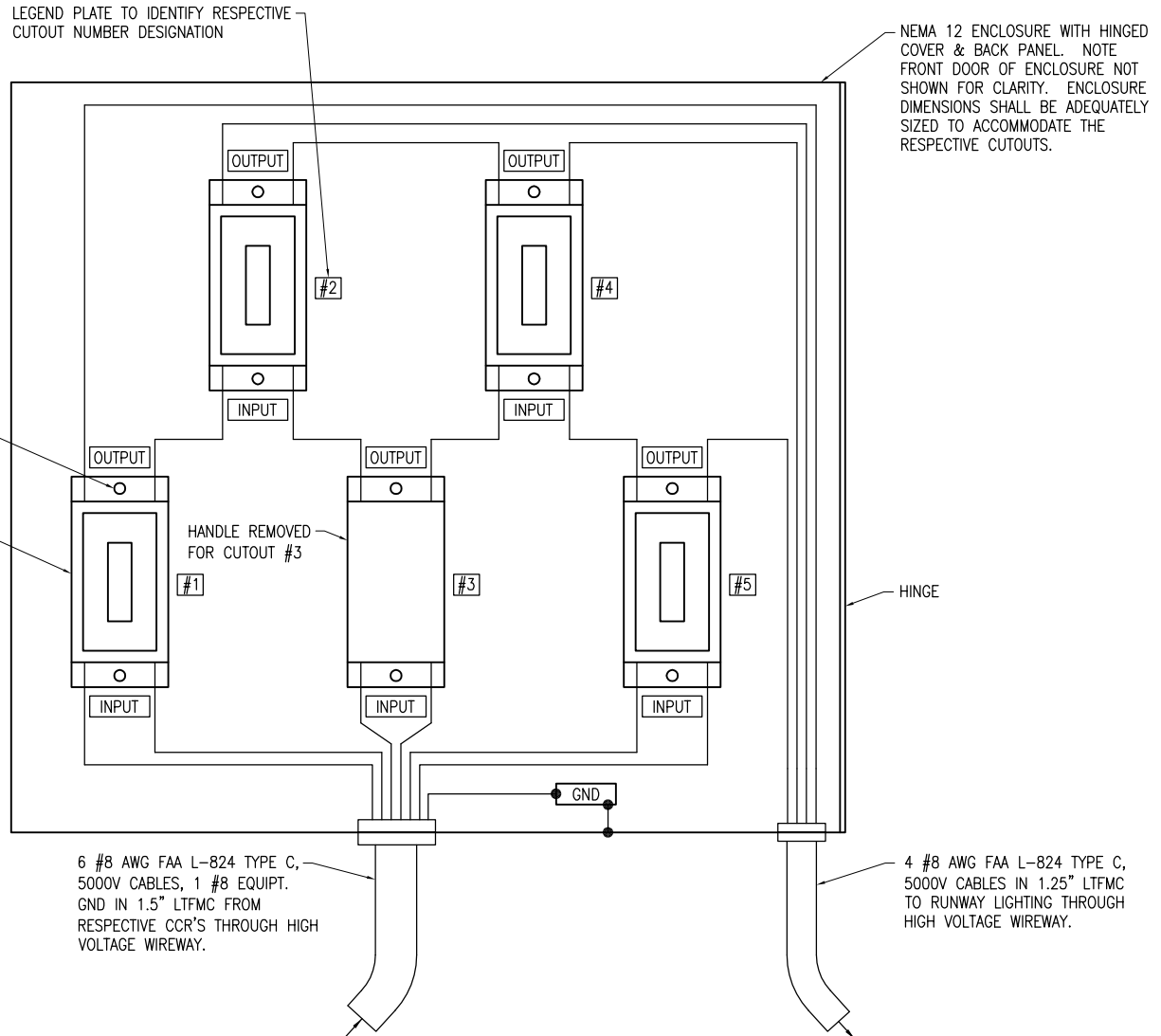
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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

HIGH VOLTAGE WIRING  
SCHEMATIC FOR TAXIWAYS



SERIES PLUG CUTOUT TYPE S-1, CROUSE-HINDS CAT. NO. 30775, (MODEL-2) OR APPROVED EQUAL. NOTE CROUSE-HINDS CAT. NO. 30771, (MODEL-3) SERIES PLUG CUTOUTS ARE NOT ACCEPTABLE, BECAUSE THE HANDLE IS NOT REMOVABLE. CUTOUTS SHALL BE THE SAME MODEL NUMBER AND MANUFACTURER TO ENSURE COMPATIBILITY (TYP. FOR 5)

NEMA 12 ENCLOSURE WITH HINGED COVER & BACK PANEL. NOTE FRONT DOOR OF ENCLOSURE NOT SHOWN FOR CLARITY. ENCLOSURE DIMENSIONS SHALL BE ADEQUATELY SIZED TO ACCOMMODATE THE RESPECTIVE CUTOUTS.

NOTES

1. SEE "HIGH VOLTAGE WIRING SCHEMATIC FOR TAXIWAYS" SHEET FOR INFORMATION ON PROPOSED WIRING OF PLUG CUTOUTS.
2. PROVIDE TAXIWAY CUTOUT SCHEDULE AND INSTALL IN PLUG CUTOUT CABINET, ON INTERIOR OF DOOR

- DIRECTIONS TO TRANSFER TAXIWAY LIGHTING FROM RESPECTIVE NORMAL CCR TO SPARE/BACKUP CCR.
1. SHUT OFF INPUT POWER (CIRCUIT BREAKERS) TO ALL THREE TAXIWAY CCR'S & TURN CCR SELECTOR SWITCHES TO OFF.
  2. REFER TO TAXIWAY LIGHTING CKT SCHEDULE FOR CUTOUTS. PULL & INSERT CUTOUT HANDLES CORRESPONDING TO RESPECTIVE TAXIWAY CKT.
  3. GO TO TAXIWAY RADIO RELAY INTERFACE PANEL AND TURN "SPARE CCR SELECTOR SWITCH" TO DESIRED TAXIWAY CIRCUIT POSITION.
  4. TURN ON INPUT POWER (CIRCUIT BREAKERS) TO THE TWO ACTIVE TAXIWAY REGULATORS.
  5. TURN SELECTOR SWITCHES ON EACH ACTIVE TAXIWAY REGULATOR TO "REMOTE" POSITION.

**TAXIWAY CCR TRANSFER PROCEDURE PLACARD DETAIL**

PROVIDE PLACARD FOR TAXIWAY REGULATORS AS NOTED ABOVE. LETTERING TO BE 1/4" HIGH, BLACK ON WHITE BACKGROUND. LOCATE ADJACENT TO TAXIWAY CUTOUTS ENCLOSURE

**SERIES PLUG CUTOUT CABINET DETAIL**

SERIES CUTOUT POSITIONS FOR CONSTANT CURRENT REGULATOR TO POWER FOLLOWING CIRCUITS:

EAST-WEST TAXIWAY LIGHTING CKT			
REGULATOR NO.	CUTOUT NO.	INSERTED	PULLED
1	1	X	
	2	X	
	3		X
EAST-WEST TAXIWAY LIGHTING CKT			
REGULATOR NO.	CUTOUT NO.	INSERTED	PULLED
2 (SPARE)	1		X
	2		X
	3	X	
	4	X	
TAXIWAY "A" LIGHTING CKT			
REGULATOR NO.	CUTOUT NO.	INSERTED	PULLED
2 (SPARE)	2	X	
	3	X	
	4		X
	5		X
	6		
TAXIWAY "A" LIGHTING CKT			
REGULATOR NO.	CUTOUT NO.	INSERTED	PULLED
3	3		X
	4	X	
	5	X	

**TAXIWAY CUTOUT SCHEDULE**

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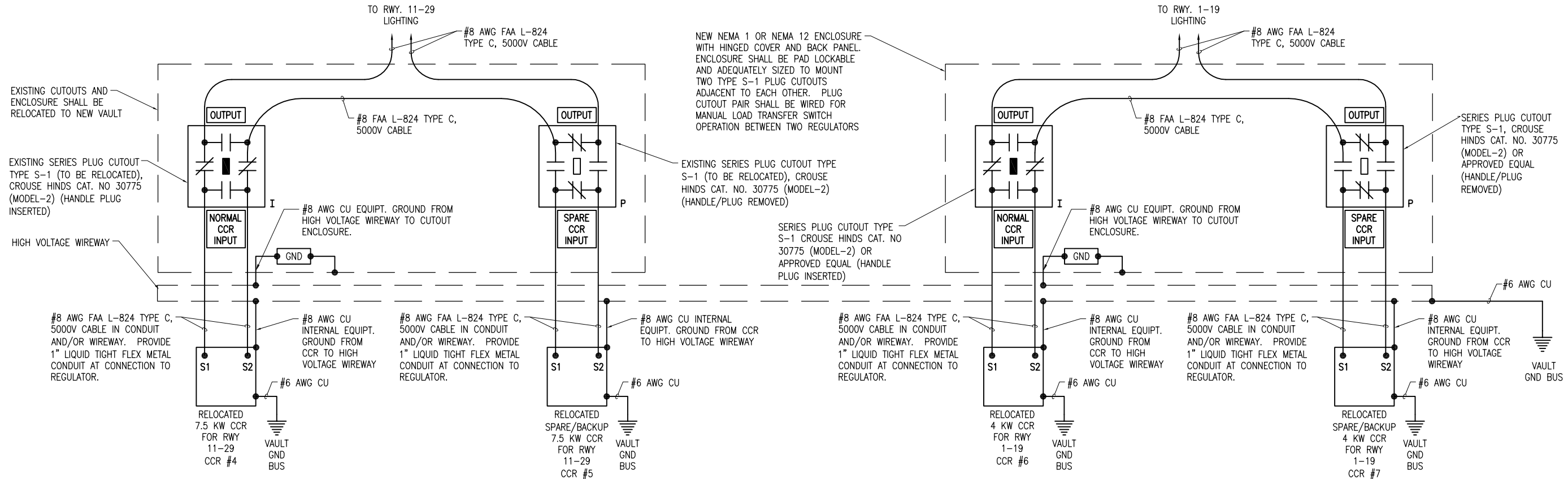
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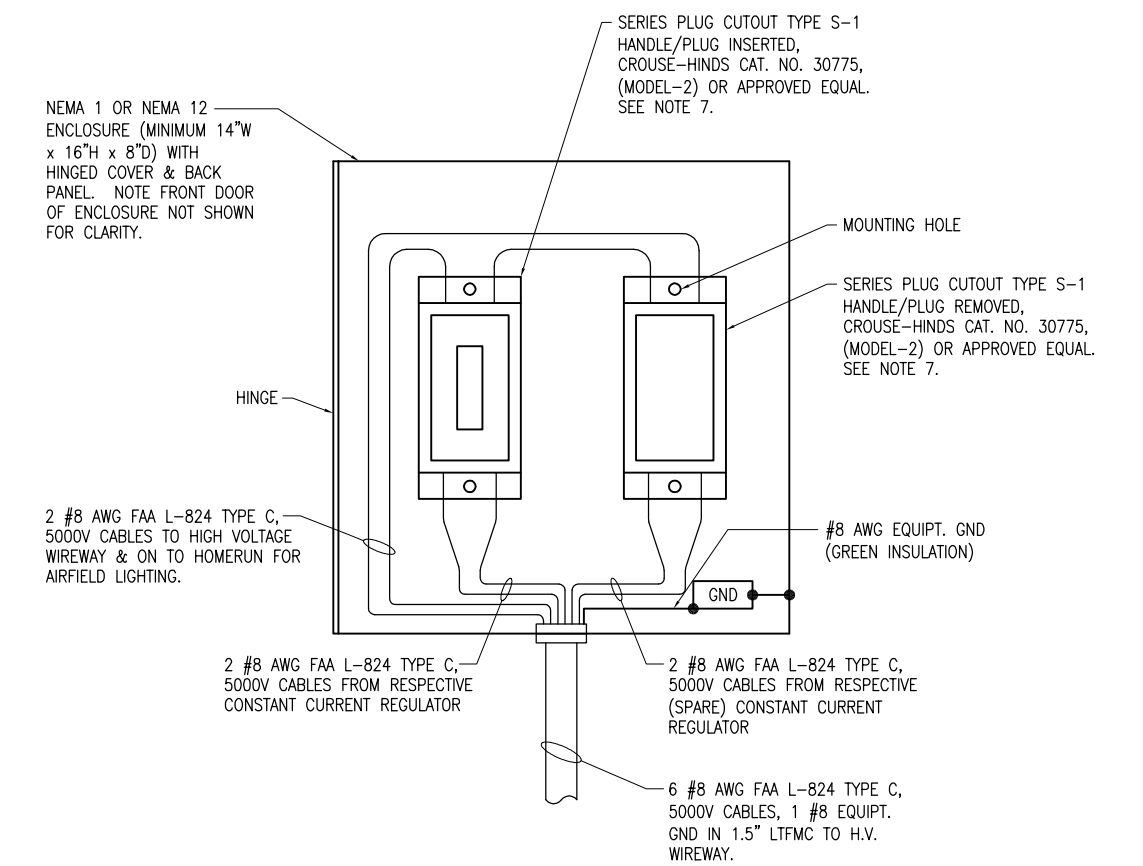
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REPLACE ELECTRICAL VAULT AND EQUIPMENT

SERIES PLUG CUTOUT DETAILS FOR TAXIWAYS



HIGH VOLTAGE WIRING SCHEMATIC FOR RUNWAYS



SERIES PLUG CUTOUT MOUNTING DETAIL FOR RUNWAY CIRCUIT

NEW NEMA 1 OR NEMA 12 ENCLOSURE WITH HINGED COVER AND BACK PANEL. ENCLOSURE SHALL BE PAD LOCKABLE AND ADEQUATELY SIZED TO MOUNT TWO TYPE S-1 PLUG CUTOUTS ADJACENT TO EACH OTHER. PLUG CUTOUT PAIR SHALL BE WIRED FOR MANUAL LOAD TRANSFER SWITCH OPERATION BETWEEN TWO REGULATORS

EXISTING SERIES PLUG CUTOUT TYPE S-1 (TO BE RELOCATED), CROUSE HINDS CAT. NO. 30775 (MODEL-2) (HANDLE/PLUG REMOVED)

SERIES PLUG CUTOUT TYPE S-1 CROUSE HINDS CAT. NO. 30775 (MODEL-2) OR APPROVED EQUAL (HANDLE PLUG INSERTED)

LEGEND

- "I" DENOTES PLUG CUTOUT WITH PLUG INSERTED
- "P" DENOTES PLUG CUTOUT WITH PLUG PULLED
- "CCR" DENOTES CONSTANT CURRENT REGULATOR

NOTES

1. PROVIDE PHENOLIC ENGRAVED LEGEND PLATES FOR EACH CONSTANT CURRENT REGULATOR (EXISTING & NEW) NOTING THE RUNWAY AND/OR TAXIWAY SERVED.
2. EACH PLUG CUTOUT CABINET SHALL BE FURNISHED WITH A PHENOLIC ENGRAVED LEGEND PLATE THAT IDENTIFIES THE RESPECTIVE RUNWAY OR TAXIWAY CIRCUIT OR REGULATOR. INCLUDE AN ADDITIONAL LEGEND PLATE LABELED "CAUTION OPERATE CUTOUTS WITH CCR SHUT OFF".
3. PROVIDE PHENOLIC ENGRAVED LEGEND PLATES FOR THE CUTOUTS TO IDENTIFY THE RESPECTIVE REGULATOR OUTPUT CONNECTION AND THE RESPECTIVE CIRCUIT LOAD CONNECTION.
4. BOND EACH REGULATOR FRAME TO VAULT GROUND BUS WITH A DEDICATED #6 AWG COPPER BONDING JUMPER.
5. PROVIDE ADEQUATE WORKING SPACE IN FRONT OF EACH CUTOUT ENCLOSURE TO MEET NEC CLEARANCE REQUIREMENTS.
6. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6, SUITABLE FOR GROUNDING AND SUNLIGHT RESISTANT. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS NOT UL LISTED. CONFIRM LIQUID TIGHT FLEXIBLE METAL CONDUIT BEARS THE UL LABEL PRIOR TO INSTALLING IT.
7. SERIES PLUG CUTOUTS SHALL BE RATED SUITABLE FOR NORMAL OPERATION WITH HANDLE REMOVED OR HANDLE INSERTED. SERIES PLUG CUTOUTS SHALL BE CROUSE-HINDS CAT. NO. 30775, OR APPROVED EQUAL. THE RESPECTIVE MANUFACTURER SHALL CERTIFY IN WRITING THAT THEIR CUTOUT IS SUITABLE AND RATED FOR THE RESPECTIVE APPLICATION. OTHER CUTOUTS THAT DO NOT FUNCTION THE SAME AS CROUSE-HINDS CAT. NO. 30775 (MODEL-2) ARE NOT ACCEPTABLE.
8. HIGH VOLTAGE & LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME WIREWAY.

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MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

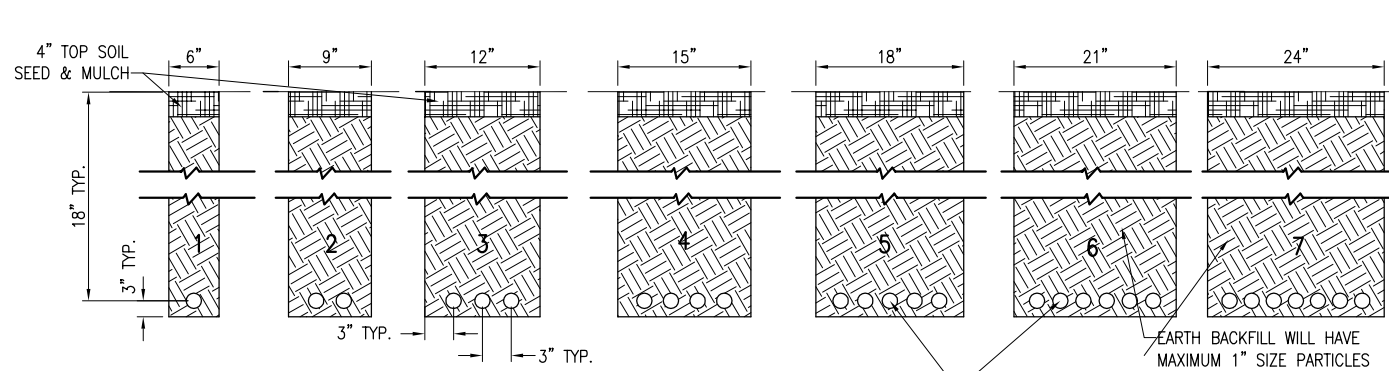
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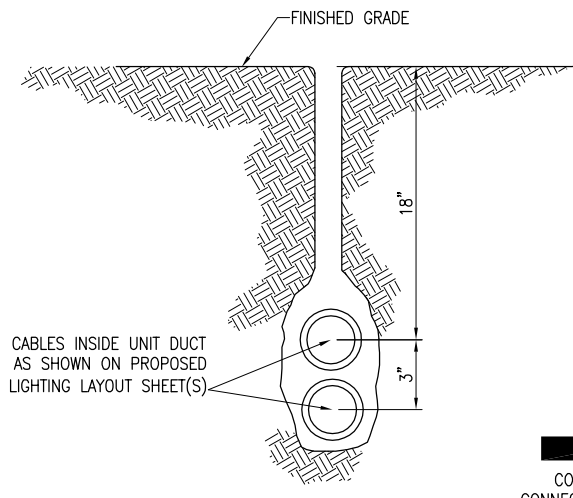
REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

HIGH VOLTAGE WIRING  
SCHEMATIC FOR RUNWAYS

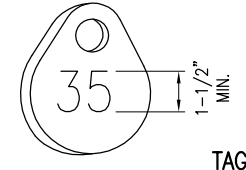


**NOTES:**  
 DETAIL NUMBERS INDICATE NO. OF CABLES.  
 TRENCHES WITH MORE THAN SEVEN CABLES SHALL BE INCREASED 3" IN WIDTH FOR EACH ADDITIONAL CABLE; IF SPECIFIED ON PLANS TWO PARALLEL TRENCHES MAY BE CONSTRUCTED.  
 DEPTH OF TRENCHES SHALL BE AS SHOWN ABOVE UNLESS OTHERWISE SPECIFIED ON THE PLANS.  
 ALL DISTURBED SURFACES SHALL BE RESTORED TO THEIR ORIGINAL CONDITION. COST IS INCIDENTAL TO TRENCH.

**CABLE TRENCHES**  
 (NOT TO SCALE)

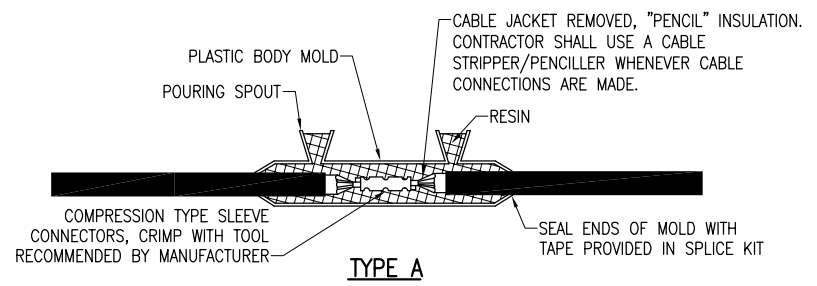


**PLOWED CABLE**  
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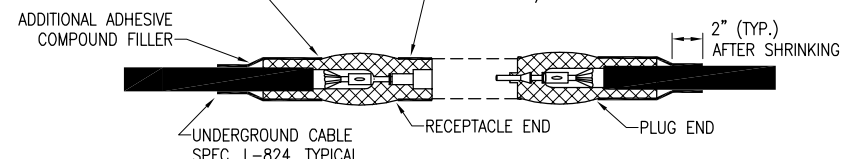
**TAG DETAIL**  
 (NOT TO SCALE)

**NOTE:**  
 AFFIX NON-CORROSIVE TAG TO FIXTURE FACING RUNWAY WITH SET SCREW, WIRE TIE, OR METAL BAND. NUMERALS SHALL BE ENGRAVED FOR PERMANENT READABILITY.



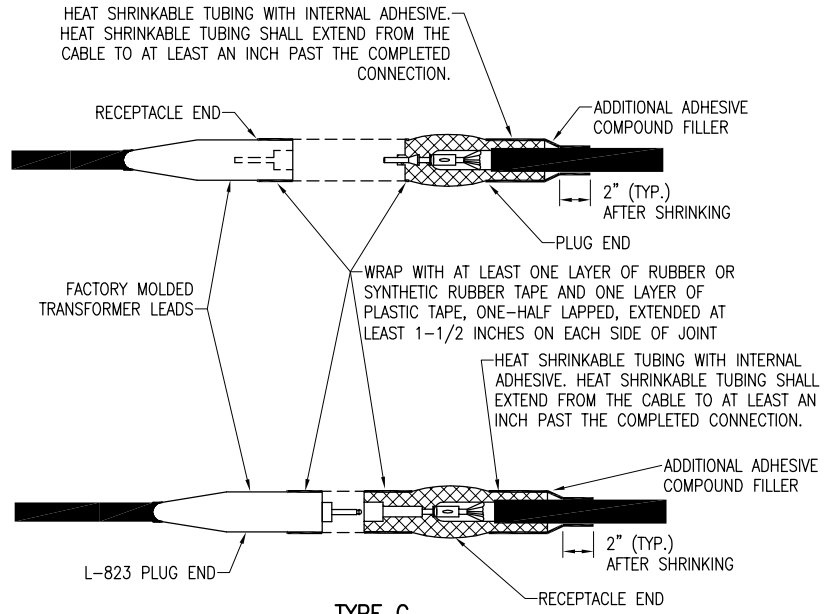
FOR SPLICES IN LOW VOLTAGE CABLE (600V) HOMERUNS FOR EXTENSIONS TO EXISTING LOW VOLTAGE CABLES ONLY. TYPE A SPLICES SHALL BE MADE IN SPLICE CANS, HANDHOLES, MANHOLES OR JUNCTION BOXES.

CONTINUOUS HEAT SHRINK TUBING PLACED OVER THE ENTIRE L-823 CONNECTOR(S) BOTH MALE AND FEMALE AT ALL 5KV JUNCTIONS. THE HEAT SHRINK TUBING SHALL BE APPROXIMATELY 18" IN LENGTH WITH 6 INCHES OF MASTIC ON BOTH ENDS AND VOID OF MASTIC IN MIDDLE OF TUBE RATED FOR 5KV.



**TYPE B**

FOR SPLICES AT JUNCTION OF HOMERUN WITH LOOP CIRCUIT AND FOR SPLICES IN HOMERUNS FOR EXTENSIONS TO EXISTING CABLES



**TYPE C**

FOR SPLICES AT RUNWAY AND TAXIWAY LIGHTS

**NOTES:**

- SEE PROPOSED LIGHTING LAYOUT SHEET(S) FOR SPLICE TYPE.
- INSIDE DIAMETER OF CONNECTOR SHALL PROPERLY MATCH THE OUTSIDE DIAMETER OF CABLE.
- SPLICES SHALL BE MADE IN SPLICE CANS, BASE CANS, HANDHOLES, MANHOLES, OR JUNCTION BOXES.

**CABLE SPLICES**

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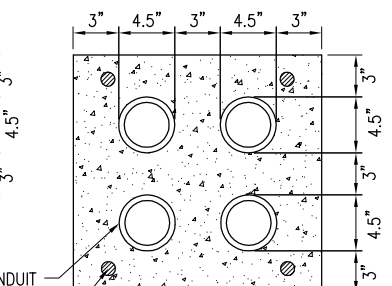
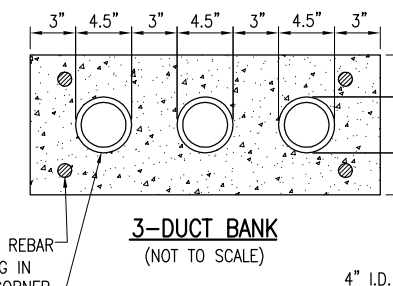
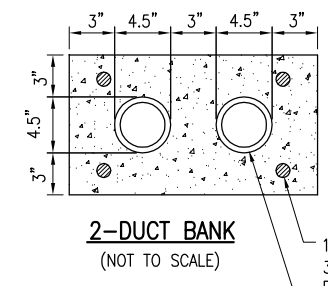
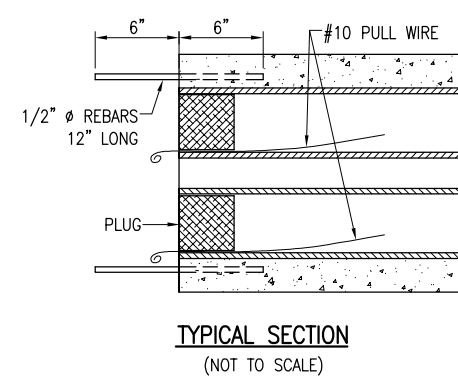
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REPLACE ELECTRICAL  
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ELECTRICAL DETAILS  
 SHEET 1



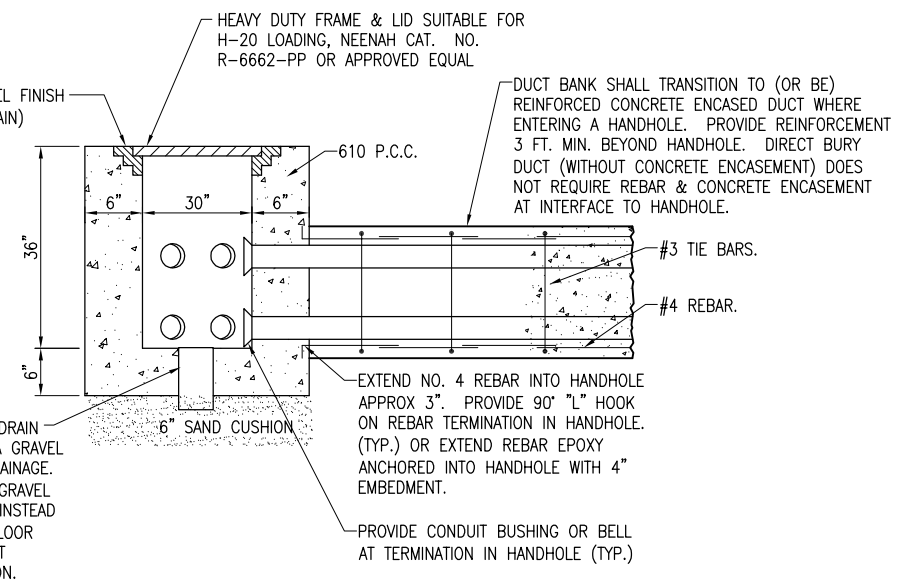
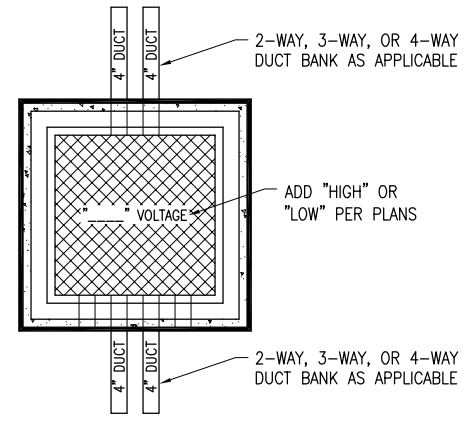


TYPICAL SECTION  
(NOT TO SCALE)

2-DUCT BANK  
(NOT TO SCALE)

3-DUCT BANK  
(NOT TO SCALE)

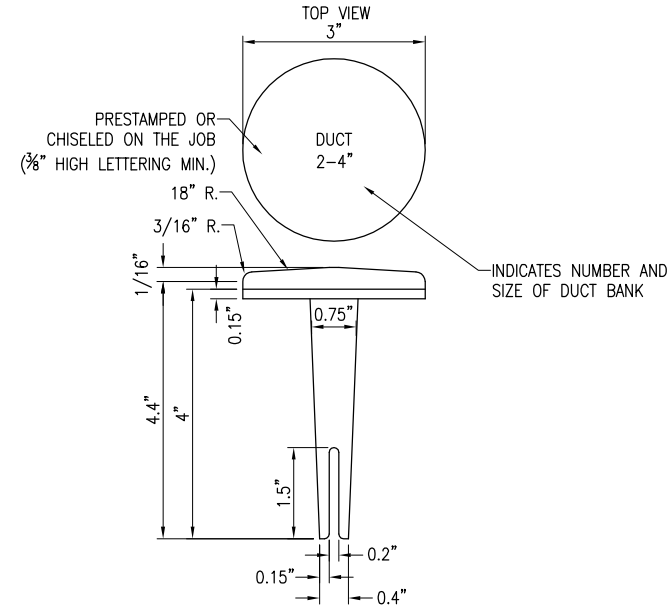
4-DUCT BANK  
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NOTES:

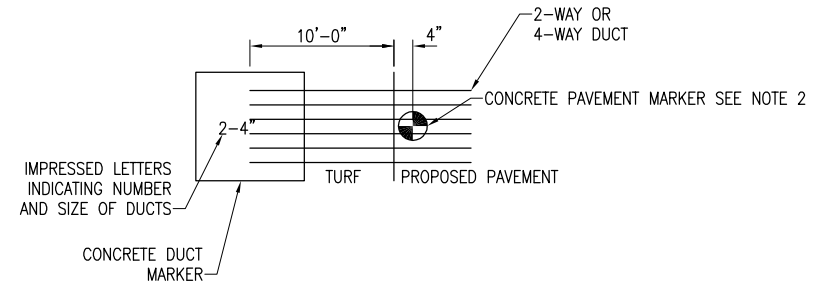
- LIDS FOR LOW VOLTAGE HANDHOLES SHALL BE LABELED "LOW VOLTAGE". LIDS FOR HIGH VOLTAGE HANDHOLES SHALL BE LABELED "HIGH VOLTAGE". COORDINATE LETTERING WITH MFR.
- HANDHOLES MAY BE CAST IN PLACE OR PRECAST. PRECAST MANUFACTURERS MUST BE ON IDOT (ILLINOIS DEPT. OF TRANSPORTATION) APPROVED LIST OF CERTIFIED PRECAST CONCRETE PRODUCERS.
- HANDHOLES WILL BE PAID FOR UNDER ITEM AR110610 ELECTRICAL HANDHOLE PER EACH. SEE SPECIAL PROVISIONS.
- ALL CORING, INTERFACE, AND LABOR ASSOCIATED WITH CONDUIT, DUCT, CABLE IN UNIT DUCT, AND / OR CABLE ENTRIES WILL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE HANDHOLE AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

ELECTRICAL HANDHOLE  
"NOT TO SCALE"



BITUMINOUS PAVEMENT DUCT MARKERS  
"NOT TO SCALE"

NOTE:  
TOP OF MARKER SHALL BE FLUSH WITH FINISHED PAVEMENT SURFACE. MARKER MAY BE INSTALLED IN A DRILLED HOLE AND SECURED WITH EPOXY GLUE.



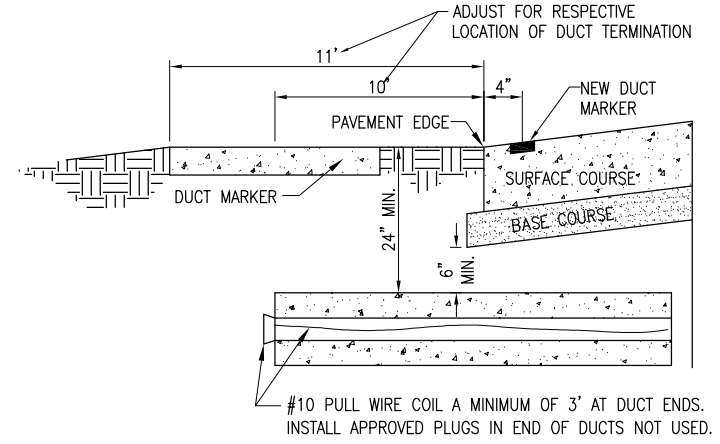
DUCT MARKER DETAIL  
"NOT TO SCALE"

DUCT BANK NOTES:

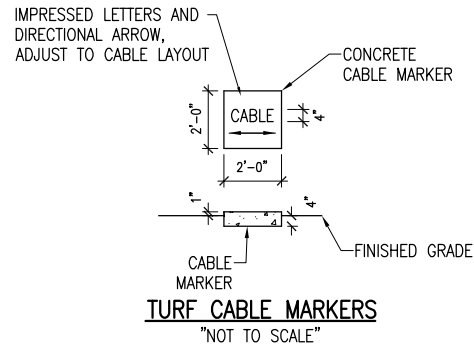
- DIMENSIONS FOR CONCRETE COVERAGE AND SEPARATION BETWEEN DUCTS ARE MINIMUM.
- INCLUDE DUCT SPACERS AS MANUFACTURED BY UNDERGROUND DEVICES INC., TO MAINTAIN PROPER SEPARATION OF CONDUITS.
- REBAR IS REQUIRED TO ACCOMMODATE FUTURE DUCT EXTENSIONS & INTERFACE AT DUCT BANK TERMINATIONS. CONCRETE ENCASED DUCT BANKS TERMINATING IN HANDHOLES REQUIRE REBAR AT TERMINATIONS.
- CONDUITS FOR CONCRETE ENCASED DUCT SHALL BE SCHEDULE 40 PVC CONFORMING TO ITEM 110.
- MINIMUM DEPTH OF TOP OF DUCT ENCASEMENT SHALL BE 18" BELOW FINISHED GRADE.
- HIGH VOLTAGE AND LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME RACEWAY, CONDUIT, DUCT, HANDHOLE, OR MANHOLE.
- HOMERUN CABLES FOR A RESPECTIVE CIRCUIT SHALL BE INSTALLED IN THE SAME RACEWAY OR DUCT.
- DUCT INTERFACE TO HANDHOLES OR MANHOLES WILL BE CONSIDERED INCIDENTAL TO THE RESPECTIVE DUCT PAY ITEM.

CABLE & DUCT MARKER NOTES:

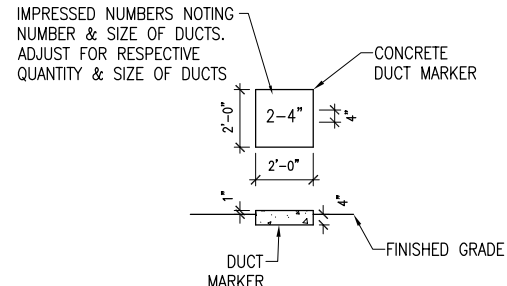
- THE COST OF ALL TURF AND PAVEMENT DUCT MARKERS SHALL BE INCIDENTAL TO THE DUCT. THE COST OF ALL CABLE MARKERS SHALL BE INCIDENTAL TO THE CABLE.
- BITUMINOUS PAVEMENT DUCT MARKER AND CONCRETE DUCT MARKER TO BE PROVIDED AT EACH END OF EACH DUCT AS SHOWN ON THE LOCATION PLAN. FOR CONCRETE PAVEMENT, THE LETTER "D" SHALL BE IMPRESSED IN THE PAVEMENT INSTEAD OF THE MARKER. THE LETTER SHALL BE FORMED AS DESCRIBED IN NOTE 4.
- CABLE MARKERS SHALL BE PLACED AT CHANGES OF DIRECTION AND APPROXIMATELY EVERY 200' ALONG CABLE RUNS.
- CONCRETE CABLE MARKERS AND DUCT MARKERS SHALL HAVE LETTERS 4" HIGH, 3" WIDE WITH WIDTH OF STROKE 1/2" AND 1/4" DEEP. ALL LETTERS, NUMBERS AND ARROWS TO BE IMPRESSED.



UNDERGROUND ELECTRICAL DUCT  
"NOT TO SCALE"



TURF CABLE MARKERS  
"NOT TO SCALE"



TURF DUCT MARKERS  
"NOT TO SCALE"

REVISION	DATE

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS  
A.I.P. PROJ.: 3-17-0040-B12  
IL PROJ.: 1H2-4031

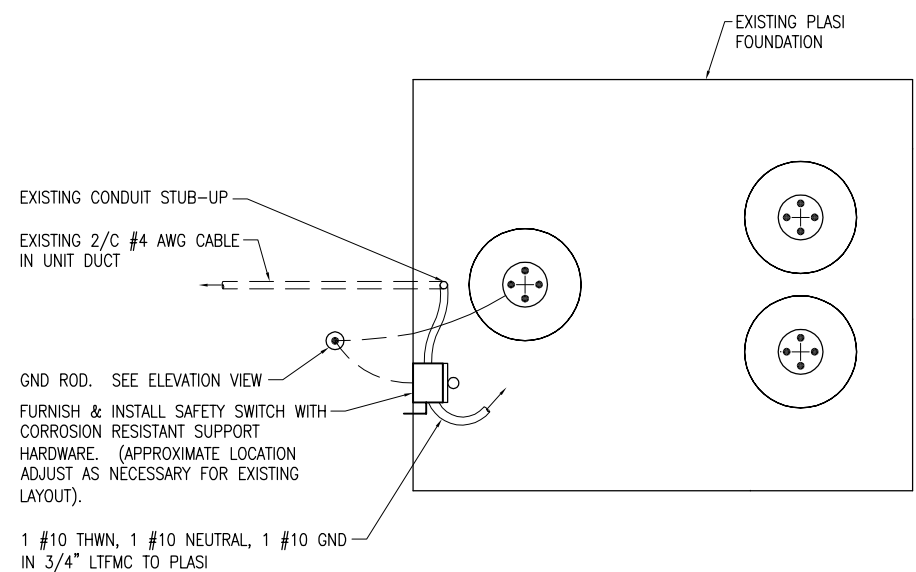
Hanson Proj. No. 10A0078	FILENAME E-502.DWG	Scale NONE	Date
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REVIEWED	KNL/CAH	08/17/10	

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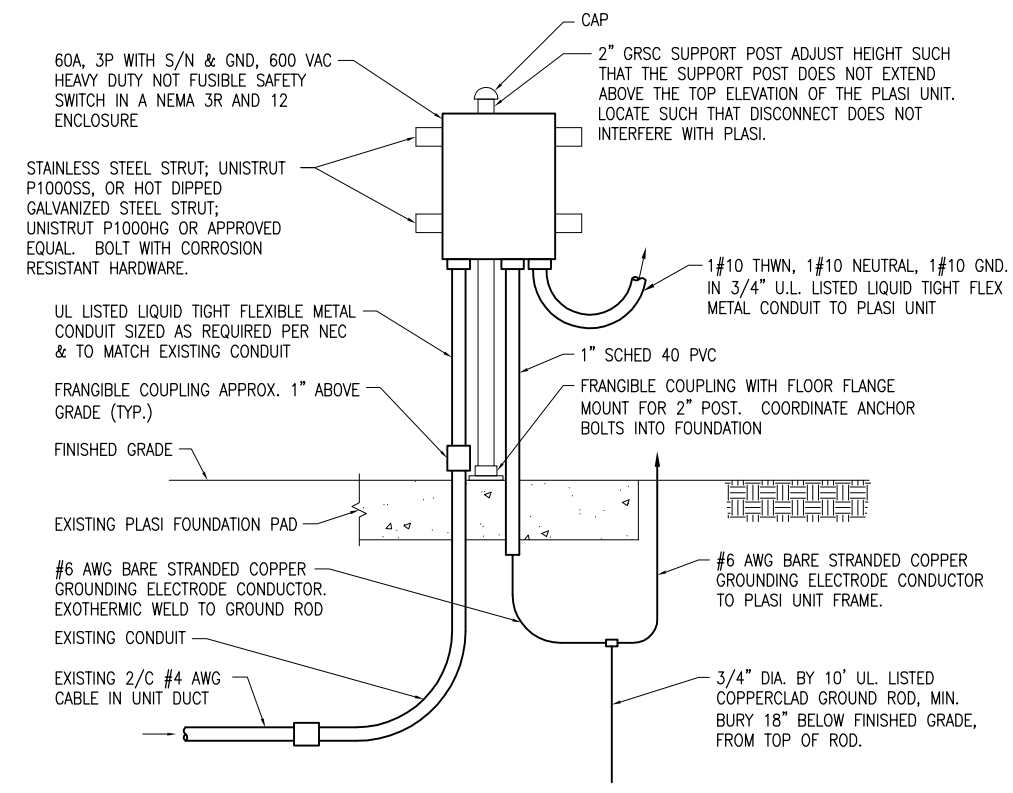
REPLACE ELECTRICAL  
VAULT AND EQUIPMENT  
ELECTRICAL DETAILS  
SHEET 2

**NOTES**

1. PLASI UNITS LOCATED ON RUNWAY 1-19 ARE EXISTING. A HEAVY DUTY 60 AMP, 2 POLE OR 3 POLE WITH SOLID NEUTRAL & GND, 600 VAC NOT FUSIBLE SAFETY SWITCH IN A NEMA 3R AND 12 ENCLOSURE SHALL BE FURNISHED & INSTALLED AT EACH PLASI. 60 AMP SAFETY SWITCH IS REQUIRED TO ACCOMMODATE #4 AWG OR #2 AWG CONDUCTORS FOR LUG TERMINATIONS & WIRE BENDING SPACE. NEUTRAL SHALL BE BONDED TO GROUND IN SAFETY SWITCH & GND ROD SHALL BE INSTALLED TO CONFORM WITH NEC 250.32
2. LTFMC DENOTES LIQUID TIGHT FLEXIBLE METAL CONDUIT UL LISTED, SUITABLE FOR GROUNDING, AND SUNLIGHT RESISTANT. NEC 350.6 NOTES LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE LISTED. DO NOT INSTALL LTFMC THAT IS NOT UL LISTED. CONFIRM LTFMC BEARS THE UL LABEL PRIOR TO INSTALLATION
3. CONTRACTOR SHALL FURNISH & INSTALL BOOST TRANSFORMERS FOR PLASI UNITS IN THE VAULT. BOOST TRANSFORMERS SHALL BE SIZED & CONNECTED TO PROVIDE THE PROPER VOLTAGE AT THE RESPECTIVE PLASI UNIT AS RECOMMENDED BY THE PLASI MANUFACTURER (DEVORE AVIATION CORPORATION, 6104 JEFFERSON BLVD, N.E., ALBUQUERQUE, NEW MEXICO 87109-3410, PHONE: 505-345-8713, FAX: 505-344-3835).
4. INSTALLATION OF THE SAFETY SWITCH AND ASSOCIATED CONDUIT, WIRING, FITTINGS, GROUNDING, & ACCESSORIES FOR EACH PLASI UNIT SHALL BE PAID FOR UNDER ITEM AR125989 REFURBISH PLASI PER EACH.
5. SAFETY SWITCHES SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.

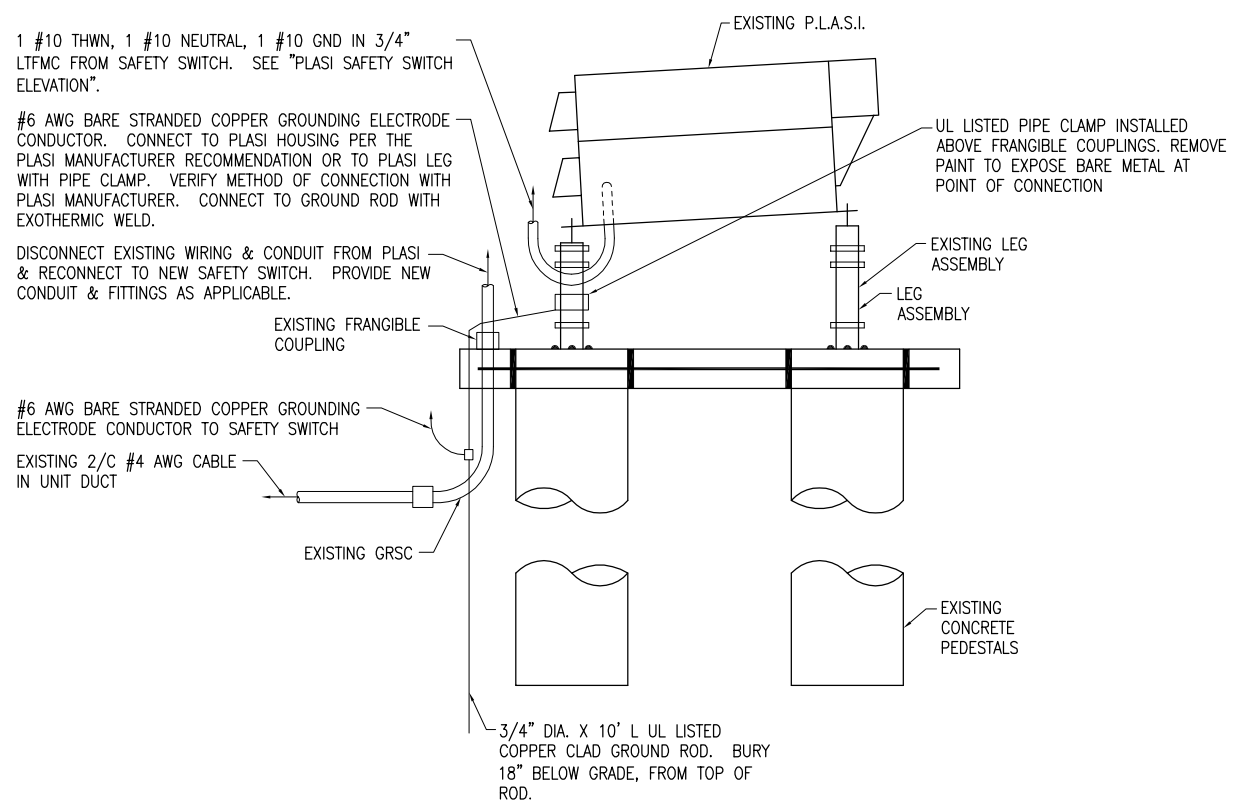


**PLASI FOUNDATION PLAN VIEW**



NOTE: SEE NEW ELECTRICAL ONE LINE DIAGRAM FOR VAULT AND PLASI FOR ADDITIONAL INFORMATION ON EQUIPMENT AND WIRING.

**PLASI SAFETY SWITCH ELEVATION**  
"NOT TO SCALE"



**PLASI ELEVATION**

ALL WORK SHOWN ON THIS SHEET SHALL BE PAID FOR UNDER ITEM AR125989 - REFURBISH PLASI - PER EA.

FEB 03, 2011 1:16 PM H:\GLO00382 E:\AIRPORTS\EFFINGHAM\10A0078\CA00\VAIRPORT\SHEET\E-503.DWG

REVISION	DATE

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MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

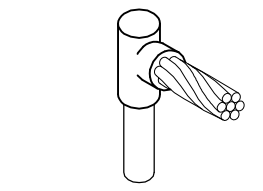
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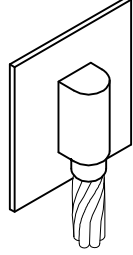
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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

PROPOSED PLASI WIRING  
DETAILS AND NOTES



CABLE TO GROUND ROD

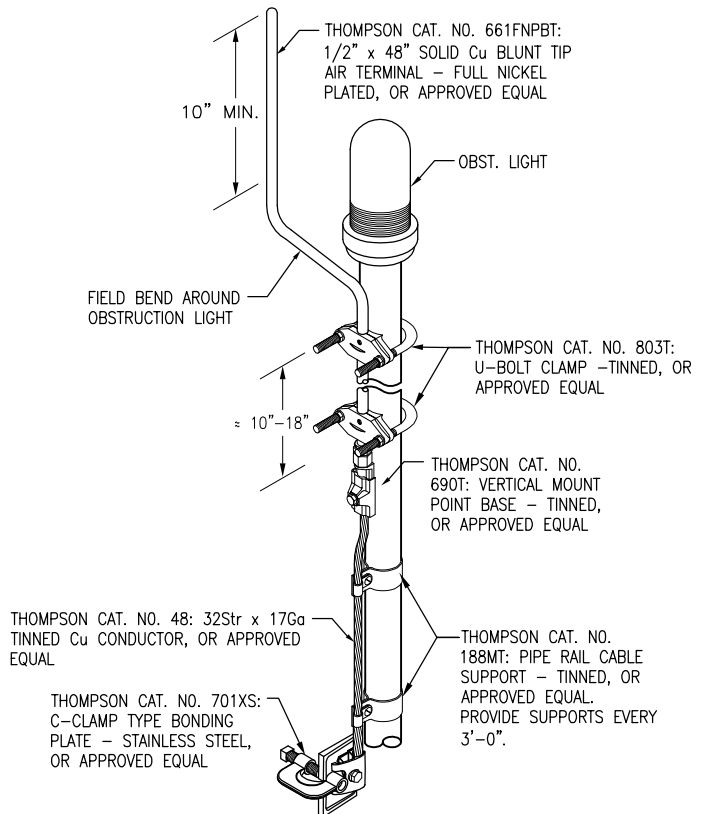


CABLE TO SURFACE

DETAIL NOTES

- EXOTHERMIC WELDS SHALL BE CADWELDED AS MANUFACTURED BY ERICO PRODUCTS, SOLON, OHIO, ULTRAWELDED AS MANUFACTURED BY HARGER LIGHTNING PROTECTION & GROUNDING EQUIPMENT, GRAYSLAKE, IL, THERMOWELDED AS MANUFACTURED BY CONTINENTAL INDUSTRIES, TULSA, OKLAHOMA, OR APPROVED EQUAL. VERIFY PROPER SIZES, MOLDS, TYPES, AND REQUIREMENTS FOR THE RESPECTIVE APPLICATION WITH THE MANUFACTURER, AND INSTALL PER THEIR DIRECTIONS.
- FOR APPLICATIONS TO GALVANIZED STEEL OR PAINTED STEEL, REMOVE GALVANIZING AND/OR PAINT & CLEAN THE SURFACE TO EXPOSE BARE STEEL BEFORE MAKING EXOTHERMIC WELD CONNECTION.
- VERIFY EXOTHERMIC MOLDS ARE SUITABLE FOR USE WITH THE RESPECTIVE TYPE (SOLID OR STRANDED) & SIZE CONDUCTOR.

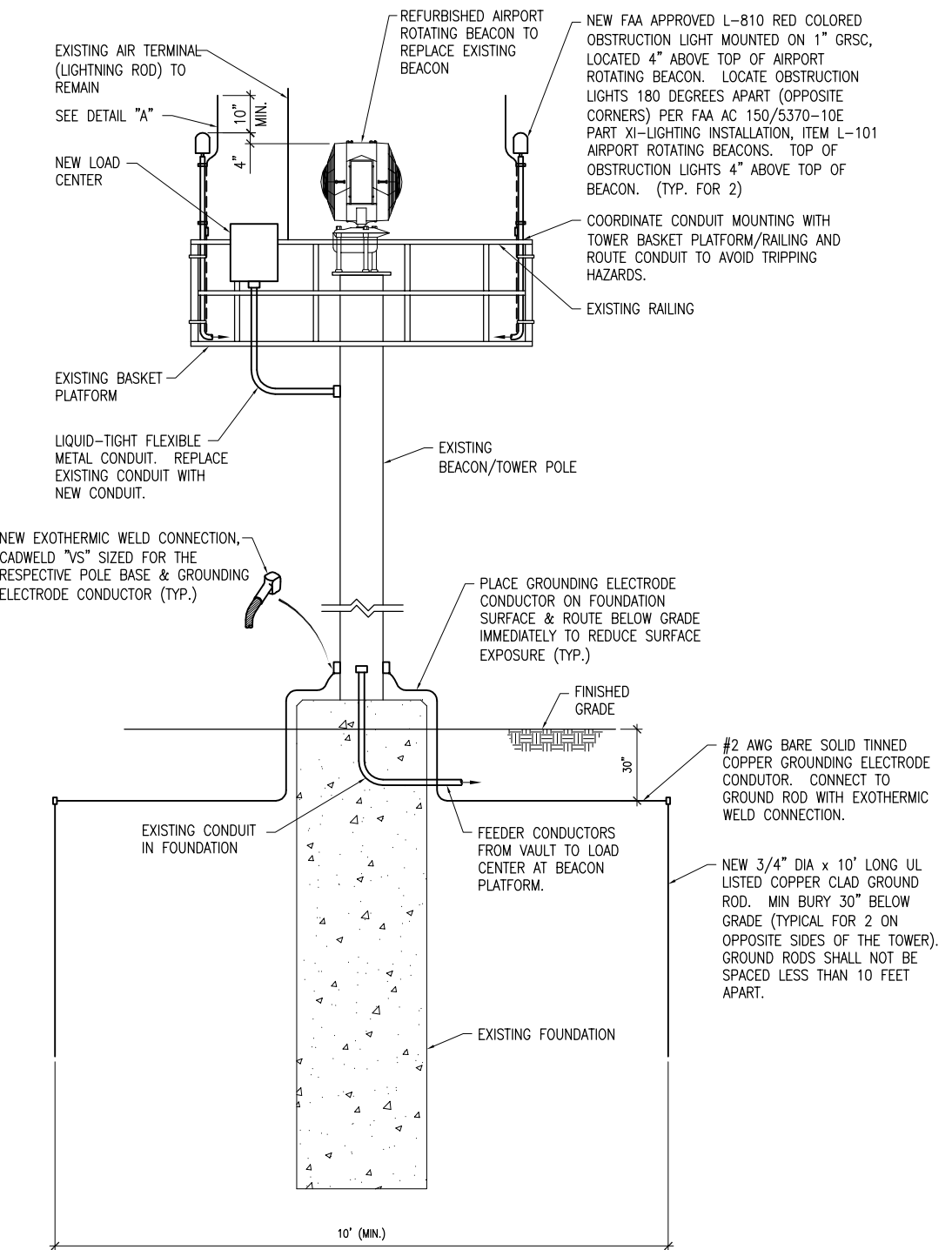
EXOTHERMIC WELD DETAILS



DETAIL A  
NTS

NOTES

- REFERENCES TO THOMPSON ARE THOMPSON LIGHTNING PROTECTION INC., 901 SIBLEY MEMORIAL HWY, ST. PAUL, MN 55188, PHONE: 651-455-7661, 800-777-1230, FAX: 651-455-2545.
- VERIFY LIGHTNING PROTECTION COMPONENTS AND CATALOG NUMBERS WITH THE RESPECTIVE LIGHTNING PROTECTION EQUIPMENT MANUFACTURER.



LIGHTNING PROTECTION DETAIL FOR AIRPORT ROTATING BEACON

NTS

ADDITIVE ALTERNATE NO. 1

REMOVAL & REPLACEMENT OF EXISTING AIRPORT ROTATING BEACON WILL BE PAID FOR UNDER ITEM AS101580 REFURBISH 36" BEACON PER EACH. ALL OTHER WORK SHOWN ON THIS SHEET SHALL BE PAID FOR UNDER ITEM AS800591 - UPGRADE AIRPORT ROTATING BEACON - PER L.S.

AIRPORT ROTATING BEACON LOAD CENTER SCHEDULE			
CKT #	DUTY	SIZE	
1	SURGE PROTECTOR (PHASE A)	30A 1P	
2	SURGE PROTECTOR (PHASE B)	30A 1P	
3	AIRPORT ROTATING BEACON	15A 1P	
4	OBSTRUCTION LIGHTS	15A 1P	
5	BLANK		
6	BLANK		

100 AMP, 120/240 VAC, 1 PHASE, 3 WIRE, 6 CIRCUIT LOAD CENTER WITH MAIN LUGS IN A NEMA 3R RAIN PROOF ENCLOSURE, SQUARE D CAT. NO. Q0612L100RBCU WITH EQUIPMENT GROUND BAR KIT OR APPROVED EQUAL.

NOTES

- INCLUDE EQUIPT GROUND BAR KIT.
- ALL BREAKERS SHALL HAVE 10,000 AIC RATING AT 120/240 VAC.
- PHASE "A" SHALL BE SWITCHED THROUGH A LIGHTING CONTACTOR AT THE VAULT. PHASE "B" SHALL BE UNSWITCHED.
- INCLUDE ENGRAVED PHENOLIC LEGEND PLATE LABELED ARB PANEL, 120/240 VAC, 1PH, 3W, FED FROM VAULT.
- SURGE PROTECTORS SHALL BE SUITABLE FOR 120VAC, 1PH, 2W PLUS GROUND, 30KA (MINIMUM) SURGE CURRENT RATING, JOSLYN MODEL 1260-21 OR LIGHTING PROTECTION CORP. MODEL LPC 11765-132, OR APPROVED EQUAL. FURNISH & INSTALL TWO SURGE PROTECTORS (ONE FOR EACH PHASE).
- LOAD CENTER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.

REVISION	DATE	DESCRIPTION
02/01/11		Revised as per IDA review - KNIL

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS  
A.I.P. PROJ.: 3-17-0040-B12  
ILL. PROJ.: 1H2-4031

Hanson Proj. No. 10A00078	Filename E-504.DWG	Scale NONE	Date
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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT  
ADDITIVE ALTERNATE NO. 1  
LIGHTNING PROTECTION  
DETAILS FOR BEACON

REVISION	02/01/11	Revised as per IDA review - KNL
DATE		

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
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A.I.P. PROJ.: 3-17-0040-B12  
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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

ELECTRICAL NOTES  
SHEET 1

**GENERAL NOTES**

- ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 70 - NATIONAL ELECTRICAL CODE (NEC) MOST CURRENT ISSUE IN FORCE, THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES, AND REQUIREMENTS IN FORCE. ANY INSTALLATIONS WHICH VOID THE U.L. LISTING, ETL LISTING (OR OTHER THIRD PARTY LISTING) AND/OR THE MANUFACTURER'S WARRANTY OF A DEVICE WILL NOT BE PERMITTED.
- CONTRACTOR SHALL KEEP A COPY OF THE LATEST NEC IN FORCE ON SITE AT ALL TIMES DURING CONSTRUCTION FOR USE AS A REFERENCE.
- CONTRACTOR SHALL COORDINATE WORK AND ANY POWER OUTAGES AND/OR SHUT DOWN OF SYSTEMS WITH THE RESPECTIVE FACILITY OWNER PERSONNEL AND THE AIRPORT MANAGER/DIRECTOR. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
- THE CONTRACTOR SHALL ASCERTAIN THAT ALL LIGHTING SYSTEM COMPONENTS FURNISHED BY HIM, INCLUDING FAA APPROVED EQUIPMENT, ARE COMPATIBLE IN ALL RESPECTS WITH EACH OTHER AND THE REMAINDER OF THE NEW/EXISTING SYSTEM. ANY NONCOMPATIBLE COMPONENTS FURNISHED BY THIS CONTRACTOR SHALL BE REPLACED BY HIM AT NO ADDITIONAL COST TO THE AIRPORT SPONSOR WITH A SIMILAR UNIT, APPROVED BY THE ENGINEER (DIFFERENT MODEL OR DIFFERENT MANUFACTURER) THAT IS COMPATIBLE WITH THE REMAINDER OF THE AIRPORT LIGHTING SYSTEM.
- IN CASE THE CONTRACTOR ELECTS TO FURNISH AND INSTALL AIRPORT LIGHTING EQUIPMENT REQUIRING ADDITIONAL WIRING, TRANSFORMERS, ADAPTORS, MOUNTINGS, ETC., TO THOSE SHOWN ON THE DRAWINGS AND/OR LISTED IN THE SPECIFICATION, ANY COST FOR THESE ITEMS SHALL BE INCIDENTAL TO THE EQUIPMENT COST.
- THE CONTRACTOR INSTALLED EQUIPMENT (INCLUDING FAA APPROVED) SHALL NOT GENERATE ANY ELECTROMAGNETIC INTERFERENCE IN THE EXISTING AND/OR NEW COMMUNICATIONS, WEATHER, AIR NAVIGATION, AND AIR TRAFFIC CONTROL EQUIPMENT. ANY EQUIPMENT GENERATING SUCH INTERFERENCE SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST WITH THE EQUIPMENT MEETING THE APPLICABLE SPECIFICATIONS AND NOT GENERATING ANY INTERFERENCE.
- WHEN A SPECIFIC TYPE, STYLE, CLASS, ETC. OF FAA APPROVED EQUIPMENT IS SPECIFIED ONLY THAT TYPE, STYLE, CLASS, WILL BE ACCEPTABLE, EVEN THOUGH EQUIPMENT OF OTHER TYPES STYLES, CLASSES, ETC. MAY BE APPROVED.
- ANY AND ALL INSTRUCTIONS FROM THE RESIDENT ENGINEER TO THE CONTRACTOR REGARDING CHANGES IN OR DEVIATIONS FROM THE PLANS AND SPECIFICATIONS SHALL BE IN WRITING WITH COPIES SENT TO THE AIRPORT SPONSOR AND THE ILLINOIS DEPARTMENT OF TRANSPORTATION, DIVISION OF AERONAUTICS. THE CONTRACTOR SHALL NOT ACCEPT ANY VERBAL INSTRUCTIONS FROM THE RESIDENT ENGINEER REGARDING ANY CHANGES FROM THE PLANS AND SPECIFICATIONS.
- A MINIMUM OF THREE COPIES OF THE INSTRUCTION BOOK SHALL BE SUPPLIED WITH EACH DIFFERENT TYPE OF EQUIPMENT. THE BOOKS DESCRIBING A MORE SOPHISTICATED TYPE OF EQUIPMENT, SUCH AS REGULATORS, PAPI, REIL, ETC. AS A MINIMUM SHALL CONTAIN THE FOLLOWING:
  - A DETAILED DESCRIPTION OF THE OVERALL EQUIPMENT AND ITS INDIVIDUAL COMPONENTS.
  - THEORY OF OPERATION INCLUDING THE FUNCTION OF EACH COMPONENT.
  - INSTALLATION INSTRUCTION.
  - START-UP INSTRUCTIONS.
  - PREVENTATIVE MAINTENANCE REQUIREMENTS.
  - CHART FOR TROUBLE-SHOOTING.
  - COMPLETE POWER AND CONTROL DETAILED WIRING DIAGRAM(S), SHOWING EACH CONDUCTOR/CONNECTION/COMPONENT - "BLACK" BOXES ARE NOT ACCEPTABLE. THE DIAGRAM OF THE NARRATIVE SHALL SHOW VOLTAGE/CURRENTS/WAVE SHAPES AT STRATEGIC LOCATIONS TO BE USED WHEN CHECKING AND/OR TROUBLE-SHOOTING THE EQUIPMENT. WHEN THE EQUIPMENT HAS SEVERAL MODES OF OPERATION, SUCH AS SEVERAL BRIGHTNESS STEPS, THESE PARAMETERS SHALL BE INDICATED FOR ALL DIFFERENT MODES.
  - PARTS LIST WHICH WILL INCLUDE ALL MAJOR AND MINOR COMPONENTS SUCH AS RESISTORS, DIODES, ETC. IT SHALL INCLUDE A COMPLETE NOMENCLATURE OF EACH COMPONENT AND, IF APPLICABLE, THE NAME OF ITS MANUFACTURER AND THE CATALOG NUMBER.
  - SAFETY INSTRUCTIONS.

**POWER AND CONTROL NOTES**

- PROVIDE LEGEND PLATES FOR ALL ELECTRICAL EQUIPMENT TO IDENTIFY FUNCTION, CIRCUIT VOLTAGE AND PHASE. WHERE THE EQUIPMENT CONTAINS FUSES, ALSO IDENTIFY THE FUSE OR FUSE LINK AMPERE RATING. WHERE THE EQUIPMENT DOES NOT HAVE SUFFICIENT AREA TO INSTALL LEGEND PLATES, THE LEGEND PLATES SHALL BE INSTALLED ON THE WALL NEXT TO THE UNIT. LEGEND PLATES SHALL BE WEATHERPROOF ENGRAVED PLASTIC OR PHENOLIC MATERIAL, 1/4" HIGH BLACK LETTERS ON A WHITE BACKGROUND UNLESS NOTED OTHERWISE. SECURE WITH WEATHERPROOF ADHESIVE AND MACHINE SCREWS. FURNISH ADDITIONAL LEGEND PLATES WHERE REQUIRED BY CODE, FOR ADDITIONAL EQUIPMENT, AS DETAILED HEREIN ON THE PLANS, AND AS NOTED IN THE SPECIAL PROVISION SPECIFICATIONS.
- COLOR CODE ALL PHASE WIRING BY THE USE OF COLORED WIRE INSULATION AND/OR COLORED TAPE. WHERE TAPE IS USED, THE WIRE INSULATION SHALL BE BLACK. BLACK AND RED SHALL BE USED FOR PHASE CONDUCTORS ON 120/240VAC SINGLE-PHASE, THREE WIRE SYSTEMS AND BLACK, ORANGE (FOR HIGH LEG) AND BLUE SHALL BE USED FOR PHASE CONDUCTORS ON 240/120VAC THREE-PHASE, FOUR WIRE SYSTEMS. NEUTRAL CONDUCTORS, SIZE NO. 6 AWG OR SMALLER, SHALL BE IDENTIFIED BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH. NEUTRAL CONDUCTORS LARGER THAN NO. 6 AWG SHALL BE IDENTIFIED EITHER BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH OR BY THE USE OF WHITE TAPE AT ITS TERMINATIONS AND INSIDE ACCESSIBLE WIREWAYS. INSULATED GROUND CONDUCTORS SHALL HAVE GREEN COLORED INSULATION FOR ALL CONDUCTOR SIZES (AWG OR KCMIL).
- ALL BRANCH CIRCUIT CONDUCTORS CONNECTED TO A PARTICULAR PHASE SHALL BE IDENTIFIED WITH THE SAME COLOR. THE COLOR CODING SHALL BE EXTENDED TO THE POINT OF UTILIZATION.
- IN CONTROL WIRING THE SAME COLOR SHALL BE USED THROUGHOUT THE SYSTEM FOR THE SAME FUNCTION, SUCH AS 10%, 30%, 100% BRIGHTNESS CONTROL, ETC.
- LOW VOLTAGE (600 V.) AND HIGH VOLTAGE (5000 V.) CONDUCTORS SHALL BE INSTALLED IN SEPARATE WIREWAYS.
- NEATLY LACE WIRING IN DISTRIBUTION PANELS, WIREWAYS, SWITCHES AND JUNCTION/PULL BOXES.
- THE MINIMUM SIZE OF PULL/JUNCTION BOXES, REGARDLESS OF THE QUANTITY AND SIZE OF THE CONDUCTORS SHOWN, SHALL BE AS FOLLOWS:
  - IN STRAIGHT PULLS THE LENGTH OF THE BOX SHALL NOT BE LESS THAN EIGHT TIMES THE TRADE DIAMETER OF THE LARGER CONDUIT. THE TOTAL AREA (INCLUDING THE CONDUIT CROSS-SECTIONAL AREA) OF A BOX END SHALL BE AT LEAST 3 TIMES GREATER THAN THE TOTAL TRADE CROSS-SECTIONAL AREA OF THE CONDUITS TERMINATING AT THE END.
  - IN ANGLE PULLS OR 'U' PULLS THE DISTANCE BETWEEN EACH CONDUIT ENTRY INSIDE THE BOX AND THE OPPOSITE WALL OF THE BOX SHALL NOT BE LESS THAN SIX (6) TIMES THE TRADE DIAMETER OF THE LARGEST CONDUIT. THIS DISTANCE SHALL BE INCREASED FOR ADDITIONAL ENTRIES BY THE AMOUNT OF THE SUM OF THE DIAMETERS OF ALL OTHER CONDUIT ENTRIES ON THE SAME WALL AS THE BOX. THE DISTANCE BETWEEN CONDUIT ENTRIES ENCLOSING THE SAME CONDUCTOR SHALL NOT BE LESS THAN SIX TIMES THE TRADE DIAMETER OF THE LARGEST CONDUIT.
- A RUN OF CONDUIT BETWEEN TERMINATIONS AT EQUIPMENT ENCLOSURES, SQUARE DUCTS AND PULL/JUNCTION BOXES, SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR QUARTER BENDS (360 DEGREES TOTAL), INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE TERMINATIONS, CAST, CONDUIT TYPE OUTLETS SHALL NOT BE TREATED AS PULL/JUNCTION BOXES.
- EQUIPMENT CABINETS SHALL NOT BE USED AS PULL/JUNCTION BOXES. ONLY WIRING TERMINATING AT THE EQUIPMENT SHALL BE BROUGHT INTO THESE ENCLOSURES.
- SPLICES AND JUNCTION POINTS SHALL BE PERMITTED ONLY IN JUNCTION BOXES, DUCTS EQUIPPED WITH REMOVABLE COVERS, AND AT EASILY ACCESSIBLE LOCATIONS.
- CIRCUIT BREAKERS IN POWER DISTRIBUTION PANEL(S) SHALL BE THERMAL-MAGNETIC MOLDED CASE, PERMANENT TRIP WITH 100 AMPERE, MINIMUM FRAME.
- DUAL LUGS SHALL BE USED WHERE TWO (2) WIRES, SIZE NO. 6 OR LARGER, ARE TO BE CONNECTED TO THE SAME TERMINAL.
- ALL INTERIOR WALL MOUNTED EQUIPMENT ENCLOSURES SHALL BE MOUNTED ON HOT DIPPED GALVANIZED STEEL STRUT SUPPORT, OR STAINLESS STEEL STRUT SUPPORT, WITH CORROSION RESISTANT HARDWARE.
- SUPPORT FOR EXTERIOR MOUNTED EQUIPMENT SHALL USE HOT DIPPED GALVANIZED STEEL STRUT SUPPORT OR STAINLESS STEEL STRUT SUPPORT WITH STAINLESS STEEL HARDWARE. PROVIDE ZINC RICH PAINT APPLIED TO FIELD CUTS OF GALVANIZED STEEL SUPPORT TO MINIMIZE THE POTENTIAL FOR CORROSION PER THE RESPECTIVE STRUT SUPPORT MANUFACTURER'S RECOMMENDATIONS.

- CONDUITS FOR ELECTRIC SERVICE ENTRANCE AND FEEDERS SHALL BE AS DETAILED HEREIN ON THE PLANS. WHERE GALVANIZED RIGID STEEL CONDUIT IS SPECIFIED IT SHALL HAVE THREADED FITTINGS. SET SCREW TYPE FITTINGS WILL NOT BE ACCEPTABLE. CONDUITS FOR UNDERGROUND APPLICATIONS SHALL BE AS DETAILED HEREIN. CONDUITS FOR GROUNDING ELECTRODE CONDUCTORS OR INDIVIDUAL GROUNDING CONDUCTORS SHALL BE SCHEDULE 40 OR SCHEDULE 80 PVC.
- PROVIDE LIQUID TIGHT FLEXIBLE METAL CONDUIT AT CONNECTIONS TO EQUIPMENT SUBJECT TO VIBRATION OR WHERE FLEXIBILITY IS REQUIRED. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6, SUITABLE FOR GROUNDING, SUNLIGHT RESISTANT, AND RESISTANT TO OIL, GASOLINE, AND GREASE. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO MOTORS, TRANSFORMERS, & CONSTANT CURRENT REGULATORS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. DO NOT INSTALL LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS NOT UL LISTED. CONFIRM LIQUID-TIGHT FLEXIBLE METAL CONDUIT BEARS THE UL LABEL PRIOR TO INSTALLING IT.
- UNLESS OTHERWISE SHOWN, ALL EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES WITH THE LINES OF THE STRUCTURE.
- ALL STEEL CONDUITS, FITTINGS, NUTS, BOLTS, ETC. SHALL BE GALVANIZED.
- USE CONDUIT BUSHINGS AT EACH CONDUIT TERMINATION. WHERE NO. 4 AWG OR LARGER UNDERGROUND WIRE IS INSTALLED, USE INSULATED BUSHINGS.
- USE DOUBLE LOCK NUTS AT EACH CONDUIT TERMINATION.
- WRAP ALL PRIMARY AND SECONDARY POWER TRANSFORMER CONNECTIONS WITH SUFFICIENT LAYERS OF INSULATING TAPE (3M SCOTCH 23 ALL-VOLTAGE SPLICING TAPE, 3M SCOTCH 130C LINERLESS RUBBER SPLICING TAPE, OR APPROVED EQUAL) AND COVER WITH VINYL ELECTRICAL TAPE (3M SCOTCH 88 VINYL ELECTRICAL TAPE OR APPROVED EQUAL) FOR FULL VALUE OF CABLE INSULATION VOLTAGE.
- UNLESS OTHERWISE NOTED, ALL SINGLE CONDUCTOR CONTROL WIRING SHALL BE NO. 12 AWG. COPPER MINIMUM.
- THE FOLLOWING SHALL APPLY TO RELAY/CONTACTOR PANELS/ENCLOSURES:
  - FOR INTERIOR LOCATIONS ALL COMPONENTS SHALL BE MOUNTED IN NEMA 12 (DUST TIGHT) ENCLOSURE(S) WITH VERTICALLY HINGED COVERS. FOR EXTERIOR/OUTDOOR LOCATIONS ALL COMPONENTS SHALL BE MOUNTED IN NEMA 4X STAINLESS STEEL ENCLOSURE(S) WITH VERTICALLY HINGED COVERS. ALL CONDUIT ENTRIES INTO NEMA 4, 4X ENCLOSURES SHALL HAVE NEMA 4 HUBS LISTED SUITABLE FOR THE RESPECTIVE ENCLOSURE TO MAINTAIN THE NEMA 4, 4X RATING OF THE ENCLOSURE.
  - THE ENCLOSURE(S) SHALL HAVE AMPLE SPACE FOR THE CIRCUIT COMPONENTS, TERMINAL BLOCKS AND INCOMING AND INTERNAL WIRING.
  - ALL CONTROL CONDUCTOR TERMINATIONS SHALL BE OF THE OPEN-EYE CONNECTOR/SCREW TYPE. SOLDERED CLOSED-EYE TERMINATIONS, OR TERMINATIONS WITHOUT CONNECTORS ARE NOT ACCEPTABLE.
  - WHEN THE ENCLOSURE COVER IS OPENED, ALL CIRCUIT COMPONENTS, WIRING AND TERMINALS SHALL BE EXPOSED AND ACCESSIBLE WITHOUT REMOVAL OF ANY PANELS, COVERS, ETC., EXCEPT THOSE COVERING HIGH VOLTAGE COMPONENTS.
  - ACCESS TO, OR REMOVAL OF A CIRCUIT COMPONENT OR TERMINAL BLOCK WILL NOT REQUIRE THE REMOVAL OF ANY OTHER CIRCUIT COMPONENT OR TERMINAL BLOCK.
  - EACH CIRCUIT COMPONENT SHALL BE CLEARLY IDENTIFIED INDICATING ITS CORRESPONDING NUMBER SHOWN ON THE DRAWINGS AND ITS FUNCTION.
  - A COMPLETE WIRING DIAGRAM SHALL BE MOUNTED ON THE INSIDE OF THE COVER. THE DIAGRAM SHALL REPRESENT EACH CONDUCTOR BY A SEPARATE LINE.
  - THE DIAGRAM SHALL IDENTIFY EACH CIRCUIT COMPONENT AN NUMBERING AND COLOR OF EACH TERMINAL CONDUCTOR AND TERMINAL.
  - ALL WIRING SHALL BE NEATLY TRAINED AND LACED.
  - MINIMUM WIRE SIZE SHALL BE NO. 12 AWG.
- FURNISH & INSTALL A WEATHERPROOF WARNING LABEL FOR EACH METER SOCKET, SERVICE DISCONNECT, SAFETY SWITCH, CUTOUT, PANELBOARD, & CONTROL PANEL TO WARN PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS, PER THE REQUIREMENTS OF NEC 110.16 "FLASH PROTECTION".

**AIRFIELD LIGHTING NOTES**

1. UNLESS OTHERWISE NOTED, ALL UNDERGROUND AIRFIELD LIGHTING SERIES CIRCUIT CONDUCTORS WHETHER DEB OR IN DUCT/CONDUIT SHALL BE FAA APPROVED 5000 VOLT L-824 TYPE. ALL UNDERGROUND FIELD POWER LOW VOLTAGE (600 VOLT & BELOW) CIRCUIT CONDUCTORS WHETHER DEB OR IN DUCT/CONDUIT SHALL BE UL LISTED 600 VOLT, TYPE XLP-USE-2 COPPER CONDUCTORS. CONDUCTOR SIZES SHALL BE AS SPECIFIED, HEREIN.
2. NO COMPONENTS OF PRIMARY CIRCUIT SUCH AS CABLE, CONNECTORS AND TRANSFORMERS SHALL BE BROUGHT ABOVE GROUND AT EDGE LIGHTS, SIGNS, REIL, PAPI, ETC.
3. THERE SHALL BE NO EXPOSED POWER/CONTROL CABLES BETWEEN THE POINT WHERE THEY LEAVE THE UNDERGROUND (DEB OR L-867 BASES) AND WHERE THEY ENTER THE EQUIPMENT (SUCH AS TAXIWAY SIGNS, PAPI, REIL, ETC.) ENCLOSURES. THESE CABLES SHALL BE ENCLOSED IN RIGID CONDUIT OR IN FLEXIBLE, WATERTIGHT CONDUIT WITH BREAKABLE COUPLING(S) AT THE GRADE OR THE HOUSING COVER, AS SHOWN IN APPLICABLE DETAILS.
4. THE JOINTS OF THE L-823 PRIMARY CONNECTORS SHALL BE WRAPPED WITH AT LEAST ONE LAYER OF RUBBER OR SYNTHETIC RUBBER TAPE AND ONE LAYER OF PLASTIC TAPE, ONE-HALF LAPPED, EXTENDING AT LEAST 1-1/2 INCHES ON EACH SIDE OF THE JOINT, AS SHOWN ON SHEET NO. 24.
5. THE CABLE ENTRANCE INTO THE FIELD-ATTACHED L-823 CONNECTORS SHALL BE ENCLOSED BY A HEAT-SHRINKABLE TUBING WITH CONTINUOUS INTERNAL ADHESIVE, AS SHOWN ON SHEET NO. 24.
6. L-823 TYPE II, TWO-CONDUCTOR SECONDARY CONNECTORS SHALL BE CLASS 'A' (FACTORY MOLDED).
7. THERE SHALL BE NO SPLICES IN THE SECONDARY CABLE(S) WITHIN THE STEMS OF A RUNWAY/TAXIWAY EDGE/THRESHOLD LIGHTING FIXTURE AND THE WIREWAYS LEADING TO TAXIWAY SIGNS AND PAPI/REIL EQUIPMENT.
8. ELECTRICAL INSULATING GREASE SHALL BE APPLIED WITHIN THE L-823, SECONDARY, TWO CONDUCTOR CONNECTORS TO PREVENT WATER ENTRANCE. THESE CONNECTORS SHALL NOT BE TAPED.
9. DEB ISOLATION TRANSFORMERS SHALL BE BURIED AT A DEPTH OF TEN (10") INCHES ON A LINE CROSSING THE LIGHT AND PERPENDICULAR TO THE RUNWAY/TAXIWAY CENTERLINE AT A LOCATION TWELVE (12") INCHES FROM THE LIGHT OPPOSITE FROM THE RUNWAY/TAXIWAY.
10. A SLACK OF THREE (3') FEET, MINIMUM, SHALL BE PROVIDED IN THE PRIMARY CABLE AT EACH TRANSFORMER/CONNECTOR TERMINATION. AT STAKE-MOUNTED LIGHTS, THE SLACK SHALL BE LOOSELY COILED IMMEDIATELY BELOW THE ISOLATION TRANSFORMER.
11. DIRECTION OF PRIMARY CABLES SHALL BE IDENTIFIED BY COLOR CODING AS FOLLOWS: WHEN FACING LIGHT WITH BACK TO PAVEMENT, CABLE TO THE LEFT IS CODED RED AND CABLE TO RIGHT IS CODED BLUE. THIS APPLIES TO STAKE MOUNTED LIGHTS AND BASE MOUNTED LIGHTS WHERE THE BASE HAS ONLY ONE ENTRANCE.
12. L-867 BASES SHALL BE SIZE B, 24" DEEP, CLASS I, UNLESS OTHERWISE NOTED.
13. BASE MOUNTED BREAKABLE COUPLINGS SHALL NOT HAVE WEEP HOLES TO THE OUTSIDE. PLUGGED UP HOLES SHALL NOT BE ACCEPTABLE. IT SHALL BE A 1/4" DIAMETER, MINIMUM, OR EQUIVALENT OPENING FOR DRAINAGE FROM THE SPACE AROUND THE SECONDARY CONNECTOR INTO THE L-867 BASE.
14. THE ELEVATION OF THE BREAKABLE COUPLING GROOVE SHALL NOT EXCEED 1-1/2" ABOVE THE EDGE OF THE COVER IN CASE OF BASE MOUNTED COUPLINGS, OR THE TOP OF THE STAKE IN CASE OF STAKE MOUNTED COUPLINGS.
15. WHERE THE BREAKABLE COUPLING IS NOT AN INTEGRAL PART OF THE LIGHT FIXTURE STEM OR MOUNTING LEG, A BEAD OF SILICON SEAL SHALL BE APPLIED COMPLETELY AROUND LIGHT STEM OR WIREWAY AT BREAKABLE COUPLING TO PROVIDE A WATERTIGHT SEAL.
16. TOPS OF THE STAKES SUPPORTING LIGHT FIXTURES SHALL BE FLUSH WITH THE SURROUNDING GRADE.
17. PLASTIC LIGHTING FIXTURE COMPONENTS, SUCH AS LAMP HEADS, STEMS, BREAKABLE COUPLINGS, BASE COVERS, BRACKETS, STAKES, SHALL NOT BE ACCEPTABLE.
18. THE TOLERANCE FOR THE HEIGHT OF RUNWAY/TAXIWAY EDGE LIGHTS SHALL BE: ONE (1) INCH. IN CASE OF STAKE MOUNTED LIGHTS, THE SPECIFIED LIGHTING FIXTURE HEIGHT SHALL BE MEASURED BETWEEN THE TOP OF THE STAKE AND THE TOP OF THE LENS. IN CASE OF BASE MOUNTED LIGHTS, THE SPECIFIED LIGHTING FIXTURE HEIGHT SHALL BE MEASURED BETWEEN THE TOP OF THE BASE FLANGE AND THE TOP OF THE LENS, THUS INCLUDING THE BASE COVER, THE FRANGIBLE COUPLING, THE STEM, THE LAMP HOUSING AND THE LENS.
19. THE TOLERANCE FOR THE LATERAL SPACING (LIGHT LANE TO RUNWAY/TAXIWAY CENTERLINE) OF RUNWAY/TAXIWAY EDGE LIGHTS SHALL BE ONE (1) INCH. THIS ALSO APPLIES AT INTERSECTIONS TO LATERAL SPACING BETWEEN LIGHTS OF A RUNWAY/TAXIWAY AND THE INTERSECTING RUNWAY/TAXIWAY.

20. ENTRANCES INTO L-867 BASES SHALL HAVE CONDUIT COUPLINGS OR REDUCERS TO INTERFACE UNIT DUCT/CONDUIT TO L-867 BASE HUBS, OR SHALL BE SEALED WITH HEAT SHRINK.
21. GALVANIZED/PAINTED EQUIPMENT/COMPONENT SURFACES SHALL NOT BE DAMAGED BY DRILLING, FILING, ETC. DRAIN HOLES IN METAL TRANSFORMER HOUSINGS SHALL BE MADE BEFORE GALVANIZING.
22. EDGE LIGHT NUMBERING TAGS SHALL BE FACING THE PAVEMENT.
23. CABLE/SPLICE/DUCT MARKERS SHALL BE PRECAST CONCRETE OF THE SIZE SHOWN. LETTERS/NUMBERS/ARROWS FOR THE LEGEND TO BE IMPRESSED INTO THE TOPS OF THE MARKERS SHALL BE PRE-ASSEMBLED AND SECURED IN THE MOLD BEFORE THE CONCRETE IS POURED. LEGEND INSCRIBED BY HAND IN WET CONCRETE SHALL NOT BE ACCEPTABLE.
24. ALL UNDERGROUND CABLE RUNS SHALL BE IDENTIFIED BY CABLE MARKERS AT 200 FEET MAXIMUM SPACING, WITH AN ADDITIONAL MARKER AT EACH CHANGE OF DIRECTION OF THE CABLE RUN. CABLE MARKERS SHALL BE INSTALLED IMMEDIATELY ABOVE THE CABLES.
25. THERE SHALL BE NO SPLICES BETWEEN THE ISOLATION TRANSFORMERS. L-823 CONNECTORS ARE ALLOWED AT TRANSFORMER CONNECTIONS ONLY, UNLESS OTHERWISE SHOWN.
26. APPLY AN OXIDE INHIBITING, ANTI-SEIZING COMPOUND TO ALL SCREWS, NUTS AND BREAKAGE COUPLING THREADS.
27. LOCATIONS OF ENDS OF ALL UNDERGROUND DUCTS SHALL BE IDENTIFIED BY DUCT MARKERS.
28. WHERE A PARALLEL, CONSTANT VOLTAGE PAPI SYSTEM IS PROVIDED, THE "T" SPLICES SHALL BE OF THE CAST TYPE.
29. CONCRETE USED FOR SLABS, FOOTINGS, BACKFILL AROUND TRANSFORMER HOUSINGS, MARKINGS, ETC. SHALL BE 3500 PSI, AIR-ENTRAINED.
30. ALL POWER AND CONTROL CABLES IN MAN/HAND HOLES SHALL BE TAGGED. USE EMBOSSED COPPER STRIPS TO BE ATTACHED AT BOTH ENDS TO THE CABLE BY THE USE OF PLASTIC STRAPS. MINIMUM OF TWO TAGS SHALL BE PROVIDED ON EACH CABLE IN A MAN/HAND HOLE-ONE AT THE CABLE ENTRANCE AND ONE AT THE CABLE EXIT.
31. THE LOCATION, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND AND/OR ABOVEGROUND UTILITIES INDICATED ON THE PLANS IS NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY WHATEVER IN RESPECT TO ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION. THERE IS NO GUARANTEE EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED IN THE CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES OF HIS OPERATIONAL PLANS AND SHALL OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULE OF THE COMPANIES FOR REMOVAL OR ADJUSTMENT WHERE REQUIRED. IN THE EVENT AN UNEXPECTED UTILITY INTERFERENCE IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY COMPANY OF JURISDICTION. THE OWNER'S REPRESENTATIVE AND/OR THE RESIDENT ENGINEER SHALL ALSO BE IMMEDIATELY NOTIFIED. ANY DAMAGE TO SUCH MAINS AND SERVICES SHALL BE RESTORED TO SERVICE AT ONCE AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT. ALL UTILITY CABLES AND LINES SHALL BE LOCATED BY THE RESPECTIVE UTILITY. **CONTACT JULIE (JOINT UTILITY LOCATION INFORMATION FOR EXCAVATORS) FOR UTILITY INFORMATION, PHONE: 1-800-892-0123.** CONTACT THE FAA (FEDERAL AVIATION ADMINISTRATION) FOR ASSISTANCE IN LOCATING FAA CABLES AND UTILITIES. LOCATION OF FAA POWER, CONTROL AND COMMUNICATION CABLES SHALL BE COORDINATED WITH AND/OR LOCATED BY THE FAA. ALSO CONTACT AIRPORT DIRECTOR/MANAGER AND AIRPORT PERSONNEL FOR ASSISTANCE IN LOCATING UNDERGROUND AIRPORT CABLES AND/OR UTILITIES. ALSO COORDINATE WORK WITH ALL ABOVE GROUND UTILITIES.
32. WHEN PREPARING CABLE FOR SPLICES, THE CONTRACTOR SHALL USE A CABLE STRIPPER/PENCILLER WHENEVER CABLE CONNECTIONS ARE MADE.

**GROUNDING NOTES FOR AIRFIELD LIGHTING**

1. GROUNDING FOR RUNWAY LIGHTS, TAXIWAY LIGHTS, AND LIGHTED TAXI GUIDANCE SIGNS SHALL BE AS DETAILED ON THE PLANS AND AS SPECIFIED HEREIN. PER FAA AC 150/5340-30E DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS, CHAPTER 12, PART 12.6; A GROUND MUST BE INSTALLED AT EACH LIGHT FIXTURE. THE PURPOSE OF THE LIGHT BASE GROUND IS TO PROVIDE A DEGREE OF PROTECTION FOR MAINTENANCE PERSONNEL FROM POSSIBLE CONTACT WITH AN ENERGIZED LIGHT BASE OR MOUNTING STAKE THAT MAY RESULT FROM A SHORTED POWER CABLE OR ISOLATION TRANSFORMER. A LIGHT BASE GROUND SHALL BE INSTALLED AT EACH TRANSFORMER BASE/LIGHT CAN ASSOCIATED WITH RUNWAY LIGHTS, TAXIWAY LIGHTS, AND LIGHTED TAXI GUIDANCE SIGNS. A LIGHT BASE GROUND SHALL ALSO BE INSTALLED AT EACH STAKE MOUNTED LIGHT FIXTURE. A LIGHT BASE GROUND SHALL BE INSTALLED AND BONDED TO THE METAL FRAME OF EACH TAXI GUIDANCE SIGN AS DETAILED ON THE PLANS AND IN ACCORDANCE WITH THE RESPECTIVE TAXI GUIDANCE SIGN MANUFACTURER RECOMMENDATIONS. THE LIGHT BASE GROUND SHALL BE A #6 AWG BARE COPPER CONDUCTOR BONDED TO THE GROUND LUG ON THE RESPECTIVE L-867 TRANSFORMER BASE/LIGHT CAN OR MOUNTING STAKE AND A 5/8-INCH DIAMETER BY 8-FOOT LONG (MINIMUM) UL LISTED COPPER CLAD GROUND ROD. CONNECTIONS TO GROUND LUGS ON THE L-867 TRANSFORMER BASE/LIGHT CAN OR MOUNTING STAKE SHALL BE WITH A UL LISTED GROUNDING CONNECTOR. CONNECTIONS TO GROUND RODS SHALL BE MADE WITH EXOTHERMIC WELD TYPE CONNECTORS, CADWELD BY ERICO PRODUCTS, INC., SOLON, OHIO, (PHONE: 800-248-9353), THERMOWELD BY CONTINENTAL INDUSTRIES, INC., TULSA, OKLAHOMA (PHONE: 918-663-1440), ULTRAWELD BY HARGER, GRAYSLAKE, ILLINOIS (PHONE: 800-842-7437), OR APPROVED EQUAL. EXOTHERMIC WELD CONNECTIONS SHALL BE INSTALLED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S DIRECTIONS USING MOLDS AS REQUIRED FOR EACH RESPECTIVE APPLICATION. BOLTED CONNECTIONS WILL NOT BE PERMITTED AT GROUND RODS. TOP OF GROUND RODS SHALL BE BURIED 12 INCHES MINIMUM BELOW GRADE, UNLESS SPECIFIED OTHERWISE HEREIN, FOR RESPECTIVE APPLICATIONS.
2. CLEAN ALL METAL SURFACES BEFORE MAKING GROUND CONNECTIONS. METALLIC SURFACES TO BE JOINED SHALL BE PREPARED BY THE REMOVAL OF ALL NON-CONDUCTIVE MATERIAL PER 2008 NATIONAL ELECTRICAL CODE ARTICLE 250-12.
3. PER FAA 150/5340-30E THE RESISTANCE TO GROUND OF THE RESPECTIVE MOUNTING STAKE OR LIGHT BASE (WITH GROUND ROD CONNECTED) MUST BE 25 OHMS OR LESS.

**GROUNDING NOTES FOR PLASI**

1. GROUNDING FOR PLASI SHALL CONFORM TO THE RESPECTIVE PLASI MANUFACTURER'S INSTALLATION INSTRUCTIONS, AS DETAILED ON THE PLANS, AND AS SPECIFIED HEREIN. THE POWER CIRCUIT TO THE PLASI UNIT SHALL INCLUDE AN EQUIPMENT GROUND WIRE. THE EXISTING POWER FEEDER CIRCUIT IS A 120 VAC, 2-WIRE CIRCUIT WITHOUT AN EQUIPMENT GROUND WIRE. TO COMPLY WITH THE REQUIREMENTS OF NEC AND THE PLASI MANUFACTURER'S INSTALLATION INSTRUCTIONS A SAFETY SWITCH/DISCONNECT SHALL BE INSTALLED AT THE PLASI. THE 120 VAC FEEDER CONDUCTORS FROM THE VAULT SHALL TERMINATE ON THIS SAFETY SWITCH/DISCONNECT. FURNISH AND INSTALL A 3/4 INCH DIAMETER BY 10 FOOT LONG, COPPER-CLAD GROUND ROD AT THE SITE OF THE PLASI UNIT. TOP OF GROUND ROD SHALL BE BURIED 18 INCHES MINIMUM BELOW GRADE. ALL CONNECTIONS TO GROUND RODS SHALL BE MADE WITH EXOTHERMIC WELD TYPE CONNECTORS, CADWELD BY ERICO PRODUCTS, INC., SOLON, OHIO, (PHONE 1-800-248-9353), THERMOWELD BY CONTINENTAL INDUSTRIES, INC., TULSA, OKLAHOMA (PHONE 918-663-1440) OR ULTRAWELD BY HARGER LIGHTNING PROTECTION GROUNDING EQUIPMENT, GRAYSLAKE, ILLINOIS (PHONE 1-800-842-7437), OR APPROVED EQUAL. EXOTHERMIC WELD CONNECTIONS SHALL BE INSTALLED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S DIRECTIONS USING MOLDS AS REQUIRED FOR EACH RESPECTIVE APPLICATION. BOLTED CONNECTIONS WILL NOT BE PERMITTED AT GROUND RODS OR AT BURIED GROUNDING ELECTRODE CONDUCTORS. CONNECT THE SAFETY SWITCH ENCLOSURE FRAME/GROUND BAR TO THE GROUND ROD WITH A #6 AWG BARE STRANDED COPPER GROUNDING ELECTRODE CONDUCTOR. BOND THE NEUTRAL TO GROUND IN THIS SAFETY WITH A #6 AWG (MINIMUM) STRANDED COPPER BONDING JUMPER. FROM THE LOAD SIDE OF THE SAFETY SWITCH INSTALL 1 #10 THWN, 1 #10 THWN NEUTRAL, AND 1 #10 EQUIPMENT GROUND IN 3/4 INCH LIQUID-TIGHT, FLEXIBLE METAL CONDUIT TO THE PLASI UNIT. THE PLASI UNIT SHALL ALSO BE BONDED TO THE GROUND ROD WITH A #6 AWG BARE STRANDED COPPER CONDUCTOR. GROUND WIRE CONNECTION TO A PLASI UNIT SHALL BE WITH A TWO-HOLE TONGUE COMPRESSION LUG BOLTED TO THE BOTTOM OF THE PLASI HOUSING OR WITH A UL-LISTED PIPE CLAMP CONNECTED TO ONE OF THE PLASI LEGS LOCATED ABOVE THE FRANGIBLE COUPLING.

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REVISION	DATE
02/01/11	Revised as per IDA review - KNIL

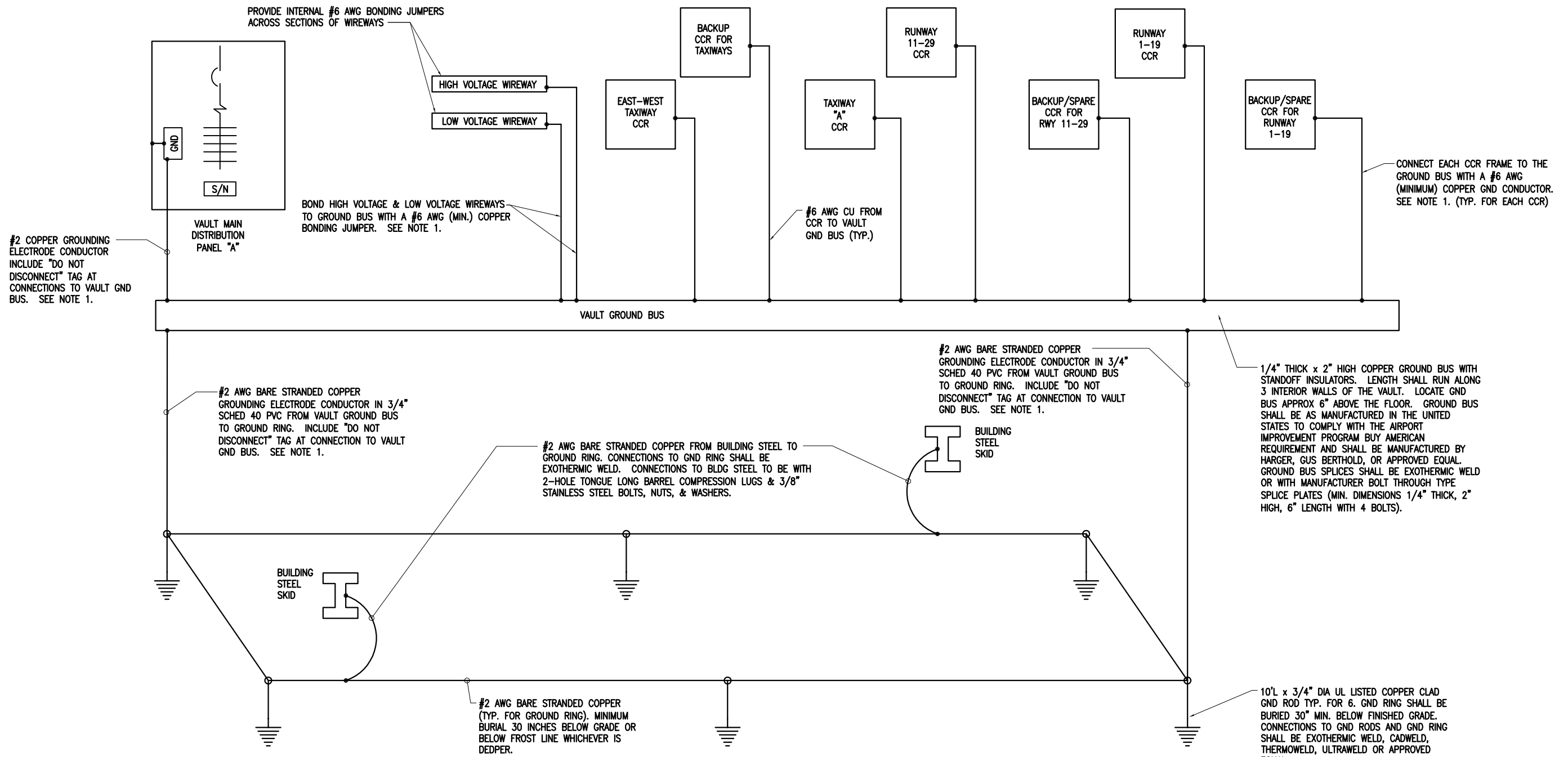
EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS  
A.I.P. PROJ.: 3-17-0040-B12  
ILL. PROJ.: 1H2-4031

Hanson Proj. No. 10A0078	07/30/10
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DATE	08/17/10

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REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

ELECTRICAL NOTES  
SHEET 2

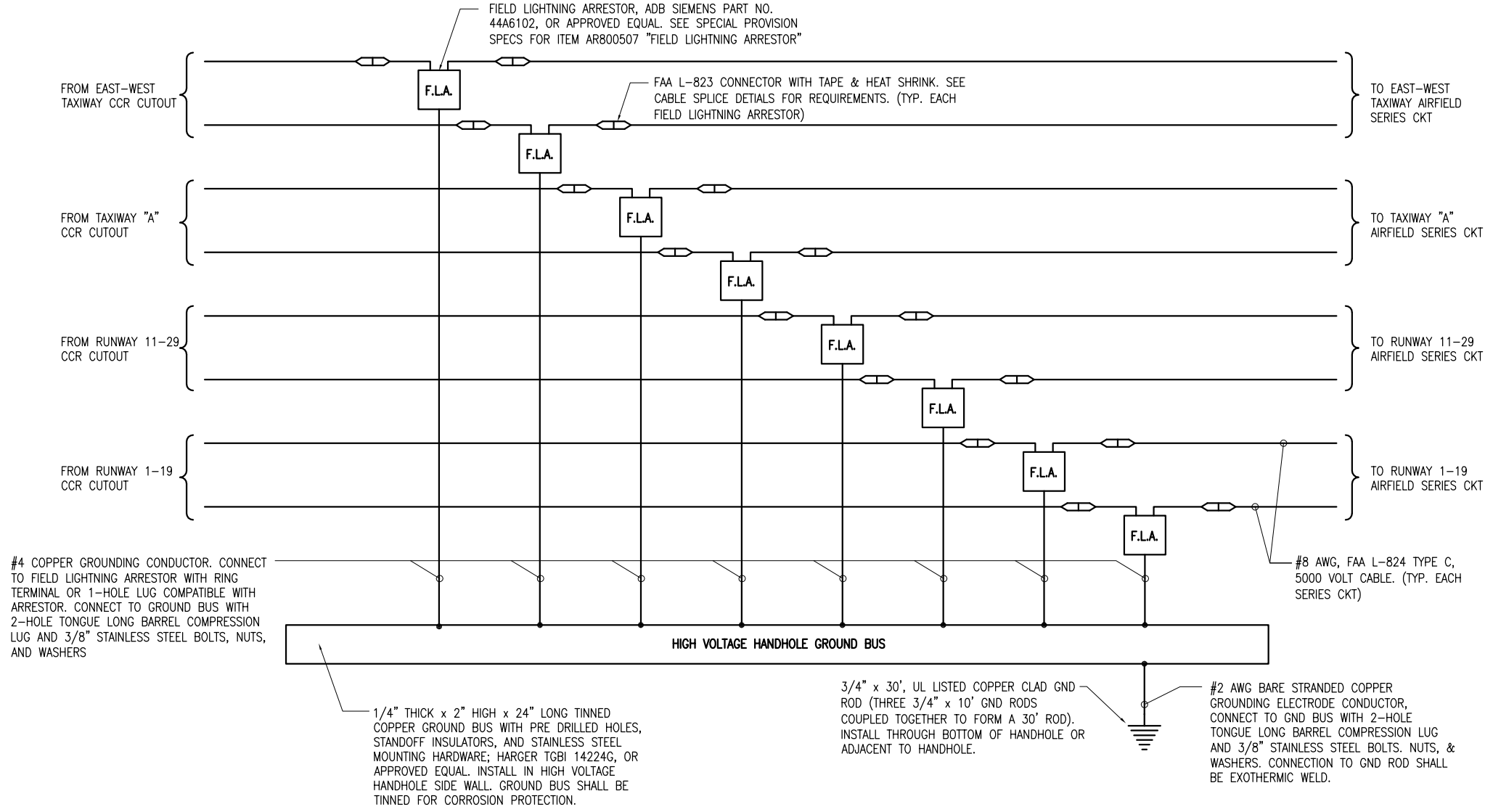


VAULT GROUND BUS RISER

NOTES

- CONNECTIONS TO GROUND BUS BAR SHALL BE WITH 2-HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE BUS BAR WITH 3/8" STAINLESS STEEL BOLTS, NUTS, & WASHERS.
- ALL INSULATED GROUND WIRES SHALL HAVE GREEN COLORED INSULATION FOR ALL CONDUCTOR AWG AND KCMIL.
- ALL WORK SHOWN ON THIS SHEET SHALL BE PAID FOR UNDER ITEM AR109200 "INSTALL ELECTRICAL EQUIPMENT" PER LUMP SUM.

REVISION	
DATE	
EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS	
A.I.P. PROJ.: 3-17-0040-B12 IL PROJ.: 1H2-4031	
Hanson Proj. No. 10A0078	
Filename E-613.DWG	
Scale NONE	
Date	
LAYOUT	07/30/10
DRAWN	KNL
REVIEWED	KNL/CAH
	08/05/10
	08/17/10
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REPLACE ELECTRICAL VAULT AND EQUIPMENT	VAULT GROUND BUS RISER
<div style="font-size: 2em; font-weight: bold;">30</div> 30 of 33 sheets	



**HIGH VOLTAGE HANDHOLE GROUND BUS RISER**

**NOTES**

1. CONNECTIONS TO GROUND BUS BAR SHALL BE WITH 2-HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE BUS BAR WITH 3/8" STAINLESS STEEL BOLTS, NUTS, & WASHERS.
2. GROUND BUS BAR SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. GROUND RODS SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA FROM 100% DOMESTIC STEEL. INCLUDE CERTIFICATION OF COMPLIANCE WITH SHOP DRAWING SUBMITTAL.
3. GROUND BUS BAR IN HIGH VOLTAGE HANDHOLE, GROUND ROD, GROUNDING ELECTRODE CONDUCTOR AND ASSOCIATED CONNECTIONS WILL BE PAID FOR UNDER ITEM AR109200 "INSTALL ELECTRICAL EQUIPMENT" PER LUMP SUM.
4. FIELD LIGHTNING ARRESTORS, ASSOCIATED L-823 CABLE CONNECTIONS, GROUND WIRE, AND CONNECTORS WILL BE PAID FOR UNDER ITEM AR800507 "FIELD LIGHTNING ARRESTOR" PER EACH.

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REVISION
DATE

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS

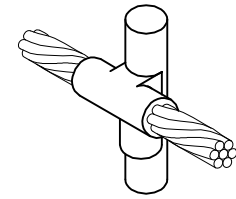
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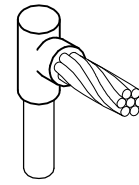
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REPLACE ELECTRICAL VAULT AND EQUIPMENT

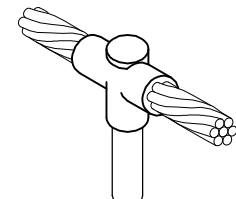
HIGH VOLTAGE HANDHOLE GROUND BUS RISER



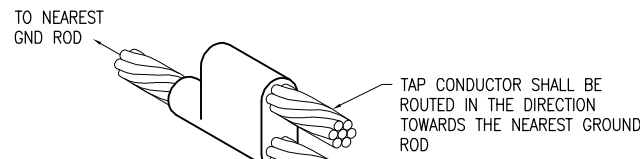
**CABLE TO GROUND ROD**



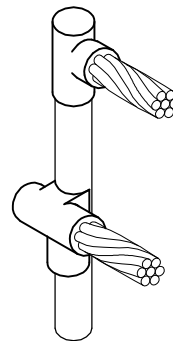
**CABLE TO GROUND ROD**



**CABLE TO GROUND ROD**



**CABLE TO CABLE HORIZONTAL PARALLEL TAP**

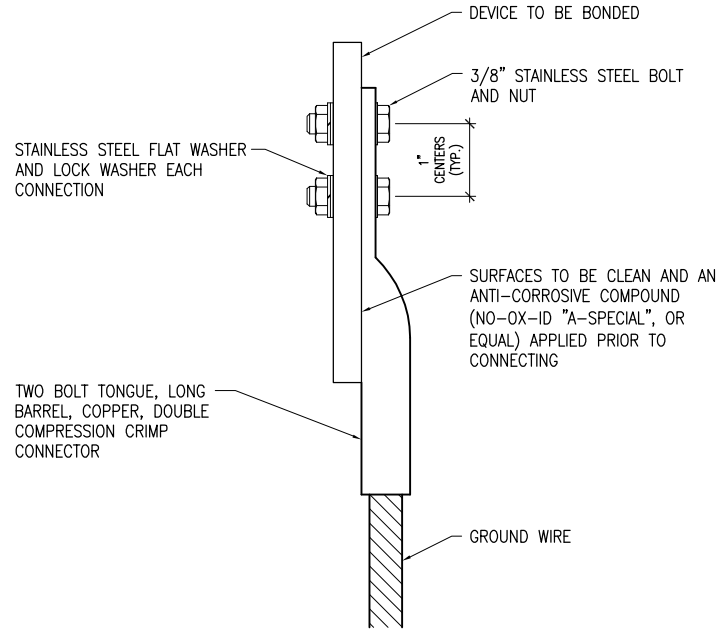


**CABLES TO GROUND ROD**

**DETAIL NOTES**

1. ALL BELOW GRADE CONNECTIONS TO GROUND RODS & GROUND RING CONDUCTORS SHALL BE EXOTHERMIC WELD TYPE CONNECTIONS. EXOTHERMIC WELDS SHALL BE CADWELD AS MANUFACTURED BY ERICO PRODUCTS, SOLON, OHIO, ULTRAWELD AS MANUFACTURED BY HARGER LIGHTNING PROTECTION & GROUNDING EQUIPMENT, GRAYSLAKE, IL, THERMOWELD AS MANUFACTURED BY CONTINENTAL INDUSTRIES, TULSA, OKLAHOMA, OR APPROVED EQUAL. VERIFY PROPER SIZES, MOLDS, TYPES, AND REQUIREMENTS FOR THE RESPECTIVE APPLICATION WITH THE MANUFACTURER, AND INSTALL PER THEIR DIRECTIONS.
2. FOR APPLICATIONS TO GALVANIZED STEEL OR PAINTED STEEL, REMOVE GALVANIZING AND/OR PAINT & CLEAN THE SURFACE TO EXPOSE BARE STEEL BEFORE MAKING EXOTHERMIC WELD CONNECTION.
3. INDIVIDUAL GROUNDING ELECTRODE CONDUCTORS SHALL NOT BE INSTALLED IN METAL CONDUIT. INSTALL GROUNDING ELECTRODE CONDUCTORS IN SCHED 40 PVC CONDUIT AS REQUIRED IN FOUNDATIONS, FOR PROTECTION, WHERE ENTERING ENCLOSURES, ETC. WHERE PLASTIC CONDUIT IS USED FOR INDIVIDUAL GROUND WIRES, DO NOT COMPLETELY ENCIRCLE THE CONDUIT WITH FERROUS AND/OR MAGNETIC MATERIALS. WHERE METAL CLAMPS ARE INSTALLED USE NYLON BOLTS, NUTS, WASHERS, & SPACERS TO INTERRUPT A COMPLETE METALLIC PATH FROM ENCIRCLING THE CONDUIT.

**EXOTHERMIC WELD DETAILS**

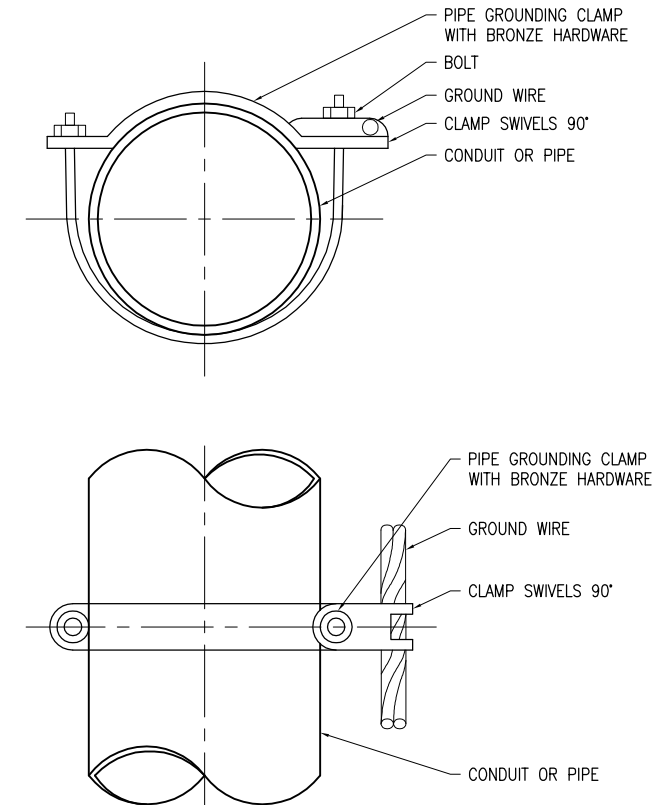


2 HOLE LONG BARREL COMPRESSION LUG TABLE			
WIRE SIZE	BURNDY CAT. NO.	THOMAS & BETTS CAT. NO.	PENN-UNION CAT. NO.
#8 AWG STRANDED	YA8C-2TC38	256-30695-1157	BBLU-8D-2TC38
#6 AWG SOLID	YA8C-2TC38 OR YGA6C-2TC38E2G1		
#6 AWG STRANDED	YA6C-2TC38	256-30695-1158	BBLU-6D-2TC38
#4 AWG STRANDED	YA4C-2TC38	256-30695-1159	BBLU-4D-2TC38
#2 AWG STRANDED	YA2C-2TC38	256-30695-1160	BBLU-2D-2TC38
#2 AWG SOLID	YA3C-2TC38	256-30695-1160	BBLU-3D-2TC38
#1/0 AWG STRANDED	YA25-2TC38	256-30695-1162	BBLU-1/0D-2TC38
#2/0 AWG STRANDED	YA26-2TC38	256-30695-1116	BBLU-2/0D-2TC38
#3/0 AWG STRANDED	YA27-2TC38	54816BE	BBLU-3/0D-2TC38
#4/0 AWG STRANDED	YA28-2TC38	256-30695-1117	BBLU-4/0D-2TC38

**NOTES**

1. ALL CONNECTIONS TO GROUND BUS BAR SHALL BE WITH 2 HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE BUS BAR.
2. GROUND WIRE CONNECTIONS TO EQUIPMENT SHALL BE WITH 2 HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE DEVICE OR WITH THE RESPECTIVE EQUIPT MANUFACTURER'S LUG OR TERMINAL WHERE APPLICABLE.
3. GROUNDING ELECTRODE CONDUCTORS, BONDING JUMPERS, & INDIVIDUAL GROUND WIRES SHALL NOT BE INSTALLED IN METAL CONDUIT. WHERE PLASTIC CONDUIT IS USED FOR INDIVIDUAL GROUND WIRES, DO NOT COMPLETELY ENCIRCLE THE CONDUIT WITH FERROUS AND/OR MAGNETIC MATERIALS. WHERE METAL CLAMPS ARE INSTALLED USE NYLON BOLTS, NUTS, WASHERS, & SPACERS TO INTERRUPT A COMPLETE METALLIC APTH FROM ENCIRCLING THE CONDUIT.
4. ALL CONNECTIONS SHALL BE COATED WITH A CORROSION PREVENTATIVE COMPOUND (SANCHEM INC. NO-OX-ID "A-SPECIAL", BURNDY PENETROX E, OR EQUAL) BEFORE JOINING. ALL COPPER BUS BARS SHALL BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION. CLEAN SURFACES, OF RESPECTIVE DEVICES TO BE BONDED, TO BARE METAL, PER NEC 250-12.

**GROUNDING LUG CONNECTION DETAIL**



PIPE GROUNDING CLAMP TABLE	
BURNDY CAT. NO.	PIPE SIZE
GAR3902-BU	1/2" - 1"
GAR3903-BU	1 1/4" - 2"
GAR3904-BU	2 1/2" - 3 1/2"
GAR3905-BU	4" - 5"
GAR3906-BU	6"

**NOTES**

1. PIPE GROUNDING CLAMPS SHALL HAVE BRONZE HARDWARE, BE CORROSION RESISTANT, SUITABLE FOR DIRECT BURIAL IN EARTH OR CONCRETE, & UL467 LISTED.

**PIPE/CONDUIT GROUNDING CLAMP DETAIL**

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REVISION	DATE

EFFINGHAM COUNTY  
MEMORIAL AIRPORT  
EFFINGHAM, ILLINOIS  
A.I.P. PROJ.: 3-17-0040-B12  
IL PROJ.: 1H2-4031

Hanson Proj. No. 10A0078	FILENAME E-505.DWG	Scale NONE	Date
LAYOUT	KNL	07/30/10	
DRAWN	RL	08/05/10	
REVIEWED	KNL/CAH	08/17/10	

**HANSON**  
Professional Services Inc. 2011  
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Ph: (217) 788-2450 Fax: (217) 788-2503  
www.hanson-inc.com  
Offices Nationwide

REPLACE ELECTRICAL  
VAULT AND EQUIPMENT

GROUNDING DETAILS

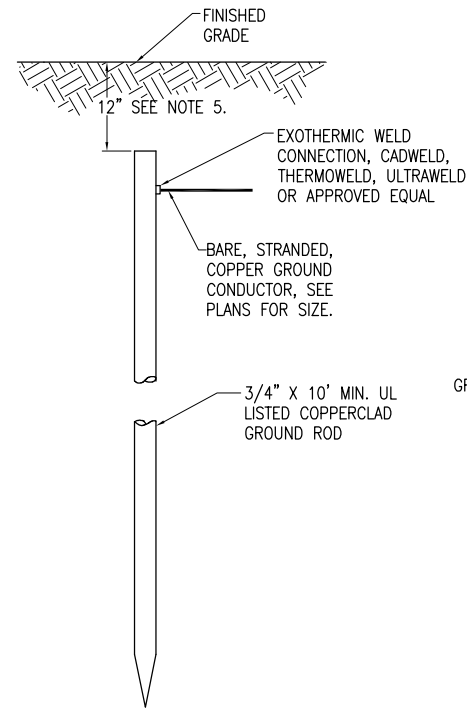


**GROUNDING NOTES**

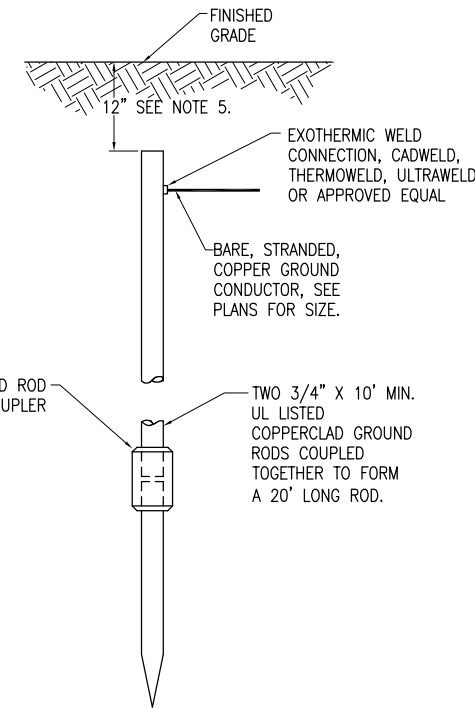
- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL GROUNDING AS MAY BE NECESSARY OR REQUIRED TO MAKE A COMPLETE GROUNDING SYSTEM AS REQUIRED BY THE LATEST NATIONAL ELECTRICAL CODE (NFPA 70) IN FORCE AND FAA-STD-019a (LIGHTNING AND SURGE PROTECTION, GROUNDING, BONDING, AND SHIELDING REQUIREMENTS FOR FACILITIES AND ELECTRONIC EQUIPMENT). THE RELIABILITY OF THE GROUNDING SYSTEM IS DEPENDENT ON CAREFUL, PROPER INSTALLATION AND CHOICE OF MATERIALS. IMPROPER PREPARATION OF SURFACES TO BE JOINED TO MAKE AN ELECTRICAL PATH, LOOSE JOINTS OR CORROSION CAN INTRODUCE IMPEDANCE THAT WILL SERIOUSLY IMPAIR THE ABILITY OF THE GROUND PATH TO PROTECT PERSONNEL AND EQUIPMENT AND TO ABSORB TRANSIENTS THAT CAN CAUSE NOISE IN COMMUNICATIONS CIRCUITS. THE FOLLOWING FUNCTIONS ARE PARTICULARLY IMPORTANT TO ENSURE A RELIABLE GROUND SYSTEM:
- FURNISH AND INSTALL GROUND RODS AS DETAILED HEREIN. GROUND RODS FOR AIRFIELD LIGHTING (RUNWAY LIGHTING, TAXIWAY LIGHTING, TAXI GUIDANCE SIGNS, & DISTANCE REMAINING SIGNS) SHALL BE MINIMUM 5/8-IN. DIAMETER BY 8-FT LONG, UL-LISTED COPPER CLAD WITH 10-MIL MINIMUM COPPER COATING. GROUND RODS FOR OTHER APPLICATIONS SHALL BE MINIMUM 3/4-IN. DIAMETER BY 10-FT LONG, UL-LISTED, COPPER CLAD WITH 10-MIL MINIMUM COPPER COATING. GROUND RODS SHALL BE SPACED OR AS DETAILED ON THE RESPECTIVE PLANS, AND IN NO CASE SPACED LESS THAN ONE ROD LENGTH APART. ALL CONNECTIONS TO GROUND RODS AND THE GROUND RING SHALL BE MADE WITH EXOTHERMIC WELD TYPE CONNECTORS, CADWELD BY ERICO PRODUCTS, INC., SOLON, OHIO, (PHONE 1-800-248-9353), THERMOWELD BY CONTINENTAL INDUSTRIES, INC., TULSA, OKLAHOMA (PHONE 918-663-1440) OR ULTRAWELD BY HARGER, GRAYSLAKE, ILLINOIS (PHONE 1-800-842-7437) OR APPROVED EQUAL. EXOTHERMIC WELD CONNECTIONS SHALL BE INSTALLED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S DIRECTIONS USING MOLDS AS REQUIRED FOR EACH RESPECTIVE APPLICATION. BOLTED CONNECTIONS WILL NOT BE PERMITTED AT GROUND RODS OR AT BURIED GROUNDING ELECTRODE CONDUCTORS.
- CONTRACTOR SHALL TEST EACH MADE ELECTRODE GROUND ROD/GROUND FIELD/GROUND RING WITH AN INSTRUMENT SPECIFICALLY DESIGNED FOR TESTING GROUND FIELD SYSTEMS. IF GROUND RESISTANCE EXCEEDS 10 OHMS, CONTACT THE RESIDENT ENGINEER FOR FURTHER DIRECTION. COPIES OF GROUND FIELD TEST RESULTS SHALL BE FURNISHED TO THE RESIDENT ENGINEER, UPON REQUEST, FOR REVIEW AND RECORD PURPOSES.
- ALL PRODUCTS ASSOCIATED WITH THE GROUNDING SYSTEM SHALL BE UL-LISTED AND LABELED.
- ALL BOLTED OR MECHANICAL CONNECTIONS SHALL BE COATED WITH A CORROSION PREVENTATIVE COMPOUND BEFORE JOINING, SANCHEM INC. "NO-OX-ID "A-SPECIAL" COMPOUND, BURNDY PENETROX E, OR EQUAL.
- METALLIC SURFACES TO BE JOINED SHALL BE PREPARED BY THE REMOVAL OF ALL NON-CONDUCTIVE MATERIAL, PER 2008 NATIONAL ELECTRICAL CODE ARTICLE 250-12. ALL COPPER BUS BARS MUST BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION.
- METALLIC RACEWAY FITTINGS SHALL BE MADE UP TIGHT TO PROVIDE A PERMANENT LOW IMPEDANCE PATH FOR ALL CIRCUITS. METAL CONDUIT TERMINATIONS IN ENCLOSURES SHALL BE BONDED TO THE ENCLOSURE WITH UL-LISTED FITTINGS SUITABLE FOR GROUNDING. PROVIDE GROUNDING BUSHINGS WITH BONDING JUMPERS FOR ALL METAL CONDUITS ENTERING SERVICE EQUIPMENT (METER BASE, CT CABINET, MAIN SERVICE BREAKER ENCLOSURE, ETC.). PROVIDE GROUNDING BUSHINGS WITH BONDING JUMPERS FOR ALL METAL CONDUITS ENTERING AN ENCLOSURE THROUGH CONCENTRIC OR ECCENTRIC KNOCKOUTS THAT ARE PUNCHED OR OTHERWISE FORMED SO AS TO IMPAIR THE ELECTRICAL CONNECTION TO GROUND. STANDARD LOCKNUTS OR BUSHINGS SHALL NOT BE THE SOLE MEANS FOR BONDING WHERE A CONDUIT ENTERS AN ENCLOSURE THROUGH A CONCENTRIC OR ECCENTRIC KNOCKOUT
- ALL CONNECTIONS, LOCATED ABOVE GRADE, BETWEEN THE DIFFERENT TYPES OF GROUNDING CONDUCTORS SHALL BE MADE USING UL-LISTED DOUBLE COMPRESSION CRIMP TYPE CONNECTORS OR UL-LISTED BOLTED GROUND CONNECTORS. FOR GROUND CONNECTIONS TO ENCLOSURES, CASES AND FRAMES OF ELECTRICAL EQUIPMENT NOT SUPPLIED WITH GROUND LUGS THE CONTRACTOR SHALL DRILL REQUIRED HOLES FOR MOUNTING A BOLTED GROUND CONNECTOR. ALL BOLTED GROUND CONNECTORS SHALL BE BURNDY, THOMAS AND BETTS, OR EQUAL. TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUES IN UL STANDARD 486A TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
- ALL METAL EQUIPMENT ENCLOSURES, CONDUITS, CABINETS, BOXES, RECEPTACLES, MOTORS, ETC. SHALL BE BONDED TO THE RESPECTIVE GROUNDING SYSTEM.
- PROVIDE ALL BOXES FOR PROPOSED OUTLETS, SWITCHES, CIRCUIT BREAKERS, ETC. WITH GROUNDING SCREWS. PROVIDE ALL PANELBOARD, SWITCHGEAR, ETC., ENCLOSURES WITH GROUNDING BARS WITH INDIVIDUAL SCREWS, LUGS, CLAMPS, ETC., FOR EACH OF THE GROUNDING CONDUCTORS THAT ENTER THEIR RESPECTIVE ENCLOSURES.
- EACH NEW FEEDER CIRCUIT AND/OR BRANCH CIRCUIT SHALL INCLUDE AN EQUIPMENT GROUND WIRE. METAL RACEWAY OR CONDUIT SHALL NOT MEET THIS REQUIREMENT. THE EQUIPMENT GROUND WIRE FROM EQUIPMENT SHALL NOT BE SMALLER THAN ALLOWED BY 2008 NEC TABLE 250-122 "MINIMUM SIZE CONDUCTORS OR GROUNDING RACEWAY AND EQUIPMENT." WHEN CONDUCTORS ARE ADJUSTED IN SIZE TO COMPENSATE FOR VOLTAGE DROP, EQUIPMENT-GROUNDING CONDUCTORS SHALL BE ADJUSTED PROPORTIONATELY ACCORDING TO CIRCULAR MIL AREA. ALL EQUIPMENT GROUND WIRES SHALL BE COPPER, EITHER BARE OR INSULATED GREEN IN COLOR. WHERE THE EQUIPMENT GROUNDING CONDUCTORS ARE INSULATED, THEY SHALL BE

IDENTIFIED BY THE COLOR GREEN, AND SHALL BE THE SAME INSULATION TYPE AS THE PHASE CONDUCTORS.

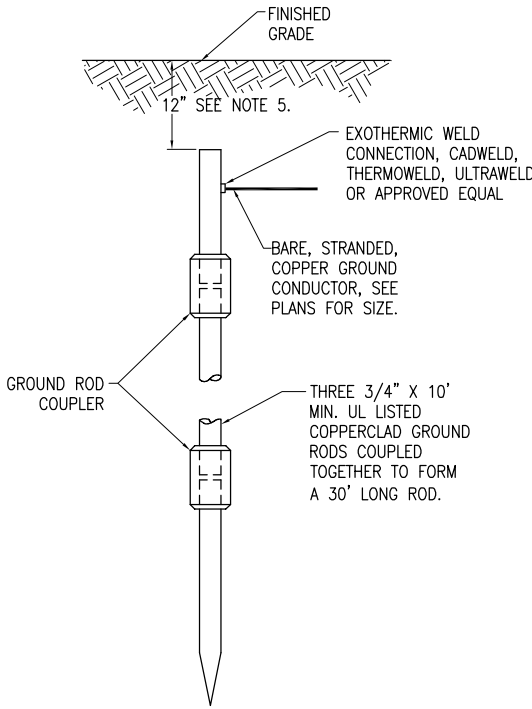
- ALL EXTERIOR METAL CONDUIT, WHERE NOT ELECTRICALLY CONTINUOUS BECAUSE OF MANHOLES, HANDHOLES, NON-METALLIC JUNCTION BOXES, ETC., SHALL BE BONDED TO ALL OTHER METAL CONDUIT IN THE RESPECTIVE DUCT RUN, AND AT EACH END, WITH A COPPER-BONDING JUMPER SIZED IN CONFORMANCE WITH 2008 NEC 250-102. WHERE METAL CONDUITS TERMINATE IN AN ENCLOSURE (SUCH AS A MOTOR CONTROL CENTER, SWITCHBOARD, ETC) WHERE THERE IS NOT ELECTRICAL CONTINUITY WITH THE CONDUIT AND THE RESPECTIVE ENCLOSURE, PROVIDE A BONDING JUMPER FROM THE RESPECTIVE ENCLOSURE GROUND BUS TO THE CONDUIT SIZED PER 2008 NEC 250-102.
- IT IS THE INTENT OF THIS SPECIFICATION THAT ALL MOTOR FRAMES, PUMP BASES ELECTRICAL EQUIPMENT ENCLOSURES, PANEL HOUSINGS, CONDUITS, BOXES, ETC. HAVE A CONTINUOUS COPPER WIRE GROUND CONNECTION AND SHALL BE POSITIVELY BONDED TO THE RESPECTIVE GROUNDING SYSTEM. CONDUIT CONNECTORS WILL NOT BE CONSIDERED AS ADEQUATE GROUNDING.
- PROVIDE A POSITIVE GROUND BOND FOR ALL OUTLET BOXES, ELECTRICAL EQUIPMENT ENCLOSURES, GROUNDING RECEPTACLES, TOGGLE SWITCHES, ETC. INSTALL A GROUNDING CONDUCTOR IN ALL WIRE AND CABLE RACEWAYS. GROUND CONDUCTOR TO HAVE 600-VOLT INSULATION AND BE IDENTIFIED BY A CONTINUOUS GREEN COLOR COATING. THEY SHALL BE USED SOLELY FOR GROUNDING PURPOSES AND BE ENTIRELY SEPARATE FROM WHITE GROUNDED NEUTRAL CONDUCTOR, EXCEPT AT SUPPLY SIDE OF SERVICE DISCONNECTING MEANS, WHERE GROUNDING AND NEUTRAL SYSTEMS ARE TO BE CONNECTED TO SERVICE GROUND.
- EACH AND ALL GROUNDED CASED AND METAL PARTS ASSOCIATED WITH ELECTRICAL EQUIPMENT SHALL BE TESTED FOR CONTINUITY OF CONNECTION WITH GROUND BUS SYSTEM BY CONTRACTOR IN PRESENCE OF OWNER'S REPRESENTATIVE.
- ALL CONNECTIONS BETWEEN THE DIFFERENT TYPES OF GROUNDING CONDUCTORS ABOVE GRADE SHALL BE MADE USING BOLTED GROUND CONNECTORS. GROUND LUGS SHALL BE PROVIDED IN ALL ENCLOSURES AND WIRING TERMINATION JUNCTION BOXES. EQUIPMENT GROUNDS AND GROUNDING CONDUCTOR SHALL BE CONNECTED TO THESE GROUND LUGS. FOR GROUND CONNECTIONS TO ENCLOSURES, CASES AND FRAMES OF ELECTRICAL EQUIPMENT NOT SUPPLIED WITH GROUND LUGS THE CONTRACTOR SHALL DRILL REQUIRED HOLES FOR MOUNTING A BOLTED GROUND CONNECTOR. ALL BOLTED GROUND CONNECTORS SHALL BE BURNDY, OR APPROVED EQUAL.
- BOND ALL NONCURRENT-CARRYING PARTS OF METAL EQUIPMENT TO GROUND SYSTEM.
- BUILDING STRUCTURAL STEEL SYSTEM SHALL BE BONDED TO ELECTRICAL GROUND SYSTEM.
- INSTALL GROUNDING ELECTRODE CONDUCTORS, LIGHTNING PROTECTION DOWN CONDUCTORS AND SEPARATE GROUND CONDUCTORS IN SCHEDULE 40 OR SCHEDULE 80 PVC CONDUIT OR EXPOSED WHERE ACCEPTABLE TO LOCAL CODES. WHERE GROUNDING ELECTRODE CONDUCTORS, LIGHTNING PROTECTION DOWN CONDUCTORS OR INDIVIDUAL GROUND CONDUCTORS ARE RUN IN PVC CONDUIT, DO NOT COMPLETELY ENIRCLE CONDUIT WITH FERROUS AND/OR MAGNETIC MATERIALS. USE NON-METALLIC REINFORCED FIBERGLASS STRUT SUPPORT. WHERE METAL CONDUIT CLAMPS ARE INSTALLED, USE NYLON BOLTS, NUTS, WASHERS AND SPACERS TO INTERRUPT A COMPLETE METALLIC PATH FROM ENCIRCLING THE CONDUIT. THIS IS REQUIRED TO AVOID GIRDLING OF GROUND CONDUCTORS. GIRDLING OF A GROUND CONDUCTOR IS THE RESULT OF PLACING THE CONDUCTOR IN A RING OF MAGNETIC MATERIAL. THIS RING COULD BE A METALLIC CONDUIT, U-BOLT OR STRUT SUPPORT PIPE CLAMP, OR OTHER SUPPORT HARDWARE. THE RESULT OF GIRDLING GROUND CONDUCTORS SIGNIFICANTLY INCREASES THE INDUCTIVE IMPEDANCE OF THE GROUND CONDUCTOR. INDUCTIVE AND CAPACITIVE IMPEDANCE IS A TYPE OF RESISTANCE THAT OPPOSES THE FLOW OF ALTERNATING CURRENT. ANY INCREASE IN THE IMPEDANCE OF A GROUND CONDUCTOR REDUCES ITS ABILITY TO EFFECTIVELY MITIGATE RADIO FREQUENCY NOISE IN THE GROUND SYSTEM. THE CONDITION WHERE A GROUND CONDUCTOR IS GIRDLED DURING A LIGHTNING STRIKE RESULTS IN PHENOMENA KNOWN AS SURGE IMPEDANCE LOADING. SURGE IMPEDANCE LOADING IS A RESULT OF VOLTAGE AND CURRENT REACHING 500,000 VOLTS AND 10,000 AMPS FOR A SHORT DURATION. GIRDLING FURTHER INCREASES THE IMPEDANCE AT LIGHTNING FREQUENCIES OF 100 KILOHERTZ TO 100 MEGAHERTZ. AT THESE POWER AND FREQUENCY LEVELS ANY INCREASE IN THE IMPEDANCE OF THE GROUND CONDUCTOR MUST BE CONTROLLED. DURING LIGHTNING DISCHARGE CONDITIONS A LOW INDUCTIVE IMPEDANCE PATH IS MORE IMPORTANT THAN A LOW DC RESISTANCE PATH.
- IF LOCAL CODES DICTATE THAT INDIVIDUAL GROUNDING CONDUCTORS MUST BE RUN IN METAL CONDUIT OR RACEWAY, THEN THE CONDUIT OR RACEWAY MUST BE BONDED AT EACH END OF THE RUN WITH A BONDING JUMPER SIZED EQUAL TO THE INDIVIDUAL GROUNDING CONDUCTOR OR AS REQUIRED BY 2008 NEC 250-102. NOTE THIS DOES NOT APPLY TO AC EQUIPMENT GROUNDING CONDUCTORS RUN WITH AC CIRCUITS.
- WHERE A CONFLICT IS DETERMINED WITH RESPECT TO GROUNDING REQUIREMENTS PER MANUFACTURER INSTALLATION INSTRUCTIONS, NEC, AND/OR THE CONTRACT DOCUMENTS, CONTACT THE RESIDENT ENGINEER OR PROJECT ENGINEER FOR FURTHER DIRECTIONS.
- GROUND RODS SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. STEEL USED TO MANUFACTURER GROUND RODS SHALL BE 100 PERCENT DOMESTIC STEEL.



**10 FT. GROUND ROD**



**20 FT. GROUND ROD**



**30 FT. GROUND ROD**

**GROUND RODS**  
(NOT TO SCALE)

**NOTES**

- TYPE AND MINIMUM NUMBER OF GROUND RODS SHALL BE AS SPECIFIED ON THE PLAN.
- THE RESISTANCE TO GROUND OF THE GROUNDING SYSTEM SHALL NOT EXCEED 25 OHMS.
- COST OF GROUND RODS IS INCIDENTAL TO THE ASSOCIATED ITEMS REQUIRING GROUNDING UNLESS OTHERWISE SPECIFIED. GROUND RODS FOR VAULT AND HIGH VOLTAGE HANDHOLE, AND WIND CONE WILL BE CONSIDERED INCIDENTAL TO ITEM AR109200.
- GROUND RODS SHALL BE SPACED AS DETAILED ON THE PLANS AND SHALL NOT BE SPACED LESS THAN ONE ROD LENGTH APART.
- TOP OF GROUND RODS SHALL BE 12" MINIMUM BELOW GRADE UNLESS DETAILED OTHERWISE HEREIN. GROUND RING CONDUCTORS SHALL BE 30" MINIMUM BELOW GRADE OR BELOW FROST LINE WHICHEVER IS DEEPER.

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REVISION	DATE	02/01/11	Revised as per IDA review - KNIL	
<p><b>EFFINGHAM COUNTY MEMORIAL AIRPORT EFFINGHAM, ILLINOIS</b></p> <p style="font-size: small;">A.I.P. PROJ.: 3-17-0040-B12 IL PROJ.: 1H2-4031</p>				
Hanson Proj. No. 10A0078	Filename E-004.DWG	Scale NONE	Date	07/30/10
LAYOUT	KNIL	RLL	08/05/10	08/17/10
REVIEWED	KNIL/CAH	REVIEWED	KNIL/CAH	08/17/10
<p style="font-size: x-small;">© Copyright Hanson Professional Services Inc. 2011 Hanson Professional Services Inc. 1525 South Sixth Street Springfield, Illinois 62703-2986 Ph: (217) 788-2450 Fax: (217) 788-2903 www.hanson-inc.com Offices Nationwide</p>				
<p><b>REPLACE ELECTRICAL VAULT AND EQUIPMENT</b></p>		<p><b>GROUNDING NOTES</b></p>		
33				
33 of 33 sheets				