

Olsson  
601 P Street, Suite 200  
Lincoln, Nebraska  
April 13, 2020

ADDENDUM NO. 1

Reconstruct Runway 18/36, Lighting, PAPI's, REIL's & Wind Cone  
Gould Peterson Municipal Airport  
Tarkio, Missouri  
**Bid Date: April 28, 2020 – 1:30 pm**  
MoDOT# 18-001A-1A  
Olsson Project No. 019-1607

TO ALL WHO HAVE RECEIVED PLANS AND SPECIFICATIONS FOR THE REFERENCED PROJECT.

**Note: Prospective bidders must obtain a copy of the project manual and project drawings from either [www.questcdn.com](http://www.questcdn.com) or Olsson at the address identified within the Notice to Bidders. Any other sources utilized will not be acceptable for consideration.**

**Plans**

1. Insert sheets 55 – 61 into plan set dated 3/30/20.
2. Refer to the Plan Sheets 62, 63, 64 and 65

Delete the existing Plan Sheets 62, 63, 64 and 65 in their entirety and **REPLACE** with the attached Plan Sheets 62, 63, 64, and 65 dated 3/30/20.

**Specifications**

3. Refer to Specification P-610 Concrete for Miscellaneous Structures, Section 1.1

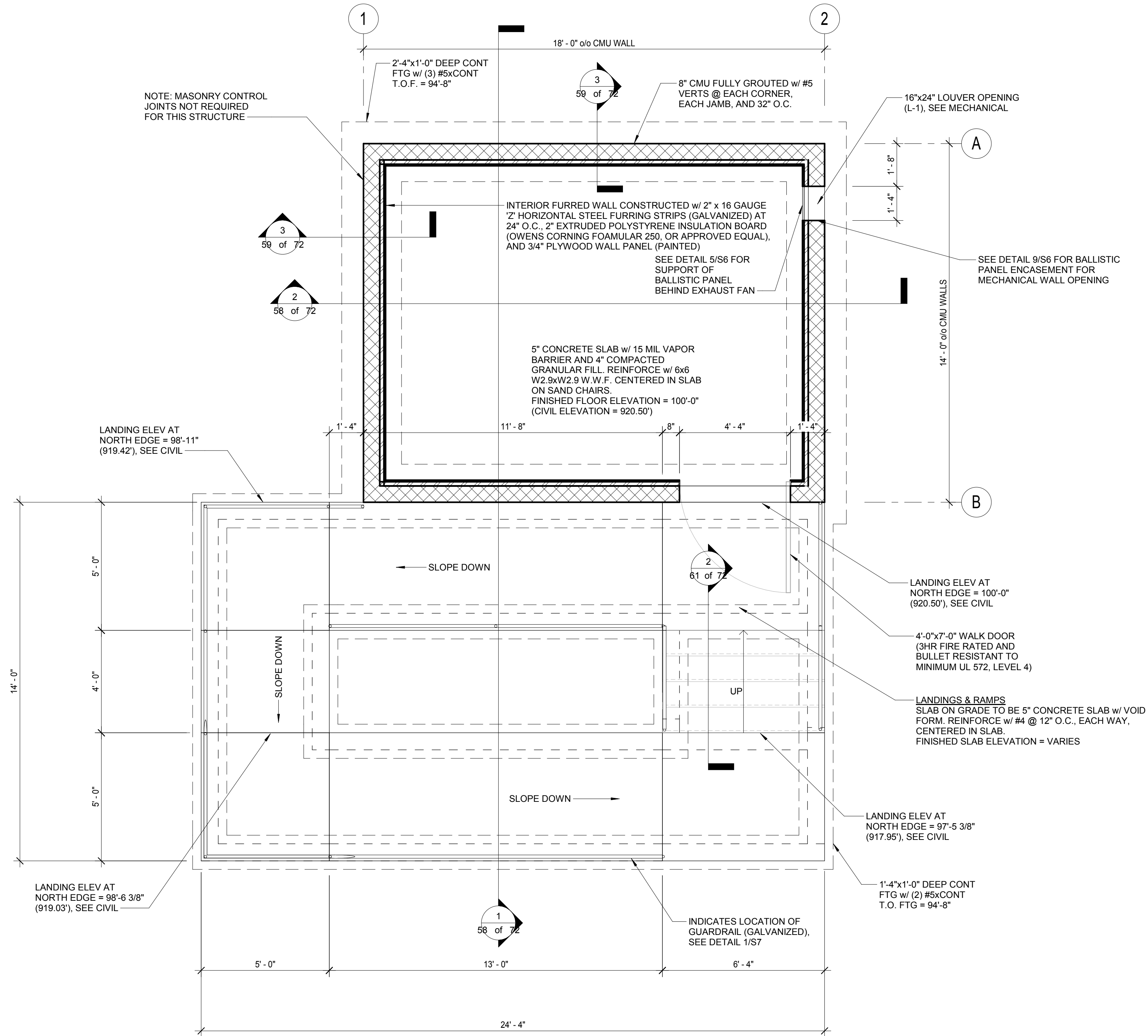
Add the following to Section 610-1.1:

“For small projects less than 20 cubic yards, concrete meeting state department of transportation specifications MODOT Class B-1 Concrete may be used.”

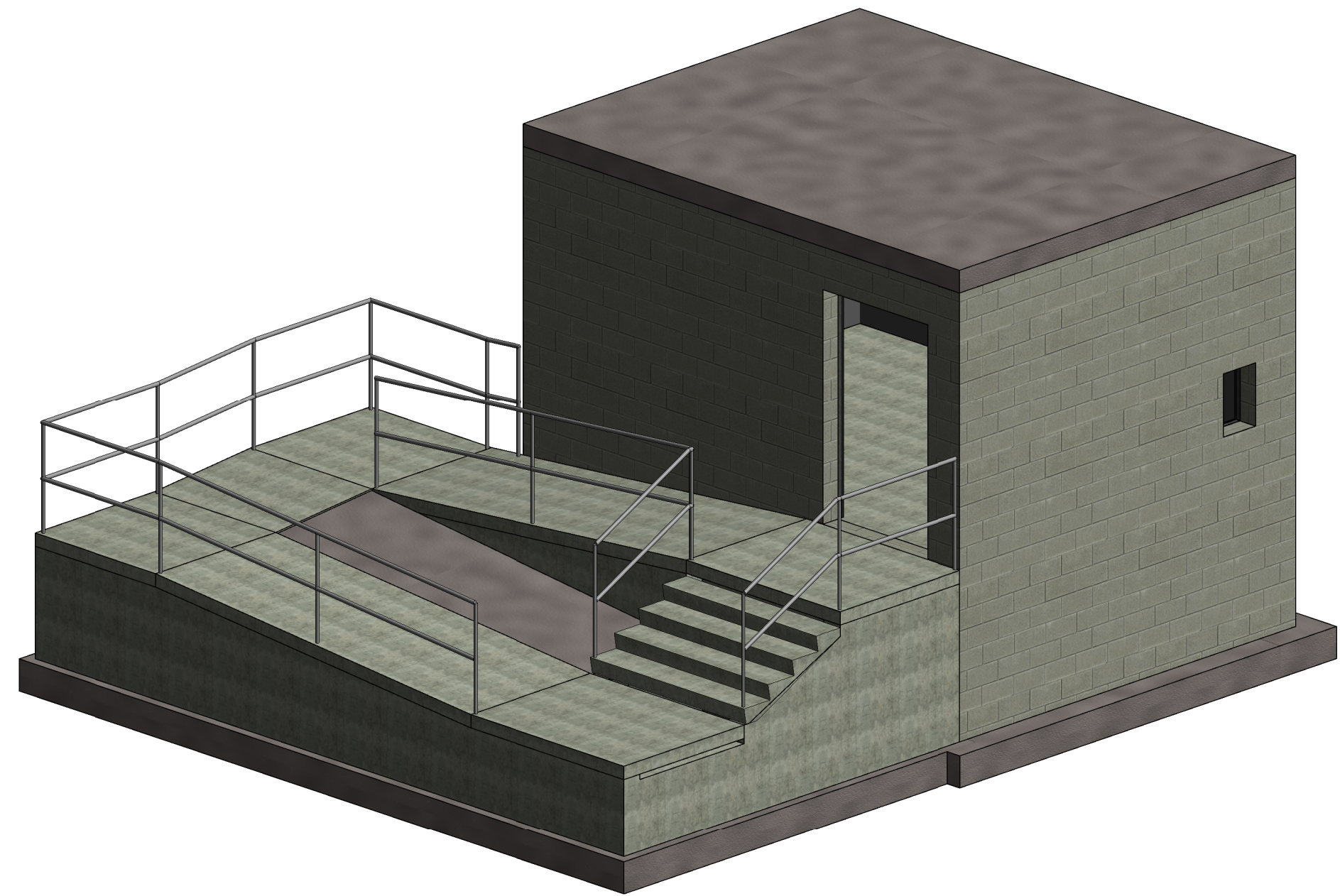
**Each Bidder must acknowledge receipt of all addenda in the space provided on the Proposal Form.**

\\oa.odaoconsulting.com\nts-ns1\projects-direct\2019\1501-2000\019-1607 40-Design\AutoCAD\Task 50050- Structural\REV1\019-1607 Tarkio Electrical Vault.rvt  
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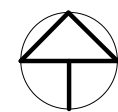
**1 FOUNDATION PLAN**  
SCALE = 3/8" = 1'-0"



L-109 CONSTRUCTION OF AIRPORT TRANSFORMER VAULT IN PLACE (1 LS)



**2 ISO VIEW**  
SCALE =



FOUNDATION PLAN  
ELECTRICAL VAULT

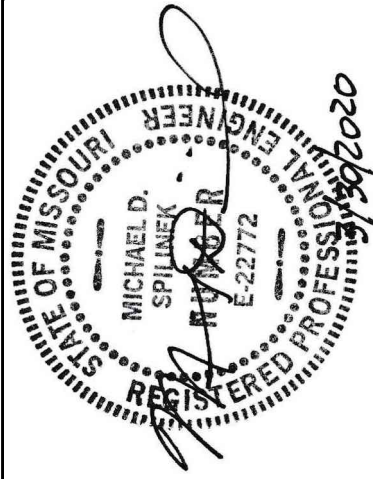
RECONSTRUCT RUNWAY 18/36, LIGHTING,  
PAPI'S, REIL'S & WIND CONE  
MODOT 18-001A-1A

TARKIO, MISSOURI

2020

| REV. NO. | DATE     | REVISION DESCRIPTION |
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| 1        | 03/30/20 | ADDENDUM NO.1        |
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REVISIONS



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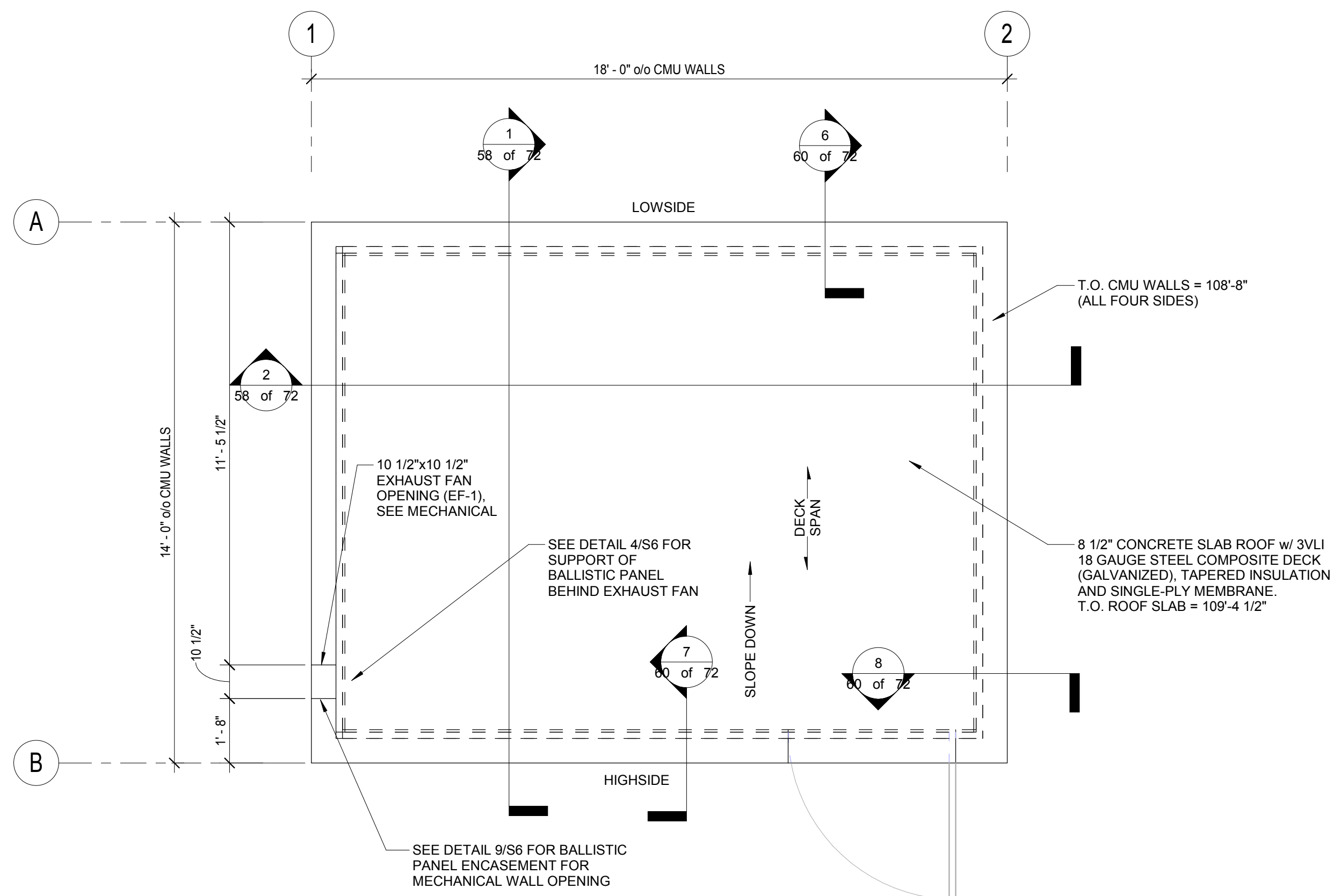
TEL 308.384.8750  
FAX 308.384.8752  
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drawn by: FAV  
checked by: MDS  
approved by: MDS  
QA/QC by: CRS  
project no.: 019-1607  
drawing no.: 500-500507  
date: 01.20.2020

SHEET  
55 of 72

BASE BID





**1 ROOF PLAN**  
SCALE = 3/8" = 1'-0"

SCALE = 3/8" = 1'-0"



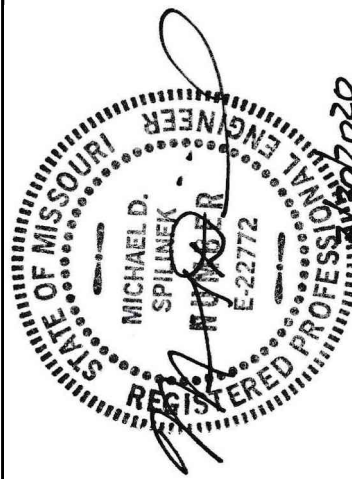
drawn by: \_\_\_\_\_ FAY  
checked by: \_\_\_\_\_ MDS  
approved by: \_\_\_\_\_ MDS  
QA/QC by: \_\_\_\_\_ CRS  
project no.: 019-160  
drawing no.: 500-50050  
date 01.20.2021

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BASE BID

|                   |   |                  |
|-------------------|---|------------------|
| ROOF FRAMING PLAN | RECONSTRUCT RUNWAY 18/36, LIGHTING,<br>PAPI'S, REIL'S & WIND CONE<br>MODOT 18-001A-1A | TARKIO, MISSOURI |
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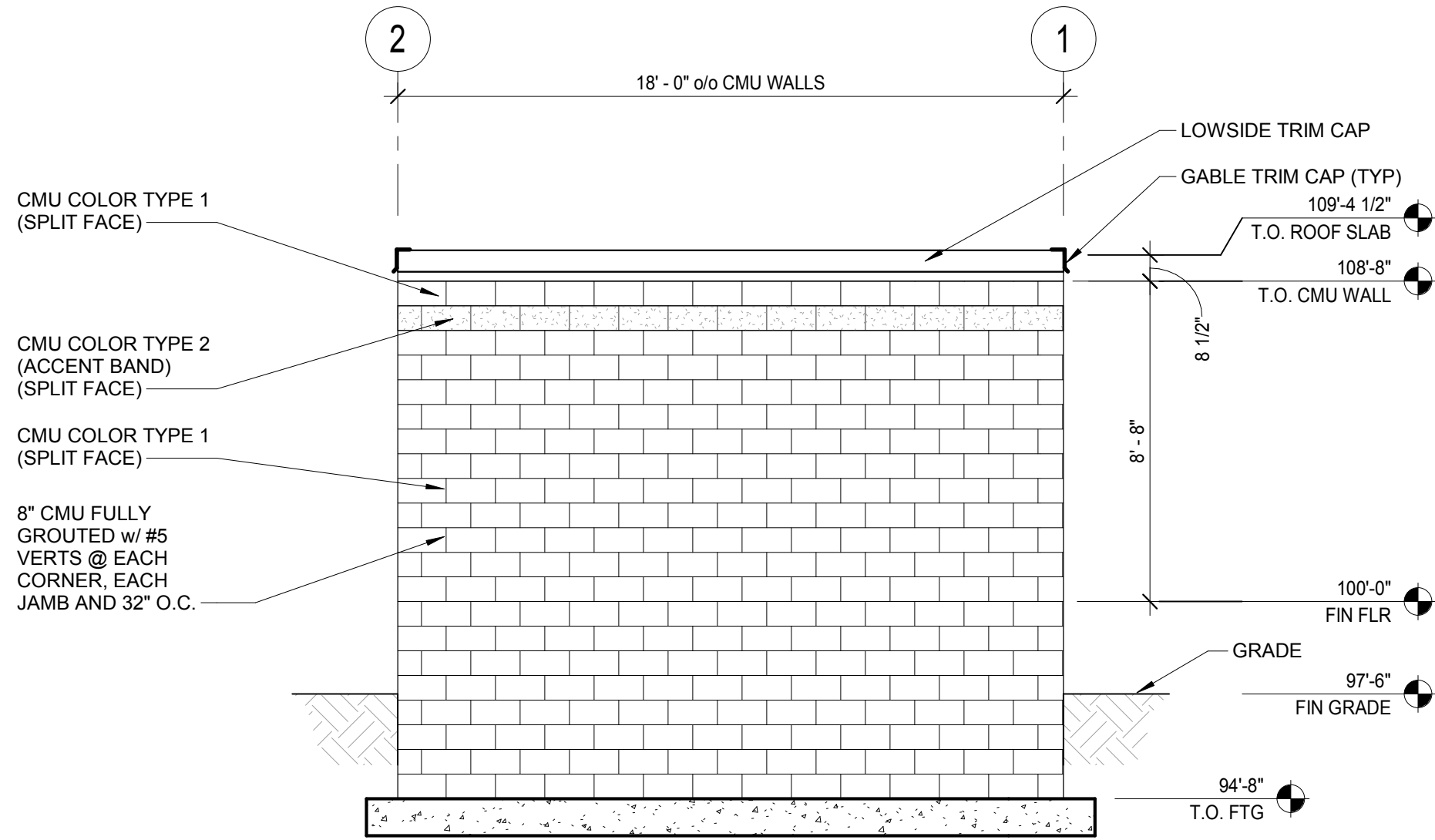
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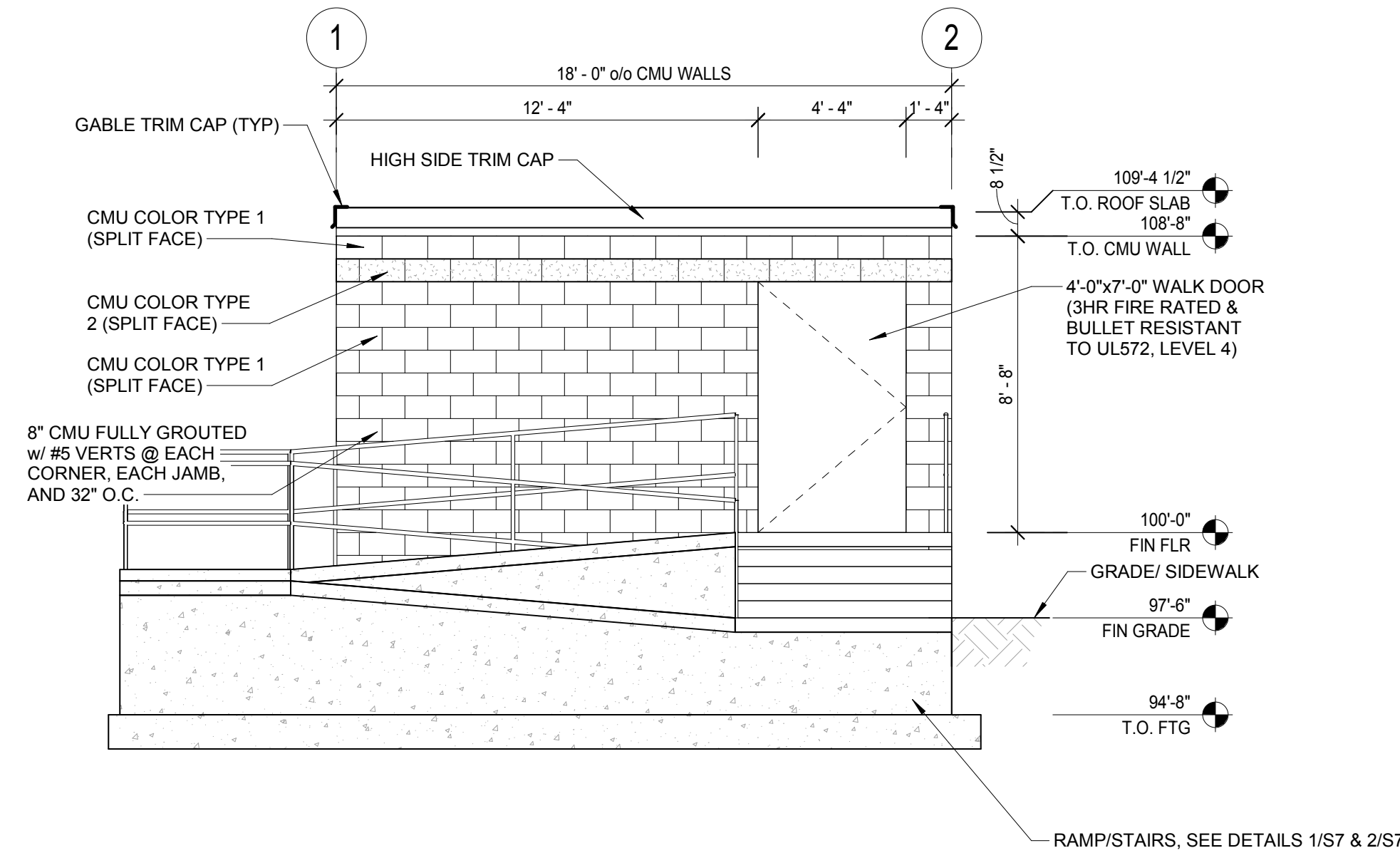
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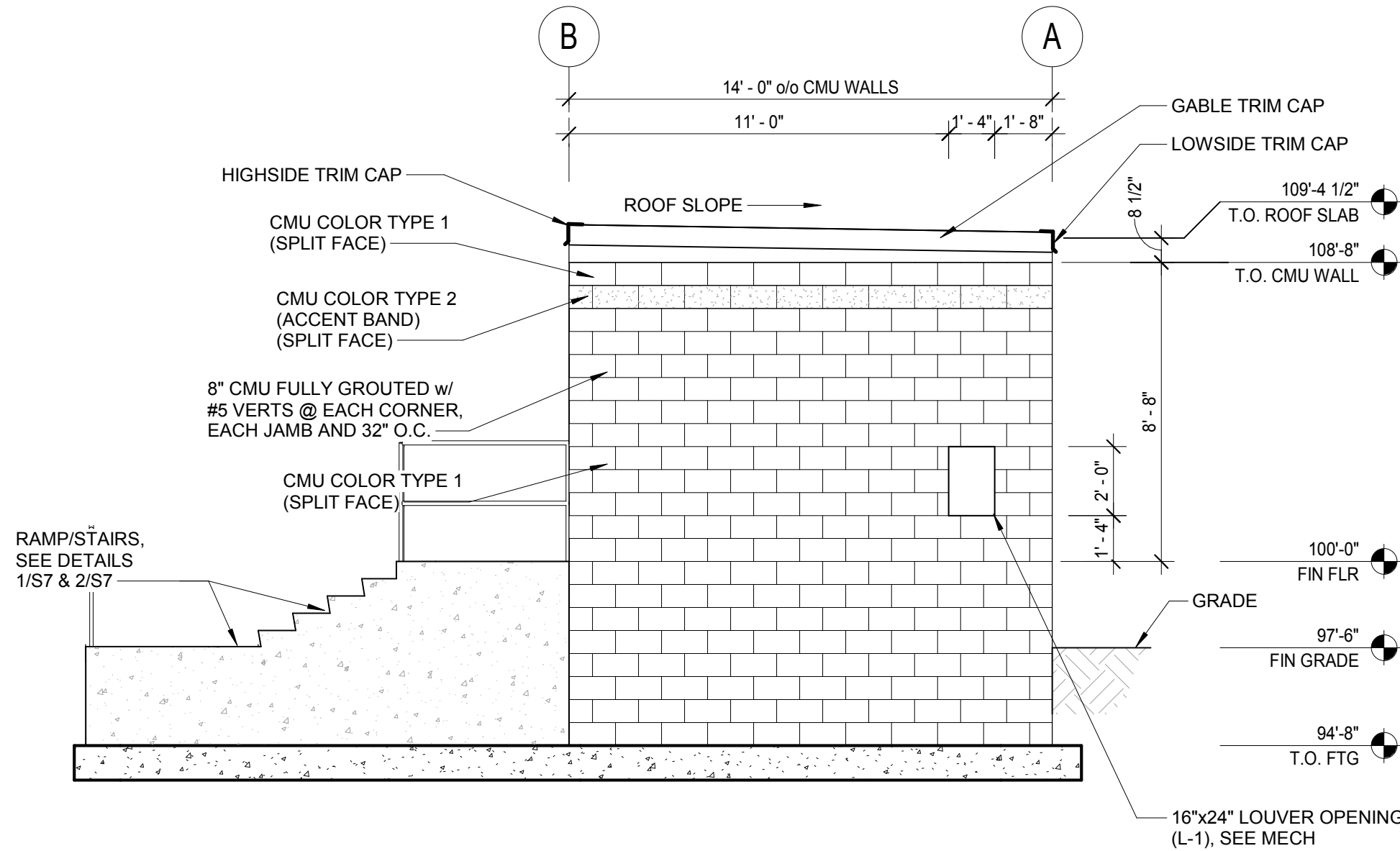
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SCALE = 1/4" = 1'-0"



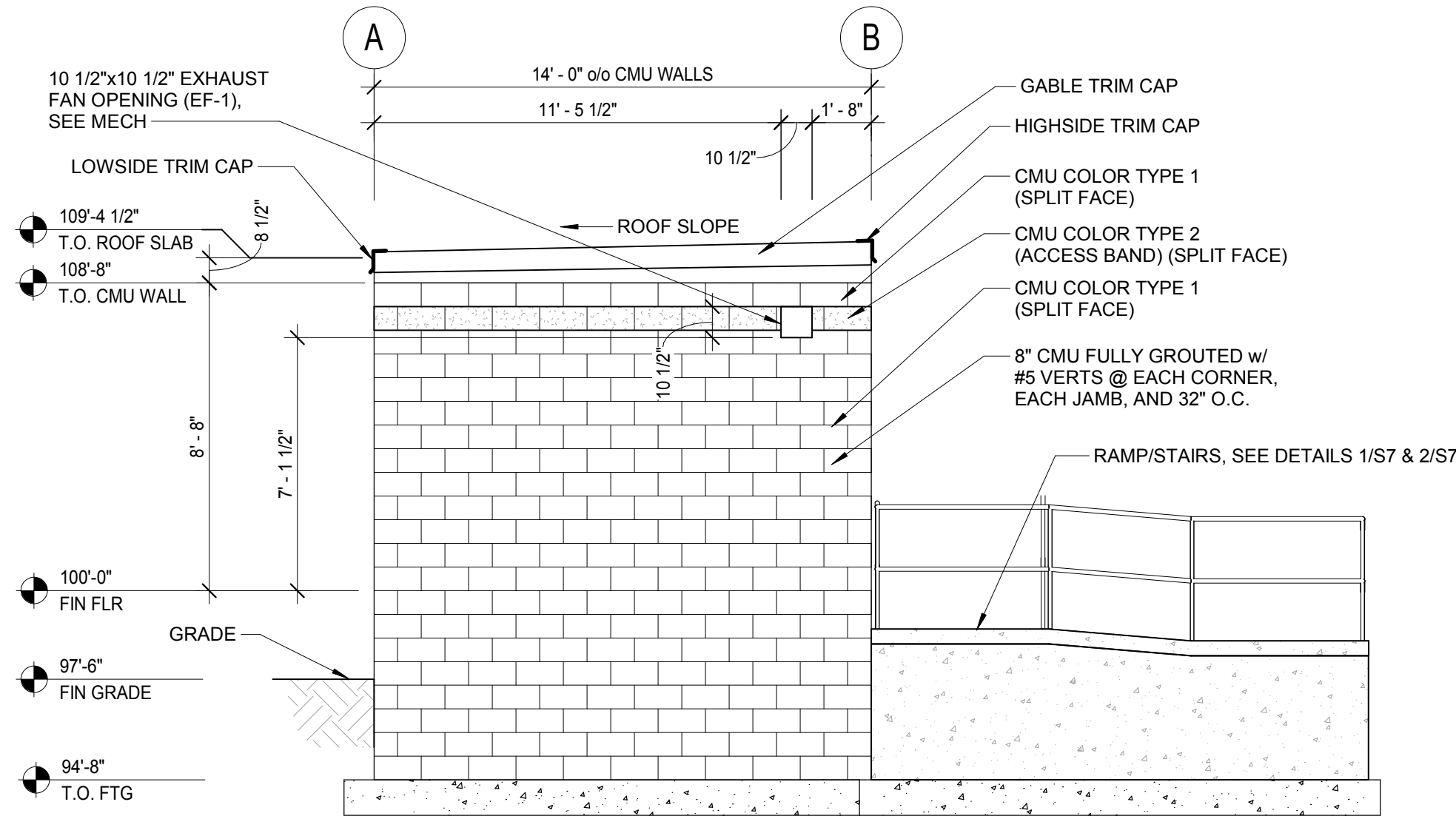
### 3 SOUTH ELEVATION

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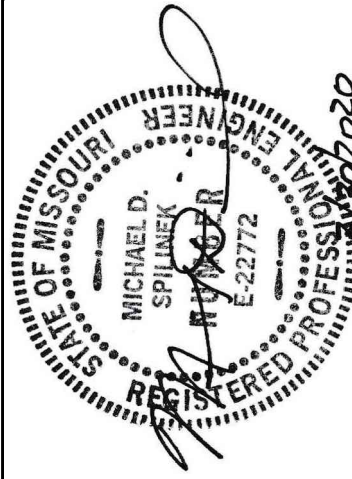
### 2 EAST ELEVATION

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



### 4 WEST ELEVATION

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



| REV NO. | DATE     | REVISION DESCRIPTION |
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REVISIONS

| ELEVATIONS   | 2020 |
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| RECONSTRUCT RUNWAY 18/36, LIGHTING, PAPI'S, REIL'S & WIND CONE |      |
| MODOT 18-001A-1A   |      |
| TARKIO, MISSOURI   |      |

|              |            |
|--------------|------------|
| drawn by:    | FAV        |
| checked by:  | CRS        |
| approved by: | CRS        |
| QA/QC by:    | MDS        |
| project no.: | 019-1607   |
| drawing no.: | 500-500507 |
| date:        | 01.20.2020 |

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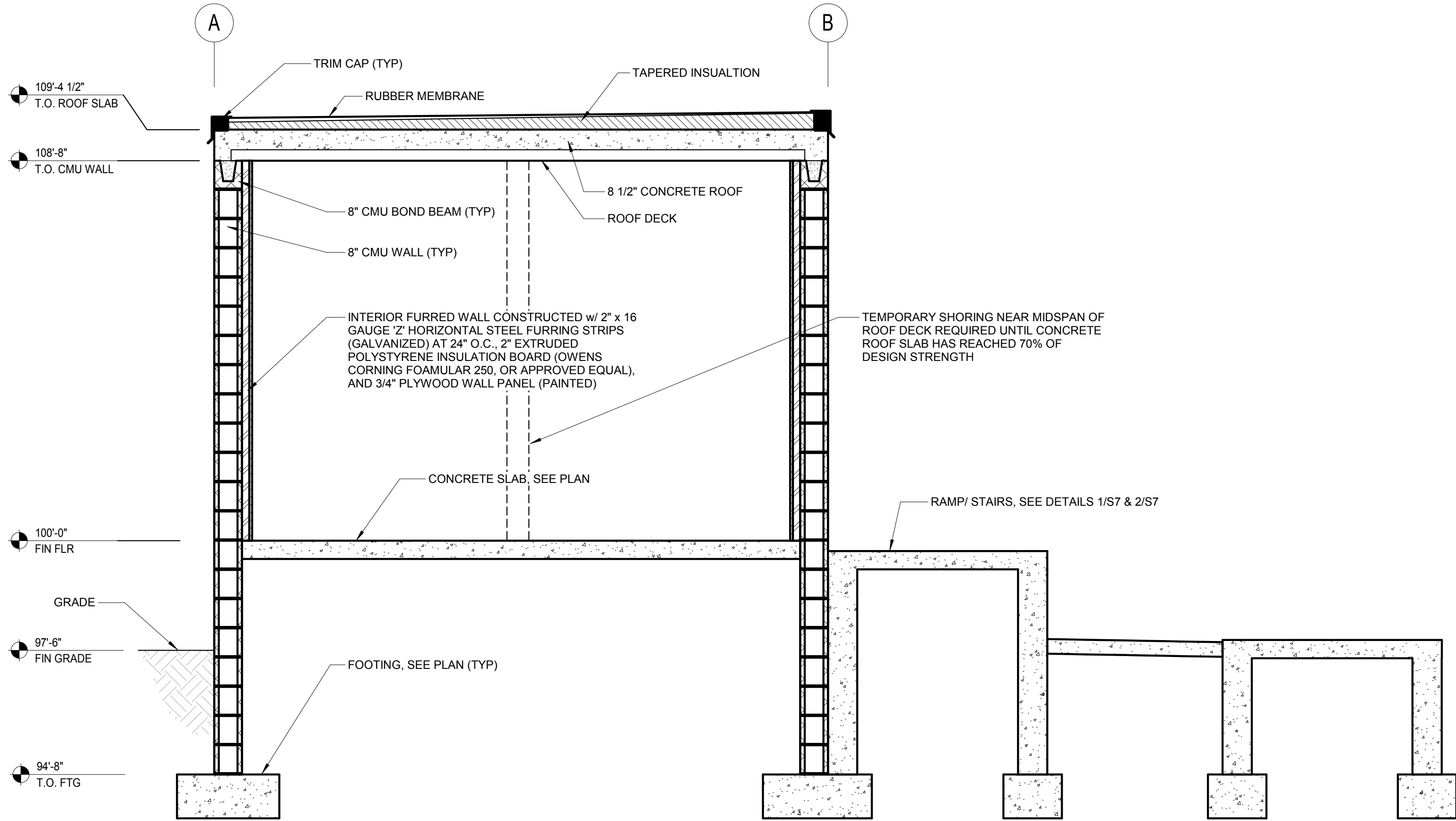
BASE BID

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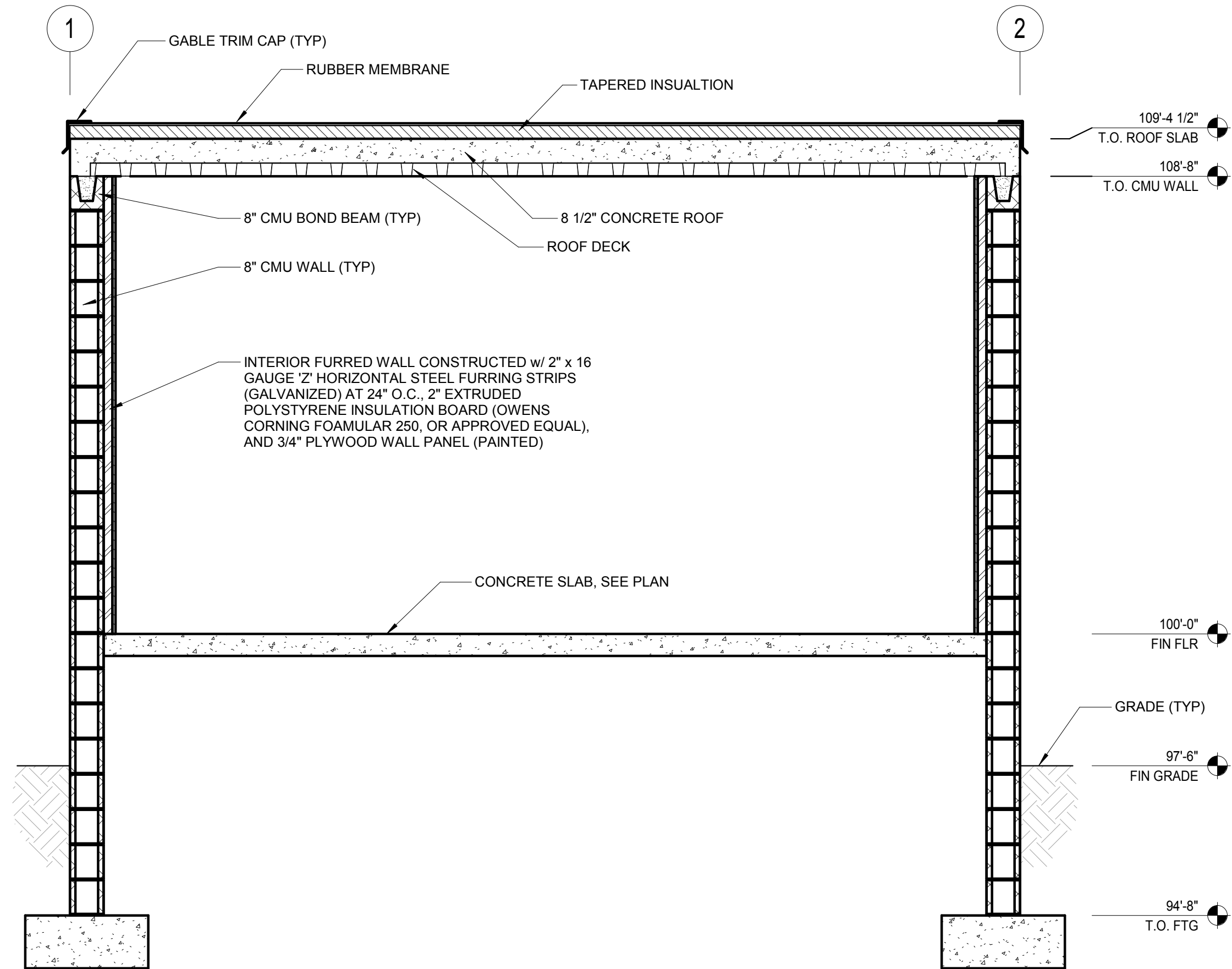
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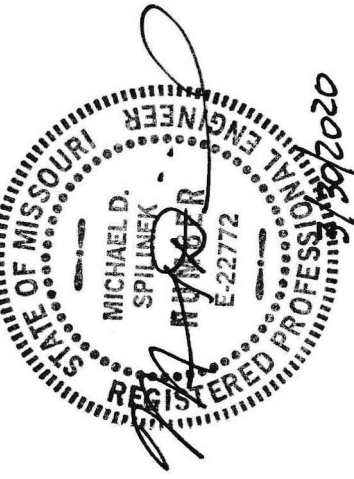
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**1 CROSS SECTION NORTH - SOUTH**  
SCALE = 1/2" = 1'-0"



**2 CROSS SECTION EAST - WEST**  
SCALE = 1/2" = 1'-0"



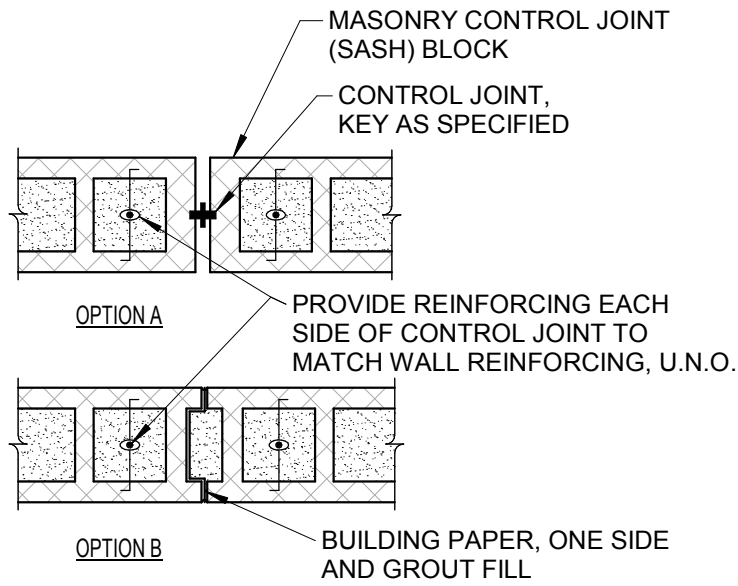
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| CROSS SECTIONS  | REVISIONS |
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| RECONSTRUCT RUNWAY 18/36, LIGHTING, PAPI'S, REIL'S & WIND CONE<br>MODOT 18-001A-1A  | 2020      |
| TARKIO, MISSOURI  |           |
| drawn by: FAV<br>checked by: MDS<br>approved by: MDS<br>QA/QC by: CRS<br>project no.: 019-1607<br>drawing no.: 500-500507<br>date: 01.20.2020 |           |



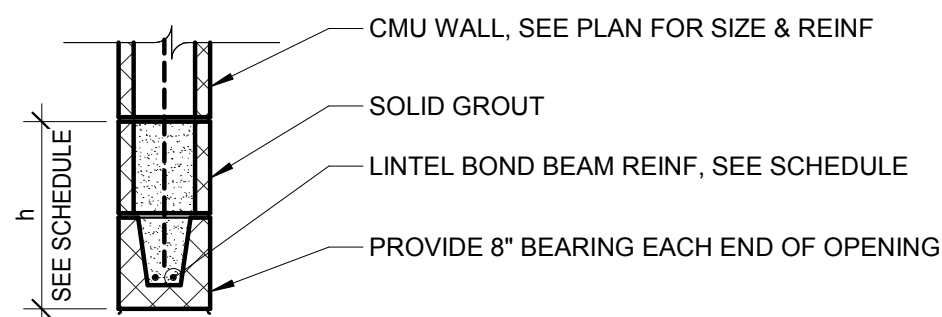


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## 1 MASONRY CONTROL JOINTS

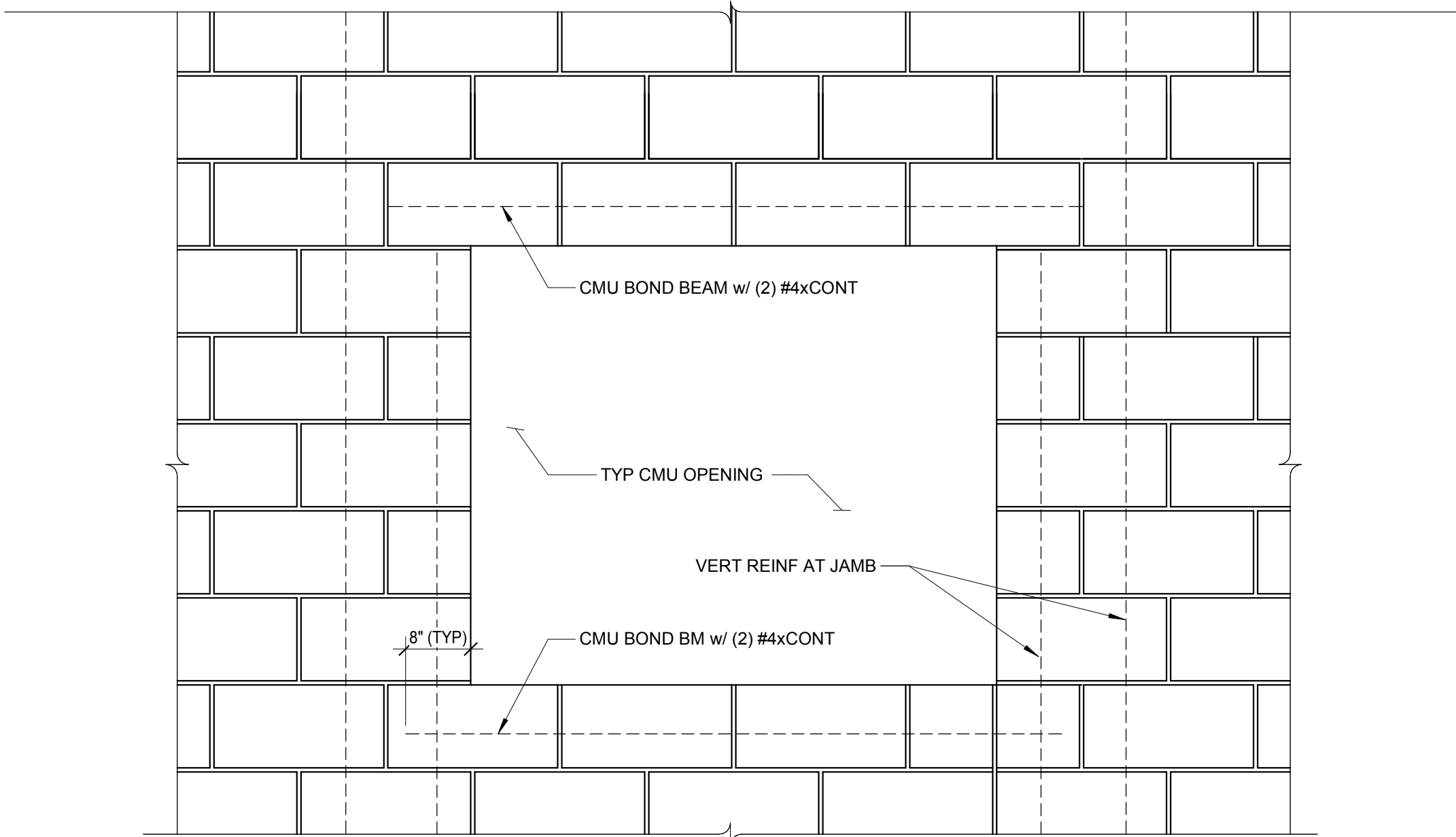
SCALE = 3/4" = 1'-0"



| CMU LINTEL SCHEDULE |     |        |
|---------------------|-----|--------|
| MARK                | h   | REINF  |
| L1                  | 16" | 2 - #4 |

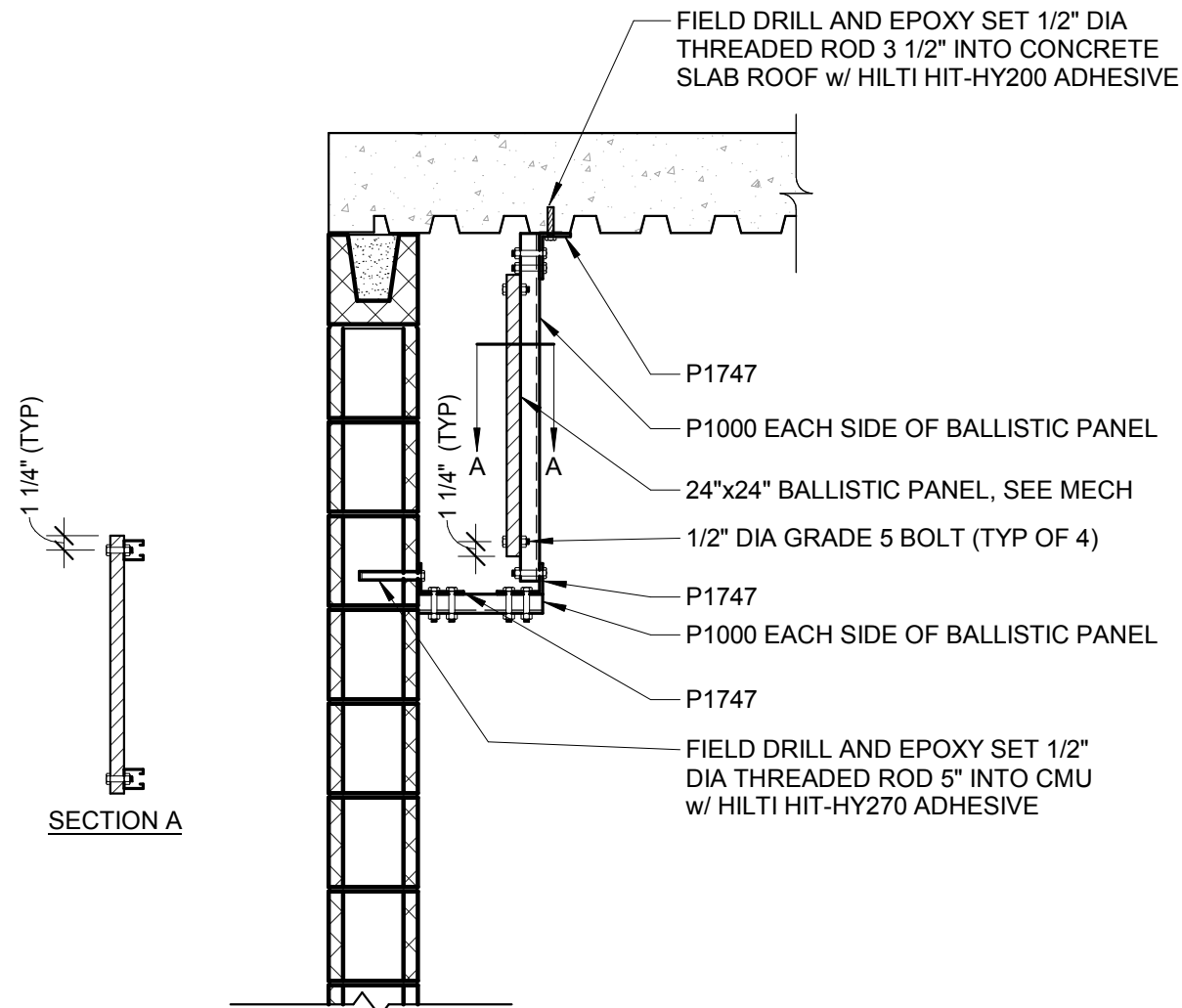
## 2 TYPICAL LINTEL

SCALE = 3/4" = 1'-0"



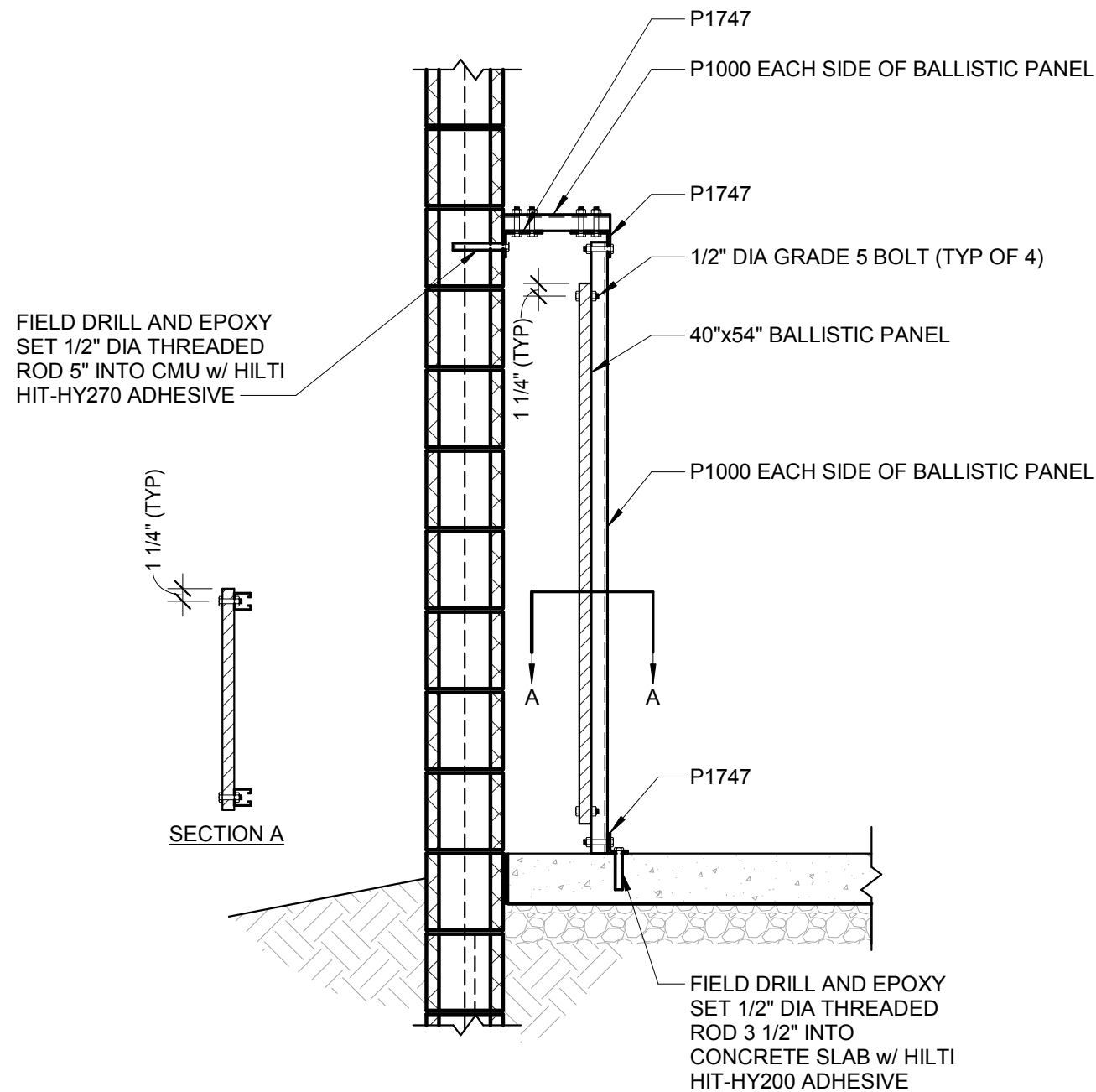
## 3 TYPICAL OPENING REINFORCEMENT IN CMU

SCALE = 3/4" = 1'-0"



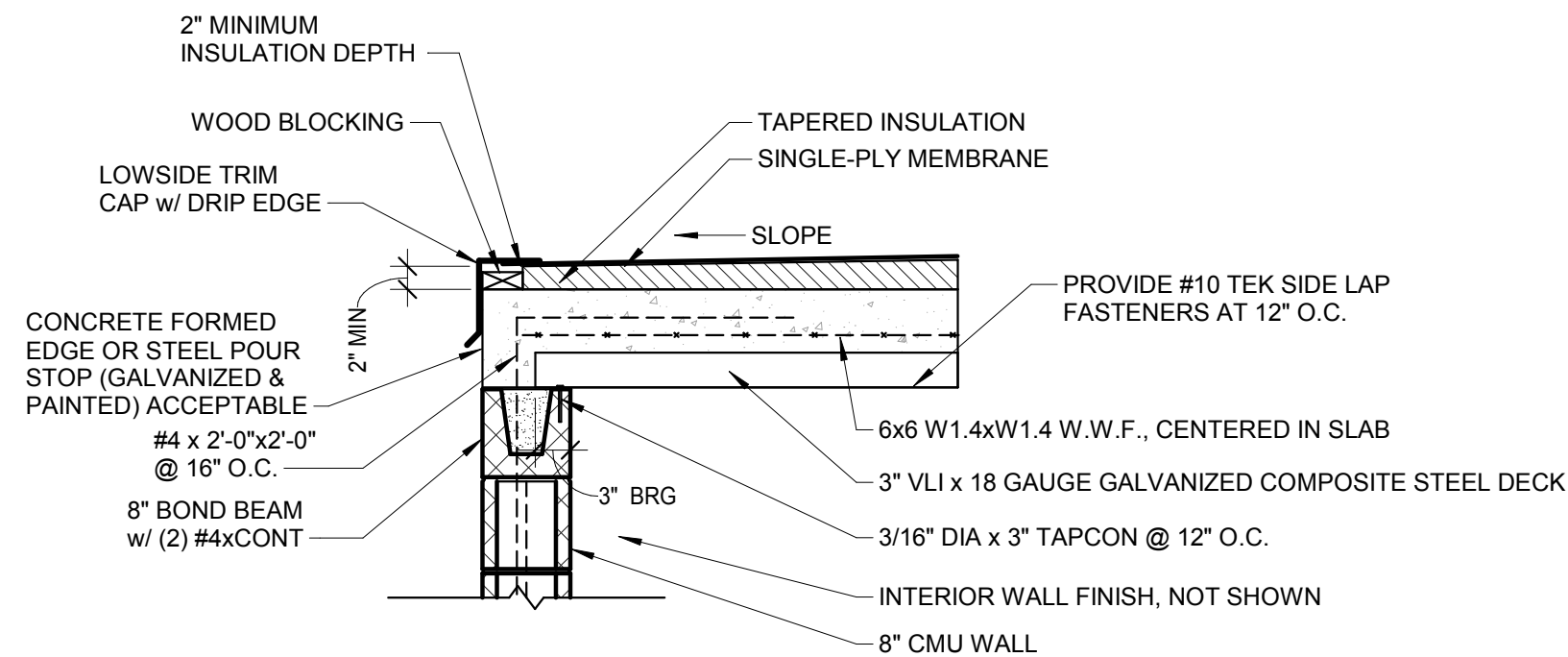
## 4 UNISTRUT SUPPORT FOR BALLISTIC PANEL (EF-1)

SCALE = 3/4" = 1'-0"



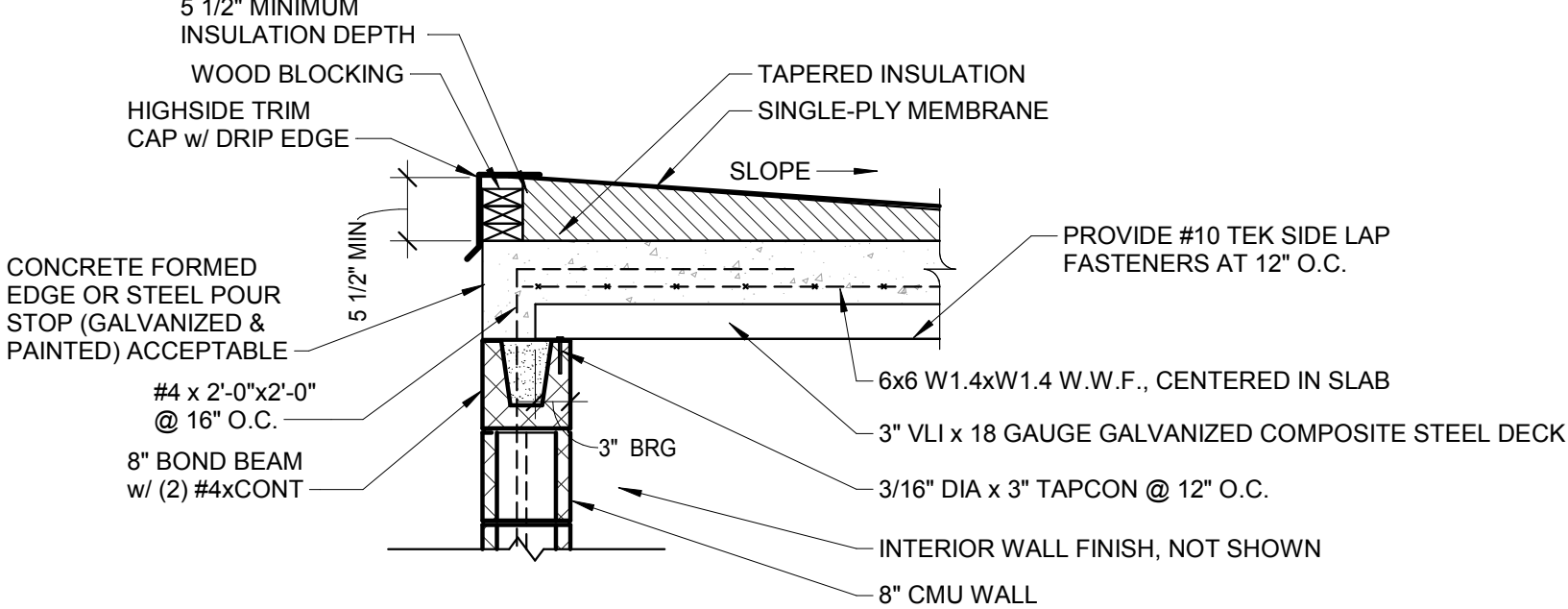
## 5 UNISTRUT SUPPORT FOR BALLISTIC PANEL (L-1)

SCALE = 3/4" = 1'-0"



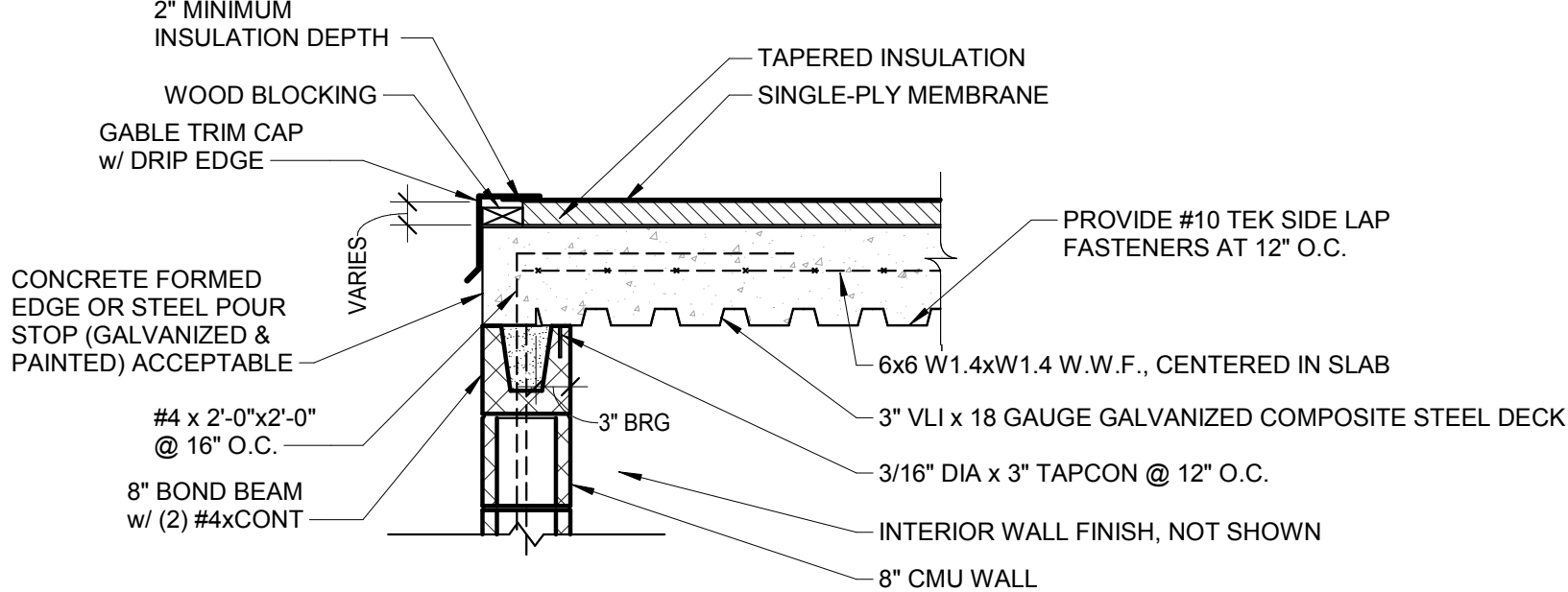
## 6 LOWSIDE ROOF DETAIL

SCALE = 3/4" = 1'-0"



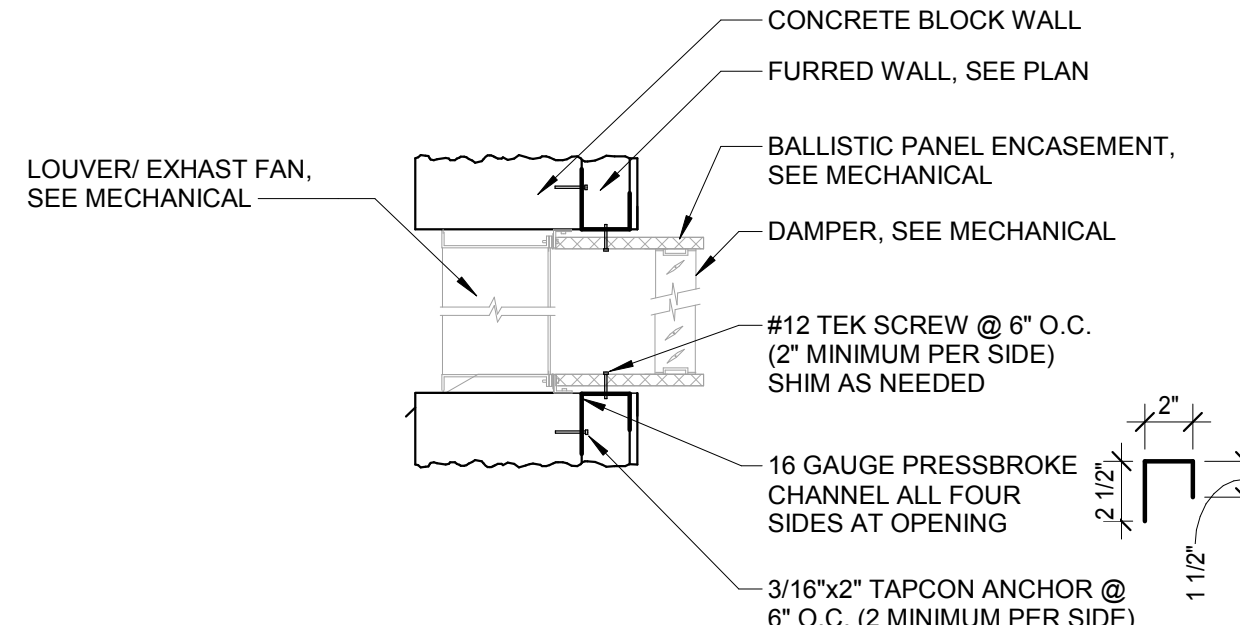
## 7 HIGHSIDE ROOF DETAIL

SCALE = 3/4" = 1'-0"



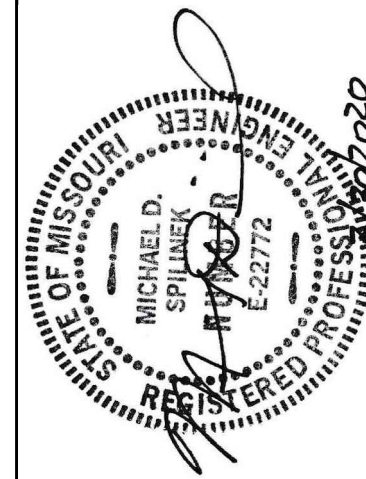
## 8 GABLE ROOF DETAIL

SCALE = 3/4" = 1'-0"



## 9 BALLISTIC PANEL ENCASEMENT

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



REVISION DESCRIPTION

DATE

REV NO.

ADDENDUM NO.1

REVISIONS

FRAMING DETAILS

RECONSTRUCT RUNWAY 18/36, LIGHTING, PAPI'S, REIL'S & WIND CONE  
MODOT 18-001A-1A

TARKIO, MISSOURI

2020

drawn by: FAV  
checked by: MDS  
approved by: MDS  
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BASE BID

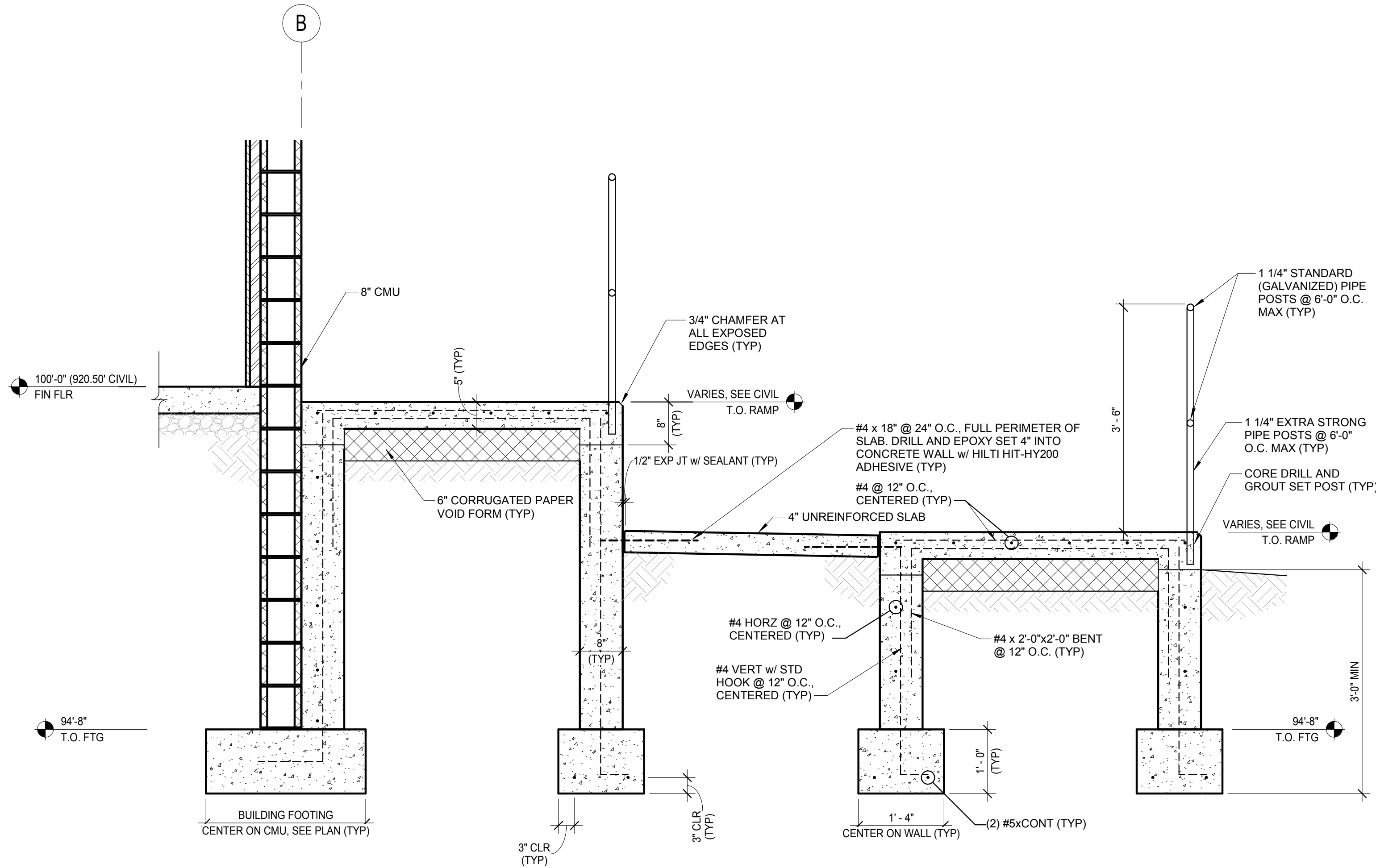
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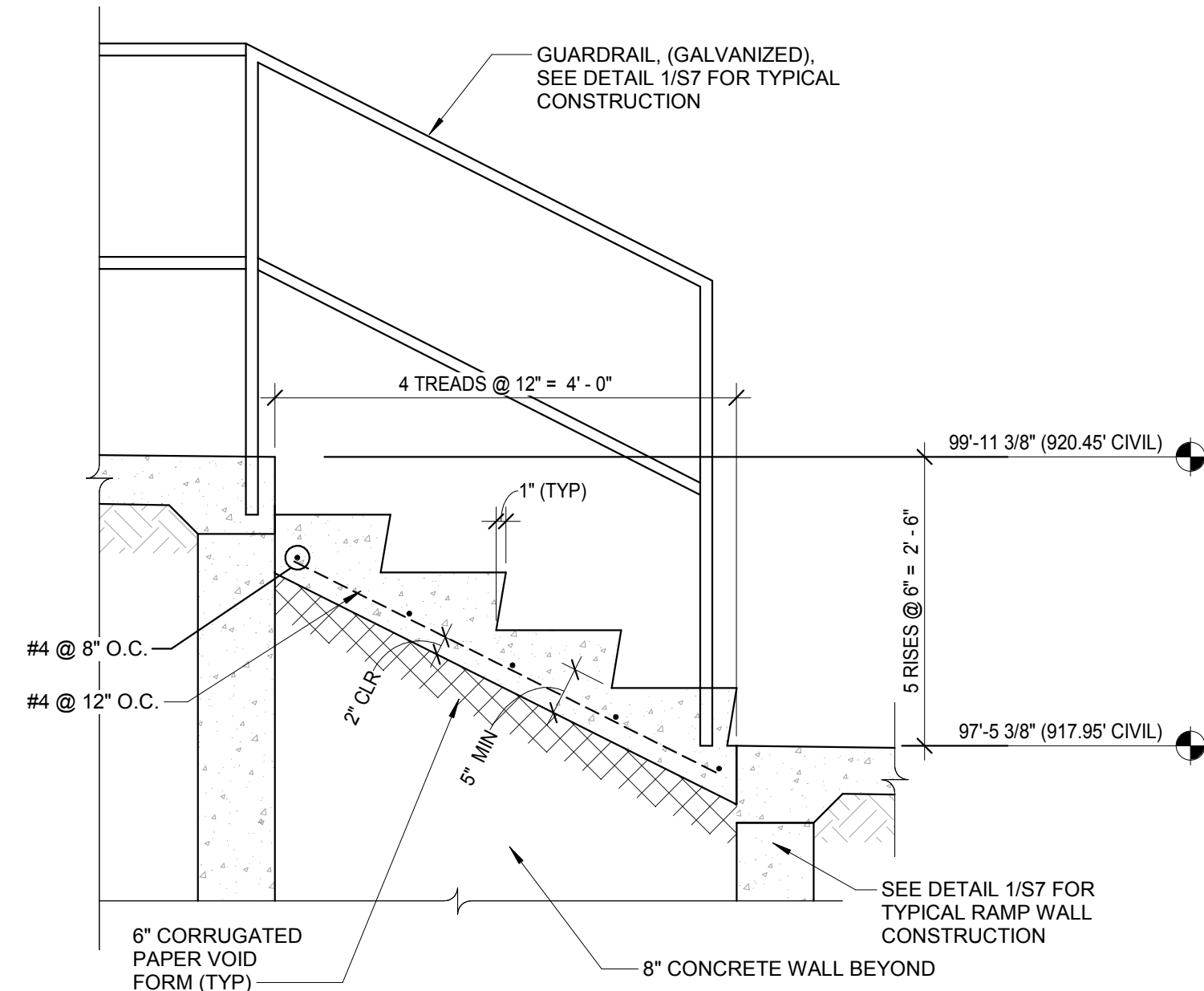
1 RAMP SECTION

SCALE = 3/4" = 1'-0"



2 STAIR SECTION

SCALE = 3/4" = 1'-0"



BASE BID

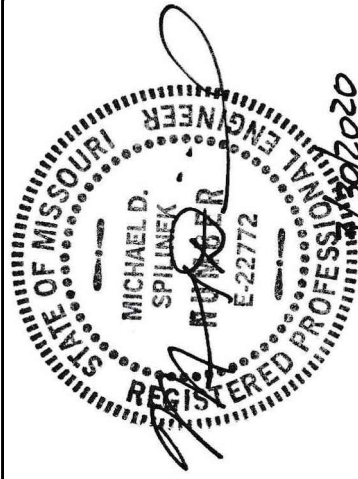
drawn by: FAV  
checked by: MDS  
approved by: MDS  
QA/QC by: CRS  
project no.: 019-1607  
drawing no.: 500-500507  
date: 01.20.2020

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RAMP AND STAIR DETAILS  
RECONSTRUCT RUNWAY 18/36, LIGHTING,  
PAV'TS, REIL'S & WIND CONE  
MODOT 18-001A-1A  
TARKIO, MISSOURI

2020

REVISIONS

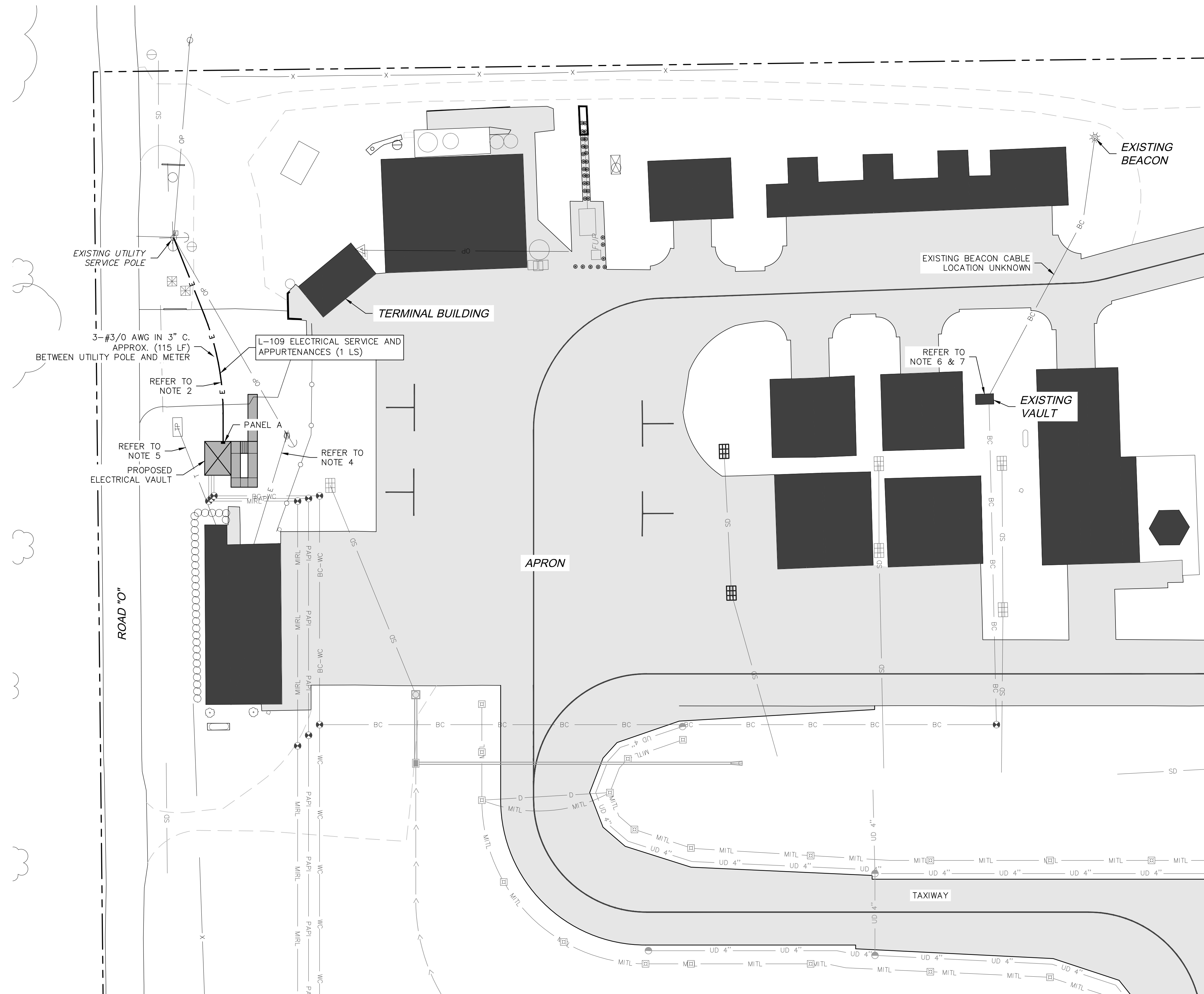


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## ELECTRICAL SERVICE PLAN

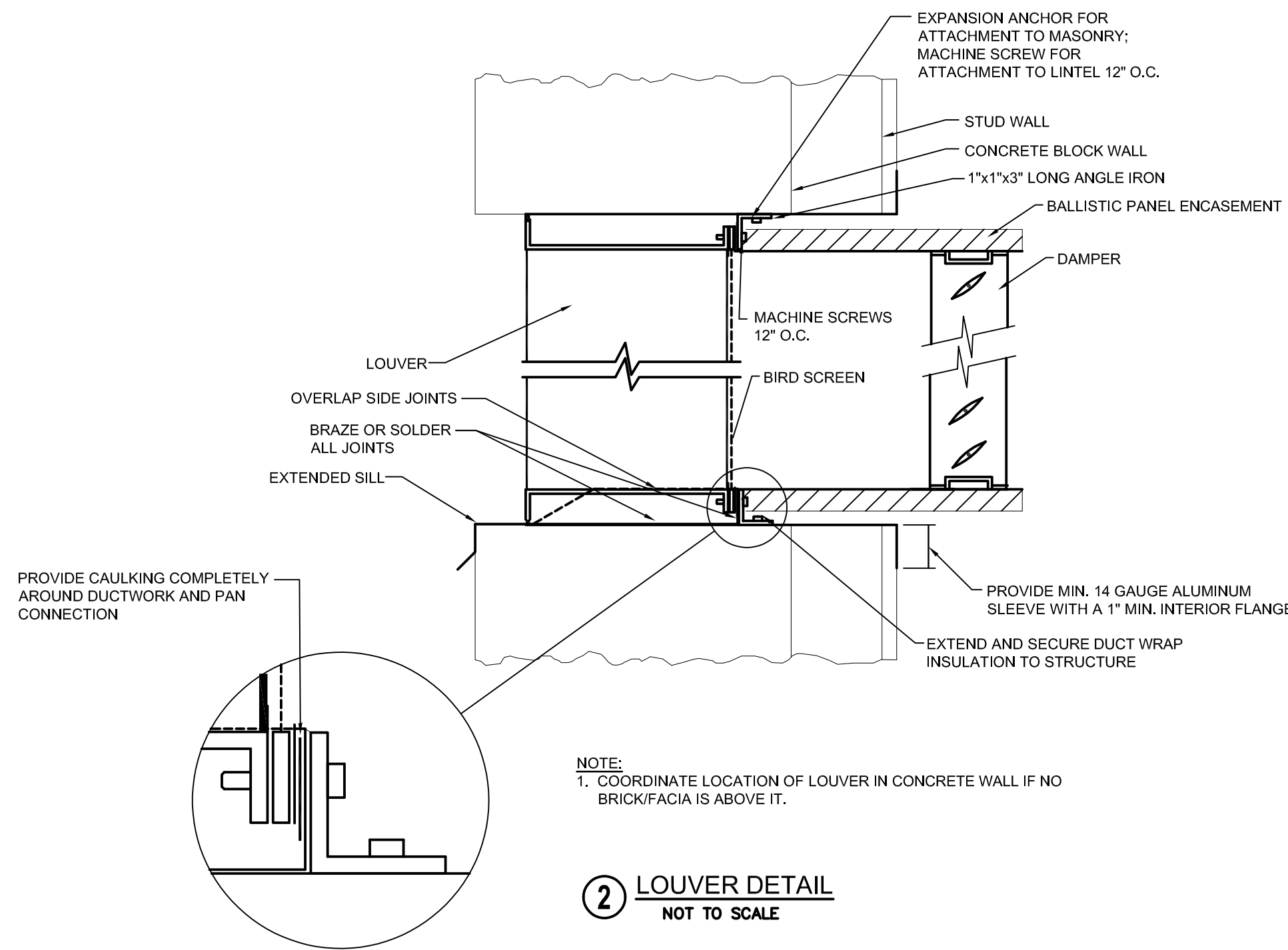
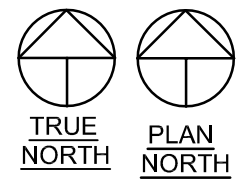
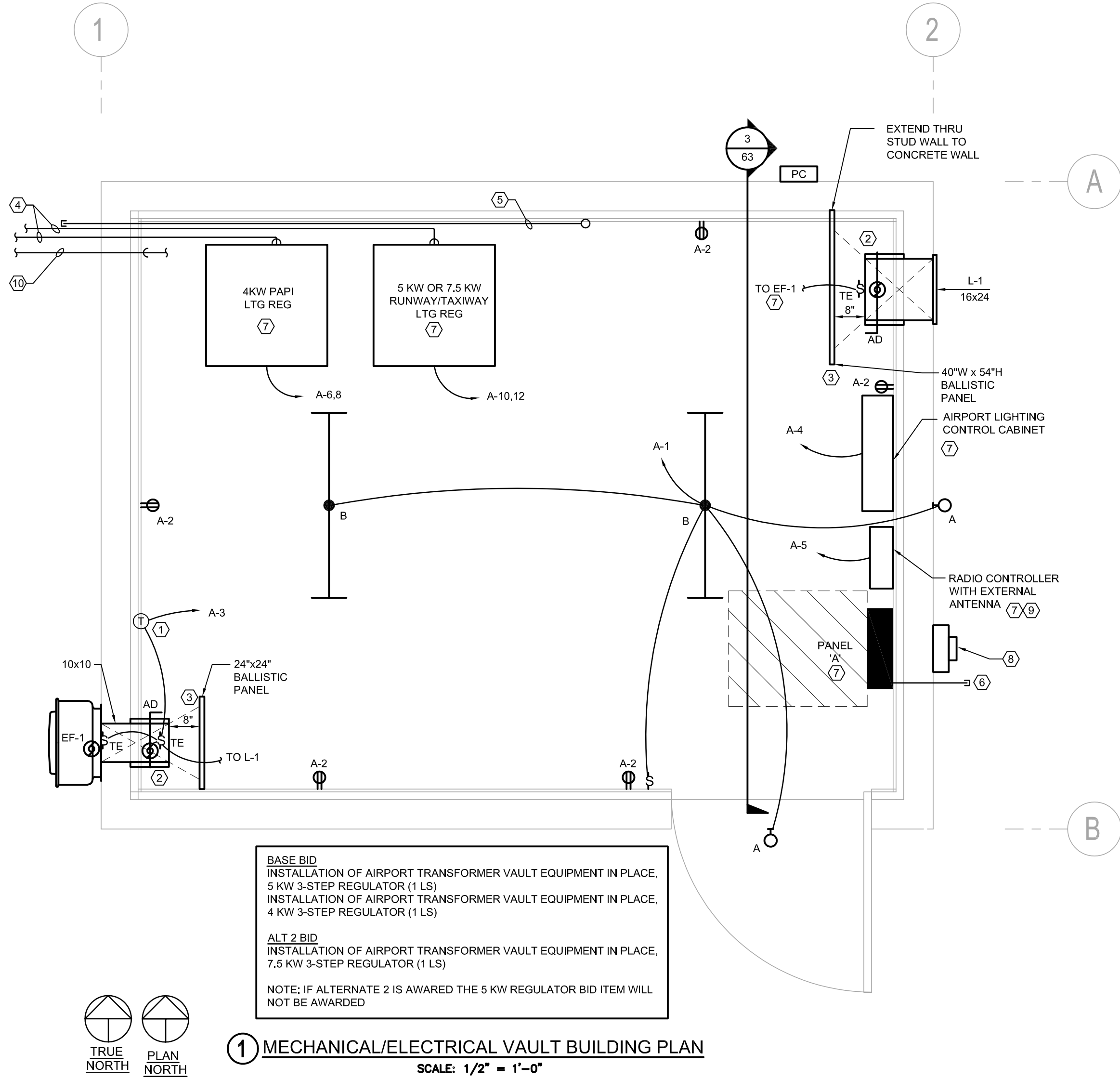
NOTES:

1. COORDINATE ELECTRICAL SERVICE WORK WITH AIRPORT AND ENERGY POWER.
2. INSTALL ELECTRICAL SERVICE FROM METER TO PANEL A. ROUTE CONDUIT ON THE EXTERIOR OF PROPOSED VAULT AND PENETRATE INTO BACK OF PANEL. MAKE PENETRATION WATER TIGHT. ALL EQUIPMENT, LABOR, MATERIALS AND INCIDENTALS REQUIRED SHALL BE CONSIDERED SUBSIDIARY TO BID ITEM "ELECTRICAL SERVICE AND APPURTENANCES".
3. CONTRACTOR SHALL COORDINATE AND SCHEDULE INSPECTIONS FOR FIRE MARSHAL AND STATE ELECTRICAL INSPECTORS.
4. THE EXACT LOCATION OF THE ELECTRICAL LINE THAT SERVICES EXISTING HANGAR IS UNKNOWN. CONTRACTOR IS RESPONSIBLE FOR LOCATING THE ELECTRICAL LINE TO THE EXISTING BUILDING. TEMPORARY WIRING MAY BE REQUIRED TO MAINTAIN POWER TO THE BUILDING, WHICH IS CONSIDERED SUBSIDIARY TO THE RESPECTIVE BID ITEM.
5. THE EXACT LOCATION OF THE TELEPHONE LINE IS UNKNOWN. CONTRACTOR IS RESPONSIBLE FOR LOCATING THE TELEPHONE LINE. TEMPORARY WIRING MAY BE REQUIRED TO MAINTAIN SERVICE, WHICH IS CONSIDERED SUBSIDIARY TO THE RESPECTIVE BID ITEM.
6. DISCONNECT AND REMOVE EXISTING REGULATORS IN THE EXISTING VAULT. REGULATORS SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OFF AIRPORT PROPERTY IN A LEGAL MANNER. DISCONNECT ELECTRICAL SERVICE TO THE VAULT, COORDINATE WITH ENERGY. LEAVE THE EXISTING METER CABINET IN PLACE, UTILIZING AS A JUNCTION BOX. SERVICE TO ADJACENT BUILDING TO REMAIN IN PLACE.
7. INTERCEPT EXISTING BEACON CIRCUIT AT EXISTING VAULT. REFER TO SHEET 42 FOR CONDUIT AND CONDUCTOR SIZES.

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|---|------|
| ELECTRICAL SERVICE PLAN   |      |
| RECONSTRUCT RUNWAY 18/36, LIGHTING,<br>PAPI'S, REIL'S & WIND CONE<br>MODOT 18-001A-1A |      |
| TARKIO MISSOURI   | 2020 |

drawn by: JTC  
checked by: RAZ  
approved by: FLE  
QA/QC by: RAZ  
project no.: 019-1607  
drawing no.:  
date: 03.30.2020



**MECHANICAL EQUIPMENT SCHEDULE:**

- A. LOUVER (L-1): GREENHECK MODEL ESD-435 (OR EQUAL), DRAINABLE BLADE, EXTRUDED ALUMINUM CONSTRUCTION, 4" FRAME DEPTH, 3-1/4" BLADE SPACING, AND 1/4" x 1/4" BIRDSCREEN. PROVIDE WITH 115V MOTORIZED DAMPER (AD) AND CLEAR ANODIZE FINISH.
- B. EXHAUST FAN (EF-1): GREENHECK MODEL CW-090-VG (OR EQUAL), SIDEWALL, ALUMINUM CONSTRUCTION, EC-MOTOR, 530 CFM, 0.4 ESP, 1495 RPM, 6.9 SONES, 1/10 HP, 115/60/1. PROVIDE WITH DISCONNECT SWITCH AND 115V MOTORIZED DAMPER (AD) WITH END SWITCH. WALL OPENING SHALL BE 10.5' x 10.5'.
- C. THERMOSTAT: ADJUSTABLE, 120V THERMOSTAT, HONEYWELL T631C1012 (OR EQUAL), TEMPERATURE RANGE 20 TO 90 DEG. F.
- D. BALLISTIC PANELS: ARMORTECH OPAQUE 1-3/16" FIBERGLASS PANEL, UL 752 RATED TO PROTECTION LEVEL 4, FIELD CUT PANEL TO SIZES LISTED ON FLOOR PLANS OR SHEET NOTES.

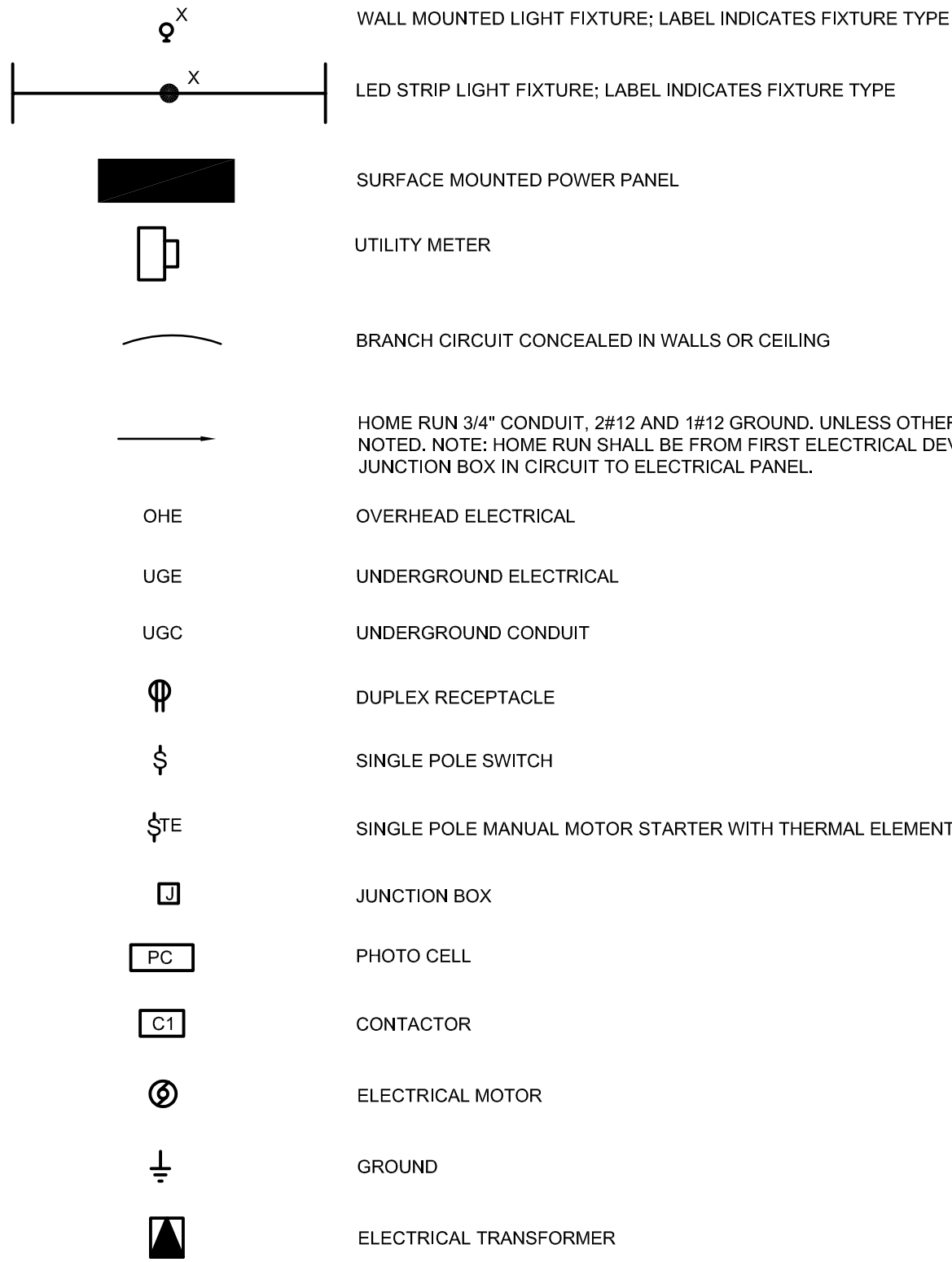
**GENERAL NOTES:**

- A. ALL MATERIALS AND APPURTENANCES REQUIRED AS SHOWN TO CONSTRUCT/PREPARE ALL ELECTRICAL COMPONENTS WITHIN THE ELECTRICAL VAULT PER PLANS AND SPECIFICATIONS IS CONSIDERED SUBSIDIARY TO ELECTRICAL VAULT BID ITEMS.
- B. INSTALL A DEDICATED EQUIPMENT GROUNDING CONDUCTOR WITH ALL 600V (OR LESS) BRANCH CIRCUITS. SIZE IN ACCORDANCE WITH THE N.E.C., NO. 12 CU MINIMUM.
- C. INSTALL UNDERGROUND CONDUITS 24" DEEP (MIN.) UNLESS NOTED OTHERWISE.
- D. ROUTING OF ALL NEW UNDERGROUND CONDUIT SHALL BE COORDINATED WITH THE SITE GRADING, DEMOLITION, AND NEW CONSTRUCTION.
- E. WIRING WITHIN VAULT SHALL BE 600V, THWN-2, COPPER, IN RGS CONDUIT PER FAA REQUIREMENTS. RGS FITTINGS SHALL BE STEEL, COMPRESSION TYPE.
- F. ALL INTERIOR CONDUIT SHALL BE RAN EXPOSED IN A WORKMAN LIKE MANNER; I.E. PERPENDICULAR AND PARALLEL TO STRUCTURE.
- G. ALL IRON, STEEL, AND MANUFACTURED GOODS USED IN THIS PROJECT SHALL BE PRODUCED IN THE UNITED STATES, EXCEPT AS NOTED IN THE AID AGREEMENT (BUY AMERICAN ACT).
- H. ALL CONVENIENCE OUTLETS SHALL BE HEAVY-DUTY DUPLEX UNITS DESIGNED FOR INDUSTRIAL SERVICE.
- I. REGULATORS SHALL BE FERRORESONANT WITH THREE BRIGHTNESS STEPS AND AN S-1 CUTOUT.
- J. CONDUIT TRANSITIONS TO BELOW GRADE SHALL HAPPEN INSIDE THE BUILDING AND SHALL NOT HAVE LB OR CONDUIT EXPOSED OUTSIDE OF THE BUILDING.

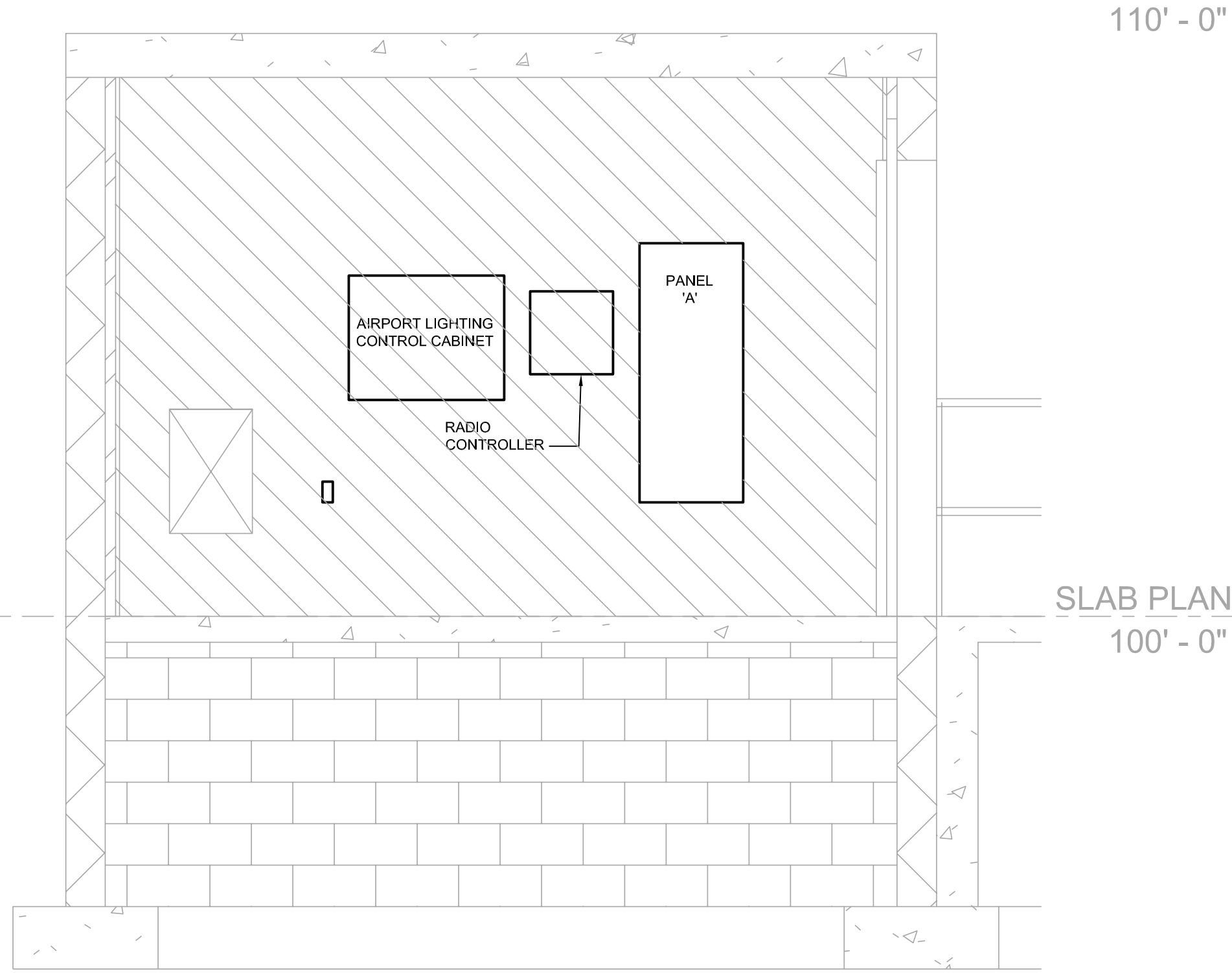
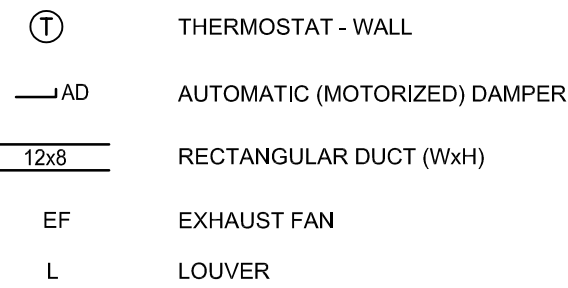
**SHEET NOTES:** (SYMBOLS ①, ②, ETC.)

1. PROVIDE 115V THERMOSTAT TO OPEN THE L-1 AND EF-1 MOTORIZED DAMPERS WHEN TEMPERATURE RISES ABOVE 90°F. AN END SWITCH ON THE EXHAUST FAN DAMPER SHALL START EF-1.
2. DUCTWORK (INCLUDING DAMPER) SHALL BE STUBBED INTO ROOM 6" PAST FACE OF STUD WALL. ENCASE DUCT WITH BALLISTIC PANEL STRIPS FROM INSIDE OF CONCRETE WALL TO END OF DUCT. OVERLAP PANELS AT CORNERS PER MANUFACTURERS RECOMMENDATION. MOUNT DAMPER ACTUATOR OUTSIDE OF BALLISTIC PANEL. DRILL HOLE THRU BALLISTIC PANEL FOR DAMPER SHAFT AS SMALL AS POSSIBLE AND PROVIDE SHAFT EXTENSION AS NEEDED. SEE STRUCTURAL PLANS FOR BALLISTIC PANEL MOUNTING REQUIREMENTS.
3. INSTALL BALLISTIC PANEL 8" FROM OPEN END OF DUCTWORK, AND CENTER PANEL ON CENTER OF WALL OPENING. SEE STRUCTURAL PLANS FOR BALLISTIC PANEL MOUNTING REQUIREMENTS. PANEL SHALL BE CAPABLE OF BEING REMOVED IF NEEDED. NO STRAIGHT LINE OF SIGHT SHALL BE CAPABLE THRU THE BUILDING OPENING TO WITHIN 2" OF THE EDGE OF THE PANEL.
4. 2" CONDUIT TO JUNCTION CANS. REFER TO SHEET 42.
5. SPARE (2) 2" CONDUIT FOR FUTURE REGULATOR. STUB 5'-0" BEYOND VAULT BUILDING, CAP AND STAKE.
6. SPARE 2" CONDUIT, STUB 5'-0" BEYOND VAULT BUILDING, CAP AND STAKE. THIS CONDUIT IS TO SERVE ANY FUTURE MISC. LOADS.
7. PROVIDE 3' WORKING CLEARANCE IN FRONT OF ELECTRICAL PANELS, DISCONNECTS, REGULATORS AND CONTROL PANELS. COORDINATE WITH REGULATOR MANUFACTURER ON REQUIRED WORKING CLEARANCES.
8. CONTACT THE UTILITY COMPANY TO VERIFY THE CORRECT METER LOCATION PRIOR TO ROUGH-IN. PROVIDE A 2"x6" SUPPORT AT THE METER LOCATION TO PROVIDE A STRONG STRUCTURAL SUPPORT INTO WHICH THE METER SOCKET MOUNTING SCREWS CAN BE DRIVEN.
9. REFER TO ELECTRICAL RISER DIAGRAM FOR MORE INFORMATION ON THE MOUNTING OF THE ANTENNA.
10. WINDCONE/BEACON CIRCUITS. ROUTE TO PANEL 'A' VIA THE AIRPORT LIGHTING CONTROL CABINET.

**ELECTRICAL LEGEND**



**MECHANICAL LEGEND**



**3 EAST ELEVATION MECHANICAL/ELECTRICAL VAULT BUILDING PLAN**  
SCALE: 1/2" = 1'-0"

**MECHANICAL AND ELECTRICAL PLAN AND LEGEND**

RECONSTRUCT RUNWAY 18/36, LIGHTING,  
PAPI'S, REIL'S & WIND CONE  
MODOT 18-001A-1A

TARKIO, MISSOURI

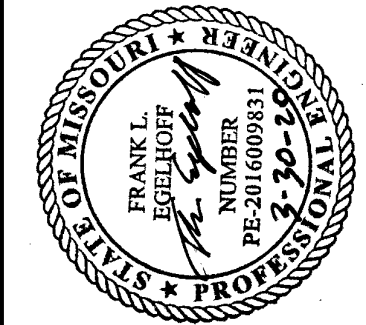
2020

drawn by: EMK  
checked by: RAZ  
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QA/QC by: FLE  
project no.: 019-1607  
drawing no.:  
date: 03.30.2020

**SHEET**

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BASE BID



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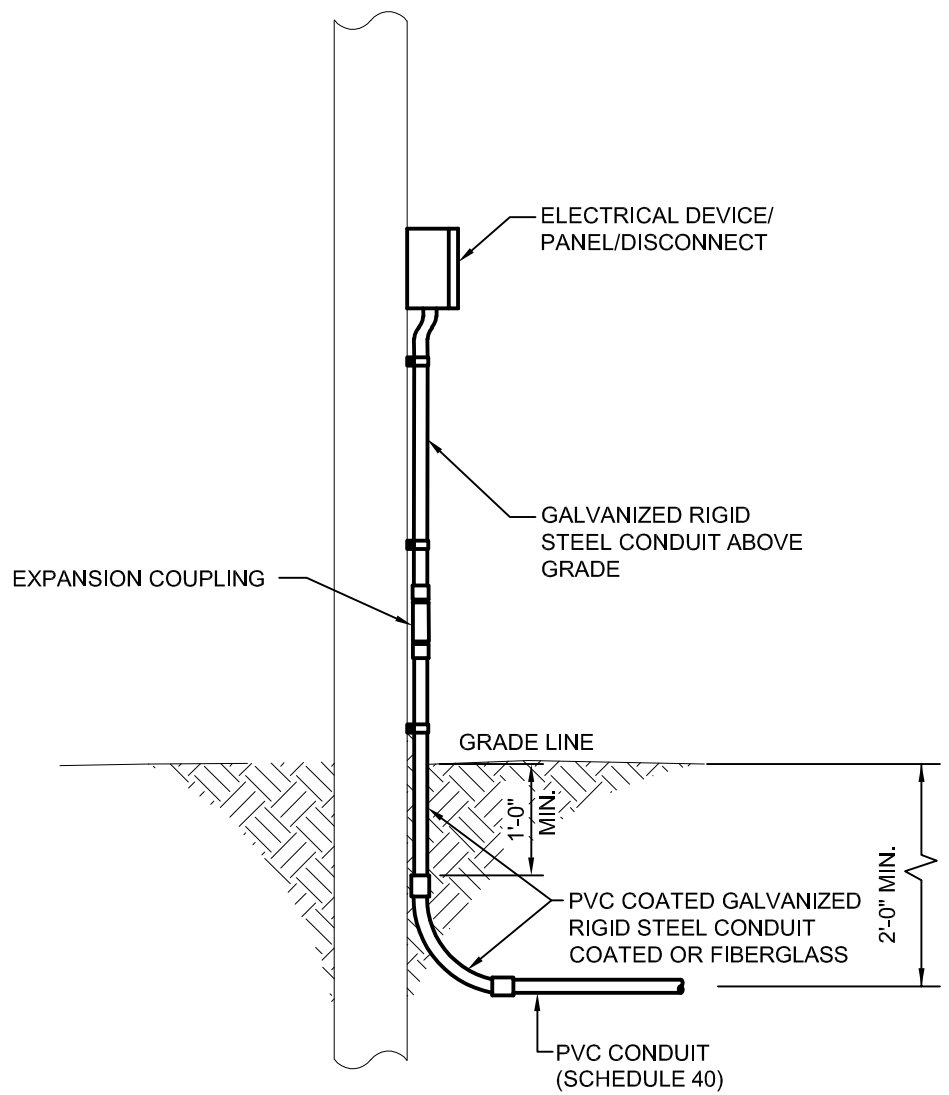


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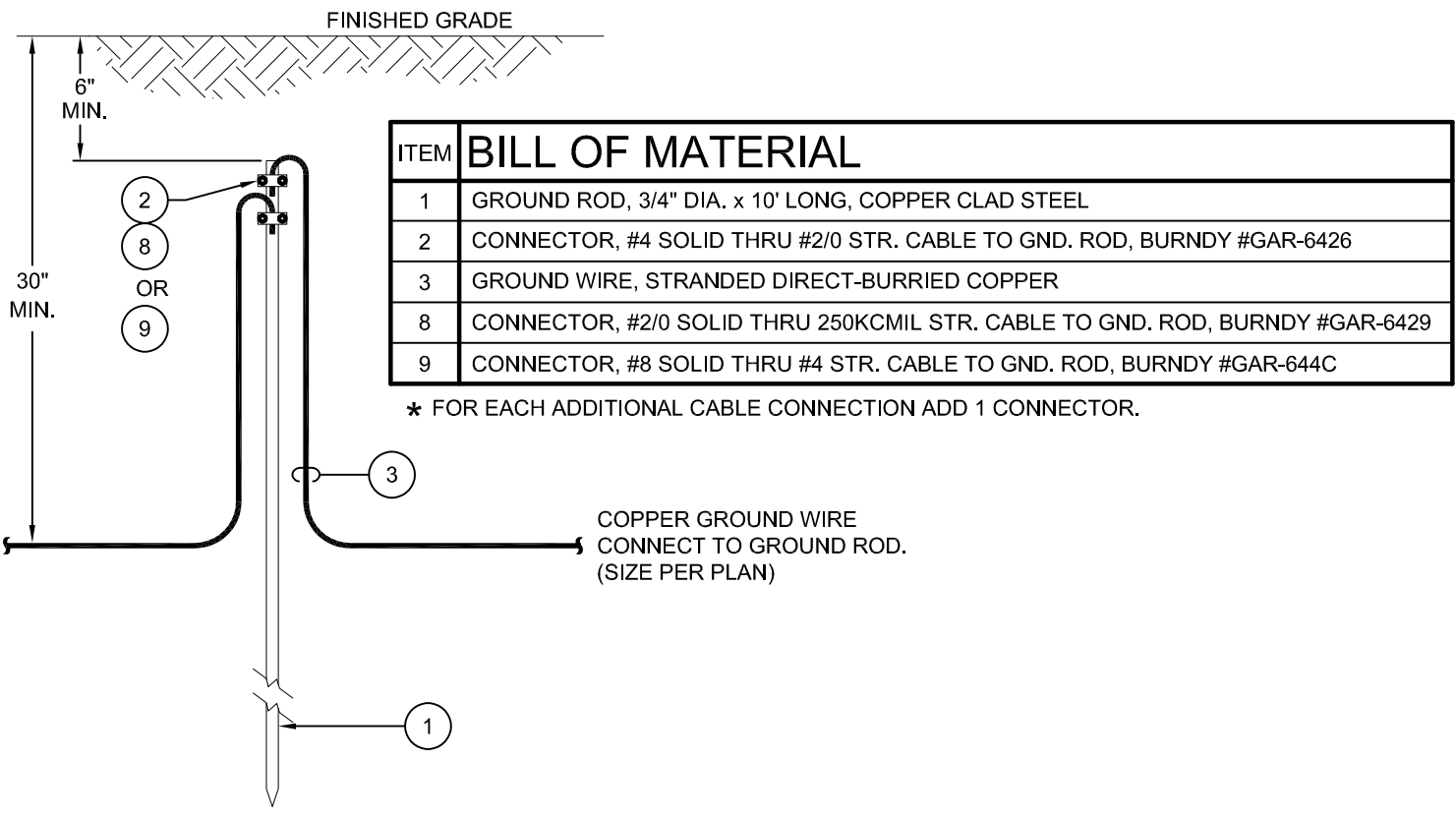
| LIGHTING FIXTURE SCHEDULE |  |              |  |                         |      |         |            |                              |                      |
|---------------------------|--|--------------|--|-------------------------|------|---------|------------|------------------------------|----------------------|
| ID                        | DESCRIPTION                                    | MANUFACTURER | CATALOG NO.                                | LAMPS                   | LOAD | VOLTAGE | MOUNTING   | COMMENTS                     | ACCEPTABLE MANUF.    |
| A                         | LED FULL CUT OFF WALL PACK PHOTO-ELECTRIC CELL | WILLIAMS     | WPTZS-L20/750-PC-120                       | 5000K, 2000 LUMEN LED   | 25   | 120     | WALL MOUNT | MUST FOLLOW BUY AMERICAN ACT | LITHONIA USPM, EATON |
| B                         | LED FULLY GASKETED FIXTURE                     | WILLIAMS     | 96-4-L62-840-HIAFR-SSCMB-SS LATCH-DRV-120V | 4000K, 6400 LUMEN LED'S | 48   | 120     | CHAIN HUNG | MUST FOLLOW BUY AMERICAN ACT | LITHONIA USPM, EATON |

|                   |            |  |                           |           |      |          |                             |                                    |      |      |   |
|-------------------|------------|--|---------------------------|-----------|------|----------|-----------------------------|------------------------------------|------|------|---|
| PANEL NO.         | A          |  | TYPE LIGHTING & APPLIANCE |           |      |          |                             |                                    |      |      |   |
| SERVICE VOLTAGE   | 120/240-1Ø |  | PHASE BUS RATING 225A     |           |      |          | MOUNTING Surface            |                                    |      |      |   |
| MAIN BREAKER SIZE | 200A       |  | NEUTRAL BUS RATING 225A   |           |      |          | SHORT CIRCUIT RATING 22KAIC |                                    |      |      |   |
|                   |            |  |                           |           |      |          |                             |                                    |      |      |   |
| DESCRIPTION       |            |  | C/B                       | VOLT AMPS |      | CKT. NO. | CKT. NO.                    | VOLT AMPS                          |      | C/B  | DESCRIPTION                               |
|                   |            |  | AMP                       | A         | B    |          |                             | A                                  | B    | AMP  |   |
| LIGHTING          |            |  | 20/1                      | 146       |      | 1        | 2                           | 900                                |      | 20/1 | RECEPTACLE                                |
| EF-1 / DAMPERS    |            |  | 20/1                      |           | 500  | 3        | 4                           |                                    | 500  | 20/1 | CONTROL PANEL                             |
| RADIO CONTROLLER  |            |  | 20/1                      | 500       |      | 5        | 6                           | 2000                               |      | 25/2 | 4 KW PAPI REGULATOR (BASE BID)            |
| WIND CONE         |            |  | 20/1                      |           | 1000 | 7        | 8                           |                                    | 2000 | ---- |   |
| EXISTING BEACON   |            |  | 20/1                      | 1500      |      | 9        | 10                          | 2500                               |      | 30/2 | 5KW RUNWAY/TAXIWAY REGULATOR (BASE BID)   |
| SPARE             |            |  | 20/1                      |           | 0    | 11       | 12                          |                                    | 2500 | ---- | (PROVIDE 40/2 IF 7.5KW ALT 2 IS ACCEPTED) |
| SPARE             |            |  | 20/1                      | 0         |      | 13       | 14                          | 0                                  |      | 20/1 | SPARE                                     |
| SPARE             |            |  | 20/1                      |           | 0    | 15       | 16                          |                                    | 0    | 20/1 | SPARE                                     |
| SPARE             |            |  | 20/1                      | 0         |      | 17       | 18                          | 0                                  |      | 20/1 | SPARE                                     |
| SPARE             |            |  | 20/1                      |           | 0    | 19       | 20                          |                                    | 0    | 20/1 | SPARE                                     |
| SPACE             |            |  | ----                      | 0         |      | 21       | 22                          | 0                                  |      | ---- | SPACE                                     |
| SPACE             |            |  | ----                      |           | 0    | 23       | 24                          |                                    | 0    | ---- | SPACE                                     |
| SPACE             |            |  | ----                      | 0         |      | 25       | 26                          | 0                                  |      | ---- | SPACE                                     |
| SPACE             |            |  | ----                      |           | 0    | 27       | 28                          |                                    | 0    | ---- | SPACE                                     |
| SPACE             |            |  | ----                      | 0         |      | 29       | 30                          | 0                                  |      | ---- | SPACE                                     |
|                   |            |  |                           |           |      |          |                             |                                    |      |      |   |
| TOTAL PHASE A:    |            |  | 63.2                      | AMPS      | 7.6  | KVA      |                             | TOTAL CONNECTED LOADS:             |      | 14.1 | KVA                                       |
| TOTAL PHASE B:    |            |  | 56.3                      | AMPS      | 6.8  | KVA      |                             | TOTAL CONNECTED LOADS PLUS SPARES: |      | 14.3 | KVA                                       |
|                   |            |  |                           |           |      |          |                             | ESTIMATED DEMAND LOADS:            |      | 14.4 | KVA                                       |

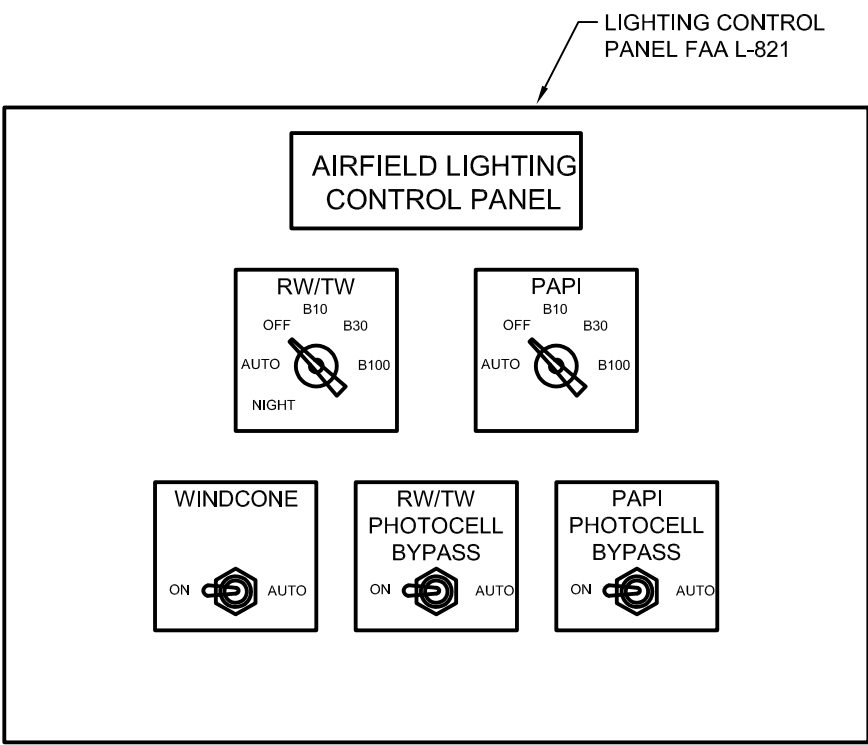
| BRANCH CIRCUIT COPPER CONDUCTOR AND CONDUIT SIZE **  |                         |                                    |   |   |  |  |
|--|-------------------------|------------------------------------|---|---|--|--|
| PROTECTION DEVICE RATING (AMPS)  | REQUIRED CONDUCTOR SIZE | EQUIPMENT GROUNDING CONDUCTOR SIZE | SINGLE PHASE 2 WIRE + GND. CONDUIT SIZE | SINGLE PHASE 3 WIRE + GND. CONDUIT SIZE * | THREE PHASE 3 WIRE + GND. CONDUIT SIZE | THREE PHASE 4 WIRE + GND. CONDUIT SIZE * |
| 15   | 12 AWG                  | 12 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 20   | 12 AWG                  | 12 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 25   | 10 AWG                  | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 25   | 10 AWG                  | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 30   | 10 AWG                  | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 35   | 8 AWG                   | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 40   | 8 AWG                   | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 3/4"                                     |
| 45   | 6 AWG                   | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 1"                                       |
| 50   | 6 AWG                   | 10 AWG                             | 3/4"                                    | 3/4"                                      | 3/4"                                   | 1"                                       |
| 60   | 4 AWG                   | 10 AWG                             | 1"                                      | 1"  | 1"                                     | 1-1/4"                                   |
| 70   | 4 AWG                   | 8 AWG                              | 1"                                      | 1"  | 1"                                     | 1-1/4"                                   |
| 80   | 3 AWG                   | 8 AWG                              | 1"                                      | 1-1/4"                                    | 1-1/4"                                 | 1-1/4"                                   |
| 90   | 2 AWG                   | 8 AWG                              | 1"                                      | 1-1/4"                                    | 1-1/4"                                 | 1-1/4"                                   |
| 100  | 1 AWG                   | 8 AWG                              | 1-1/4"                                  | 1-1/2"                                    | 1-1/2"                                 | 1-1/2"                                   |
| * = UNLESS OTHERWISE NOTED ON THE DRAWINGS.  |                         |                                    |   |   |  |  |
| ** = ALL CONDUCTORS SIZED ON THE POWER RISER DIAGRAM OR IN BRANCH CIRCUIT CONDUCTOR TABLE ARE BASED ON 3 CURRENT CARRYING CONDUCTORS IN A RACEWAY OR CABLE. CONDUCTORS SHALL BE DERATED IN ACCORDANCE WITH THE NEC IF 4 OR MORE CONDUCTORS ARE PLACED IN A RACEWAY OR CABLE. |                         |                                    |   |   |  |  |



OUTDOORS EXPOSED CONDUIT DETAIL  
NO SCALE

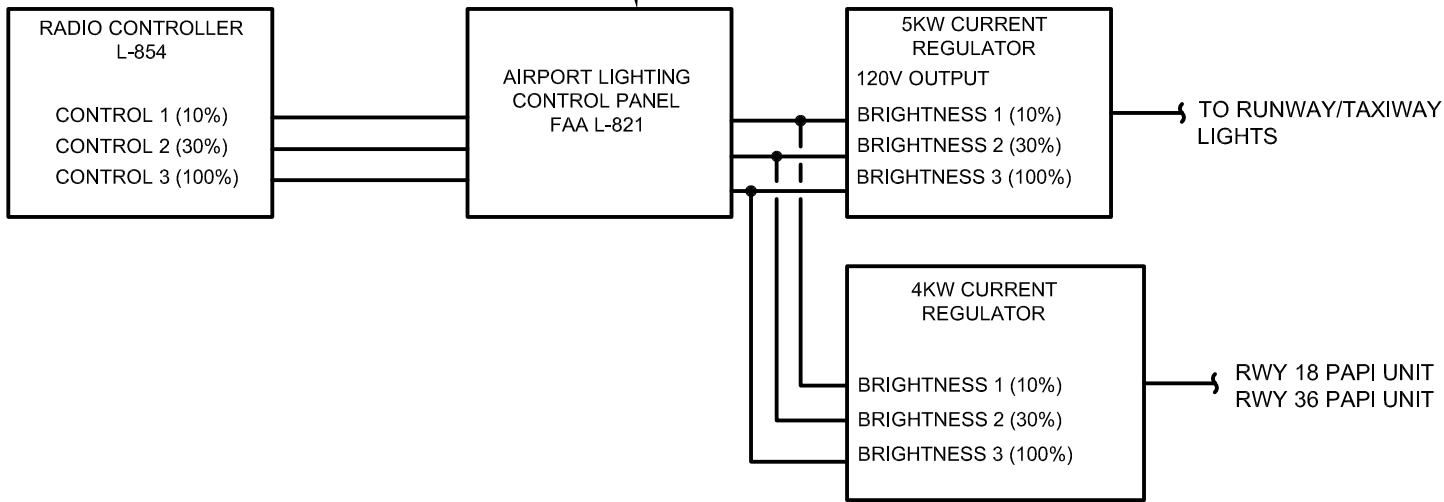


GROUND ROD INSTALLATION  
NO SCALE



AIRFIELD LIGHTING CONTROL PANEL ENCLOSURE  
NO SCALE

L-821 SWITCH/RELAY CONTROL/CONTACTOR AIRPORT LIGHTING CONTROL PANEL SHALL BE COMPLETELY WIRED AT THE FACTORY WITH CONNECTIONS MADE TO ALL APPROPRIATE TERMINALS SO THE ONLY CONNECTIONS NECESSARY IN THE FIELD WILL BE TO CONNECT THE EXTERNAL CONTROL CIRCUITS AND INPUT POWER. PROVIDE WITH ADEQUATE RELAYS TO SERVE THE LIGHTING CIRCUITS INDICATED. PROVIDE WITH INTERNAL ASTRONOMICAL TIMECLOCK AND PHOTOCELL BY-PASS SWITCH.



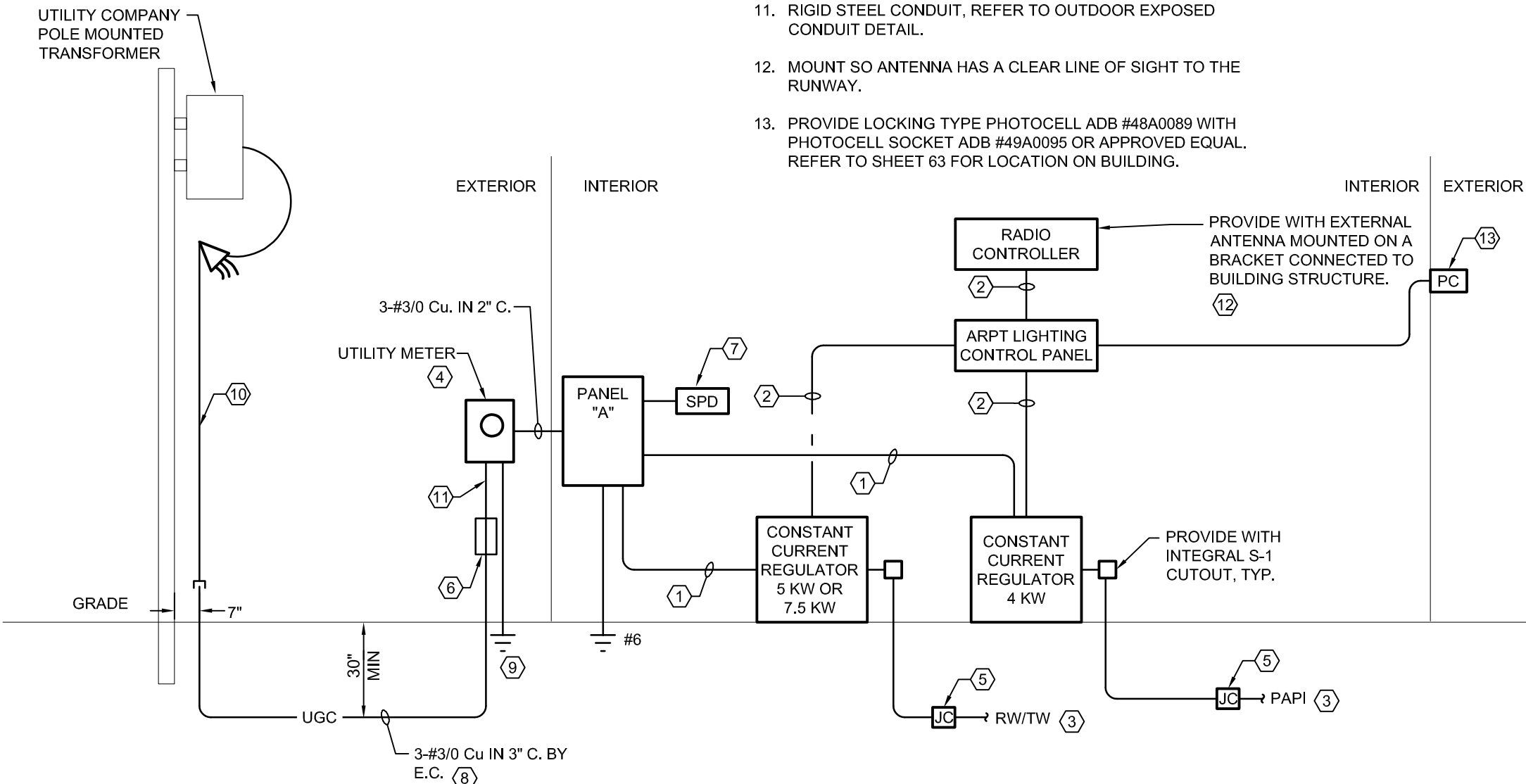
CURRENT REGULATOR CONTROL DIAGRAM  
NO SCALE

RISER DIAGRAM GENERAL NOTES:

- COORDINATE INSTALLATION WITH UTILITY COMPANY. EVERYG AND COMPLY WITH THEIR INSTALLATION REQUIREMENTS.
- IF THE UTILITY COMPANY DETERMINES THE EXISTING TRANSFORMER IS NOT OF ADEQUATE SIZE, THEY WILL UP-SIZE AT NO COST TO THE CUSTOMER.
- ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR THE CONDUIT AND CONDUCTORS FROM THE TRANSFORMER TO THE METER.
- GROUND AND BOND ELECTRICAL SERVICE AND ALL ASSOCIATED EQUIPMENT IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, UTILITY, AND LOCAL AUTHORITY.
- REFER TO SHEET 62 FOR ELECTRICAL SITE INFORMATION, CONDUIT ROUTING, AND TRANSFORMER LOCATION.
- CONTRACTOR SHALL PROVIDE "SHORT CIRCUIT/COORDINATION/DEVICE EVALUATION/ARC FLASH ANALYSIS" AS PART OF THE SUBMITTAL PROCESS. REFER TO SPECIFICATIONS.
- PROVIDE APPROVED SLIP JOINT ON ALL CONDUIT RISERS.

RISER DIAGRAM SHEET NOTES: (SYMBOLS ①, ②, ETC.)

- REFER TO BRANCH CIRCUIT COPPER CONDUCTOR AND CONDUIT SIZE TABLE, THIS SHEET.
- CONTROL WIRE IN CONDUIT. WIRE AS REQUIRED BY RADIO CONTROLLER AND REGULATOR MANUFACTURERS.
- REFER TO SHEET 42 FOR CONTINUATION.
- ELECTRICAL CONTRACTOR TO PROVIDE UTILITY COMPANY APPROVED METER SOCKET. MOUNT NOT LESS THAN 42" AFG OR MORE THAN 60" AFG.
- REFER TO JUNCTION CAN GROUP DETAIL ON SHEET 42.
- PROVIDE APPROVED SLIP JOINT ON ALL CONDUIT RISERS. TYP.
- PROVIDE SURGE PROTECTION DEVICE, SERVICE ENTRANCE RATED, 150 VAC LINE-TO-GROUND, 80KA PEAK SURGE RATING PER PHASE.
- PROVIDE ALL TRENCHING, BACKFILL, CONDUCTORS AND NEC APPROVED UL LISTED 3" CONDUIT (GRAY RIGID SCH 40 PVC) FROM THE METER TO THE POLE MOUNT TRANSFORMER. INSTALL IN STRAIGHT LINE IF POSSIBLE. IF HORIZONTAL TURNS ARE REQUIRED, ONLY ONE HORIZONTAL 90-DEGREE TURN SHALL BE ALLOWED. PROVIDE WITH PULL ROPE. LEAVE ENOUGH CABLING TO GO TO TOP OF POLE.
- PROVIDE DRIVEN GROUND ROD PER UTILITY COMPANY REQUIREMENTS.
- RISER CONDUITS SHALL BE RIGID PVC SCHEDULE 80.
- RIGID STEEL CONDUIT, REFER TO OUTDOOR EXPOSED CONDUIT DETAIL.
- MOUNT SO ANTENNA HAS A CLEAR LINE OF SIGHT TO THE RUNWAY.
- PROVIDE LOCKING TYPE PHOTOCELL ADB #48A0089 WITH PHOTOCELL SOCKET ADB #48A0095 OR APPROVED EQUAL. REFER TO SHEET 63 FOR LOCATION ON BUILDING.



ELECTRICAL RISER DIAGRAM  
NO SCALE

GENERAL ELECTRICAL NOTES

- 600 VOLT CONDUCTORS SHALL BE THWN-2 PER FAA REQUIREMENTS. CONDUIT SHALL BE RIGID GALVANIZED STEEL WHERE EXPOSED OUTDOORS, PVC SCHEDULE 40 WHERE BELOW GRADE, AND GRS WITH COMPRESSION FITTINGS WHERE INSIDE BUILDING. REFER TO SPECIFICATIONS FOR ADDITIONAL CONDUCTOR REQUIREMENTS.
- REFER TO SPECIFICATION SECTION L-108 FOR INSTALLATION OF UNDERGROUND ELECTRICAL POWER CABLE.
- REFER TO SPECIFICATION SECTION L-109 FOR EQUIPMENT.
- REFER TO SPECIFICATION SECTION L-110 FOR DUCTBANKS AND CONDUIT.
- REFER TO SPECIFICATION SECTION L-115 FOR MANHOLES AND JUNCTIONS.
- REFER TO SPECIFICATION SECTION L-125 FOR INSTALLATION OF LIGHTING.

ELECTRICAL ONE-LINE, SCHEDULES AND, DETAILS

RECONSTRUCT RUNWAY 18/36, LIGHTING, PAPI'S, REIL'S & WIND CONE

MODOT 18-001A-1A

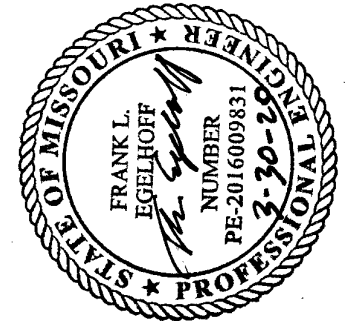
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DIVISION 16 - ELECTRICAL SPECIFICATIONS

SECTION 16000 - GENERAL PROVISIONS

GENERAL REQUIREMENTS

ALL REQUIREMENTS UNDER DIVISION ONE AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS SHALL BE A PART OF THIS SECTION. EACH CONTRACTOR SHALL BE RESPONSIBLE TO BECOME THOROUGHLY FAMILIAR WITH ALL ITS CONTENTS AS TO REQUIREMENTS WHICH AFFECT THIS DIVISION OR SECTION. THE CONTRACTOR SHALL UNDER THIS SECTION INCLUDES ALL MATERIAL, EQUIPMENT, APPLIANCES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE EACH SYSTEMS FUNCTIONING AS INDICATED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.

INSPECTION OF SITE

THE CONTRACTOR SHALL PERSONALLY INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

MATERIAL AND WORKMANSHIP

ALL MATERIAL AND APPARATUS SHALL BE NEW AND IN FIRST CLASS CONDITION. ALL MATERIAL AND APPARATUS SHALL HAVE MARKINGS OR A NAMEPLATE IDENTIFYING THE MANUFACTURER AND PROVIDING SUFFICIENT REFERENCE TO ESTABLISH QUALITY, SIZE AND CAPACITY. ALL WORKMANSHIP SHALL BE OF THE FINEST POSSIBLE BY EXPERIENCED MECHANICS OF THE PROPER TRADE. IN GENERAL, ALL MATERIALS AND EQUIPMENT SHALL BE OF COMMERCIAL SPECIFICATION GRADE IN QUALITY. LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE. ALL HOISTS, SCAFFOLDS, STAGING, RUNWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED FOR THE PERFORMANCE OF THE ELECTRICAL WORK SHALL BE FURNISHED BY THIS CONTRACTOR. MATERIAL AND EQUIPMENT SHALL BE STORED AND MAINTAINED IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE.

COORDINATION

THE CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER CONTRACTORS AND SUBCONTRACTORS SO THAT VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE AND WILL ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS AND TO RELEVANT EQUIPMENT DRAWINGS TO DETERMINE THE EXTENT OF CLEAR SPACES. THE CONTRACTOR SHALL MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS; AND TO FACILITATE CONCEALING CONDUIT IN THE MANNER ANTICIPATED IN THE DESIGN. THE CONTRACTOR SHALL PROVIDE MATERIALS WITH TRIM WHICH WILL FIT PROPERLY THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED.

SUBMITTALS

SUBMIT A MINIMUM OF ONE (1) COPY BY EMAIL OR MAIL, OR MORE IF SPECIFIED IN ANOTHER SECTION, OF SHOP DRAWINGS AND PRODUCT DATA ON ALL ELECTRICAL EQUIPMENT TO BE PROVIDED BY THE CONTRACTOR.

TITLE EACH DRAWING WITH PROJECT NAME AND NUMBER; IDENTIFY EACH ELEMENT OF DRAWINGS BY REFERENCE TO SHEET NUMBER AND DETAIL, SCHEDULE OR ROOM NUMBER OF CONTRACT DOCUMENTS.

SEQUENTIALLY NUMBER SUBMITTALS ACCORDING THEIR SPECIFICATION SECTION NUMBER. REVISED SUBMITTALS SHOULD INCLUDE ORIGINAL NUMBER AND A SEQUENTIAL ALPHABETIC SUFFIX.

CONTRACTOR AND SUPPLIER SHALL REVIEW AND STAMP AND SIGN SUBMITTALS PRIOR TO TRANSMITTAL; DETERMINE AND VERIFY FIELD MEASUREMENTS, FIELD CONSTRUCTION CRITERIA, MANUFACTURERS CATALOG NUMBERS AND CONFORMANCE OF SUBMITTAL WITH REQUIREMENTS OF CONTRACT DOCUMENTS. IDENTIFY IN WRITING AT TIME OF SUBMITTAL OF ANY DEVIATIONS FROM REQUIREMENTS OF CONTRACT DOCUMENTS.

MARK DIMENSIONS AND VALUES IN UNITS TO MATCH THOSE SPECIFIED.

MARK ANY FEATURES/OPTIONS BEING PROVIDED, DELETE OR PUT A LINE THROUGH FEATURES/OPTIONS THAT ARE NOT BEING PROVIDED.

DO NOT FABRICATE OR ORDER PRODUCTS OR BEGIN WORK THAT REQUIRES SUBMITTALS UNTIL APPROVAL OF SUBMITTAL.

APPROVAL OF EQUIPMENT DOES NOT CONSTRUE APPROVAL OF EQUIPMENT, COMPONENTS, ETC. THAT NO INFORMATION IS FURNISHED TO SHOW COMPLIANCE WITH CONTRACT DOCUMENTS.

CONTRACTOR SHALL PAY A SHOP DRAWING REVIEW FEE OF \$100.00, TO THE ENGINEER, FOR EACH SHOP DRAWING REVIEW AFTER TWO REVIEWS THAT ARE MARKED "RETURNED FOR CORRECTIONS" BY THE ENGINEER.

SUBSTITUTIONS

THE OWNER SHALL BE THE SOLE AND FINAL JUDGE AS TO THE SUITABILITY OF ITEMS SUBSTITUTED FOR THOSE SPECIFIED. REQUESTS FOR SUBSTITUTIONS SHALL BE SUBMITTED NO LATER THAN TEN (10) DAYS PRIOR TO THE DAY OF BID OPENING. IF PRIOR APPROVAL IS NOT GRANTED, EQUIPMENT SHALL BE FURNISHED AS SPECIFIED OR AS SHOWN ON THE PLANS.

THE ENTIRE COST OF ALL CHANGES OF ANY TYPE DUE TO SUBSTITUTIONS FOR MATERIALS SPECIFIED SHALL BE BORNE BY THE CONTRACTOR AT NO EXTRA COST TO THE OWNER AND SHALL REIMBURSE OTHER TRADES OF ADDITIONAL COST DUE TO SUBSTITUTION.

DOCUMENT EACH REQUEST WITH COMPLETE DATA SUBSTANTIATING COMPLIANCE OF PROPOSED SUBSTITUTION WITH CONTRACT DOCUMENTS.

REQUEST CONSTITUTES A REPRESENTATION THAT CONTRACTOR:

- HAS INVESTIGATED PROPOSED PRODUCT AND DETERMINED THAT IT MEETS OR EXCEEDS, IN ALL RESPECTS, SPECIFIED PRODUCT.
  - WILL PROVIDE THE SAME WARRANTY FOR SUBSTITUTION AS FOR SPECIFIED PRODUCT.
  - WILL COORDINATE INSTALLATION AND MAKE OTHER CHANGES THAT MAY BE REQUIRED FOR WORK TO BE COMPLETE IN ALL RESPECTS.
  - WAIVES CLAIMS FOR ADDITIONAL COSTS OR TIME EXTENSION THAT MAY SUBSEQUENTLY BECOME APPARENT.
  - WILL REIMBURSE OWNER FOR REVIEW OR REDESIGN SERVICES ASSOCIATED WITH RE-APPROVAL BY AUTHORITIES.
- SUBSTITUTIONS WILL NOT BE CONSIDERED WHEN THEY ARE INDICATED OR IMPLIED ON SHOP DRAWING OR PRODUCT DATA SUBMITTALS WITHOUT SEPARATE WRITTEN REQUEST, OR WHEN ACCEPTANCE WILL REQUIRE SUBSTANTIAL REVISION OF CONTRACT DOCUMENTS.

DIMENSIONS AND LAYOUTS

THE DRAWINGS ARE SCHEMATIC IN NATURE, BUT SHOW THE VARIOUS COMPONENTS OF THE SYSTEMS APPROXIMATELY TO SCALE AND ATTEMPT TO INDICATE HOW THEY ARE TO BE INTEGRATED WITH OTHER PARTS OF THE BUILDING. FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. DETERMINE EXACT LOCATIONS BY JOB MEASUREMENTS, BY CHECKING THE REQUIREMENTS OF OTHER TRADES, AND BY REVIEWING ALL CONTRACT DOCUMENTS. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS WHICH COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION.

ORDINANCES AND CODES

CONTRACTOR'S PERFORMANCE, WORKMANSHIP AND MATERIALS SHALL COMPLY WITH NATIONAL FIRE PROTECTION ASSOCIATION CODES, STATE AND LOCAL BUILDING CODES, AND/OR ALL OTHER APPLICABLE CODES AND ORDINANCES. CONTRACTOR SHALL COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES. OBTAIN AND PAY FOR ALL PERMITS. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW. CONTRACTOR SHALL MAINTAIN ALL NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE SAFETY OF THE PUBLIC.

ADJUSTING, ALIGNING AND TESTING

ALL ELECTRICAL EQUIPMENT ON THIS PROJECT FURNISHED UNDER THIS DIVISION AND ALL ELECTRICAL EQUIPMENT FURNISHED BY OTHERS SHALL BE ADJUSTED, ALIGNED AND TESTED FOR PROPER OPERATION BY THE ELECTRICAL CONTRACTOR. COMPLETE WIRING SYSTEMS SHALL BE FREE FROM SHORT CIRCUITS. ALL MOTORS SHALL BE VERIFIED FOR PROPER ROTATION.

THE CONTRACTOR SHALL MAINTAIN ON THE PROJECT PREMISES THE FOLLOWING AT ALL TIMES: A TRUE RMS READING VOLTMETER, A TRUE RMS READING AMMETER, AND A MEGGER INSULATION RESISTANCE TESTER. THE CONTRACTOR SHALL PROVIDE TEST DATA RATINGS AS REQUESTED OR AS REQUIRED.

CUTTING AND PATCHING

THIS CONTRACTOR SHALL DO ALL CUTTING OF WALLS, FLOORS, CEILINGS, ETC. AS REQUIRED TO INSTALL WORK UNDER THIS SECTION. CONTRACTOR SHALL OBTAIN PERMISSION OF THE ARCHITECT BEFORE DOING ANY CUTTING. ALL HOLES SHALL BE CUT AS SMALL AS POSSIBLE. CONTRACTOR SHALL PATCH WALLS, FLOORS, ETC. AS REQUIRED BY WORK UNDER THIS SECTION. ALL PATCHING SHALL BE THOROUGHLY FIRST CLASS AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION.

COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH GENERAL CONSTRUCTION. ALL CONDUIT ROUGH-IN SHALL BE CONCEALED EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE SHOWN.

GUARANTEE

GUARANTEE AGAINST DEFECTIVE WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL PAYMENT. GUARANTEE SHALL INCLUDE MATERIAL TO BE REPLACED AND ALL LABOR REQUIRED.

FIRESTOPPING OF FLOOR AND WALL PENETRATIONS

THIS CONTRACTOR SHALL SEAL ALL PENETRATIONS THROUGH FIRE RATED FLOOR AND WALL ASSEMBLIES IN ACCORDANCE WITH NFPA CODES AND UL WALL CONSTRUCTION TYPES. THE SEALING SYSTEM MUST BE CAPABLE OF PASSING A THREE HOUR TEST, PER ASTM E-814 (UL 1479). PENETRATION SEALING SYSTEM SHALL BE, AT A MINIMUM, 3M BRAND 7904 (CP-25 CAULK, OR 303 PUTTY), OR APPROVED EQUAL, AND SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

FLASHING AND PITCH POCKETS

FLASH AND COUNTERFLASH ALL OPENINGS THROUGH ROOF, AND/OR PROVIDE PITCH POCKETS AS REQUIRED. ALL ROOF PENETRATIONS SHALL BE LEAK TIGHT AT THE TERMINATION OF THE WORK.

SECTION 16075 - EQUIPMENT IDENTIFICATION

THIS CONTRACTOR SHALL FURNISH AND INSTALL EQUIPMENT IDENTIFICATION NAMEPLATES ON ALL PANELBOARDS, SWITCHES, STARTERS, ETC., INCLUDING SWITCHES IN DISTRIBUTION PANELS. NAMEPLATES SHALL BE ENGRAVED PHENOLIC PLASTIC AND SHALL BE FIRMLY ATTACHED TO THE EQUIPMENT WITH SELF-TAPPING, STAINLESS STEEL SCREWS OR STAINLESS STEEL MACHINE SCREWS WITH NUTS AN FLAT AND LOCK WASHERS. NAMEPLATES SHALL CLEARLY IDENTIFY EACH ITEM AND WHAT IT CONTROLS.

SECTION 16100 - RACEWAYS

GENERAL REQUIREMENTS

INTERIOR CONDUITS ARE ALLOWED TO BE RAN EXPOSED. ALL CONDUIT RUN UNDERGROUND SHALL BE RIGID STEEL CONDUIT OR PVC SCHEDULE 40. CONDUIT EXPOSED TO WEATHER, OR OTHER HAZARDOUS CONDITIONS SHALL BE RIGID STEEL CONDUIT. ALL INTERIOR CONDUIT SHALL BE RGS.

FINAL CONNECTION TO EACH MOTOR AND TRANSFORMER, AND TO ANY DEVICE WHICH WOULD OTHERWISE TRANSMIT MOTION, VIBRATION OR NOISE, SHALL BE IN FLEXIBLE METAL CONDUIT. WHERE FLEXIBLE METAL CONDUIT IS EXPOSED TO LIQUIDS, VAPORS OR SUNLIGHT, LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE USED. ALL FLEXIBLE METAL CONDUIT SHALL BE PROVIDED WITH AN INSULATED GROUND WIRE.

CONDUIT INSTALLATION

ALL WIRING SHALL BE RUN IN CONDUIT.

CONDUIT SHALL BE INSTALLED CONCEALED ABOVE CEILINGS OR CONCEALED IN WALL OR IN OR BENEATH FLOORS WHEREVER POSSIBLE. RUN PARALLEL TO BUILDING.

CONDUIT SHALL BE INSTALLED TO REQUIREMENTS OF STRUCTURE AND TO REQUIREMENTS OF ALL OTHER WORK ON THE PROJECT. CONDUIT SHALL BE INSTALLED TO CLEAR ALL OPENINGS, DEPRESSIONS, PIPES, DUCTS, REINFORCING STEEL, AND SIMILAR ITEMS. CONDUIT SET IN FORMS FOR CONCRETE STRUCTURE SHALL BE INSTALLED IN SUCH A MANNER THAT INSTALLATION WILL NOT AFFECT THE STRENGTH OF THE STRUCTURE. EXCEPT WHERE APPROVED IN WRITING BY THE ARCHITECT, NO CONDUIT SHALL BE RUN IN A SLAB ON GRADE. CONDUIT SHALL BE LOCATED IN GRANULAR FILL BELOW SLABS-ON GRADE.

CONDUITS SHALL BE INSTALLED CONTINUOUS BETWEEN CONNECTIONS TO OUTLETS, BOXES AND CABINETS WITH A MINIMUM POSSIBLE NUMBER OF BENDS AND NOT MORE THAN THE EQUIVALENT OF FOUR 90 BENDS BETWEEN CONNECTIONS. BENDS SHALL BE SMOOTH AND EVEN AND SHALL BE MADE WITHOUT FLATTENING CONDUIT OR FLAKING ENAMEL. RADIUS OF BENDS SHALL BE AS LONG AS POSSIBLE AND NEVER SHORTER THAN THE CORRESPONDING TRADE ELBOW. LONG RADIUS ELBOWS SHALL BE USED WHERE NECESSARY.

CONDUITS SHALL BE SECURELY FASTENED IN PLACE WITH APPROVED STRAPS, HANGERS AND STEEL SUPPORTS AS REQUIRED. SINGLE CONDUITS FOR FEEDERS SHALL BE HUNG WITH MALLEABLE SPLIT RING HANGERS WITH ROD AND TURNBUCKLE SUSPENSION FROM INSERTS SPACED NOT OVER 10 FEET APART IN CONSTRUCTION ABOVE. GROUPS OF HORIZONTAL FEEDER CONDUITS SHALL BE CLAMPED TO UNISTRUT STEEL CHANNELS AND SUSPENDED FROM INSERTS SPACED NOT OVER 10 FEET APART IN CONSTRUCTION ABOVE. VERTICAL FEEDER CONDUITS SHALL BE SECURELY CLAMPED TO STRUCTURAL STEEL MEMBERS ATTACHED TO STRUCTURE. CABLE CLAMPS SHALL BE INSTALLED FOR SUPPORT OF VERTICAL FEEDERS WHERE REQUIRED. CONDUIT SUPPORTS SHALL BE ADDED WITHIN 12" AT ONE END OF ALL BENDS. CONDUIT SHALL NOT BE SUPPORTED FROM SUSPENDED CEILING COMPONENTS.

CONDUIT ENDS SHALL BE REAMED BEFORE INSTALLATION AND ALL CONDUIT SHALL BE THOROUGHLY CLEANED BEFORE INSTALLATION AND KEPT CLEAN AFTER INSTALLATION. OPENINGS AND BOXES SHALL BE PLUGGED OR COVERED AS REQUIRED TO KEEP CONDUIT CLEAN DURING CONSTRUCTION AND ALL CONDUIT SHALL BE FISHED CLEAR OF OBSTRUCTIONS BEFORE THE PULLING OF WIRES. ALL CONDUIT SHALL BE OF AMPLE SIZE FOR PULLING OF WIRE AND SHALL NOT BE SMALLER THAN CODE REQUIREMENTS AND NOT LESS THAN 3/4" IN SIZE.

ALL ELECTRICAL WORK SHALL BE PROTECTED AGAINST DAMAGE DURING CONSTRUCTION. ANY WORK DAMAGED OR MOVED OUT OF LINE AFTER ROUGHING-IN SHALL BE REPAIRED TO MET ENGINEER'S APPROVAL WITHOUT ADDITIONAL COST TO THE OWNER.

CONDUIT TERMINATIONS AT PANELBOARDS, SWITCHBOARDS, MOTOR CONTROL EQUIPMENT AND JUNCTION BOXES SHALL BE ALIGNED AND INSTALLED TRUE AND PLUMB.

INSTALL APPROVED EXPANSION FITTINGS WHERE CONDUIT OR EMT PASSES THROUGH EXPANSION JOINTS.

INSTALL A PULL WIRE IN EACH EMPTY CONDUIT WHICH IS LEFT BY THE CONTRACTOR FOR INSTALLATION OF WIRES OR CABLES BY OTHERS.

MAKE ALL JOINTS AND CONNECTIONS IN A MANNER WHICH WILL INSURE MECHANICAL STRENGTH AND ELECTRICAL CONTINUITY.

THRU-WIRING OF LIGHT FIXTURES IS NOT PERMITTED.

BUSHINGS AND LOCKNUTS

WHERE CONDUITS ENTER BOXES, THEY SHALL BE RIGIDLY CLAMPED TO THE BOX BY A BUSHING ON THE INSIDE AND A LOCKNUT ON THE OUTSIDE, AND CONDUIT SHALL ENTER THE BOX SQUARELY. BUSHINGS AND LOCKNUTS SHALL BE MADE OF GALVANIZED MALLEABLE IRON AND SHALL HAVE SHARP, CLEAN-CUT THREADS. WHERE THIN-WALL CONDUIT ENTERS BOX, PROVIDE APPROVED E.M.T. CONNECTORS. USE INSULATED GROUNDING BUSHINGS WHEREVER CONNECTION IS SUBJECT TO VIBRATION OR MOISTURE.

SECTION 16120 - WIRE

ALL WIRE SHALL HAVE COPPER CONDUCTORS, WITH U.L. LABEL, AND 600 VOLT INSULATION. ALL WIRE SHALL BE RUN IN CONDUIT. SERVICE ENTRANCE CABLE SHALL BE TYPE USE, THHN OR XHHW WITH STRANDED CONDUCTORS. ALL FEEDER AND BRANCH CIRCUIT WIRE #6 AWG AND LARGER SHALL BE TYPE THHN OR XHHW WITH STRANDED CONDUCTORS. ALL WIRE #10 AWG AND SMALLER SHALL BE TYPE THHN (WET OR DAMP LOCATIONS, OR IN CONDUIT BELOW GRADE OR SLAB) OR THHN (DRY LOCATIONS ONLY AND ABOVE GRADE), BOTH SOLID CONDUCTORS. WIRE WITHIN FLUORESCENT FIXTURE CHANNELS SHALL BE TYPE THHN. ALL BRANCH CIRCUIT WIRING SHALL BE NOT SMALLER THAN #12 AWG WIRE. IF NO WIRE SIZE IS INDICATED ON THE PLANS FOR A BRANCH CIRCUIT, PROVIDE #12AWG WIRE AND A 20A CIRCUIT BREAKER. CONTROL WIRING SHALL HAVE 600V INSULATION AND BE OF THE PROPER TYPE, SIZE AND NUMBER AS REQUIRED TO ACCOMPLISHED SPECIFIED FUNCTION. NO MORE THAN 6 RECEPTACLES OR 16 AMPS OF LOAD PER CIRCUIT.

WIRING INSTALLATION

ALL WIRING SHALL BE INSTALLED IN APPROVED RACEWAY AND ENCLOSURES.

SUPPORT ALL WIRE AND CABLES IN VERTICAL INSTALLATIONS AS REQUIRED BY CODE BY INSTALLING CABLE SUPPORTERS OR PLUG-TYPE CONDUIT RISER SUPPORTS.

ALL WIRE AND CABLE IN CONDUIT SHALL BE CONTINUOUS WITHOUT TAPS OR SPLICES. ALL SPLICES OR TAPS SHALL OCCUR IN APPROVED BOXES AND ENCLOSURES AND SHALL BE KEPT TO THE MINIMUM REQUIRED, AND SHALL BE MADE UP WITH APPROVED SOLDERLESS CONNECTORS. ALL SPLICES, TAPS, AND JOINTS SHALL BE INSULATED AS REQUIRED BY CODE.

ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS SHALL BE DESIGNED FOR, PROPERLY SIZED FOR, AND U.L. LISTED FOR THE SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.

WHERE WIRE IS INDICATED TO BE INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHERS", CONTRACTOR SHALL LEAVE A MINIMUM OF 3 FEET OF "PIGTAIL" AT THE BOX, TAPE THE ENDS OF THE CONDUCTORS, AND COVER THE BOX.

CONDUCTORS SHALL HAVE INSULATION OF THE PROPER COLOR TO MATCH NEC COLOR CODE SYSTEM AND IN THE TABLE BELOW. IN LARGER WIRE SIZES WHERE PROPERLY COLORED INSULATION IS NOT AVAILABLE, THE CONTRACTOR SHALL USE VINYL PLASTIC ELECTRICAL TAPE OF THE APPROPRIATE COLOR AROUND EACH CABLE AT ALL TERMINATION POINTS, JUNCTION AND PULL BOXES.

SYSTEM VOLTAGE, CONDUCTOR TYPE, COLOR:

|          |                  |
|----------|------------------|
| 240/120  |                  |
| BLACK    | PHASE A          |
| RED      | PHASE B          |
| BLUE     | PHASE C          |
| WHITE    | NEUTRAL          |
| GREEN    | EQUIPMENT GROUND |
| GREEN W/ | ISOLATED GROUND  |
| YELLOW   | SIRIPE           |

ALL TERMINAL BLOCKS AND WIRE TERMINALS FOR CONTROL WIRING SHALL BE PROPERLY NUMBERED FOR IDENTIFICATION WITH VINYL STICK-ON MARKERS OR EQUIVALENT.

ALL RECEPTACLE AND NON-LIGHTING EQUIPMENT BRANCH CIRCUITS SHALL HAVE AN EQUIPMENT GROUND CONDUCTOR INSTALLED IN THE BRANCH CIRCUIT RACEWAY, SIZED IN ACCORDANCE WITH NEC TABLE 250-95.

VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 2%.

SECTION 16130 - LIGHT FIXTURES, LAMPS AND BALLASTS

LIGHT FIXTURE LOCATIONS

LIGHT FIXTURES SHOWN ON THE ELECTRICAL DRAWINGS REPRESENT GENERAL ARRANGEMENTS ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR MORE EXACT LOCATIONS. COORDINATE LOCATION WITH ALL OTHER TRADES BEFORE INSTALLATION TO AVOID CONFLICTS. LIGHT FIXTURES LOCATIONS IN MECHANICAL ROOMS SHALL BE COORDINATED WITH FINAL INSTALLED PIPING AND DUCTWORK LAYOUTS.

LIGHT FIXTURES

PROVIDE LIGHT FIXTURES AS SCHEDULED ON DRAWINGS. THIS SHALL INCLUDE ALL LAMPS, MATERIAL AND LABOR TO SECURELY HANG FIXTURES, CLEAN THEM AND MAKE THEM COMPLETELY READY FOR USE. ALL LIGHT FIXTURES SHALL INCLUDE ALL NECESSARY ACCESSORIES REQUIRED. LIGHT FIXTURE MODELS SCHEDULED ON THE DRAWINGS ARE TO SHOW THE MANUFACTURER, GRADE AND STYLE OF FIXTURES REQUIRED ONLY. PROVIDE ALL HANGERS, SUPPORTS, AND MISCELLANEOUS HARDWARE REQUIRED TO INSTALL LIGHT FIXTURES. PROVIDE PROPER TRIM TO FIT EACH CEILING CONDITION ACTUALLY ENCOUNTERED. PROVIDE ADDITIONAL TIE WIRES CONNECTED TO STRUCTURE TO CONFORM TO UB 47-16 SEISMIC REQUIREMENTS WHERE REQUIRED.

THROUGH WIRING OF FIXTURES IS NOT PERMITTED. EACH FIXTURE MUST BE CONNECTED BY A WHIP TO A JUNCTION BOX.

SECTION 16143 - DEVICES

FURNISH AND INSTALL THE FOLLOWING OUTLETS AND SWITCHES WHERE SHOWN OR REQUIRED. MINOR CHANGES RELATIVE TO THE LOCATION OF ELECTRICAL EQUIPMENT MAY BE MADE BY THIS CONTRACTOR TO COMPLY WITH STRUCTURAL AND BUILDING REQUIREMENTS AS DETERMINED IN THE COURSE OF CONSTRUCTION. ALL OUTLETS AND SWITCHES MUST BE OF THE SAME MANUFACTURER AND NOT MIXED ON THE PROJECT. COLOR OF TOGGLES AND RECEPTACLES SHALL BE GREY.

DUPLEX RECEPTACLE: PASS & SEYMOUR #5362  
SINGLE POLE SWITCH: PASS & SEYMOUR #20AC1  
THREE-WAY SWITCH: PASS & SEYMOUR #20AC3  
PILOT LIGHT SWITCH: PASS & SEYMOUR #20AC1-RPL  
KEY SWITCH: PASS & SEYMOUR #20AC1-L  
GFCI DUPLEX RECEPTACLE: PASS & SEYMOUR #2091  
ISOLATED GROUND RECEPTACLE: PASS & SEYMOUR #G6300 (NEMA 5-20G)

EQUIVALENT HUBBELL, LEVITON AND BRYANT, WILL BE ACCEPTABLE. OTHER DEVICES SHOWN ON THE PLANS BUT NOT CALLED OUT ABOVE SHALL BE OF THE SAME CONSTRUCTION QUALITY AS DEFINED BY THE MODEL NUMBERS SHOWN.

SWITCH AND OUTLET COVER PLATES

SWITCH AND OUTLET PLATES IN UNFINISHED ROOMS AND SPACES SHALL BE STAMPED STEEL PLATES, CADMIUM PLATED. GROUPS OF SWITCHES SHALL BE UNDER ONE GANG-PLATE, USUALLY MOUNTED HORIZONTALLY; WHERE REQUIRED BY DETAILS, VERTICAL MOUNTING SHALL BE USED INSTEAD. PLATES SHALL BE SET PLUMB, PARALLEL, AND SHALL FINISH FLUSH WITH THE WALL. WEATHERPROOF COVER PLATES SHALL BE CAST ALUMINUM WITH PVC GASKETING. PLATES SHALL BE SIERRA WPD OR EQUAL WITH WEATHERPROOF WHILE IN-USE COVERS FOR EACH DEVICE.

LOCATIONS OF OUTLETS, SWITCHES AND OTHER WIRING DEVICES

A. OUTLETS MUST BE CENTERED WITH REGARD TO PANELING, FURRING, AND TRIM. ANY OUTLET WHICH IS IMPROPERLY LOCATED MUST BE CORRECTED AT THE CONTRACTOR'S EXPENSE. OUTLETS MUST BE SET PLUMB OR HORIZONTAL AND SHALL EXTEND TO THE FINISHED SURFACE OF THE WALL, CEILING OR FLOOR AS THE CASE MAY BE WITHOUT PROJECTING BEYOND SAME. RECEPTACLES, SWITCHES, AND OTHER WIRING DEVICES SHOWN ON WOOD TRIM, CASES OR OTHER FIXTURES SHALL BE INSTALLED SYMMETRICALLY ON SUCH TRIM OR FIXTURE AND WHERE NECESSARY, SHALL BE SET WITH THE LONG DIMENSION OF THE PLATE HORIZONTAL, OR SHALL BE GANGED IN TANDEM.

B. MOUNTING HEIGHTS TO CENTER OF BOX ABOVE FINISHED FLOOR FOR THE BELOW NAMED ITEMS SHALL BE AS FOLLOWS UNLESS OTHERWISE INDICATED.

GENERAL FLUSH SWITCHES, AND MANUAL STATIONS 48"

GENERAL CONVENIENCE RECEPTACLES 18"

PANELBOARDS TO TOP 72"

TELEPHONE PANELS TO TOP 72"

SAFETY SWITCHES 54"

MOTOR CONTROLLERS 54"

SECTION 16150 - ELECTRICAL SERVICE AND GROUNDING

ELECTRICAL SERVICE

SEE DRAWINGS FOR TYPE, SIZE, VOLTAGE, PHASE, AND RELATED REQUIREMENTS.

GROUNDING

THE ELECTRICAL SERVICE, CONDUCTORS, CONDUITS, MOTOR FRAMES, AND SIMILAR CONDUCTING SURFACES IN THIS CONTRACT WHICH REQUIRE GROUNDING SHALL BE PERMANENTLY AND EFFECTIVELY GROUNDED BY THIS CONTRACTOR IN A THOROUGH AND EFFICIENT MANNER IN CONFORMANCE TO THE NATIONAL ELECTRICAL CODE. ALL CIRCUITS SHALL HAVE SEPARATE GREEN GROUND CONDUCTOR ROUTED WITH PHASE CONDUCTORS.

SECTION 16470 - PANELBOARDS

DESCRIPTION: NEMA PB1, CIRCUIT BREAKER TYPE, LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARD.

PANELBOARD BUS: COPPER, RATINGS AS INDICATED. PROVIDE COPPER GROUND BUS IN EACH PANELBOARD; PROVIDE INSULATED GROUND BUS WHERE SCHEDULED.

MINIMUM INTEGRATED SHORT CIRCUIT RATING: 10,000 AMPERES RMS SYMMETRICAL FOR 240 VOLT PANELBOARDS; 14,000 AMPERES RMS SYMMETRICAL FOR 480 VOLT PANELBOARDS.

MOLDED CASE CIRCUIT BREAKERS: NEMA AB 1, BOLT-ON TYPE THERMAL MAGNETIC TRIP CIRCUIT BREAKERS, WITH COMMON TRIP HANDLE FOR ALL POLES, LISTED AS TYPE SWD FOR LIGHTING CIRCUITS, TYPE HACR FOR AIR CONDITIONING EQUIPMENT CIRCUITS, CLASS A GROUND FAULT INTERRUPTER CIRCUIT BREAKERS WHERE SCHEDULED. DO NOT USE TANDEM CIRCUIT BREAKERS.

ENCLOSURE: NEMA PB 1, TYPE 1.

CABINET BOX: 6 INCHES (153 MM) DEEP, 20 INCHES WIDE.

CABINET FRONT: SURFACE CABINET FRONT AS INDICATED WITH CONCEALED TRIM CLAMPS, CONCEALED HINGE, METAL DIRECTORY FRAME, AND FLUSH LOCK ALL KEYED ALIKE. FINISH IN MANUFACTURER'S STANDARD GRAY ENAMEL.

ACCEPTABLE MANUFACTURERS SHALL BE GENERAL ELECTRIC, SQUARE D, SIEMENS, AND CUTLER HAMMER.

INSTALLATION

INSTALL PANELBOARDS IN ACCORDANCE WITH NEMA PB 1.1 AND THE NECA "STANDARD OF INSTALLATION."

INSTALL PANELBOARDS PLUMB.

HEIGHT: 6 FEET (1800 MM) TO TOP OF PANELBOARD; INSTALL PANELBOARDS TALLER THAN 6 FEET (1800 MM) WITH BOTTOM NO MORE THAN 4 INCHES (100 MM) ABOVE FLOOR.

PROVIDE FILLER PLATES FOR UNUSED SPACES IN PANELBOARDS.

PROVIDE TYPED CIRCUIT DIRECTORY FOR EACH BRANCH CIRCUIT PANELBOARD.

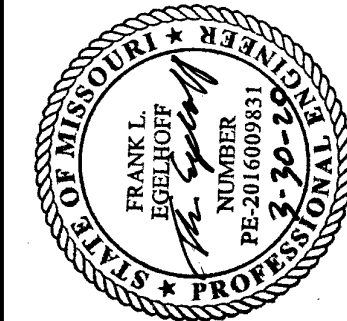
PROVIDE ENGRAVED PLASTIC NAMEPLATES.

GROUND AND BOND PANELBOARD ENCLOSURE ACCORDING TO NEC.

SHORT CIRCUIT/COORDINATION/DEVICE EVALUATION/ARC FLASH ANALYSIS  
THE CONTRACTOR SHALL, BASED UPON THE EQUIPMENT PROVIDED, INCLUDE AS PART OF THE SUBMITTAL PROCESS THE ELCTRICAL SYSTEM "SHORT CIRCUIT/COORDINATION/DEVICE EVALUATION/ARC FLASH ANALYSIS". THE ANALYSIS SHALL BE PERFORMED BY THE EQUIPMENT MANUFACTURER AND SUBMITTED IN A WRITTEN REPORT. THE ANALYSIS SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER FROM THE STATE IN WHICH THE PROJECT IS LOCATED. THE ANALYSIS SHALL COMPLY WITH NFPA-70E AND IEEE 1584.0000N.

THE ANALYSIS WILL INCLUDE: ONE LINE DIAGRAMS, SHORT CIRCUIT ANALYSIS, COORDINATION ANALYSIS, EQUIPMENT EVALUATION, ARC FLASH ANALYSIS AND ARC FLASH LABELS CONTAINING AT A MINIMUM, EQUIPMENT NAME, VOLTAGE/CURRENT RATING, AVAILABLE INCIDENT ENERGY AND FLASH PROTECTION BOUNDARY.

THE SELECTED FIRMS FIELD SERVICE ENGINEER SHALL PERFORM DATA GATHERING FOR ANALYSIS COMPLETION AND DEVICE SETTINGS, PERFORM DEVICE SETTING AS RECOMMENDED BY THE ANALYSIS AND WILL FURNISH AND INSTALL THE ARC FLASH LABELS. THE COMPONENTS WORST CASE INCIDENT ENERGY WILL BE CONSIDERED THE AVAILABLE ARC FLASH ENERGY AT THAT SPECIFIC POINT IN THE SYSTEM. SUBMIT THREE WRITTEN COPIES AND ONE ELECTRONIC COPY OF THE REPORT.



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| 1        | 3/30/20 | ADDENDUM NO. 1        |
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| ELECTRICAL SPECIFICATIONS | RECONSTRUCT RUNWAY 18/36, LIGHTING, PAPI'S, REIL'S & WIND CONE<br>MODOT 18-001A-1A | 2020             |
|                           |  | TARKIO, MISSOURI |

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