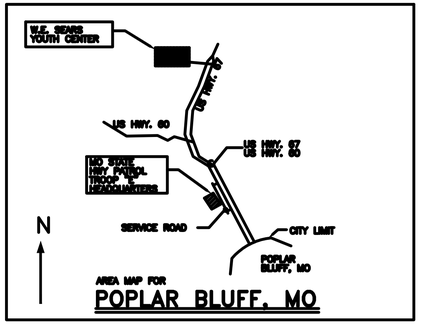
REPLACE HVAC - TROOP E HEADQUARTERS

MISSOURI STATE HIGHWAY PATROL

POPLAR BLUFF, MISSOURI

SITE LOCATION MAP



OWNER: STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

DEPARTMENT OF PUBLIC SAFETY
MISSOURI STATE HIGHWAY PATROL

PROJECT MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

STATE OF MISSOURI
PHILIP J. WENTZ
NUMBER E-29111
REGISTERED PROFESSIONAL ENGINEER
12/7/22
PHIL WENTZ
LICENSE #PE-029111
MCCLURE CORP.
NO. 000087

STATE OF MISSOURI
STEVEN L. STACK
NUMBER PE-2009002097
REGISTERED PROFESSIONAL ENGINEER
12/7/22
STEVEN STACK
LICENSE #PE-2009002097
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ARCHER-ELGIN
engineering ▪ surveying ▪ architecture

SHEET INDEX:

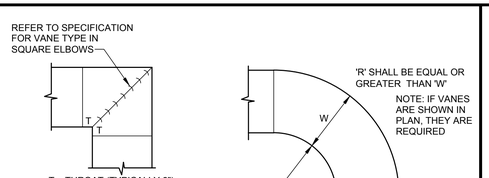
DESIGNER: MCCLURE ENGINEERING

PROJECT NUMBER: R2142-01

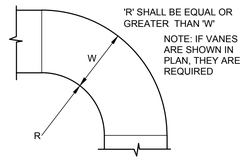
SITE NUMBER: 4758
FACILITY NUMBER: 55125

ISSUED FOR BID DRAWINGS: DEC. 7, 2022

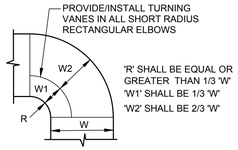
SHEET NUMBER:
CS-1
DEC 7, 2022
SHEET 1 OF 25



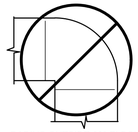
RECTANGULAR SQUARE 90° ELBOW



RECTANGULAR RADIUS 90° ELBOW
(STANDARD/LONG RADIUS)

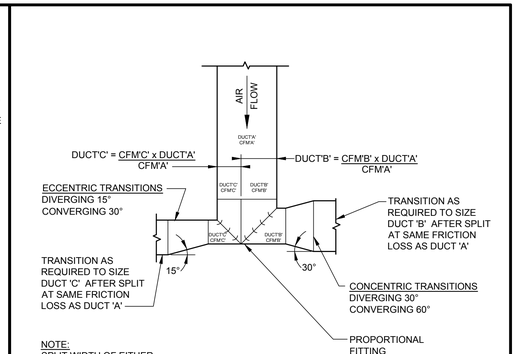


RECTANGULAR RADIUS 90° ELBOW
(SHORT RADIUS)

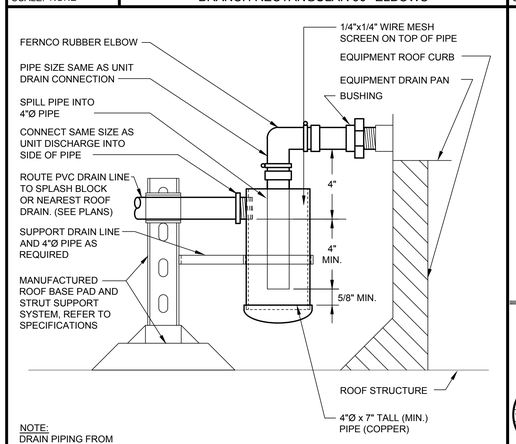


RADIUS OUTSIDE 90° ELBOW
DO NOT USE

FILE NAME: M-0006B	DUCTWORK
SCALE: NONE	BRANCH RECTANGULAR 90° ELBOWS

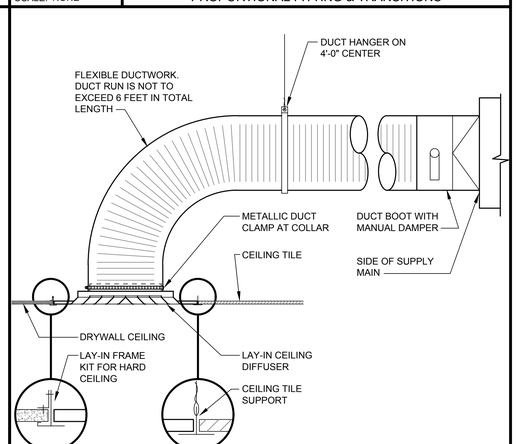


FILE NAME: M-0006A	DUCTWORK
SCALE: NONE	PROPORTIONAL FITTING & TRANSITIONS

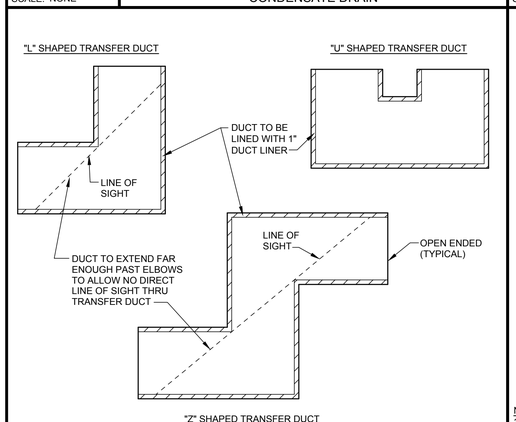


NOTE:
DRAIN PIPING FROM UNIT TO TRAP IS TO BE COPPER

FILE NAME: M-0018	ROOF TOP UNIT
SCALE: NONE	CONDENSATE DRAIN

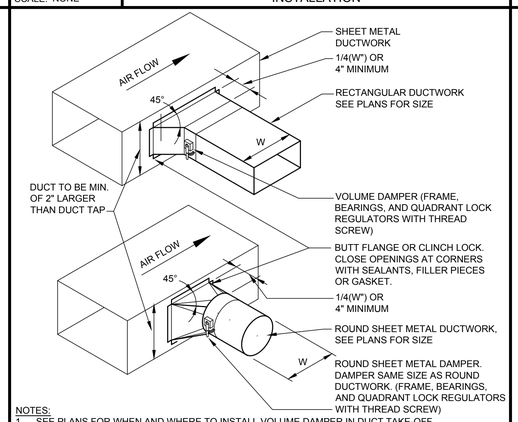


FILE NAME: M-0009A	LAY-IN DIFFUSER/GRILLE
SCALE: NONE	INSTALLATION



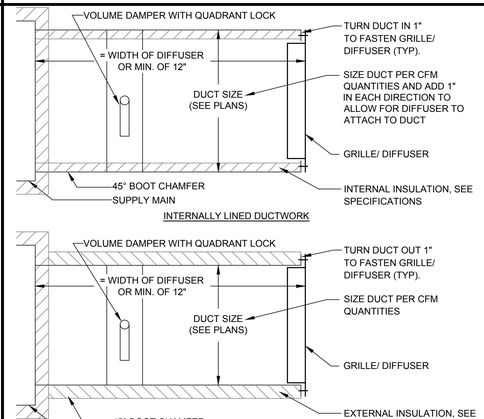
NOTES:
1. SEE PLANS FOR SIZE (X"xX") OF TRANSFER DUCT.
2. SEE PLANS FOR LOCATION OF "L", "U", AND "Z" SHAPED TRANSFER DUCTS

FILE NAME: M-0042	TRANSFER AIR DUCT DETAIL
SCALE: NONE	



NOTES:
1. SEE PLANS FOR WHEN AND WHERE TO INSTALL VOLUME DAMPER IN DUCT TAKE-OFF.
2. VOLUME DAMPERS ARE TO BE INSTALLED IN AN ACCESSIBLE LOCATION.
3. VOLUME DAMPERS ARE NOT TO BE INSTALLED IN FRONT OF VAV/FAN POWERED BOXES, UNLESS NOTED/ILLUSTRATED ON PLAN.
4. FOR DUCTS WITH EXTERNAL INSULATION, PROVIDE/INSTALL STANDOFFS FOR DAMPERS.

FILE NAME: M-0025A	45 DEGREE TAKE-OFF
SCALE: NONE	(RECTANGULAR DUCT MAIN)



FILE NAME: M-0014	EXPOSED SIDEWALL GRILLE/DIFFUSER
SCALE: NONE	

MECHANICAL

AD	ACCESS DOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
BV	BALANCE VALVE
COM	COMMON
CHV	CHECK VALVE
CU	CONDENSER UNIT
CV	CONTROL VALVE
D	DAMPER
DISCH	DISCHARGE
DN	DOWN
DR	DRAIN LINE
DV	DRAIN VALVE
EBH	ELECTRIC BASE BOARD HEATER
EF	EXHAUST FAN
ET	EXPANSION TANK
EX	EXISTING
EXH	EXHAUST
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT
F.O.T.	FLAT ON TOP
FRD	FIRE RATED DAMPER
FTR	FIN TUBE RADIATION
G	GAS
GA	GAUGE
GC	GAUGE COCK
H	HUMIDIFIER
MA	MAKE-UP AIR
MBH	1000 BTU/HR
MXA	MIXED AIR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
PR	PRESSURE REGULATOR
PRV	PRESSURE REDUCING VALVE
RA	RETURN AIR
RF	RETURN FAN
RLA	RELIEF AIR
RLF	RELIEF FAN
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SD	SMOKE DAMPER
SF	SUPPLY FAN
STR	STRAINER
SUC	SUCTION
SUD	SUCTION DIFFUSER
SV	SERVICE VALVE
TH	THERMOMETER
TW	THERMOMETER WELL
U	UNION
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME UNIT

DR	DRAIN LINE
RSUC	REFRIGERANT SUCTION
RLIQ	REFRIGERANT LIQUID
UP	PIPE LINE, TURNED UP
DN	PIPE LINE, TURNED DOWN
BV	BALANCE VALVE
CV	2 WAY CONTROL VALVE
3CV	3 WAY CONTROL VALVE
CHV	CHECK VALVE
DV	DRAIN VALVE
F	FLANGE CONNECTION
GA / GC	GAUGE AND GAUGE COCK
MC	MECHANICAL COUPLING
P	PETE'S PLUG
PFC	
PR	PRESSURE REGULATOR
PRV	
RV	RELIEF VALVE
SV	SERVICE VALVE
STR	STRAINER
T	STEAM TRAP
TH	THERMOMETER
TW	THERMOMETER WELL
U	UNION
M	METER
	CAP
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER (BOTTOM & TOP LEVEL)
PA	PIPE ANCHOR
PG	PIPE GUIDE

	FLEXIBLE DUCTWORK
	SUPPLY AIR DUCT, DOWN
	SUPPLY AIR DUCT, UP
	RETURN, OUTSIDE, RELIEF OR EXH DUCT DN
	RETURN, OUTSIDE, RELIEF OR EXH DUCT UP
	DROP IN DIRECTION OF ARROW
D / M / FRD / BDD	DAMPER AUTOMATIC CONTROL DAMPER FIRE RATED DAMPER BACK DRAFT DAMPER
D	FLEXIBLE DUCT BOOT CONNECTION WITH DAMPER (SEE DETAIL)
AP X"xX"	ACCESS DOOR/PANEL
Ø	ROUND DUCTWORK
	OVAL DUCTWORK
	TURNING VANES
	EXISTING PIPING OR EQUIPMENT TO REMAIN
	EXISTING PIPING OR EQUIPMENT TO BE REMOVED
	NEW PIPING OR EQUIPMENT
xx / ##	TYPE OF EQUIPMENT EQUIPMENT DESIGNATION NUMBER OF EQUIPMENT
X / ###	TYPE AIR DEVICE DESIGNATION CFM
X / X##	SECTION REFERENCE SECTION DESIGNATION SHEET WHERE SECTION IS SHOWN
FTR X'-X" / X X'-X"	FINNED TUBE DESIGNATION LENGTH OF ELEMENT LENGTH OF COVER (WT/WT = WALL TO WALL) SYMBOL
	CONNECT TO EXISTING EQUIPMENT
#	KEYED NOTE DESIGNATION

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

PHILIP J. WENTZ NUMBER E-29111 REGISTERED PROFESSIONAL ENGINEER 12/31/2022

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MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

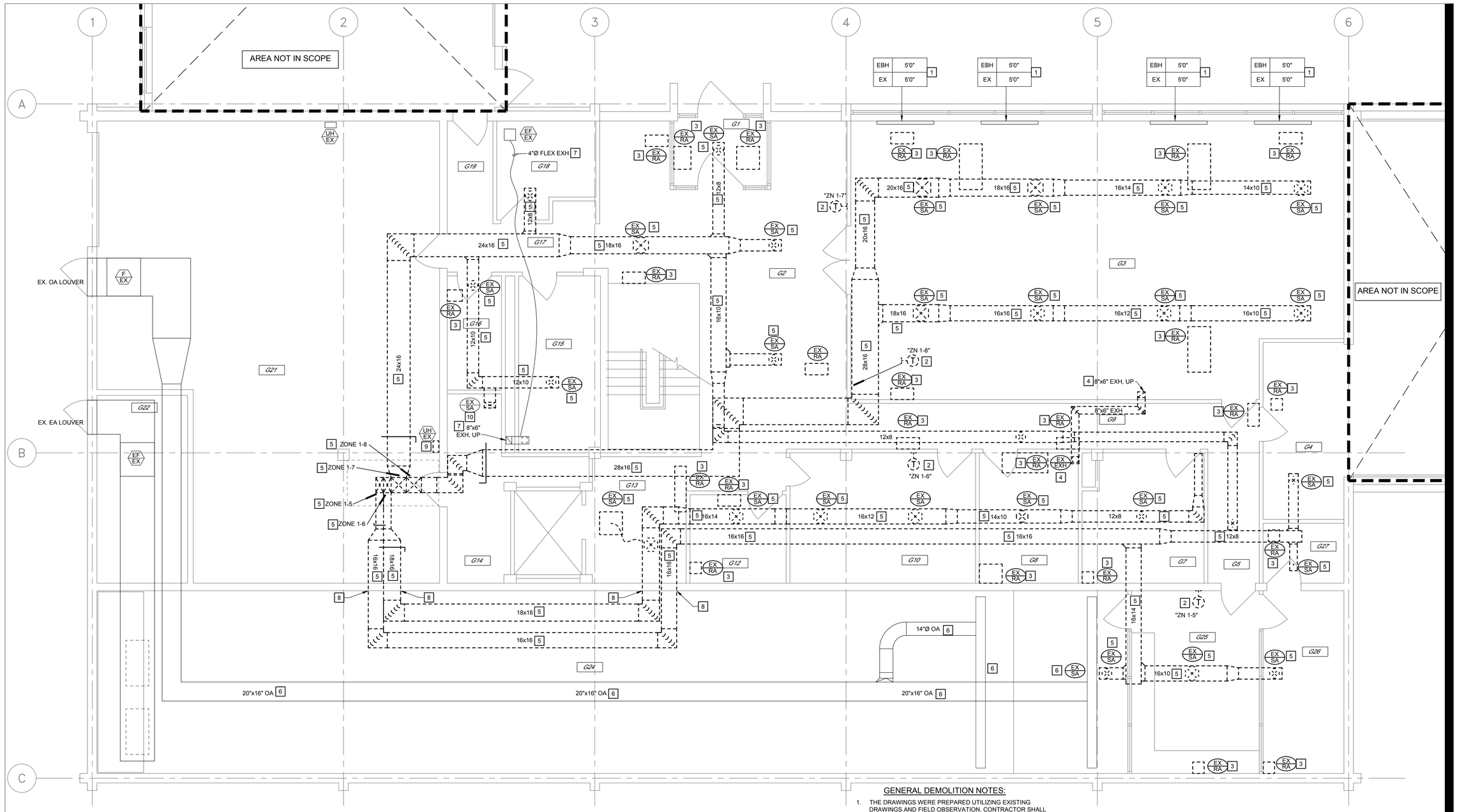
REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
MECHANICAL SYMBOLS, ABBREVIATIONS, AND DETAILS

SHEET NUMBER:
M1.0

2 OF 25 SHEETS
12/07/2022



GROUND FLOOR MECHANICAL DEMOLITION PLAN

SCALE: 1/4" = 1'0"

N

GENERAL DEMOLITION NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
3. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
4. CONTRACTOR SHALL CHECK-IN EACH DAY WITH THE OWNER'S REP.
5. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
6. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
7. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

KEYED NOTES

1. EXISTING EBH TO REMAIN IN PLACE.
2. EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING TO BE DEMOLISHED.
3. EXISTING RETURN AIR GRILLE TO BE DEMOLISHED.
4. EXISTING EXHAUST AIR DUCTWORK, HANGERS, AND ALL ASSOCIATED ACCESSORIES TO BE DEMOLISHED BACK TO THE BOTTOM OF THE FIRST FLOOR SLAB AND CAPPED.
5. EXISTING SUPPLY AIR DUCTWORK, GRILLES, HANGERS, AND ALL ASSOCIATED ACCESSORIES TO BE DEMOLISHED IN THEIR ENTIRETY.
6. EXISTING OUTDOOR AIR DUCTWORK SERVING THE FIRING RANGE TO REMAIN IN PLACE.
7. EXISTING EXHAUST DUCTWORK TO REMAIN IN PLACE.
8. ONCE DUCTS ARE DEMOLISHED PATCH WALL TO MATCH EXISTING CONDITIONS.
9. EXISTING ELECTRIC UNIT HEATER TO BE RELOCATED TO ALLOW FOR INSTALLATION OF NEW SUPPLY AIR DUCT. REFER TO NEW WORK FOR MORE INFORMATION.
10. EXISTING SUPPLY AIR GRILLE TO REMAIN AND BE RECONNECTED. REFER TO NEW WORK FOR MORE INFORMATION.

STATE OF MISSOURI
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PHILIP J. WENTZ NUMBER E-29111 REGISTERED PROFESSIONAL ENGINEER 12/07/2022

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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

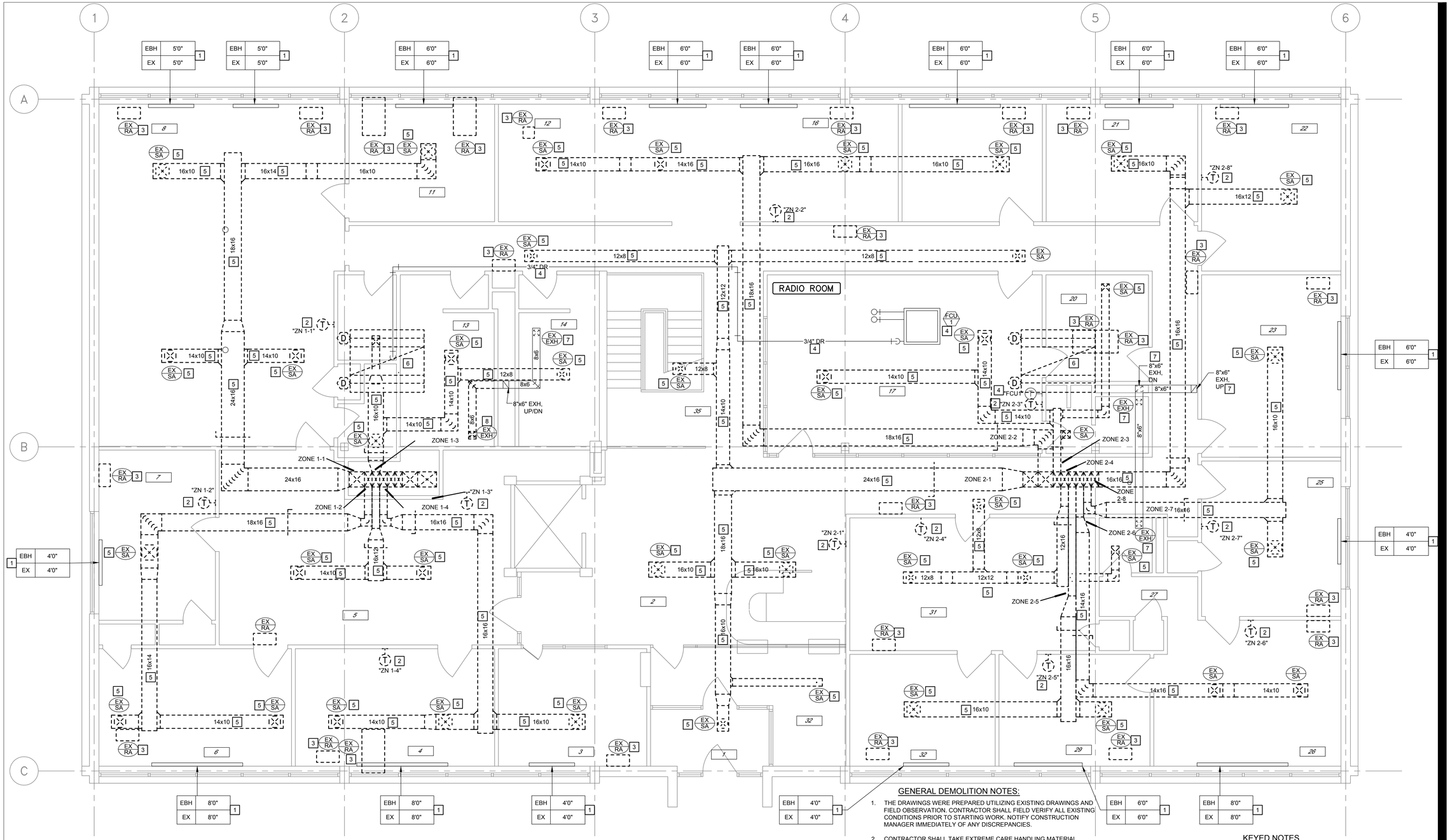
REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
GROUND FLOOR MECHANICAL DEMOLITION PLAN

SHEET NUMBER:
DM3.0

3 OF 25 SHEETS
12/07/2022



FIRST FLOOR MECHANICAL DEMOLITION PLAN

SCALE: 1/4" = 1'0"

N

GENERAL DEMOLITION NOTES:

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8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

KEYED NOTES

1. EXISTING EBH TO REMAIN IN PLACE.
2. EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING TO BE DEMOLISHED.
3. EXISTING RETURN AIR GRILLE TO BE DEMOLISHED.
4. EXISTING FCU, REFRIGERANT PIPING, CONDENSATE PIPING, AND THERMOSTAT TO REMAIN IN PLACE.
5. EXISTING SUPPLY AIR DUCTWORK, GRILLES, HANGERS, AND ALL ASSOCIATED ACCESSORIES TO BE DEMOLISHED IN THEIR ENTIRETY.
6. EXISTING RETURN AIR DUCTWORK, DAMPERS, HANGERS, AND ASSOCIATED ACCESSORIES TO BE DEMOLISHED IN THEIR ENTIRETY.
7. EXISTING EXHAUST DUCTWORK TO REMAIN IN PLACE.
8. EXISTING EXHAUST GRILLE TO BE RELOCATED. REFER TO NEW WORK FOR MORE INFORMATION.

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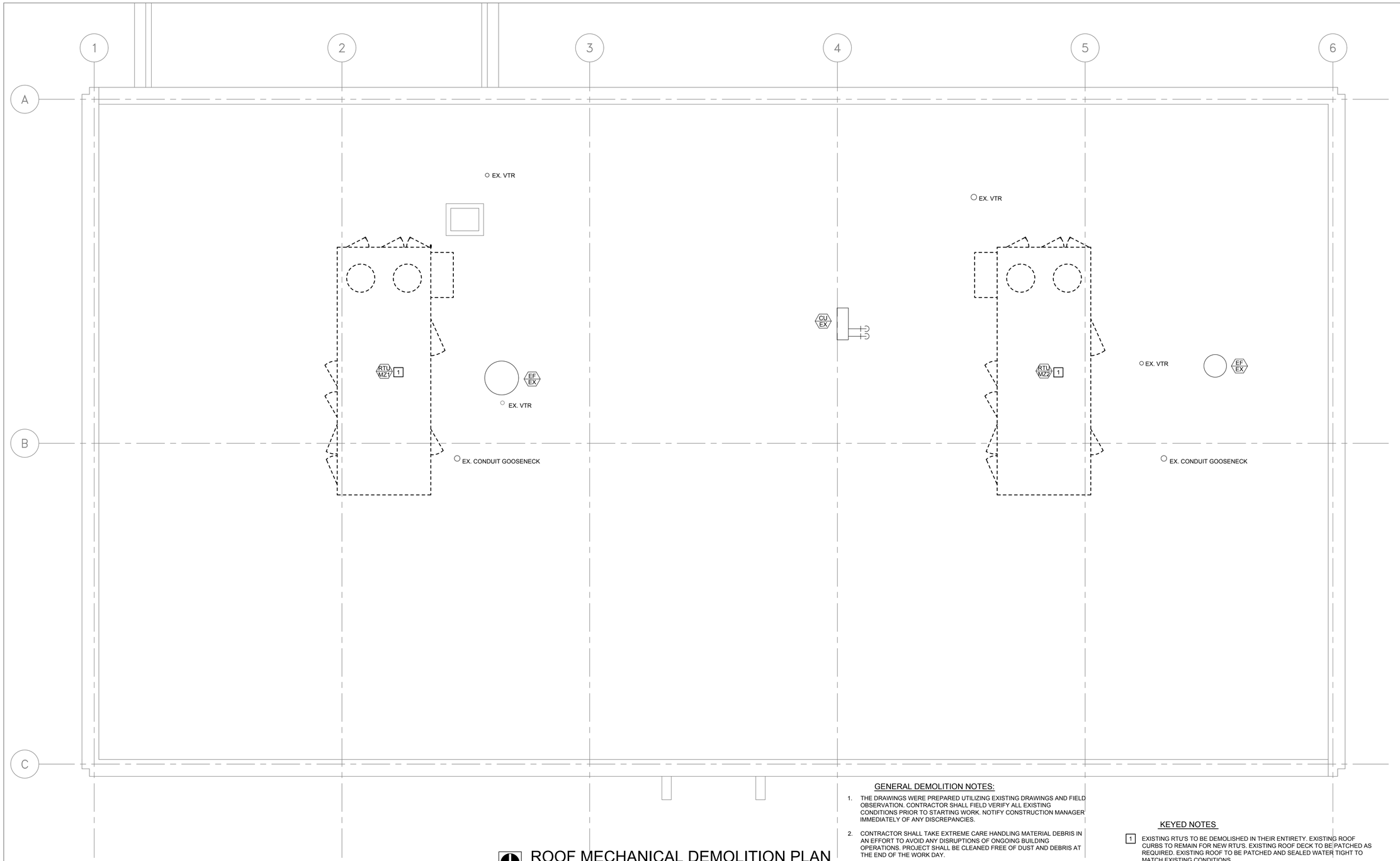
DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
FIRST FLOOR MECHANICAL DEMOLITION PLAN

SHEET NUMBER:
DM3.1

4 OF 25 SHEETS
12/07/2022



ROOF MECHANICAL DEMOLITION PLAN

SCALE: 1/4" = 1'0"

N

0 1' 2' 4'
1/4"=1'

GENERAL DEMOLITION NOTES:

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8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

KEYED NOTES

1 EXISTING RTU'S TO BE DEMOLISHED IN THEIR ENTIRETY. EXISTING ROOF CURBS TO REMAIN FOR NEW RTU'S. EXISTING ROOF DECK TO BE PATCHED AS REQUIRED. EXISTING ROOF TO BE PATCHED AND SEALED WATER TIGHT TO MATCH EXISTING CONDITIONS.

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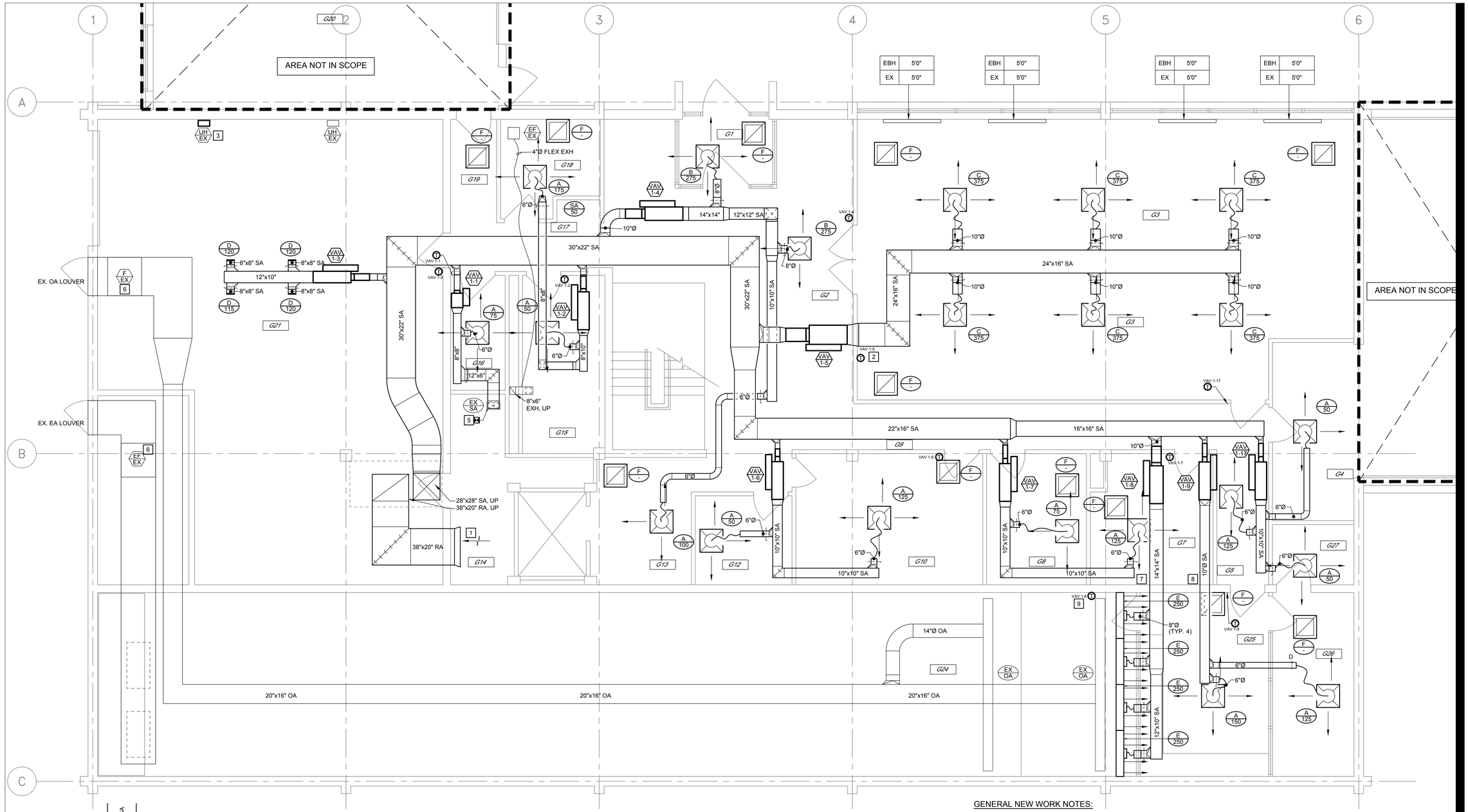
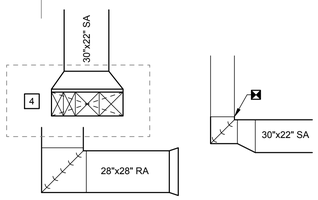
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
ROOF MECHANICAL DEMOLITION PLAN

SHEET NUMBER:
DM3.2

5 OF 25 SHEETS
12/07/2022





TEMPORARY DUCTWORK DESCRIPTION:
FOR THE TIME PERIOD AFTER THE LOWER LEVEL RENOVATION IS COMPLETE AND BEFORE THE NEW DUCT MAINS ARE ROUTED DOWN FROM THE MAIN LEVEL, THE NEW LOWER LEVEL SA MAIN NEEDS TO BE CONNECTED TO THE EXISTING MULTI-ZONE SUPPLY AIR DUCTS. SA MAIN TO BE TRANSITIONED TO 48"x16", ELBOWED UP, AND THEN CONNECTED TO THE MULTI-ZONE DUCTS. RETURN AIR DUCT TO BE INSTALLED TO POINT SHOWN AND THEN CONNECTED TO IN THE FUTURE. WHILE THE EXISTING MULTI-ZONE DUCTS ARE CONNECTED TO THE NEW SA MAIN, RTU-1s HOT DECK IS TO BE CLOSED AND COLD DECK OPENED.

GROUND FLOOR MECHANICAL - TEMPORARY DUCTWORK

SCALE: 1/4" = 1'0"

GROUND FLOOR MECHANICAL NEW WORK PLAN

SCALE: 1/4" = 1'0"

GENERAL NEW WORK NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
3. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
4. CONTRACTOR SHALL CHECK-IN EACH DAY WITH THE OWNER'S REP.
5. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
6. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
7. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

KEYED NOTES

1. RETURN AIR MAIN TO BE TERMINATED WITH BELL MOUTH FITTING OPEN ENDED.
2. VAV THERMOSTAT WITH OCCUPANCY SENSOR.
3. EXISTING ELECTRIC UNIT HEATER TO BE RELOCATED TO LOCATION SHOWN. COORDINATE NEW LOCATION WITH ELECTRICAL CONTRACTOR.
4. TEMPORARY DUCT ROUTINGS/CONNECTIONS TO BE REVISED TO ROUTING SHOWN HERE ONCE THE NEW RTU-2 IS INSTALLED AND NEW DUCT MAINS ARE ROUTED DOWN TO THE LOWER LEVEL.
5. CONNECT NEW SA DUCT TO EXISTING SUPPLY AIR GRILLE. ALL WORK TO BE PERFORMED FROM G-16 AS TO NOT DISTURB EXISTING GYPSUM BOARD CEILING IN G14.
6. GATHER READING OF CFM PERFORMANCE FOR SUPPLY AND EXHAUST FANS. SUPPLY CFM TOTAL TO BE REDUCED BY 1,000 CFM VIA SHEAVE ADJUSTMENT/REPLACEMENT WITHIN THE FIRST 60 DAYS OF THE CONTRACT.
7. ROUTE NEW 14"x14" SA DUCT THROUGH EXISTING HOLE IN CONCRETE WALL.
8. CORE DRILL CONCRETE WALL AS REQUIRED TO ROUTE NEW 10"Ø THROUGH WALL.
9. KN 9 INTERCEPT RANGE EXHAUST FAN TOGGLE SWITCH. INTERLOCK VAV 1-8 TO FAN SWITCH.

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MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
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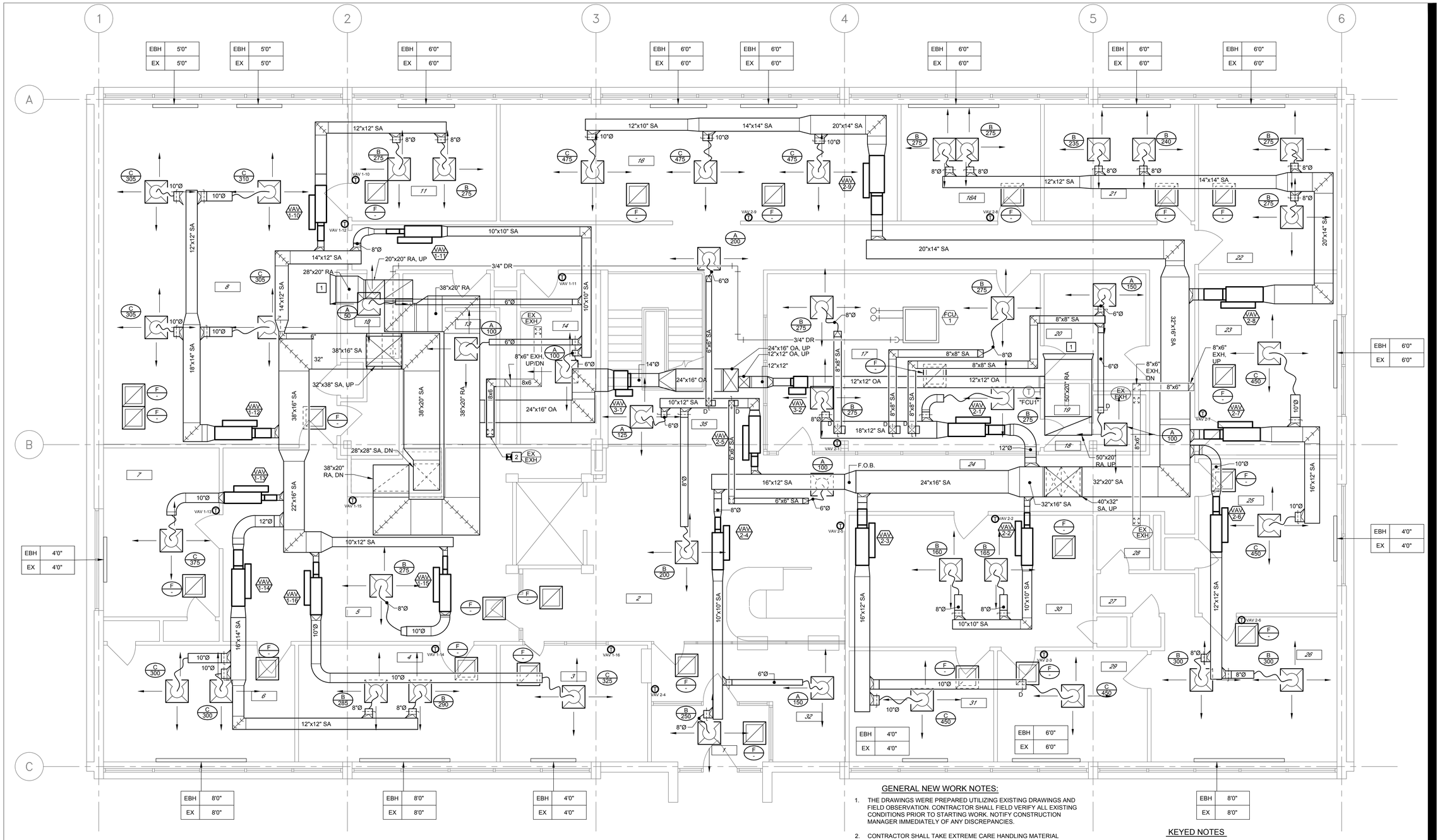
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
GROUND FLOOR MECHANICAL NEW WORK PLAN

SHEET NUMBER:
M3.0

6 OF 25 SHEETS
12/07/2022



FIRST FLOOR MECHANICAL NEW WORK PLAN

SCALE: 1/4" = 1'0"

N

0 1' 2' 4' 1/4"=1'

GENERAL NEW WORK NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
3. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
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8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

KEYED NOTES

1. RETURN AIR MAIN TO BE TERMINATED WITH BELL MOUTH FITTING OPEN ENDED.
2. CONNECT NEW EXH DUCTWORK TO RELOCATED EXISTING DIFFUSER.

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SHEET TITLE:
FIRST FLOOR MECHANICAL NEW WORK PLAN

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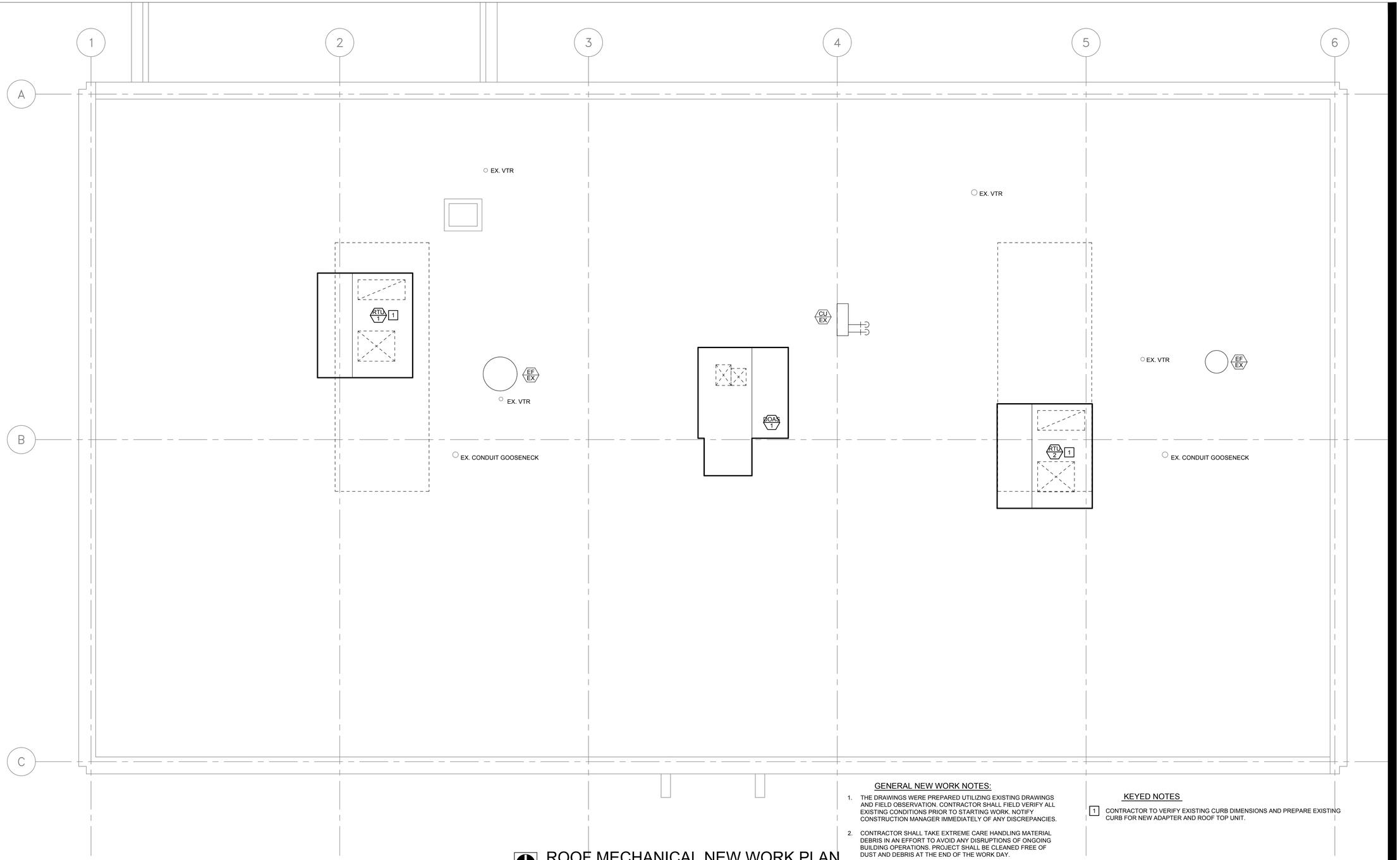

ROOF MECHANICAL NEW WORK PLAN

SCALE: 1/4" = 1'0"

N

0 1' 2' 4' 1/4"=1'

GENERAL NEW WORK NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
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8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

KEYED NOTES

1 CONTRACTOR TO VERIFY EXISTING CURB DIMENSIONS AND PREPARE EXISTING CURB FOR NEW ADAPTER AND ROOF TOP UNIT.

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ROOF MECHANICAL NEW WORK PLAN

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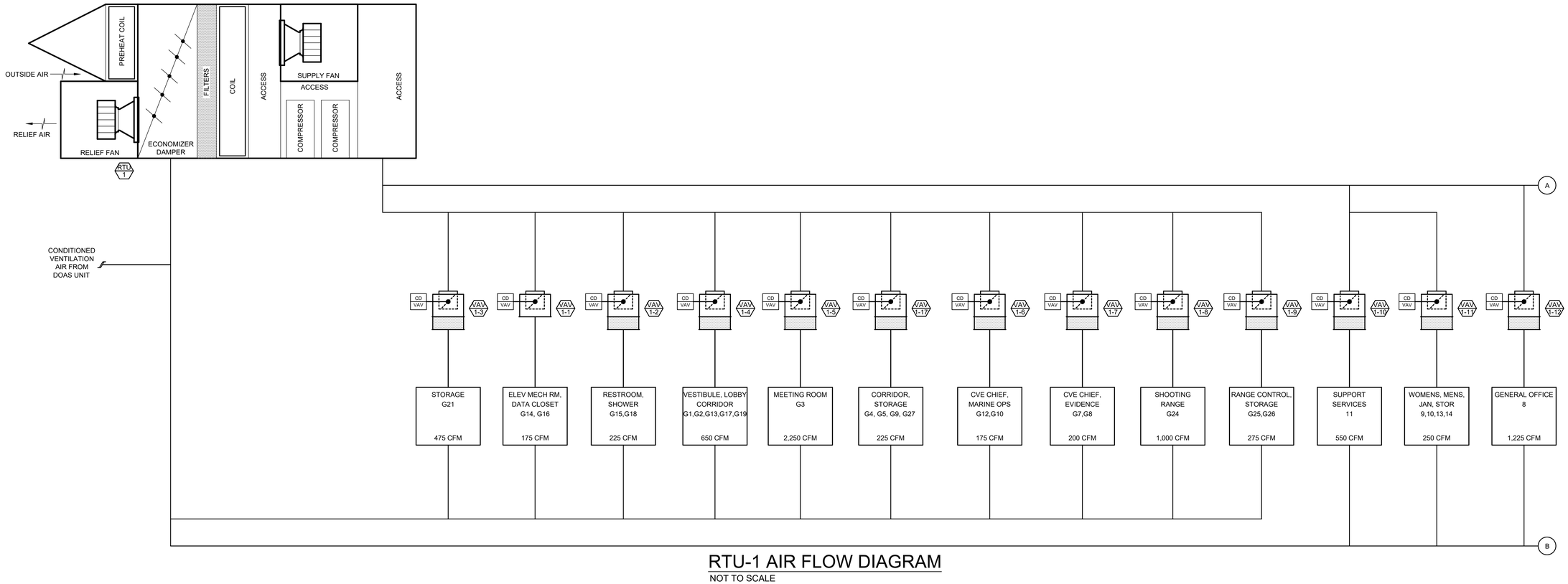
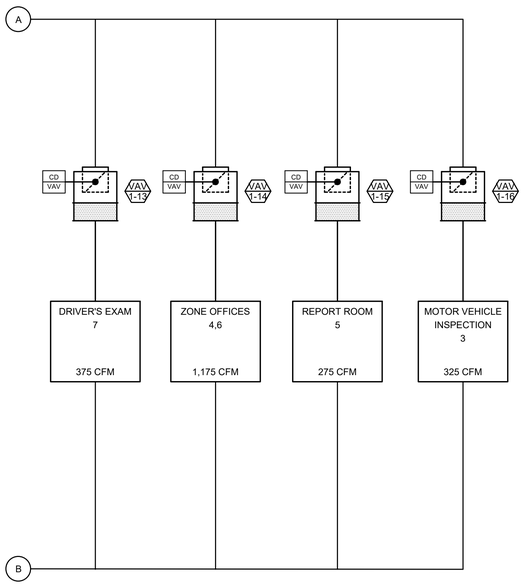


RTU-1 AIR FLOW DIAGRAM

NOT TO SCALE



AIR HANDLING UNIT RTU-1 AND RTU-2 SEQUENCE OF OPERATION

OVERVIEW:

THE AIR HANDLER IS A VARIABLE VOLUME UNIT SERVING PRESSURE INDEPENDENT TERMINAL UNITS WITH ELECTRIC REHEAT.
VENTILATION IS PROVIDED VIA PRESSURE INDEPENDENT TERMINAL UNIT FROM DOAS-1. A MODULATING DAMPER IS USED FOR ECONOMIZER FUNCTION.

THE RELIEF FAN MODULATES TO MAINTAIN BUILDING PRESSURIZATION INDEPENDENTLY OF VENTILATION AND ECONOMIZER.
THIS AIR HANDLING UNIT INCLUDES A RELIEF FAN AND DAMPER, MIXING BOX, OUTDOOR AIR DAMPERS, RETURN DAMPERS, FILTERS, PREHEAT ELECTRIC HEAT, COOLING COIL, RELIEF FAN, AND SUPPLY FAN.

SAFETIES:

THIS UNIT IS EQUIPPED WITH A SUPPLY AND RETURN AIR SMOKE DETECTOR, HIGH SUPPLY AND RELIEF PRESSURE SAFETIES.
FAN SAFETY CIRCUIT: A SAFETY RELAY SHALL BE INSTALLED IN-LINE WITH THE SPEED CONTROL SIGNAL SUCH THAT IF ANY OF THE SAFETIES TRIP, THE CONTROL SIGNAL TO THE FAN WILL BE INTERRUPTED AND THE FAN WILL BE COMMANDED OFF.
DAMPER SAFETY CIRCUIT: THE DAMPERS SHALL BE COMMANDED CLOSED WHEN THE UNIT IS OFF OR IN ALARM AND NOT SUPPLYING AIR.

SCHEDULES:

THE UNIT OPERATES UNDER THE BUILDING SCHEDULE. BUILDING IS CURRENTLY UTILIZED IN A CONSTANT OCCUPIED MODE, BUT UNOCCUPIED SET POINTS SHALL BE PROGRAMMED AND AVAILABLE FOR USE.
OCCUPIED OPERATION: THE UNIT RUNS CONTINUOUSLY IN THE OCCUPIED MODE.
UNOCCUPIED OPERATION: THE UNIT CYCLES ON AND OFF BASED ON ZONE TEMPERATURE DEMAND.

DISCHARGE AIR TEMPERATURE CONTROL:

DISCHARGE AIR TEMPERATURE SETPOINT: THE DISCHARGE AIR TEMPERATURE SETPOINT IS RESET BETWEEN 55°F AND 70°F BASED ON ZONE DEMAND.
UNOCCUPIED OPERATION: DURING UNOCCUPIED HOURS THE UNIT SHALL CYCLE ON/OFF AS REQUIRED WHENEVER THE SPACE DRIFTS PAST THE UNOCCUPIED SETPOINTS. THE DISCHARGE TEMPERATURE SHALL BE SET TO 70°F IF THE SPACE DRIFTS BELOW THE UNOCCUPIED HEATING SETPOINT, OR TO 55°F IF THE SPACE DRIFTS ABOVE THE UNOCCUPIED COOLING SETPOINT.

MIXED AIR TEMPERATURE CONTROL (ECONOMIZER):

OVERVIEW: MIXED AIR TEMPERATURE SETPOINT IS MAINTAINED BY MODULATING THE ECONOMIZER DAMPER WITHOUT CAUSING AN EXTRA HEATING LOAD.
ENABLE: ECONOMIZER IS ENABLED WHEN OUTSIDE AIR DRY-BULB TEMPERATURE IS BELOW 64°F AND THE OUTSIDE AIR DEWPOINT TEMPERATURE IS BELOW 53°F AND THE PREHEAT VALVE IS CLOSED. WHEN THE PREHEAT VALVE IS OPEN MORE THAN 0% OR THE OUTSIDE AIR CONDITIONS ARE ABOVE 65°F DRY-BULB OR 54°F DEWPOINT, THE ECONOMIZER SEQUENCE IS DISABLED.
MIXED AIR TEMPERATURE SETPOINT: THE SETPOINT SHALL BE 2°F LOWER THAN THE CALCULATED DISCHARGE AIR TEMPERATURE SETPOINT.
MIXED AIR TEMPERATURE PID: THE LOOP TAKES THE MIXED AIR TEMPERATURE AVERAGING SENSOR AS AN INPUT AND OUTPUTS A SIGNAL TO THE ECONOMIZER DAMPER. WHEN OUTSIDE AIR CONDITIONS ARE NOT MET OR THE HEATING VALVE IS OPEN THE LOOP IS DISABLED.

DISCHARGE AIR STATIC PRESSURE CONTROL:

OVERVIEW: STATIC PRESSURE IS RESET BASED ON ZONE DEMAND. EACH VAV SENDS PRESSURE REQUESTS TO THE AIR HANDLER, THE AIR HANDLER ANALYZES THE REQUESTS AND RESETS THE PRESSURE SETPOINT. THE SUPPLY FAN SPEED MODULATES TO MAINTAIN STATIC PRESSURE.
DISCHARGE AIR STATIC PRESSURE SETPOINT: THE PRESSURE SHALL BE RESET BETWEEN 0.25 IN.WC. AND 1.25 IN.WC. AS THE VAVS OPEN THEIR DAMPERS PAST 90% AND FLOW SETPOINT REMAINS BELOW 10% OF SETPOINT.
DISCHARGE AIR STATIC PRESSURE PID: THE SUPPLY FAN SPEED MODULATES FROM 30% TO 100% TO MAINTAIN STATIC PRESSURE SETPOINT. WHEN THE FAN IS OFF THE LOOP IS DISABLED.

BUILDING PRESSURE CONTROL:

OVERVIEW: WHEN THE PRESSURE GOES ABOVE SETPOINT THE RELIEF FAN IS ENABLED AND SPEED MODULATE TO MAINTAIN BUILDING PRESSURE.
BUILDING PRESSURE SETPOINT: THE SETPOINT SHALL BE CONSTANT +0.03 IN.WC. AND ADJUSTABLE BY THE OPERATOR.
BUILDING PRESSURE PID: THE LOOP USES THE BUILDING PRESSURE SENSOR AND MODULATES THE RELIEF AIR FAN SPEED TO MAINTAIN CONSTANT SETPOINT.

SUPPLY FAN CONTROL:

OVERVIEW: THE FAN OPERATES CONTINUOUSLY DURING OCCUPIED HOURS AND CYCLES DURING UNOCCUPIED HOURS AS THE ZONES REQUEST HEATING AND COOLING TO SATISFY THEIR UNOCCUPIED SETPOINTS. ONCE ENABLED THE FAN MODULATES SPEED TO MAINTAIN DUCT STATIC PRESSURE.
FAN ENABLE: THE SUPPLY FAN IS ENABLED IF THE SCHEDULE IS OCCUPIED, OR IF ANY OF THE ZONES SENDS A COOLING OR A HEATING REQUEST DURING UNOCCUPIED HOURS.
FAN SPEED CONTROL: SUPPLY FAN SPEED MODULATES FROM 30% MINIMUM SPEED WHEN THE DISCHARGE AIR STATIC PRESSURE PID OUTPUT IS 0 TO 100% SPEED WHEN THE LOOP OUTPUT IS 100.

ALARMS:

SUPPLY FAN FAILURE: ALARM WHEN FAN STATUS DOES NOT MATCH FAN COMMAND FOR MORE THAN 5 MINUTES.
RELIEF FAN FAILURE: ALARM WHEN FAN STATUS DOES NOT MATCH FAN COMMAND FOR MORE THAN 5 MINUTES.
COMPRESSOR FAILURE: WHEN COMPRESSOR DOES NOT MATCH PUMP COMMAND FOR MORE THAN 5 MINUTES.
HIGH AND LOW DISCHARGE TEMPERATURE: ALARM IF THE DISCHARGE TEMPERATURE IS 5°F ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.
DISCHARGE HIGH AND LOW STATIC: ALARM IF THE DISCHARGE STATIC IS 0.5" ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.
SAFETY ALARMS: SEPARATE ALARM FOR EACH SAFETY WHEN THE SAFETY IS ACTIVE.

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SHEET TITLE:
RTU-1 AIR FLOW DIAGRAM

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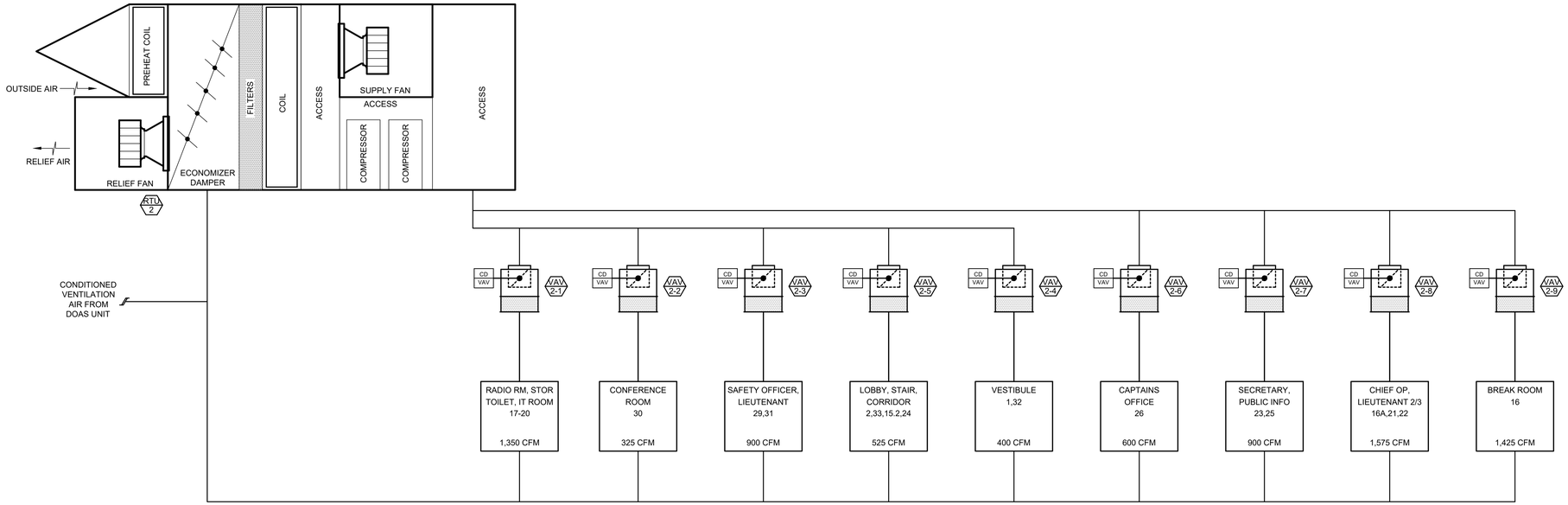

RTU-2 AIR FLOW DIAGRAM

NOT TO SCALE

VAV POINTS LIST

POINT DESCRIPTION				STARTUP TREND		SERVICE TREND		FIELD DEVICE DESCRIPTION	NOTES
TYPE	NAME	DESCRIPTION	UNITS	FREQ	ARCHIVE	FREQ	ARCHIVE	INSTRUMENT TYPE	
AI	SA-T	SUPPLY AIR TEMPERATURE	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	DUCT TEMPERATURE SENSOR - FOR TERMINAL UNIT EQUIPMENT	
AI	ZN-T	ZONE TEMPERATURE	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	ROOM SMART SENSOR	
AV	BBH-C	BASEBOARD HEAT CONTROL	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	RH-C	REHEAT CONTROL	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DPR-C	ZONE DAMPER COMMAND	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	SOFTWARE (VIRTUAL) POINT	
AV	ZN-F	TERMINAL UNIT VOLUMETRIC FLOW RATE	CFM,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	SOFTWARE (VIRTUAL) POINT	

BI BINARY INPUT
BO BINARY OUTPUT
BV BINARY VIRTUAL POINT
AI ANALOG INPUT
AO ANALOG OUTPUT
AV ANALOG VIRTUAL POINT
HW HARD WIRED INTERLOCK/SAFETY
COS CHANGE OF STATE

GENERAL NOTES
1. FOR ANALOG POINTS, UNITS COLUMN HAS TWO COMPONENTS: FIRST VALUE INDICATES ENGINEERING UNITS FOR POINT. SECOND VALUE IS NUMBER OF DECIMAL PLACES TO DISPLAY.
2. FOR BINARY POINTS, UNITS COLUMN LISTS "OFF" AND "ON" STATE LABELS FOR POINT.

RTU POINTS LIST

POINT DESCRIPTION				STARTUP TREND		SERVICE TREND		FIELD DEVICE DESCRIPTION	NOTES
TYPE	NAME	DESCRIPTION	UNITS	FREQ	ARCHIVE	FREQ	ARCHIVE	INSTRUMENT TYPE	
RTU UNIT LEVEL CONTROL POINTS - WRITTEN TO PKG. CONTROLLER									
AV	DA T-SP	DISCHARGE AIR TEMPERATURE SETPOINT	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DAP-SP	DISCHARGE AIR PRESSURE SETPOINT	IN. W.C.,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	REFERENCE ZONE PRESSURE
AV	OA-T	OUTSIDE AIR TEMPERATURE REFERENCE	°F,1	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	
BV	UNOCCLG	UNOCCUPIED COOLING MODE	OFF / ON	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
BV	UNOCHTG	UNOCCUPIED HEATING MODE	OFF / ON	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
MV	OCC-R	OCCUPANCY REQEUST	N/A	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	OCC/UNOCC/BYP/STBY/AUTO
RTU UNIT LEVEL CONTROL POINTS - READ FROM PKG. CONTROLLER									
AV	DA-T	DISCHARGE AIR TEMPERATURE	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	RA-T	RETURN AIR TEMPERATURE	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DA-DP	DISCHARGE AIR DIFFERENTIAL PRESSURE	IN. W.C.,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	REFERENCE ZONE PRESSURE
AV	OAD-C	ECONOMIZER AIR DAMPER POSITION	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	RAD-C	RETURN AIR DAMPER POSITION	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	CF-SPD	CONDENSER FAN SPEED	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	SF-SPD	SUPPLY FAN SPEED	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	CLG-C	COOLING CAPACITY	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	AL-ST	DIAGNOSTIC ALARM	N/A	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	MAP ALL ALARMS TO BAS

BI BINARY INPUT
BO BINARY OUTPUT
BV BINARY VIRTUAL POINT
AI ANALOG INPUT
AO ANALOG OUTPUT
AV ANALOG VIRTUAL POINT
HW HARD WIRED INTERLOCK/SAFETY
COS CHANGE OF STATE

GENERAL NOTES
1. FOR ANALOG POINTS, UNITS COLUMN HAS TWO COMPONENTS: FIRST VALUE INDICATES ENGINEERING UNITS FOR POINT. SECOND VALUE IS NUMBER OF DECIMAL PLACES TO DISPLAY.
2. FOR BINARY POINTS, UNITS COLUMN LISTS "OFF" AND "ON" STATE LABELS FOR POINT.

SEQUENCE OF OPERATIONS

VAV TERMINAL UNIT WITH REHEAT

OVERVIEW:

THE ZONE TERMINAL UNIT MAINTAINS ROOM SETPOINT USING A DEADBAND, TWO DIFFERENT SETPOINT ARE USED FOR HEATING AND COOLING. AS HEATING IS NEEDED, THE ELECTRIC BASEBOARD HEATER IN ENERGIZED AND THE VAV UNIT SCR RESPONDS. ONCE DISCHARGE AIR TEMPERATURE REACHES 80 DEGREES (ADJ) THE VAV RESETS THE SUPPLY FLOW FROM MINIMUM TO HEATING MAXIMUM. AS COOLING IS NEEDED THE FLOW IS INCREASED FROM MINIMUM TO COOLING MAXIMUM.

THE TERMINAL UNITS SEND HEATING, COOLING, AND PRESSURE REQUESTS TO THE AIR HANDLER. THE AIR HANDLER SUMS ALL THE REQUESTS AND RESETS ITS SETPOINTS USING CONTROL LOOP LOGIC.

THE TERMINAL UNIT IS PROVIDED WITH A MODULATING DAMPER, FLOW MEASURING STATION, MODULATING HEATING ELEMENT, A DISCHARGE TEMPERATURE SENSOR, AND A ZONE TEMPERATURE SENSOR.

ZONE OCCUPANCY:

THE ZONE IS PART OF A ZONE GROUP, SEE "ZONE GROUPS" FOR OPERATING MODES.

WHEN ZONE OCCUPANCY SENSORS ARE AVAILABLE:

THE ZONE IS ALLOWED TO INDEPENDENTLY GO INTO STANDBY MODE IF THE ZONE GROUP IS OCCUPIED AND THE SENSOR DOES NOT DETECT MOTION FOR 15 MINUTES.

AIRFLOW CONTROL:

THE AIRFLOW SETPOINT IS RESET BASED ON THE HEATING AND COOLING COMMANDS. THE SEQUENCE CALLING FOR THE GREATEST AIRFLOW SHALL BE USED FOR CONTROL.

AIRFLOW PID: AN INTERNAL FLOW SENSOR PROVIDES AN INPUT TO A CONTROL LOOP, THE LOOP SETPOINT IS DETERMINED BY THE SEQUENCE THAT REQUIRES THE MOST AIRFLOW, AND THE LOOP OUTPUT MODULATES THE DAMPER FROM CLOSED TO OPEN.

ZONE TEMPERATURE CONTROL:

ZONE TEMPERATURE IS CONTROLLED BY MODULATING AIRFLOW THROUGH THE TERMINAL UNIT AND THE REHEAT COIL. MINIMUM FLOW WILL BE RESET BASED ON OCCUPANCY STATUS.

ZONE COOLING:

WHEN THE ZONE STATE IS COOLING, THE COOLING LOOP OUTPUT SHALL BE MAPPED TO THE AIRFLOW SET POINT FROM THE COOLING MINIMUM TO THE COOLING MAXIMUM AIRFLOW SET POINTS.

IF SUPPLY AIR TEMPERATURE FROM THE AIR HANDLER IS GREATER THAN ROOM TEMPERATURE, COOLING SUPPLY AIRFLOW SET POINT SHALL BE NO HIGHER THAN THE VAV MINIMUM.

HEATING COIL IS OFF.

ZONE HEATING:

WHEN THE ZONE STATE IS HEATING, THE HEATING LOOP SHALL MAINTAIN SPACE TEMPERATURE AT THE HEATING SET POINT AS FOLLOWS:

FROM 0% TO 50%, THE HEATING-LOOP OUTPUT SHALL RESET THE DISCHARGE TEMPERATURE SET POINT FROM THE CURRENT AHU SAT SET POINT TO A MAXIMUM OF 20°F ABOVE SPACE TEMPERATURE SET POINT. THE AIRFLOW SET POINT SHALL BE THE HEATING MINIMUM.

FROM 51% TO 100%, IF THE DAT IS GREATER THAN ROOM TEMPERATURE PLUS 3°C (5°F), THE HEATING-LOOP OUTPUT SHALL RESET THE AIRFLOW SET POINT FROM THE HEATING MINIMUM AIRFLOW SET POINT TO THE HEATING MAXIMUM AIRFLOW SET POINT.

THE HEATING COIL SHALL BE MODULATED TO MAINTAIN THE DISCHARGE TEMPERATURE AT SET POINT. (DIRECTLY CONTROLLING HEATING OFF THE ZONE TEMPERATURE CONTROL LOOP IS NOT ACCEPTABLE).

ZONE DEADBAND:

WHEN THE ZONE STATE IS DEADBAND, THE ACTIVE AIRFLOW SET POINT SHALL BE THE MINIMUM AIRFLOW SET POINT. HEATING COIL IS DISABLED.

COOLING DAT REQUEST:

UP TO 3 COOLING REQUESTS ARE SENT TO THE AIR HANDLER. ONE FOR EACH OF THE FOLLOWING:

IF THE ZONE IS 3°F ABOVE SETPOINT FOR 2 MINUTES (2°F DIFFERENTIAL), SEND 3 REQUESTS.

ELSE IF THE ZONE IS 1°F ABOVE SETPOINT FOR 2 MINUTES (1°F DIFFERENTIAL), SEND 2 REQUESTS.

ELSE IF THE COOLING LOOP IS MORE THAN 95% (10% DIFFERENTIAL), SEND 1 REQUEST.

ELSE IF THE COOLING LOOP IS LESS THAN 95%, SEND 0 REQUESTS.

HEATING DAT REQUEST:

UP TO 3 HEATING REQUESTS ARE SEND TO THE AIR HANDLER.

IF THE ZONE IS 3°F BELOW SETPOINT FOR 2 MINUTES (2°F DIFFERENTIAL), SEND 3 REQUESTS.

ELSE IF THE ZONE IS 1°F BELOW SETPOINT FOR 2 MINUTES (1°F DIFFERENTIAL), SEND 2 REQUESTS

ELSE IF THE HEATING LOOP IS MORE THAN 95% (10% DIFFERENTIAL), SEND 1 REQUEST.

ELSE IF THE HEATING LOOP IS LESS THAN 95%, SEND 0 REQUESTS.

DUCT STATIC PRESSURE REQUEST:

UP TO 2 PRESSURE INCREASE REQUESTS ARE SENT TO THE AIR HANDLER. ONE FOR EACH OF THE FOLLOWING:

FLOW IS 15% BELOW SETPOINT

ZONE IS 2°F ABOVE SETPOINT

IMPORTANCE MULTIPLIER FOR PRESSURE REQUESTS SHALL BE LIMITED TO 1 OR LESS, IF SET GREATER THAN 1 THE AIR HANDLER WILL REMAIN AT MAX PRESSURE.

ALARMS:

LOW AIRFLOW:

IF THE MEASURED AIRFLOW IS LESS THAN 70% OF SET POINT FOR 5 MINUTES WHILE SET POINT IS GREATER THAN ZERO, GENERATE A LEVEL 3 ALARM.

IF THE MEASURED AIRFLOW IS LESS THAN 50% OF SET POINT FOR 5 MINUTES WHILE SET POINT IS GREATER THAN ZERO, GENERATE A LEVEL 2 ALARM.

IF A ZONE HAS AN IMPORTANCE-MULTIPLIER OF 0 FOR ITS STATIC PRESSURE REQUEST, LOW AIRFLOW ALARMS SHALL BE SUPPRESSED FOR THAT ZONE.

LOW DISCHARGE AIR TEMPERATURE:

IF DAT IS 15°F LESS THAN SET POINT FOR 10 MINUTES, GENERATE A LEVEL 3 ALARM.

IF THE DAT IS 30°F LESS THAN SET POINT FOR 10 MINUTES, GENERATE A LEVEL 2 ALARM.

AIRFLOW SENSOR CALIBRATION:

IF THE FAN SERVING THE ZONE HAS BEEN OFF FOR 10 MINUTES, AND AIRFLOW SENSOR READING IS ABOVE 10% OF THE COOLING MAXIMUM AIRFLOW SET POINT, GENERATE A LEVEL 3 ALARM.

LEAKING DAMPER:

IF THE DAMPER POSITION IS 0% AND AIRFLOW SENSOR READING IS 10% OF THE COOLING MAXIMUM AIRFLOW SET POINT FOR 10 MINUTES, GENERATE A LEVEL 4 ALARM.

TESTING/COMMISSIONING OVERRIDES:

PROVIDE SOFTWARE SWITCHES THAT INTERLOCK TO A SYSTEM LEVEL POINT TO
FORCE ZONE AIRFLOW SET POINT TO ZERO,
FORCE ZONE AIRFLOW SET POINT TO VAVCOOL-MAX,
FORCE ZONE AIRFLOW SET POINT TO VAVMIN,
FORCE ZONE AIRFLOW SET POINT TO VAVHEAT-MAX,
FORCE DAMPER FULL CLOSED/OPEN,
FORCE HEATING TO OFF/CLOSED, AND
RESET REQUEST-HOURS ACCUMULATOR POINT TO ZERO (PROVIDE ONE POINT FOR EACH RESET TYPE LISTED ABOVE).

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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:

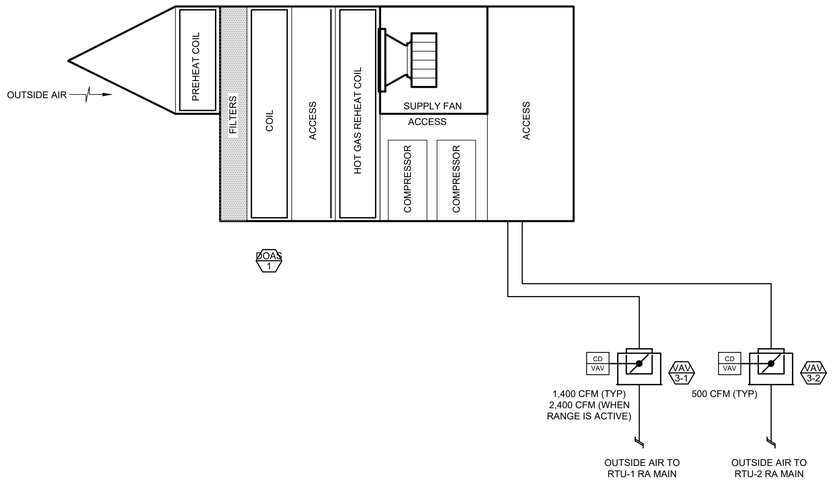
ISSUE DATE: 12/07/2022

DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
RTU-2 AIR FLOW DIAGRAM

SHEET NUMBER:
M5.1

10 OF 25 SHEETS
12/07/2022



DOAS-1 AIR FLOW DIAGRAM

NOT TO SCALE

SEQUENCE OF OPERATIONS

DOAS-1

OVERVIEW:

THE AIR HANDLER IS A VARIABLE VOLUME AIR HANDLER PROVIDING CONDITIONED VENTILATION AIR TO RTU-1 AND RTU-2.

THIS AIR HANDLING UNIT INCLUDES OUTDOOR AIR DAMPERS, FILTERS, PREHEAT ELECTRIC HEAT, COOLING COIL, HOT GAS REHEAT COIL, AND SUPPLY FAN.

SAFETIES:

THIS UNIT IS EQUIPPED WITH A SUPPLY AIR SMOKE DETECTOR, AND HIGH STATIC PRESSURE SAFETIES.

FAN SAFETY CIRCUIT: A SAFETY RELAY SHALL BE INSTALLED IN-LINE WITH THE SPEED CONTROL SIGNAL SUCH THAT IF ANY OF THE SAFETIES TRIP, THE CONTROL SIGNAL TO THE FAN WILL BE INTERRUPTED AND THE FAN WILL BE COMMANDED OFF.

DAMPER SAFETY CIRCUIT: THE DAMPERS SHALL BE COMMANDED CLOSED WHEN THE UNIT IS OFF OR IN ALARM AND NOT SUPPLYING AIR.

SCHEDULES:

THE UNIT OPERATES UNDER THE BUILDING SCHEDULE.

OCCUPIED OPERATION: THE UNIT RUNS CONTINUOUSLY IN THE OCCUPIED MODE.

UNOCCUPIED OPERATION: THE UNIT IF OFF.

COOLING COIL LEAVING AIR TEMPERATURE CONTROL:

COOLING COIL LEAVING AIR SETPOINT: WHEN OUTSIDE AIR DEW POINT IS BELOW 54°F THE COOLING COIL LEAVING AIR TEMPERATURE SETPOINT IS RESET BETWEEN 55°F AND 70°F BASED ON ZONE DEMAND. ONCE THE OUTSIDE AIR DEW POINT RISES ABOVE 55°F THE COOLING COIL LEAVING AIR TEMPERATURE SETPOINT IS SET TO 55°F IN ORDER TO PROVIDE ADEQUATE DEHUMIDIFICATION.

DISCHARGE AIR TEMPERATURE CONTROL:

DISCHARGE AIR TEMPERATURE SETPOINT: THE DISCHARGE AIR TEMPERATURE SETPOINT IS RESET BETWEEN 55°F AND 70°F BASED ON ZONE DEMAND.

DISCHARGE AIR STATIC PRESSURE CONTROL:

OVERVIEW: STATIC PRESSURE IS RESET BASED ON ZONE DEMAND. EACH VAV SENDS PRESSURE REQUESTS TO THE AIR HANDLER, THE AIR HANDLER ANALYZES THE REQUESTS AND RESETS THE PRESSURE SETPOINT. THE SUPPLY FAN SPEED MODULATES TO MAINTAIN STATIC PRESSURE.

DISCHARGE AIR STATIC PRESSURE SETPOINT: THE PRESSURE SHALL BE RESET BETWEEN 0.25 IN.WC. AND 1. IN.WC. AS THE VAVS OPEN THEIR DAMPERS PAST 90% AND FLOW SETPOINT REMAINS BELOW 10% OF SETPOINT.

DISCHARGE AIR STATIC PRESSURE PID: THE SUPPLY FAN SPEED MODULATES FROM 30% TO 100% TO MAINTAIN STATIC PRESSURE SETPOINT. WHEN THE FAN IS OFF THE LOOP IS DISABLED.

SUPPLY FAN CONTROL:

OVERVIEW: THE FAN OPERATES CONTINUOUSLY DURING OCCUPIED HOURS AND CYCLES DURING UNOCCUPIED HOURS AS THE ZONES REQUEST HEATING AND COOLING TO SATISFY THEIR UNOCCUPIED SETPOINTS. ONCE ENABLED THE FAN MODULATES SPEED TO MAINTAIN DUCT STATIC PRESSURE.

FAN ENABLE: THE SUPPLY FAN IS ENABLED IF THE SCHEDULE IS OCCUPIED AND RTU'S ARE CALLING FOR AIR.

FAN SPEED CONTROL: SUPPLY FAN SPEED MODULATES FROM 30% MINIMUM SPEED WHEN THE DISCHARGE AIR STATIC PRESSURE PID OUTPUT IS 0 TO 100% SPEED WHEN THE LOOP OUTPUT IS 100.

RANGE SUPPLY AIR:

OVERVIEW: UPON A CALL FOR RANGE VENTILATION (WALL MOUNTED TOGGLE SWITCH) SUPPLY AND EXHAUST FAN SHALL START AND VAV 1-8 SHALL PROVIDE CONDITIONED AIR. VAV SCR HEATER SHALL MODULATE TO MAINTAIN SPACE HUMIDITY AT 60% RH MAX. VAV 3-1 SHALL INCREASE TO 2400 CFM ON A CALL FOR RANGE VENTILATION.

ALARMS:

SUPPLY FAN FAILURE: ALARM WHEN FAN STATUS DOES NOT MATCH FAN COMMAND FOR MORE THAN 5 MINUTES.

COMPRESSOR FAILURE: WHEN COMPRESSOR DOES NOT MATCH PUMP COMMAND FOR MORE THAN 5 MINUTES.

HIGH AND LOW DISCHARGE TEMPERATURE: ALARM IF THE DISCHARGE TEMPERATURE IS 5°F ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.

DISCHARGE HIGH STATIC: ALARM IF THE DISCHARGE STATIC IS 0.5" ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.

SAFETY ALARMS: SEPARATE ALARM FOR EACH SAFETY WHEN THE SAFETY IS ACTIVE.

DOAS POINTS LIST

POINT DESCRIPTION				STARTUP TREND		SERVICE TREND		FIELD DEVICE DESCRIPTION	NOTES
TYPE	NAME	DESCRIPTION	UNITS	FREQ	ARCHIVE	FREQ	ARCHIVE	INSTRUMENT TYPE	
RTU UNIT LEVEL CONTROL POINTS - WRITTEN TO PKG. CONTROLLER									
AV	DAT-SP	DISCHARGE AIR TEMPERATURE SETPOINT	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DAP-SP	DISCHARGE AIR PRESSURE SETPOINT	IN. W.C.,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	REFERENCE ZONE PRESSURE
AV	OA-T	OUTSIDE AIR TEMPERATURE REFERENCE	°F,1	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	
BV	UNOC-CLG	UNOCCUPIED COOLING MODE	OFF / ON	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
BV	UNOC-HTG	UNOCCUPIED HEATING MODE	OFF / ON	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
MV	OCC-R	OCCUPANCY REQEUST	N/A	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	OCC/UNOCC/BYP/STBY/AUTO
RTU UNIT LEVEL CONTROL POINTS - READ FROM PKG. CONTROLLER									
AV	DA-T	DISCHARGE AIR TEMPERATURE	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DA-DP	DISCHARGE AIR DIFFERENTIAL PRESSURE	IN. W.C.,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	REFERENCE ZONE PRESSURE
AV	RAD-C	RETURN AIR DAMPER POSITION	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	CF-SPD	CONDENSER FAN SPEED	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	SF-SPD	SUPPLY FAN SPEED	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	CLG-C	COOLING CAPACITY	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	AL-ST	DIAGNOSTIC ALARM	N/A	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	MAP ALL ALARMS TO BAS

BI	BINARY INPUT
BO	BINARY OUTPUT
BV	BINARY VIRTUAL POINT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
AV	ANALOG VIRTUAL POINT
HW	HARD WIRED INTERLOCK/SAFETY
COS	CHANGE OF STATE

GENERAL NOTES

1. FOR ANALOG POINTS, UNITS COLUMN HAS TWO COMPONENTS: FIRST VALUE INDICATES ENGINEERING UNITS FOR POINT, SECOND VALUE IS NUMBER OF DECIMAL PLACES TO DISPLAY.
2. FOR BINARY POINTS, UNITS COLUMN LISTS "OFF" AND "ON" STATE LABELS FOR POINT.

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DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
DOAS-1 AIR FLOW DIAGRAM

SHEET NUMBER:
M5.2

11 OF 25 SHEETS
12/07/2022

AIR DEVICE SCHEDULE

UNIT DESIG.	SERVICE	MANUFACTURER & MODEL NO.	TYPE	THROW	NO. OF SLOTS	NECK SIZE (IN.)	FACE SIZE (IN.)	FINISH	NOTES
A	SUPPLY	TITUS TDC	LOUVERED FACE	SEE PLANS	N/A	6"Ø	24"x24"	WHITE	3
B	SUPPLY	TITUS TDC	LOUVERED FACE	SEE PLANS	N/A	8"Ø	24"x24"	WHITE	3
C	SUPPLY	TITUS TDC	LOUVERED FACE	SEE PLANS	N/A	10"Ø	24"x24"	WHITE	3
D	SUPPLY	TITUS 1700	SIDEWALL	SEE PLANS	N/A	6"x6"	8"x8"	WHITE	2
E	SUPPLY	TITUS TBDI-80	SLOT	SEE PLANS	4-1"	8"Ø	8"x48"	WHITE	3
F	RETURN	TITUS TDC	LOUVERED FACE	SEE PLANS	N/A	18"x18"	24"x24"	WHITE	3

GENERAL NOTE: MANUFACTURER IS BASIS OF DESIGN. SEE SPECIFICATIONS FOR ALTERNATES.

NOTES:

1. DIFFUSER SHALL BE ALUMINUM
2. PROVIDE BORDER FOR DRYWALL INSTALLATION
3. PROVIDE BORDER FOR LAY-IN INSTALLATION

VARIABLE AIR VOLUME UNIT SCHEDULE

UNIT DESIG.	AHU NO.	AREA SERVED	MANUFACTURER & MODEL NO.	INLET SIZE (IN.)	DESIGN FLOW CONDITIONS				MAX. APD (IN. W.C.)	VOLT/PH	MIN. CAPACITY KW	NOTES
					COOLING		HEATING					
					MAX. FLOW (CFM)	MIN. FLOW (CFM)	MAX. FLOW (CFM)	MIN. FLOW (CFM)				
VAV 1-1	RTU-1	ELEV MECH RM G14, DATA CLOSET G16	TITUS DESV	06	175	50			0.35			
VAV 1-2	RTU-1	RESTROOM G15, SHOWER G18	TITUS DESV	05	225	50	225	100	0.35	208/1	2.0	1,2
VAV 1-3	RTU-1	STORAGE G21	TITUS DESV	07	475	125	475	150	0.35	208/1	4.5	1,2
VAV 1-4	RTU-1	VESTIBULE G1, LOBBY G2, ELEVATOR G13	TITUS DESV	08	650	150	450	200	0.35	208/1	4.5	1,2
VAV 1-5	RTU-1	MEETING ROOM G3	TITUS DESV	14	2,250	675	1975	675	0.35	208/3	15.0	1,2
VAV 1-6	RTU-1	CVE CHIEF G12, MARINE OPS G10	TITUS DESV	05	175	50	150	100	0.35	208/1	1.0	1,2
VAV 1-7	RTU-1	CVE CHIEF G7, EVIDENCE G8	TITUS DESV	05	200	50	150	100	0.35	208/1	1.0	1,2
VAV 1-8	RTU-1	SHOOTING RANGE G24	TITUS DESV	10	1,000	1,000	1000	1,000	0.35	208/1	3.0	1,2,3
VAV 1-9	RTU-1	RANGE CONTROL G25, STORAGE G26	TITUS DESV	05	275	75	275	100	0.35	208/1	2.5	1,2
VAV 1-10	RTU-1	SUPPORT SERVICES 11	TITUS DESV	07	550	150	250	150	0.35	208/1	2.5	1,2
VAV 1-11	RTU-1	WOMENS 9, MENS 10, JAN 10	TITUS DESV	05	250	75	150	100	0.35	208/1	1.5	1,2
VAV 1-12	RTU-1	GENERAL OFFICE 8	TITUS DESV	12	1,225	350	950	425	0.35	208/1	9.0	1,2
VAV 1-13	RTU-1	DRIVER'S EXAM 7	TITUS DESV	06	375	100	300	125	0.35	208/1	3.0	1,2
VAV 1-14	RTU-1	ZONE OFFICES 4,6	TITUS DESV	10	1,175	350	875	350	0.35	208/1	8.0	1,2
VAV 1-15	RTU-1	REPORT ROOM 5	TITUS DESV	05	275	75	125	100	0.35	208/1	1.0	1,2
VAV 1-16	RTU-1	MOTOR VEHICLE INSPECTION 3	TITUS DESV	06	325	75	250	125	0.35	208/1	2.5	1,2
VAV 1-17	RTU-1	STORAGE G4, CORRIDOR G5, CORRIDOR G9, STORAGE G27	TITUS DESV	05	225	50	200	100	0.35	208/1	2.0	1,2
						0		0				
VAV 2-1	RTU-2	RADIO ROOM 17, STORAGE 18, TOILET 19, IT ROOM 20	TITUS DESV	12	1,350	400	700	425	0.35	208/1	7.0	1,2
VAV 2-2	RTU-2	CONFERENCE ROOM 30	TITUS DESV	06	325	75	275	125	0.35	208/1	1.5	1,2
VAV 2-3	RTU-2	SAFETY OFFICER 29, LIEUTENANT 31	TITUS DESV	10	900	250	500	300	0.35	208/1	5.0	1,2
VAV 2-4	RTU-2	VESTIBULE 1,32	TITUS DESV	06	400	100	400	125	0.35	208/1	3.5	1,2
VAV 2-5	RTU-2	LOOBY 2, STAIR 35, CORRIDOR 15, CORRIDOR 24	TITUS DESV	07	525	150	400	150	0.35	208/1	3.0	1,2
VAV 2-6	RTU-2	CAPTAINS OFFICE 26	TITUS DESV	07	600	175	550	150	0.35	208/1	5.0	1,2
VAV 2-7	RTU-2	PUBLIC INFO 23, SECRETARY 25	TITUS DESV	10	900	250	550	300	0.35	208/1	5.0	1,2
VAV 2-8	RTU-2	CHIEF OPP 16A, LIEUTENANT 2 & 3 21,22	TITUS DESV	12	1,575	450	900	450	0.35	208/1	8.5	1,2
VAV 2-9	RTU-2	BREAK ROOM 16	TITUS DESV	12	1,425	425	550	425	0.35	208/1	5.5	1,2
VAV 3-1	DOAS	RTU-1	TITUS DESV	14	2,400							2
VAV 3-2	DOAS	RTU-2	TITUS DESV	8	500							2

NOTES

1 SCR HEAT
2 1/2" FOIL FACED INSULATION
3 INTERLOCK VAV TO EXISTING RANGE RAN TOGGLE SWITCH. PROVIDE 1000 CFM WHEN RANGE EXHAUST IS RUNNING, PROVIDE 0 CFM WHEN SYSTEM IS DISABLED.

GENERAL NOTE: MANUFACTURER IS BASIS OF DESIGN. SEE SPECIFICATIONS FOR ALTERNATES.

AIR HANDLING UNIT SCHEDULE

UNIT DESIG.	LOCATION	SERVICE	MAUFACTURER & MODEL NO.	TOTAL AIRFLOW (CFM)	MINIMUM AIRFLOW (CFM)	ELECTRIC PREHEAT DATA			DX HEAT PUMP COIL DATA						DX COOLING PERFORMANCE					HOT GAS REHEAT		SUPPLY FAN DATA											RELIEF FAN FAN DATA								MCA	MOCP	SHIPPING WEIGHT (LBS)	NOTES
						CAPACITY KW	EAT (DB, °F)	LAT (DB, °F)	MIN ROWS	MAX FPI	MIN AREA (SQ. FT.)	EAT (DB/WB, °F)	LAT (DB/WB, °F)	OAT (DB, °F)	EAT (DB/WB, °F)	LAT (DB/WB, °F)	OAT (DB/WB, °F)	TOTAL MBH	SENSIBLE MBH	CAPACITY MBH	LAT (DB/WB, °F)	WHEEL DIAM.	WHEEL TYPE	FAN TYPE	ESP (IN. W.C.)	TSP (IN. W.C)	RPM	BHP	MOTOR DATA			WHEEL DIAM.	WHEEL TYPE	FAN TYPE	ESP (IN. W.C.)	RPM	BHP	MOTOR				
																												HP	RPM	VOLTS/PH							HP				
DOAS-1	ROOF	RTU'S	AAON RN015 80H609000M	2,900	1,900	45.1	6.0	55.0	4	14	19.9	27/26	76.1/51.7	27/26	95/78	58.3/58.1	95/78	189	105	36	70/62	18.5	AF	PD	1	1.6	1540	1.4	2	1760	208/3									236	250	1,950	1,2,3,4,5,6,7,8,9,10,11,12,14
RTU-1	ROOF	GROUND AND 1ST FLOOR	AAON RN025 80E609162B	9,650	1,400	45.1	55.0	69.7	4	14	19.9	55/54	70/59.8	40	77/66	56.7/55.9	95/78	291	209			24.5	AF	PD	2.1	4.0	1802	10.75	15	1760	208/3	22.0	AF	PD	1	1802	10	15	253	300	3,110	1,2,3,4,5,6,7,8,9,10,11,12,13
RTU-2	ROOF	1ST FLOOR EAST	AAON RN020 80E6098142B	7,800	500	45.1	55.0	73.2	4	14	19.9	55/54	70.3/59.9	40	77/66	56.6/56	95/78	233	169			27.0	AF	PD	1.5	2.9	1232	6.1	10	1760	208/3	22.0	AF	PD	1	1232	7.5	10	225	225	2,980	1,2,3,4,5,6,7,8,9,10,11,12,13

FAN TYPE

CB - CENTRIFUGAL BELT DRIVE
CD - CENTRIFUGAL DIRECT DRIVE
PB - PLENUM BELT DRIVE
PD - PLENUM DIRECT DRIVE
PDD - PLENUM DUAL DIRECT DRIVE

WHEEL TYPE

BI - BACK INCLINE
FC - FORWARD CURVE
AF - AIR FOIL

GENERAL NOTE

MANUFACTURER IS BASIS OF DESIGN. SEE SPECIFICATIONS FOR ALTERNATES.

NOTES

1 MODULATING DIGITAL SCROLL
2 35 KAIC SCCR RATING
3 INTEGRAL SUPPLY FAN VFD
4 CONVENIENCE OUTLET
5 DUAL WALL R-13 FOAM INJECTED HOUSING
6 2" MERV 8 PRE FILTERS & 4" MERV 13 FINAL FILTERS
7 1 YEAR PARTS AND LABOR, 5 YEAR COMPRESSOR PARTS WARRANTY
8 FACTORY INSTALLED NON-FUSED DISCONNECT SWITCH
9 CONDENSER HAIL GUARD
10 BACNET COMMUNICATIONS CARD
11 MODULATING HOT GAS REHEAT COIL
12 UNIT TSP INCLUDES .35" FILTER LOADING
13 ADAPTER CURB
14 DOAS CFM RANGE 1900 - 2900 CFM

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REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
MECHANICAL SCHEDULES

SHEET NUMBER:
M6.0

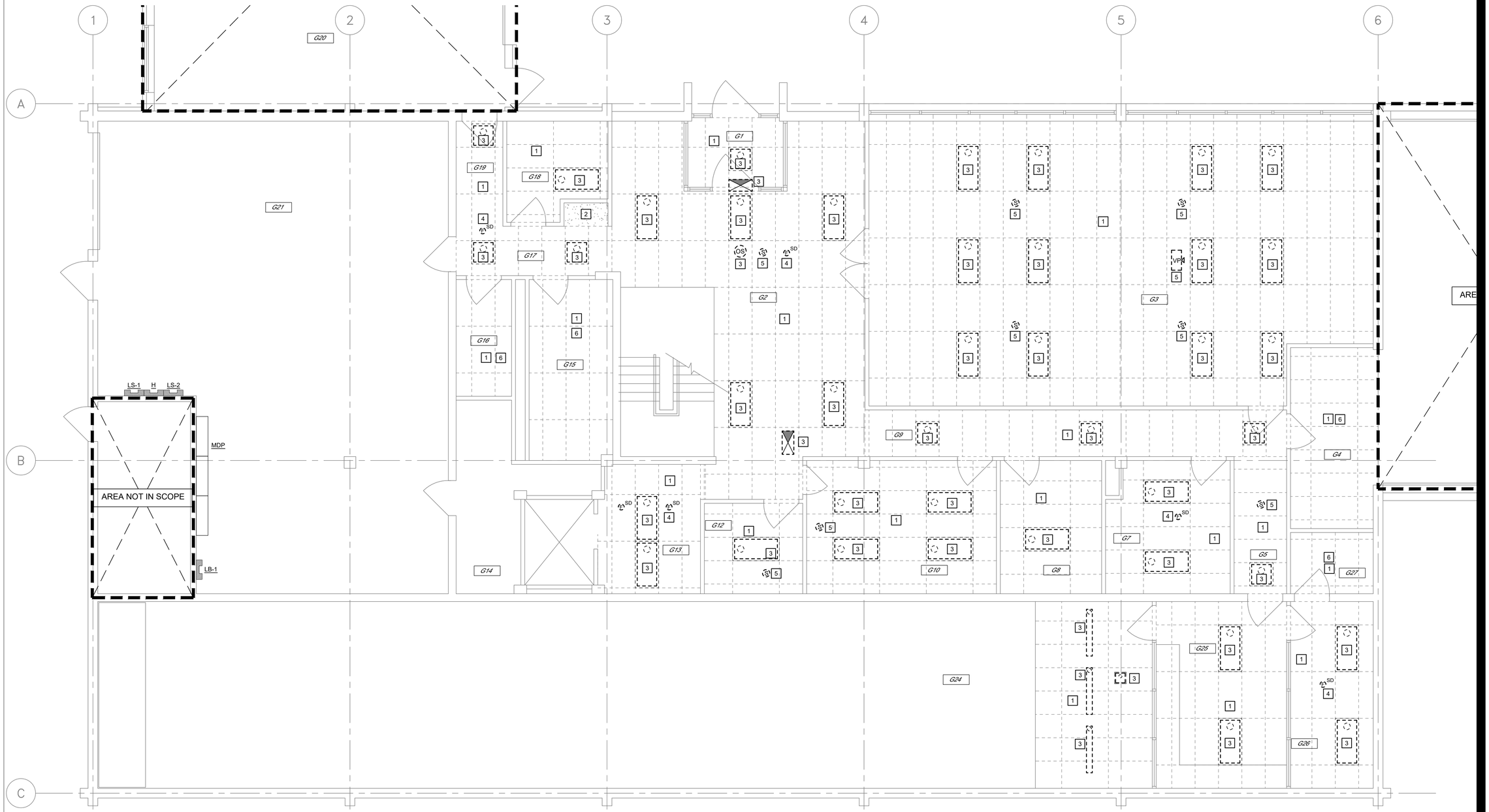
12 OF 25 SHEETS
12/07/2022

GENERAL DEMOLITION NOTES:

1. ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
2. ALL EXISTING ELECTRICAL DEVICES IN A WALL THAT IS TO BE REMOVED; ELECTRICAL CONTRACTOR SHALL DISCONNECT POWER, CUT OFF CONDUCTORS AND CAP CONDUIT IN FLOOR OR CEILING AS REQUIRED. DEVICES ARE TO BE REMOVED ALONG WITH WALL BY GENERAL CONTRACTOR UNLESS OTHERWISE NOTED.
3. ALL EXISTING ELECTRICAL DEVICES TO BE REMOVED FROM WALLS WHICH ARE TO REMAIN; ELECTRICAL CONTRACTOR SHALL DISCONNECT POWER, REMOVE CONDUCTORS, REMOVE DEVICE AND PROVIDE BLANK COVERPLATES AS REQUIRED. UNLESS OTHERWISE NOTED.
4. FOR A PORTION OF A CIRCUIT WHICH IS REMOVED OR ABANDONED, RE-ESTABLISH CIRCUIT CONTINUITY FOR THE PORTION OF THE CIRCUIT WHICH IS TO REMAIN.
5. ALL EXISTING CONDUITS, RACEWAYS AND WIRING ROUTED IN EXISTING WALLS AND CEILING SPACES (WHICH ARE TO BE DEMOLISHED) WHICH SERVE OTHER AREAS SHALL BE REROUTED AS REQUIRED.
6. ALL EXISTING LIGHTING FIXTURES THAT ARE TO BE REINSTALLED SHALL BE REPAIRED, (AS REQUIRED) CLEANED AND RELAMPED BEFORE REINSTALLATION.
7. ALL EXISTING LIGHTING FIXTURES THAT ARE NOTED TO BE REINSTALLED WHICH ARE NOT REINSTALLED SHALL BE RETURNED TO THE OWNER.
8. PROVIDE AND INSTALL SUPPORTS FOR EXISTING CABLES AND CONDUITS ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.
9. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
10. CONTRACTOR SHALL CHECK-IN WITH OWNER EACH DAY THAT THEY ARE ON SITE.

KEYED NOTES:

1. EXISTING ACT 24"x48" TILES AND SUPPORT T-GRID TO BE DEMOLISHED. EXISTING LIGHTS TO BE TAKEN DOWN AND STORED BY CONTRACTOR. R
2. EXISTING DRYWALL CEILING TO REMAIN IN PLACE.
3. PROVIDE TEMPORARY SUPPORT ABOVE CEILING FOR LAY-IN FIXTURE AND/OR CEILING MOUNTED FIXTURE TO FACILITATE CEILING GRID REMOVAL AND REPLACEMENT. REINSTALL FIXTURES IN NEW CEILING GRID ONCE IN PLACE.
4. PROVIDE TEMPORARY SUPPORT FOR CEILING MOUNTED SMOKE DETECTOR TO FACILITATE CEILING GRID REMOVAL AND REPLACEMENT. REINSTALL SMOKED DETECTOR IN NEW CEILING GRID ONCE IN PLACE.
5. PROVIDE TEMPORARTY SUPPORT FOR CEILING MOUNTED AUDIO/VISUAL/SECURITY EQUIPMENT TO FACILITATE CEILING GRID REMOVAL AND REPLACEMENT. REINSTALL EQUIPMENT IN NEW CEILING GRID ONCE IN PLACE.
6. CONTRACTOR TO VERIFY EXISTING LIGHTING AND OR SYSTEMS EQUIPMENT IN CEILING OF ROOM. TEMPORARY SUPPORT SHALL BE PROVIDED TO SUCH DEVICES TO ALLOW CEILING REPLACEMENT.



GROUND FLOOR LIGHTING AND SYSTEMS DEMOLITION PLAN
SCALE: 1/4" = 1'0"

N

0 1" 2" 4" 1/4"=1'

File: S:\075109.000 REPLACE HVAC SYSTEM MSHP TROOP E HEADQUARTERS\03 ELECTRICAL\ED2.0-075109.000 Saved: 2022-12-7 14:49 By: Acheatham

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
PHILIP J. WENTZ
NUMBER E-29111
REGISTERED PROFESSIONAL ENGINEER
12/07/2022

PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:
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310 East 6th Street
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MEP:
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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
GROUND FLOOR LIGHTING AND SYSTEMS DEMOLITION PLAN

SHEET NUMBER:
ED2.0

14 OF 25 SHEETS
12/07/2022

GENERAL DEMOLITION NOTES:

1. ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
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4. FOR A PORTION OF A CIRCUIT WHICH IS REMOVED OR ABANDONED, RE-ESTABLISH CIRCUIT CONTINUITY FOR THE PORTION OF THE CIRCUIT WHICH IS TO REMAIN.
5. ALL EXISTING CONDUITS, RACEWAYS AND WIRING ROUTED IN EXISTING WALLS AND CEILING SPACES (WHICH ARE TO BE DEMOLISHED) WHICH SERVE OTHER AREAS SHALL BE REROUTED AS REQUIRED.
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8. PROVIDE AND INSTALL SUPPORTS FOR EXISTING CABLES AND CONDUITS ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.
9. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
10. CONTRACTOR SHALL CHECK-IN WITH OWNER EACH DAY THAT THEY ARE ON SITE.

KEYED NOTES:

1. EXISTING ACT 24"x48" TILES AND SUPPORT T-GRID TO BE DEMOLISHED. EXISTING LIGHTS TO BE TAKEN DOWN AND STORED BY CONTRACTOR.
2. EXISTING DRYWALL CEILING TO REMAIN IN PLACE.
3. EXISTING ACT 24"x24" TILES AND SUPPORT T-GRID TO BE DEMOLISHED.
4. PROVIDE TEMPORARY SUPPORT ABOVE CEILING FOR LAY-IN FIXTURE AND/OR CEILING MOUNTED FIXTURE TO FACILITATE CEILING GRID REMOVAL AND REPLACEMENT. REINSTALL FIXTURES IN NEW CEILING GRID ONCE IN PLACE.
5. PROVIDE TEMPORARY SUPPORT FOR CEILING MOUNTED SMOKE DETECTOR TO FACILITATE CEILING GRID REMOVAL AND REPLACEMENT. REINSTALL SMOKED DETECTOR IN NEW CEILING GRID ONCE IN PLACE.
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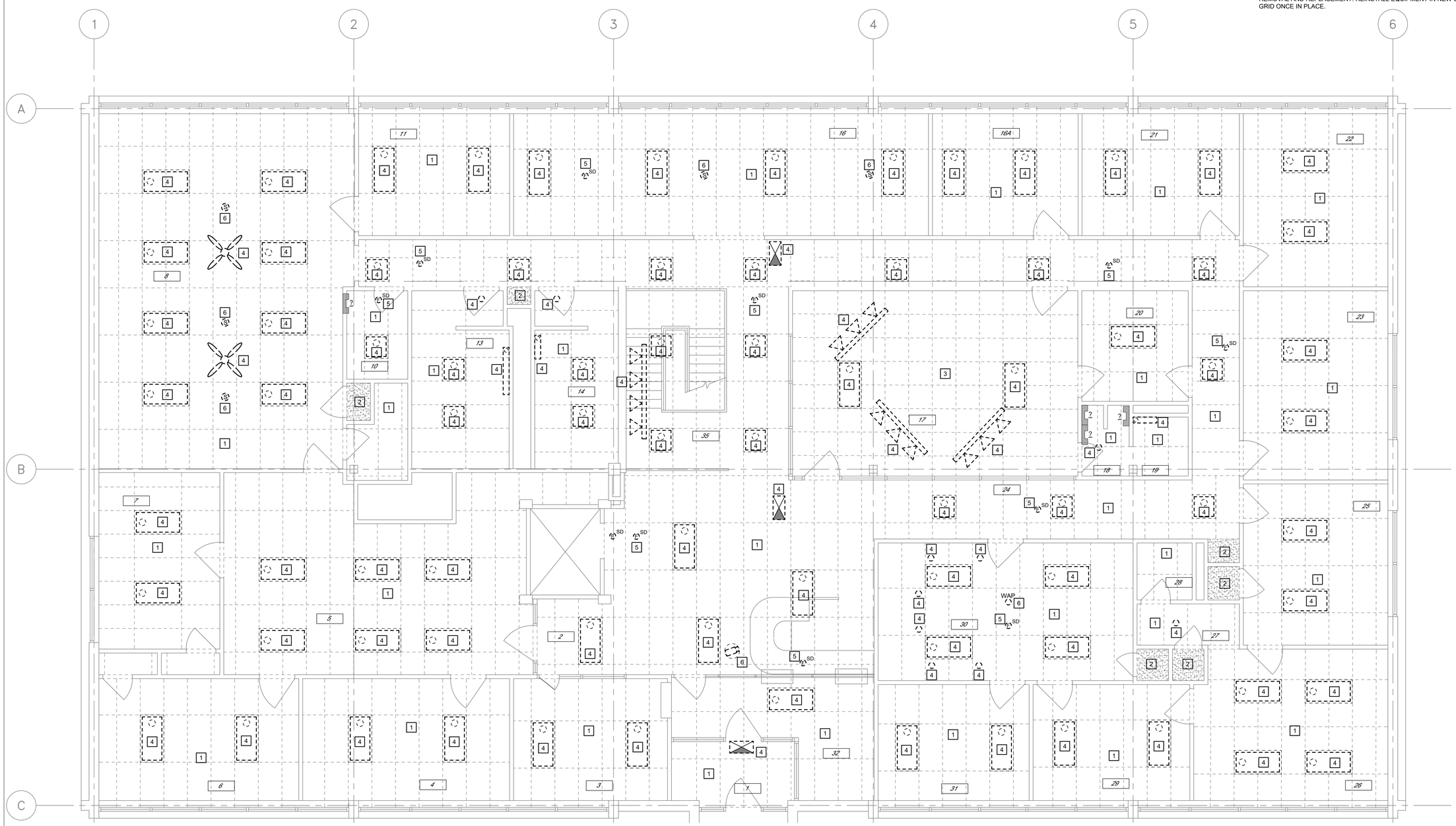

FIRST FLOOR LIGHTING AND SYSTEMS DEMOLITION PLAN

SCALE: 1/4" = 1'0"

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STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

PHILIP J. WENTZ NUMBER E-29111 REGISTERED PROFESSIONAL ENGINEER

PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:
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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
FIRST FLOOR LIGHTING AND SYSTEMS DEMOLITION PLAN

SHEET NUMBER:
ED2.1

15 OF 25 SHEETS
12/07/2022

GENERAL DEMOLITION NOTES:

1. ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
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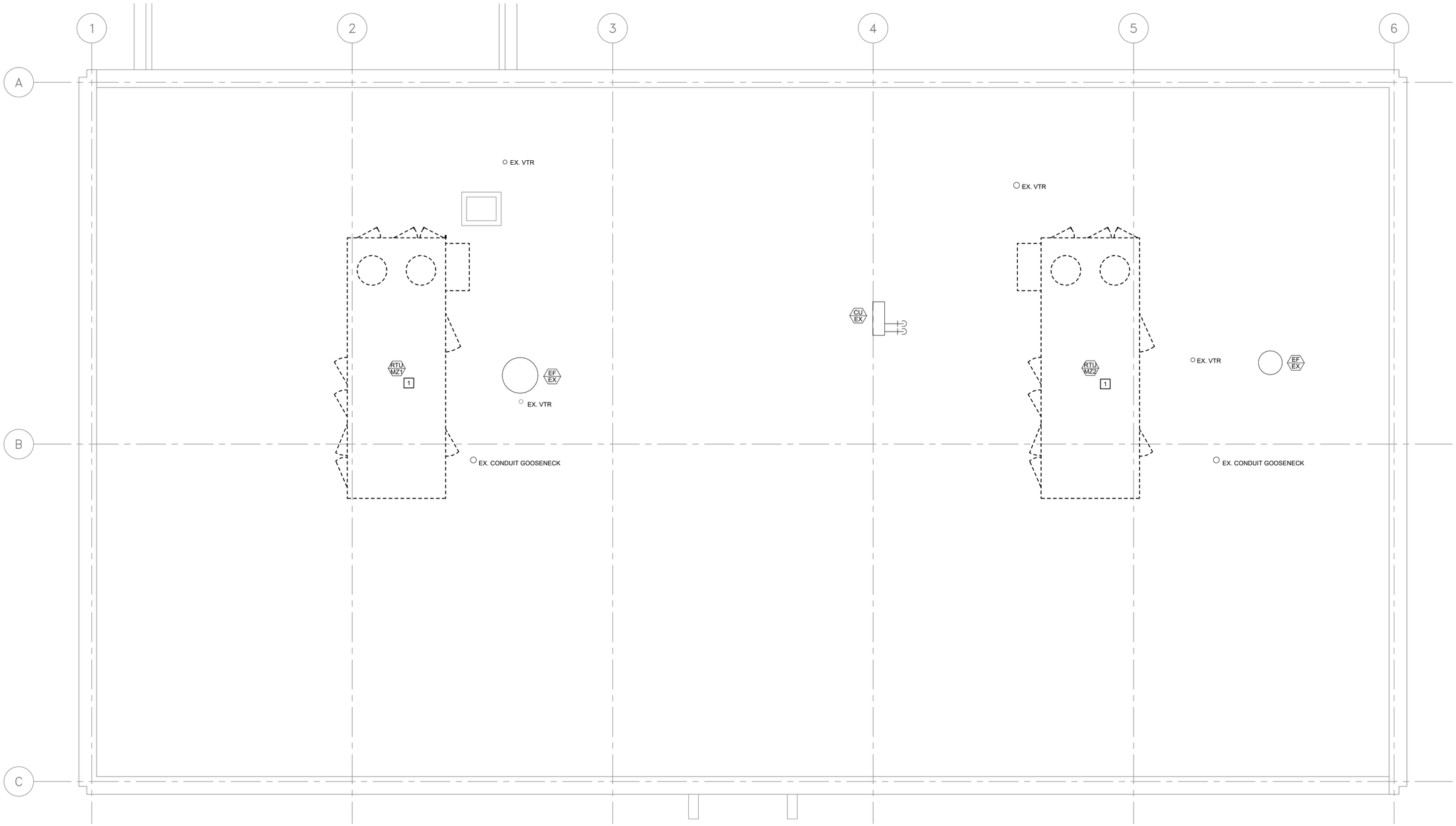
6. PROVIDE AND INSTALL SUPPORTS FOR EXISTING CABLES AND CONDUITS ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.

KEYED NOTES:

1 EXISTING EQUIPMENT AND ASSOCIATED DISCONNECTS, FEEDERS AND CONDUIT TO BE MADE SAFE AND COMPLETELY DEMOLISHED BACK TO SOURCE.



ROOF ELECTRICAL DEMOLITION WORK PLAN

SCALE: 1/4" = 1'0"

0 1' 2' 4' 1/4"=1'

N

File: S:\075109.000 REPLACE HVAC SYSTEM MSHP TROOP E HEADQUARTERS\03 ELECTRICAL\ED3.2-075109.000 Saved: 2022-12-7 15:52 By: Acheatham

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
PHILIP J. WENTZ
NUMBER E-29111
REGISTERED PROFESSIONAL ENGINEER
12/07/2022

PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

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MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
ROOF ELECTRICAL DEMOLITION PLAN

SHEET NUMBER:
ED3.2

16 OF 25 SHEETS
12/07/2022

MECHANICAL-ELECTRICAL INTERFACE

EQUIPMENT				MOTOR DATA		BRANCH CIRCUIT DATA	SOURCE DATA			UNIT CONTROLS							EQUIP ID	EQUIPMENT DISCONNECT							REMARKS
EQUIP. ID	DESCRIPTION	REF. SHEET	LOCATION	HP / (KW) / (MCA)[1]	VOLTAGE / PHASE	FEEDER SIZE	SOURCE:	TYPE[2] / POLES	OCP SWITCH/FUSE SIZE or CB TRIP	TYPE[4]	STARTER SIZE	TYPE[3]	OCP SWITCH/FUSE or CB TRIP	NEMA RATING	F	I	C[5]		SWITCH SIZE	POLE	OCP SIZE	NEMA RATING	F	I	C[5]	
DOAS-1	DOAS	E3.2	ROOF	246 MCA	208 / 3	(3) #250 MCM, (1) #4 GRD, 3"C	MDP	SF / 3	250A	PWCP	NA	NA	NA	NA	M	M	E	DOAS-1	400A	3	250A	3R	E	E	E	
RTU-1	ROOF TOP UNIT	E3.2	ROOF	253 MCA	208 / 3	(3) #350 MCM, (1) #4 GRD, 3 1/2"C	MDP	SF / 3	300A	PWCP	NA	NA	NA	NA	M	M	E	RTU-1	400A	3	300A	3R	E	E	E	
RTU-2	ROOF TOP UNIT	E3.2	ROOF	225 MCA	208 / 3	(3) #4/0 AWG, (1) #4 GRD, 2 1/2"C	MDP	SF / 3	225A	PWCP	NA	NA	NA	NA	M	M	E	RTU-2	400A	3	225A	3R	E	E	E	
VAV 1-2	VAV BOX W/ ELECTRIC REHEAT	E3.0	G15	2 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-1	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-2	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-3	VAV BOX W/ ELECTRIC REHEAT	E3.0	G21	4.5 KW	208 / 1	(2) #10 AWG, (1) #10 GRD, 3/4"C	PP-1	CB / 1	30A	TST	NA	NA	NA	NA	M	M	E	VAV 1-3	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-4	VAV BOX W/ ELECTRIC REHEAT	E3.0	G2	4.5 KW	208 / 1	(2) #10 AWG, (1) #10 GRD, 3/4"C	PP-1	CB / 1	30A	TST	NA	NA	NA	NA	M	M	E	VAV 1-4	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-5	VAV BOX W/ ELECTRIC REHEAT	E3.0	G2	15 KW	208 / 1	(2) #4 AWG, (1) #10 GRD, 1 1/4"C	PP-1	CB / 1	60A	TST	NA	NA	NA	NA	M	M	E	VAV 1-5	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-6	VAV BOX W/ ELECTRIC REHEAT	E3.0	G13	1 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-1	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-6	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-7	VAV BOX W/ ELECTRIC REHEAT	E3.0	G8	1 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-1	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-7	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-8	VAV BOX W/ ELECTRIC REHEAT	E3.0	G7	3 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-1	CB / 1	20A	TST	NA	NA	NA	NA	M	M	E	VAV 1-8	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-9	VAV BOX W/ ELECTRIC REHEAT	E3.0	G5	2.5 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-1	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-9	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-10	VAV BOX W/ ELECTRIC REHEAT	E3.1	8	2.5 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-10	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-11	VAV BOX W/ ELECTRIC REHEAT	E3.1	8	1.5 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-11	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-12	VAV BOX W/ ELECTRIC REHEAT	E3.1	8	9 KW	208 / 1	(2) #4 AWG, (1) #10 GRD, 1 1/4"C	PP-2	CB / 1	60A	TST	NA	NA	NA	NA	M	M	E	VAV 1-12	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-13	VAV BOX W/ ELECTRIC REHEAT	E3.1	5	3 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	20A	TST	NA	NA	NA	NA	M	M	E	VAV 1-13	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-14	VAV BOX W/ ELECTRIC REHEAT	E3.1	5	8 KW	208 / 1	(2) #6 AWG, (1) #10 GRD, 1"C	PP-2	CB / 1	50A	TST	NA	NA	NA	NA	M	M	E	VAV 1-14	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-15	VAV BOX W/ ELECTRIC REHEAT	E3.1	5	1 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-15	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-16	VAV BOX W/ ELECTRIC REHEAT	E3.1	5	2.5 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-16	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 1-17	VAV BOX W/ ELECTRIC REHEAT	E3.0	G2	2 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-1	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 1-17	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-1	VAV BOX W/ ELECTRIC REHEAT	E3.1	17	7 KW	208 / 1	(2) #6 AWG, (1) #10 GRD, 1"C	PP-2	CB / 1	45A	TST	NA	NA	NA	NA	M	M	E	VAV 2-1	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-2	VAV BOX W/ ELECTRIC REHEAT	E3.1	30	1.5 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	15A	TST	NA	NA	NA	NA	M	M	E	VAV 2-2	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-3	VAV BOX W/ ELECTRIC REHEAT	E3.1	30	5 KW	208 / 1	(2) #10 AWG, (1) #10 GRD, 3/4"C	PP-2	CB / 1	30A	TST	NA	NA	NA	NA	M	M	E	VAV 2-3	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-4	VAV BOX W/ ELECTRIC REHEAT	E3.1	2	3.5 KW	208 / 1	(2) #10 AWG, (1) #10 GRD, 3/4"C	PP-2	CB / 1	25A	TST	NA	NA	NA	NA	M	M	E	VAV 2-4	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-5	VAV BOX W/ ELECTRIC REHEAT	E3.1	2	3 KW	208 / 1	(2) #12 AWG, (1) #12 GRD, 3/4"C	PP-2	CB / 1	20A	TST	NA	NA	NA	NA	M	M	E	VAV 2-5	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-6	VAV BOX W/ ELECTRIC REHEAT	E3.1	25	5 KW	208 / 1	(2) #10 AWG, (1) #10 GRD, 3/4"C	PP-2	CB / 1	30A	TST	NA	NA	NA	NA	M	M	E	VAV 2-6	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-7	VAV BOX W/ ELECTRIC REHEAT	E3.1	23	5 KW	208 / 1	(2) #10 AWG, (1) #10 GRD, 3/4"C	PP-2	CB / 1	30A	TST	NA	NA	NA	NA	M	M	E	VAV 2-7	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-8	VAV BOX W/ ELECTRIC REHEAT	E3.1	23	8.5 KW	208 / 1	(2) #4 AWG, (1) #10 GRD, 1 1/4"C	PP-2	CB / 1	60A	TST	NA	NA	NA	NA	M	M	E	VAV 2-8	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT
VAV 2-9	VAV BOX W/ ELECTRIC REHEAT	E3.1	16	5.5 KW	208 / 1	(2) #8 AWG, (1) #10 GRD, 3/4"C	PP-2	CB / 1	35A	TST	NA	NA	NA	NA	M	M	E	VAV 2-9	NA	NA	NA	NA	N	N	N	FACTORY-MOUNTED DISCONNECT

HP / (kW)[1]:
HORSEPOWER IS SHOWN UNLESS KILOWATTS (kW) OR MINIMUM CIRCUIT AMPACITY (MCA) IS CALLED OUT

TYPE[2]:
FS FUSED SWITCH
CB CIRCUIT BREAKER
NA NOT APPLICABLE

TYPE[4]:
COMB Combination Magnetic Starter
/ Disconnect Switch or Circuit Breaker
MAG Magnetic Starter
2SIW 2-speed 1-winding Magnetic Starter
2SDW 2-speed 2-winding Magnetic Starter
MAN Manual Motor Starter
PWCP Pre-wired Control Panel
VFD Variable Frequency Drive
TOG Toggle Switch (horsepower rated)
TST Thermostat
RIB Relay in a Box
NA Not Applicable

F I C[5]: (Furnished, Installed, Connected)
M Mechanical, Plumbing, Fire Protection Contractor, or Factory
E Electrical Contractor
N Not Applicable

GENERAL ONE-LINE NOTES:

1. ALL EQUIPMENT SHOWN AS THIN CONTINUOUS LIGHT LINE IS EXISTING EQUIPMENT TO REMAIN.
2. ALL EQUIPMENT SHOWN AS THICK DASHED HEAVY LINE IS EXISTING EQUIPMENT TO BE REMOVED.
3. ALL EQUIPMENT SHOWN AS THICK CONTINUOUS DARK LINE IS NEW EQUIPMENT.
4. COORDINATE ELECTRICAL SHUT-DOWNS WITH OWNER AND UTILITY PROVIDER.

KEYED NOTES:

1 FURNISH AND INSTALL FUSE REDUCERS WITH NEW FUSE.

2 FURNISH AND INSTALL INTELLIGENT PANELBOARD WITH BACNET CAPABILITY.

PANELBOARD: H
VOLTAGE: 208 /120V
MAIN: 225 A MCB
SHORT CIRCUIT: 14 K AIC
LOCATION: MECHANICAL RM G21

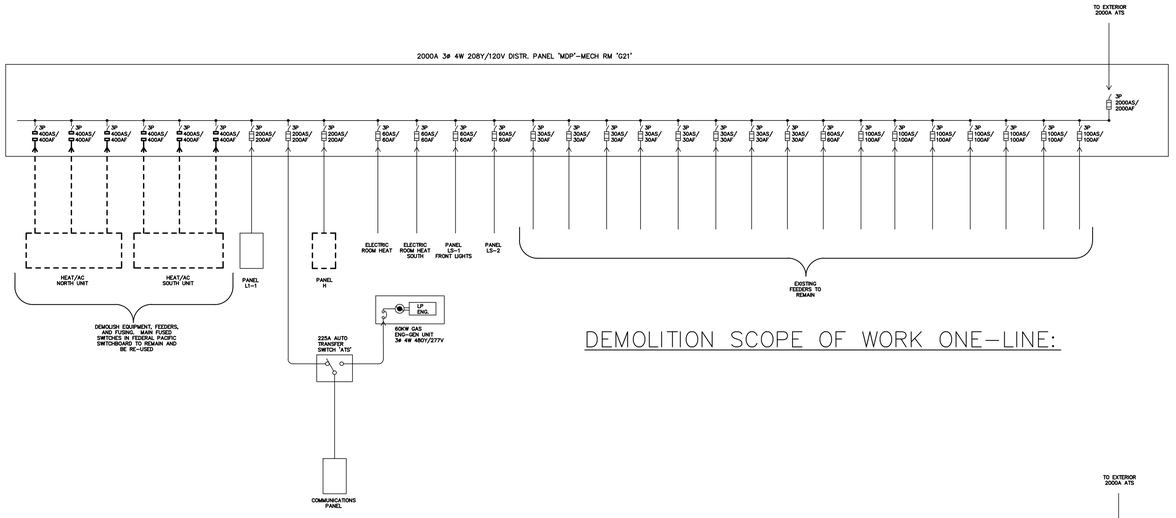
LOAD	POLES	CKT BKR	CKT	Ph	CKT	CKT BKR	POLES	LOAD
BASEBOARD HEATER RM G3 E	2	20	1	A	2	20	2	BASEBOARD HEATER RM G3 W
			3	B	4			
BASEBOARD HEATER RM 8	2	20	5	C	6	20	2	BASEBOARD HEATER RM 11
			7	A	8			
BASEBOARD HEATER RM 16	2	20	9	B	10	20	2	BASEBOARD HEATER RM 21, RM 22
			11	C	12			
BASEBOARD HEATER RM 23, RM 25	2	20	13	A	14	20	2	BASEBOARD HEATER RM 26
			15	B	16			
BASEBOARD HEATER RM 29, RM 31	2	20	17	C	18	20	2	BASEBOARD HEATER RM 3
			19	A	20			
BASEBOARD HEATER RM 4	2	20	21	B	22	20	1	EXISTING LOAD
			23	C	24	20	1	EXISTING LOAD
BASEBOARD HEATER RM 6	2	20	25	A	26	20	2	FLOOR PLUG RM 8
			27	B	28			
BASEBOARD HEATER RM 7	2	20	29	C	30	20	2	BASEBOARD HEATER RM 16A
			31	A	32			
SPARE	1	20	33	B	34	20	1	SPARE
SPARE	1	20	35	C	36	20	1	SPARE
SPARE	1	20	37	A	38	20	1	SPARE
SPARE	1	20	39	B	40	20	1	SPARE
SPARE	1	20	41	C	42	20	1	SPARE

PANELBOARD: PP1
VOLTAGE: 208 /120V
MAIN: 100 A MCB
SHORT CIRCUIT: 14 K AIC
LOCATION: TELECOM RM G19

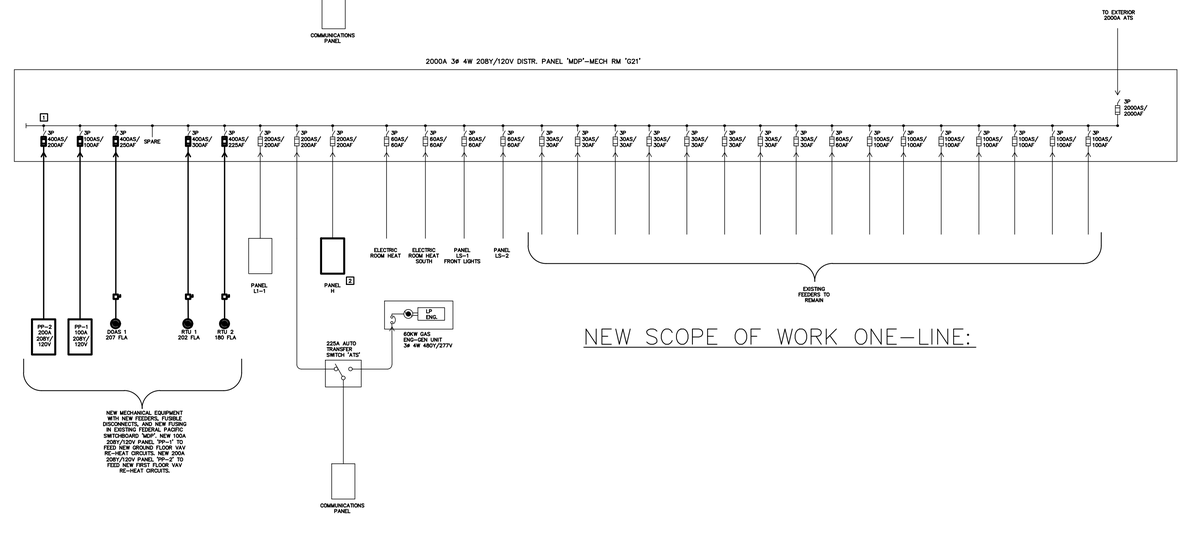
LOAD	POLES	CKT BKR	CKT	Ph	CKT	CKT BKR	POLES	LOAD
VAV 1-2	2	20	1	A	2	20	2	VAV 1-3
			3	B	4			
VAV 1-4	2	20	5	C	6	20	1	SPARE
			7	A	8	20	1	SPARE
VAV 1-6	2	20	9	B	10	20	2	VAV 1-7
			11	C	12			
VAV 1-17	2	20	13	A	14	20	2	VAV 1-9
			15	B	16			
VAV 1-8	2	20	17	C	18	20	1	SPARE
			19	A	20	20	1	SPARE
VAV 1-5	2	20	21	B	22	20	1	SPARE
			23	C	24	20	1	SPARE
SPARE	1	20	25	A	26	20	1	SPARE
SPARE	1	20	27	B	28	20	1	SPARE
SPARE	1	20	29	C	30	20	1	SPARE
SPARE	1	20	31	A	32	20	1	SPARE
SPARE	1	20	33	B	34	20	1	SPARE
SPARE	1	20	35	C	36	20	1	SPARE
SPARE	1	20	37	A	38	20	1	SPARE
SPARE	1	20	39	B	40	20	1	SPARE
SPARE	1	20	41	C	42	20	1	SPARE

PANELBOARD: PP2
VOLTAGE: 208 /120V
MAIN: 200 A MCB
SHORT CIRCUIT: 14 K AIC
LOCATION: RM 5

LOAD	POLES	CKT BKR	CKT	Ph	CKT	CKT BKR	POLES	LOAD
VAV 1-10	2	20	1	A	2	20	2	VAV 1-11
			3	B	4			
VAV 1-12	2	20	5	C	6	20	2	VAV 1-13
			7	A	8			
VAV 1-14	2	20	9	B	10	20	2	VAV 1-15
			11	C	12			
VAV 1-16	2	20	13	A	14	20	2	VAV 2-1
			15	B	16			
VAV 2-2	2	20	17	C	18	20	2	VAV 2-3
			19	A	20			
VAV 2-4	2	20	21	B	22	20	2	VAV 2-5
			23	C	24			
VAV 2-6	2	20	25	A	26	20	2	VAV 2-7
			27	B	28			
VAV 2-8	2	20	29	C	30	20	2	VAV 2-9
			31	A	32			
SPARE	1	20	33	B	34	20	1	SPARE
SPARE	1	20	35	C	36	20	1	SPARE
SPARE	1	20	37	A	38	20	1	SPARE
SPARE	1	20	39	B	40	20	1	SPARE
SPARE	1	20	41	C	42	20	1	SPARE



DEMOLITION SCOPE OF WORK ONE-LINE:



NEW SCOPE OF WORK ONE-LINE:

ELECTRICAL SYMBOLS

LIGHTING FIXTURES

- 1' X 2' FLUORESCENT RECESS MOUNTED
- 2' X 2' FLUORESCENT RECESS MOUNTED
- 2' X 4' FLUORESCENT RECESS MOUNTED
- 6 FOOT TRACK LIGHT (3 HEAD)
- 8 FOOT TRACK LIGHT (4 HEAD)
- EXIT SIGN DOUBLE FACE CEILING MOUNTED
- DOWN LIGHT RECESSED MOUNTED
- FAN CEILING MOUNTED

POWER EQUIPMENT

- LIGHTING PANELBOARD
- DISTRIBUTION PANEL
- TRANSFORMER, SEE PLAN FOR TYPE AND SIZE
- ATS: AUTOMATIC TRANSFER SWITCH
- DISCONNECT SWITCH
- 208V, 3 PHASE MOTOR
- 480V, 3 PHASE MOTOR
- VAV JUNCTION BOX WITH TOGGLE SWITCH
- LINE VOLTAGE THERMOSTAT

MISCELLANEOUS DEVICES

- CAMERA CEILING MOUNTED
- SPEAKER RECESSED CEILING MOUNTED
- VP: VIDEO PROJECTOR CEILING MOUNTED

ABBREVIATIONS

AFF ABOVE FINISHED FLOOR
AFG ABOVE FINISHED GRADE
TOF TOP OF FIXTURE
BOF BOTTOM OF FIXTURE

AUX AUXILARY
AL ALUMINUM
C CONDUIT
CB CIRCUIT BREAKER
CKT CIRCUIT
GRD GROUND
GFI GROUND FAULT CIRCUIT INTERRUPTER
MCB MAIN CIRCUIT BREAKER
MLO MAIN LUG ONLY
NC NORMALLY CLOSED
NO NORMALLY OPEN
NF NON FUSED
WP WEATHERPROOF
EC ELECTRICAL CONTRACTOR
UNO UNLESS NOTED OTHERWISE
NTS NOT TO SCALE
ARC ALUMINUM RIGID CONDUIT
EMT ELECTRICAL METALLIC TUBING
IMC INTERMEDIATE METAL CONDUIT
PVC PVC CONDUIT

MOUNTING HEIGHTS

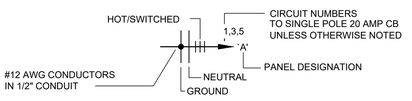
ALL MOUNTING HEIGHTS ARE AS GIVEN UNLESS OTHERWISE NOTED ON PLANS
ALL MOUNTING HEIGHTS ARE TO CENTER OF DEVICE, LIGHT FIXTURE UNLESS OTHERWISE NOTED

FIRE ALARM

- SD: SMOKE DETECTOR CEILING MOUNTED

WIRING SYMBOLS

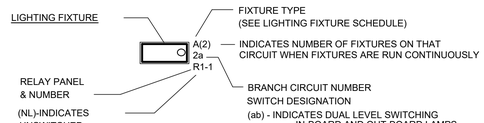
- CONDUIT DOWN
- CONDUIT UP
- CONDUIT CAPPED
- EXISTING
- DEMOLITION WORK
- NEW WORK
- CONDUIT CONCEALED IN SLAB OR IN ACCESSIBLE SPACE BELOW
- CONDUIT EXPOSED
- CONDUIT CONCEALED IN WALL OR ABOVE CEILING
- WIREWAY / WIREMOLD



NOTE:
HASH MARKS INDICATE #12 AWG CONDUCTORS ONLY SEE FLOOR PLANS FOR OTHER FEEDER CONDUCTORS AND CONDUIT SIZES

S1 SPEAKER TYPE
5W WATTAGE OF SPEAKER
R1 PUBLIC ADDRESS ZONE #

LIGHTING FIXTURE



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OFFICE OF ADMINISTRATION
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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
ELECTRICAL ONE-LINE, SCHEDULES SYMBOLS, AND ABBREVIATIONS

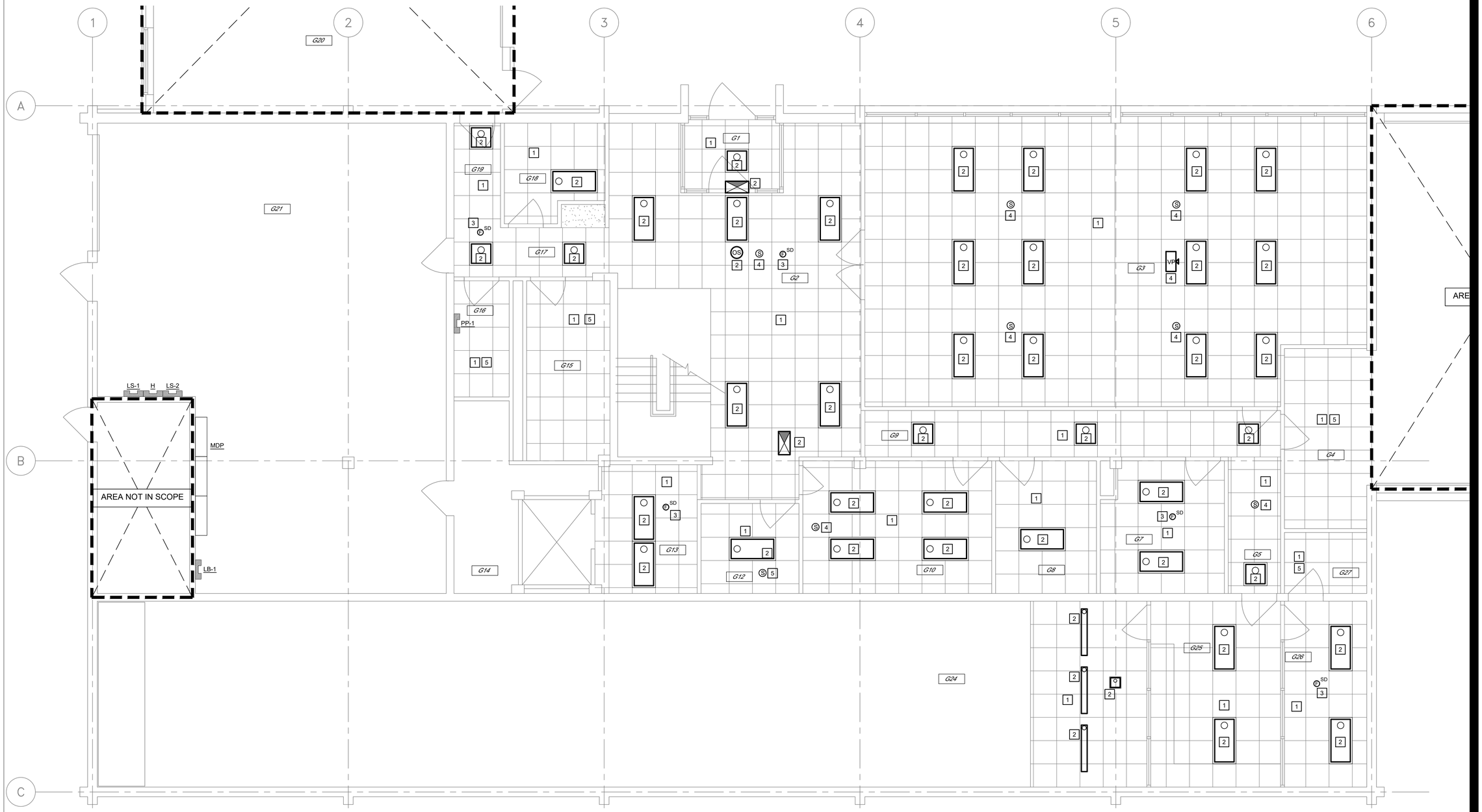
SHEET NUMBER:
E1.0

13 OF 25 SHEETS
12/07/2022

File: S:\075109.000 REPLACE HVAC SYSTEM MSHP TROOP E HEADQUARTERS\03 ELECTRICAL\SD ONE LINE Saved: 2022-12-7 15:04 By: Acheatham

KEYED NOTES:

1. SEE SHEET S.3 FOR CEILING REPLACEMENT.
2. REINSTALL EXISTING FIXTURES BEING STORED BY CONTRACTOR IN NEW CEILING GRID.
3. REINSTALL EXISTING SMOKE DETECTOR IN NEW CEILING GRID.
4. REINSTALL EXISTING AUDIO/VISUAL/SECURITY EQUIPMENT IN NEW CEILING GRID.
5. CONTRACTOR TO VERIFY EXISTING LIGHTING AND OR SYSTEMS EQUIPMENT IN CEILING OF ROOM. EXISTING DEVICES SHALL BE REINSTALLED IN NEW CEILING GRID.



GROUND FLOOR LIGHTING AND SYSTEMS NEW WORK PLAN

SCALE: 1/4" = 1'0"

N

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
PHILIP J. WENTZ
NUMBER E-29111
REGISTERED PROFESSIONAL ENGINEER
12/7/2022

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DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

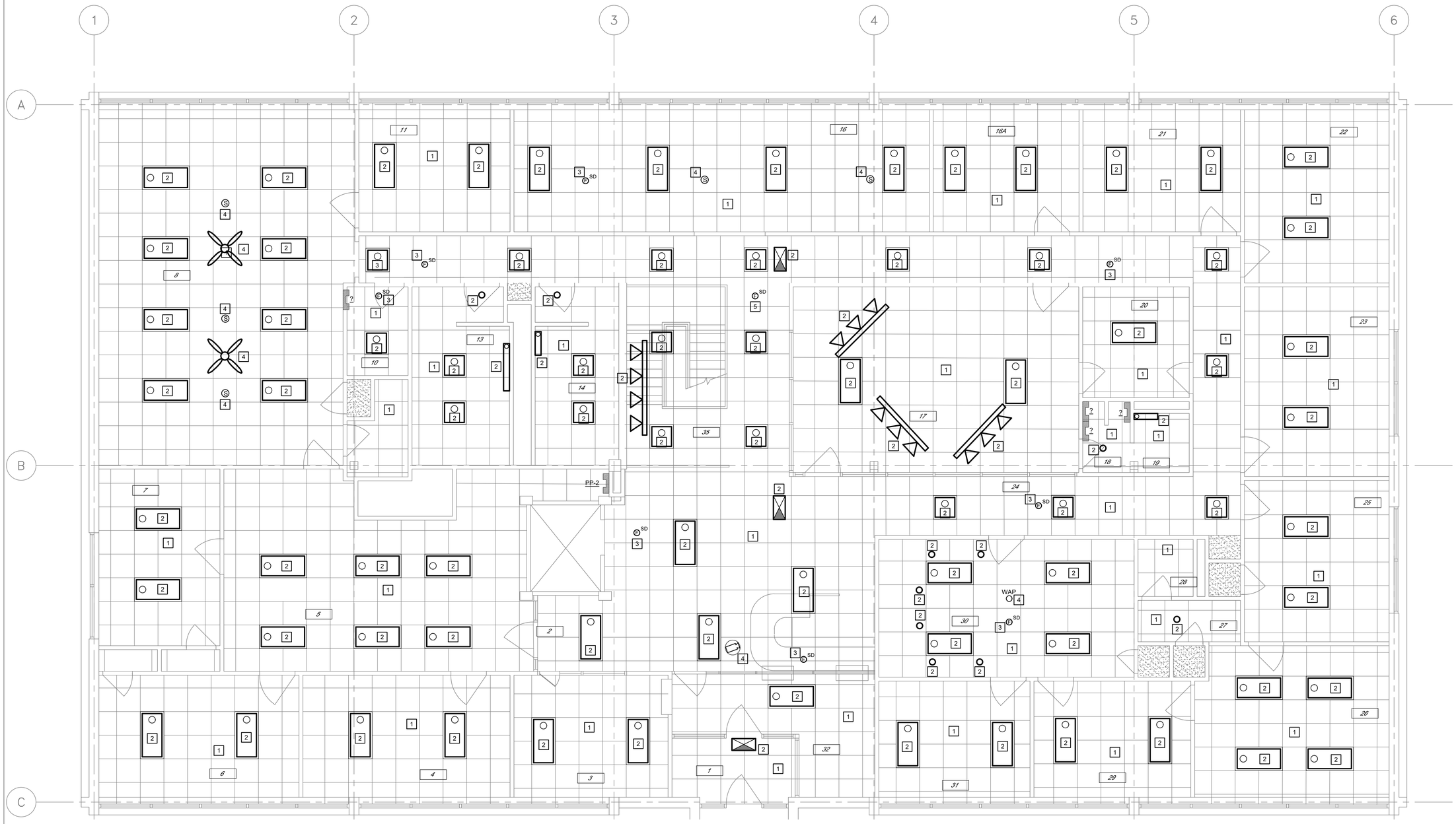
SHEET TITLE:
GROUND FLOOR LIGHTING AND SYSTEMS NEW WORK PLAN

SHEET NUMBER:
E2.0

17 OF 25 SHEETS
12/07/2022

KEYED NOTES:

1. SEE SHEET S.3 FOR CEILING REPLACEMENT SCOPE.
2. REINSTALL EXISTING FIXTURES BEING STORED BY CONTRACTOR IN NEW CEILING GRID.
3. REINSTALL EXISTING SMOKE DETECTOR IN NEW CEILING GRID.
4. REINSTALL EXISTING AUDIO/VISUAL/SECURITY EQUIPMENT IN NEW CEILING GRID.



FIRST FLOOR LIGHTING AND SYSTEMS NEW WORK PLAN

SCALE: 1/4" = 1'0"

N

0 1' 2' 4' 1/4"=1'

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
PHILIP J. WENTZ
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REGISTERED PROFESSIONAL ENGINEER
12/7/2022

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DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
FIRST FLOOR LIGHTING AND SYSTEMS NEW WORK PLAN

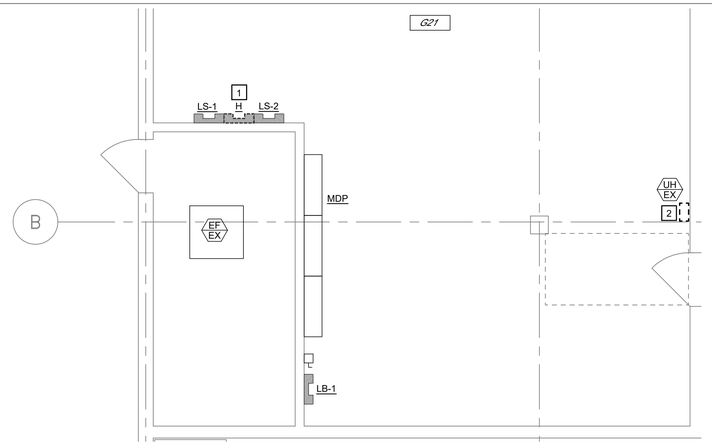
SHEET NUMBER:
E2.1

18 OF 25 SHEETS
12/07/2022

File: S:\075109.000 REPLACE HVAC SYSTEM MSHP TROOP E HEADQUARTERS\03 ELECTRICAL\E2.1-075109.000 Saved: 2022-12-7 15:51 By: Acheatham

GENERAL DEMOLITION NOTES:

1. ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
2. ALL EXISTING ELECTRICAL DEVICES IN A WALL THAT IS TO BE REMOVED; ELECTRICAL CONTRACTOR SHALL DISCONNECT POWER, CUT OFF CONDUCTORS AND CAP CONDUIT IN FLOOR OR CEILING AS REQUIRED. DEVICES ARE TO BE REMOVED ALONG WITH WALL BY GENERAL CONTRACTOR UNLESS OTHERWISE NOTED.
3. ALL EXISTING ELECTRICAL DEVICES TO BE REMOVED FROM WALLS WHICH ARE TO REMAIN; ELECTRICAL CONTRACTOR SHALL DISCONNECT POWER, REMOVE CONDUCTORS, REMOVE DEVICE AND PROVIDE BLANK COVERPLATES AS REQUIRED. UNLESS OTHERWISE NOTED.
4. FOR A PORTION OF A CIRCUIT WHICH IS REMOVED OR ABANDONED, RE-ESTABLISH CIRCUIT CONTINUITY FOR THE PORTION OF THE CIRCUIT WHICH IS TO REMAIN.
5. ALL EXISTING CONDUITS, RACEWAYS AND WIRING ROUTED IN EXISTING WALLS AND CEILING SPACES (WHICH ARE TO BE DEMOLISHED) WHICH SERVE OTHER AREAS SHALL BE REROUTED AS REQUIRED.
6. PROVIDE AND INSTALL SUPPORTS FOR EXISTING CABLES AND CONDUITS ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.



GROUND FLOOR ELECTRICAL DEMOLITION PLAN

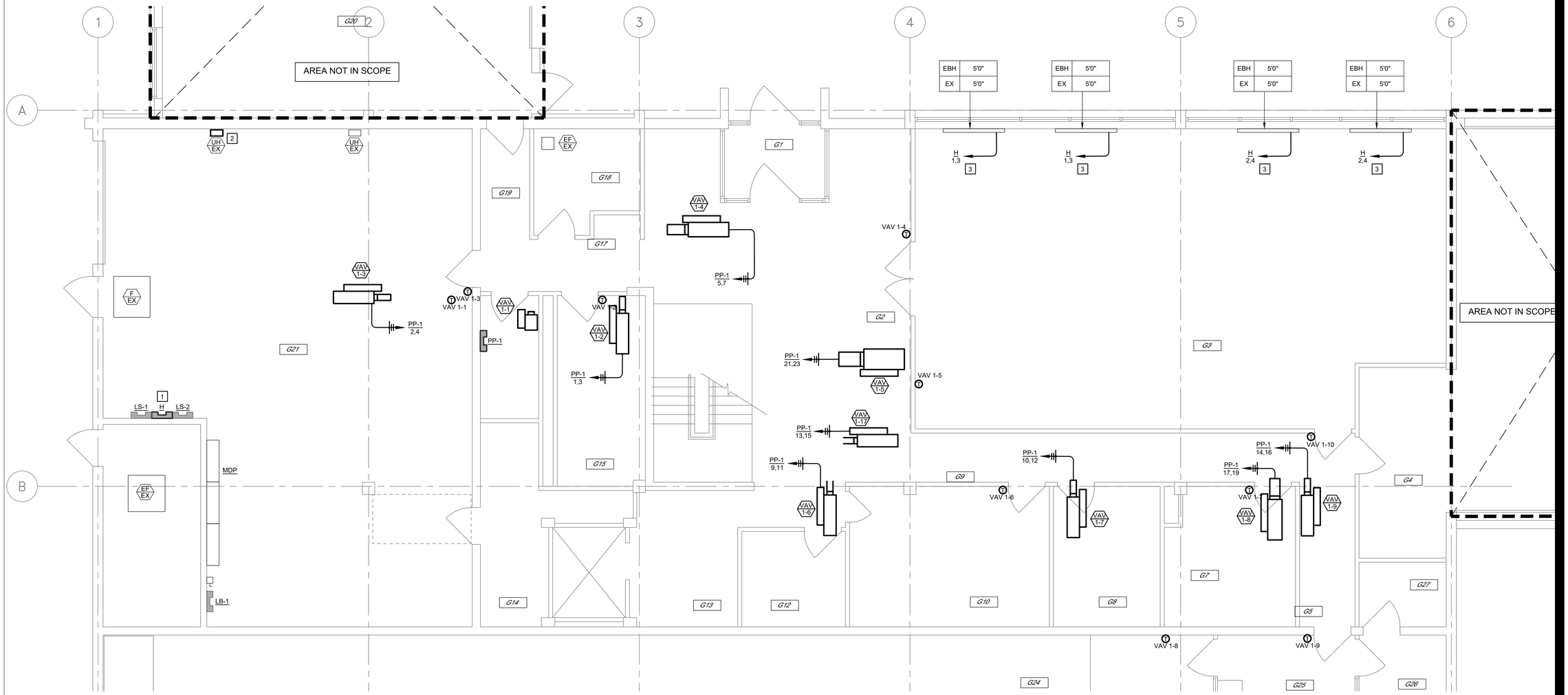
SCALE: 1/4" = 1'0"

GENERAL NEW WORK NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE OWNER'S REPRESENTATIVE. NOTICE FOR SHUTDOWN SHALL BE GIVEN TO THE OWNER AT LEAST ONE WEEK PRIOR TO SHUTDOWN.
3. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
4. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
5. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
6. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
7. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
8. CONTRACTOR SHALL CHECK-IN EACH DAY THEY ARE ON SITE.

KEYED NOTES:

1. EXISTING PANEL H TO BE DEMOLISHED AND REPLACED WITH A NEW INTELLIGENT PANELBOARD WITH BACNET CAPABILITY.
2. EXISTING ELECTRIC UNIT HEATER TO BE RELOCATED TO LOCATION SHOWN TO ALLOW FOR INSTALLATION OF NEW SUPPLY AIR DUCT. COORDINATE NEW LOCATION WITH MECHANICAL CONTRACTOR.
3. PRESERVE EXISTING BASEBOARD HEATER CIRCUIT FOR RECONNECTION TO NEW PANEL H.



GROUND FLOOR ELECTRICAL NEW WORK PLAN

SCALE: 1/4" = 1'0"

N

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PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

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DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
GROUND FLOOR ELECTRICAL DEMOLITION & NEW WORK PLANS

SHEET NUMBER:
E3.0

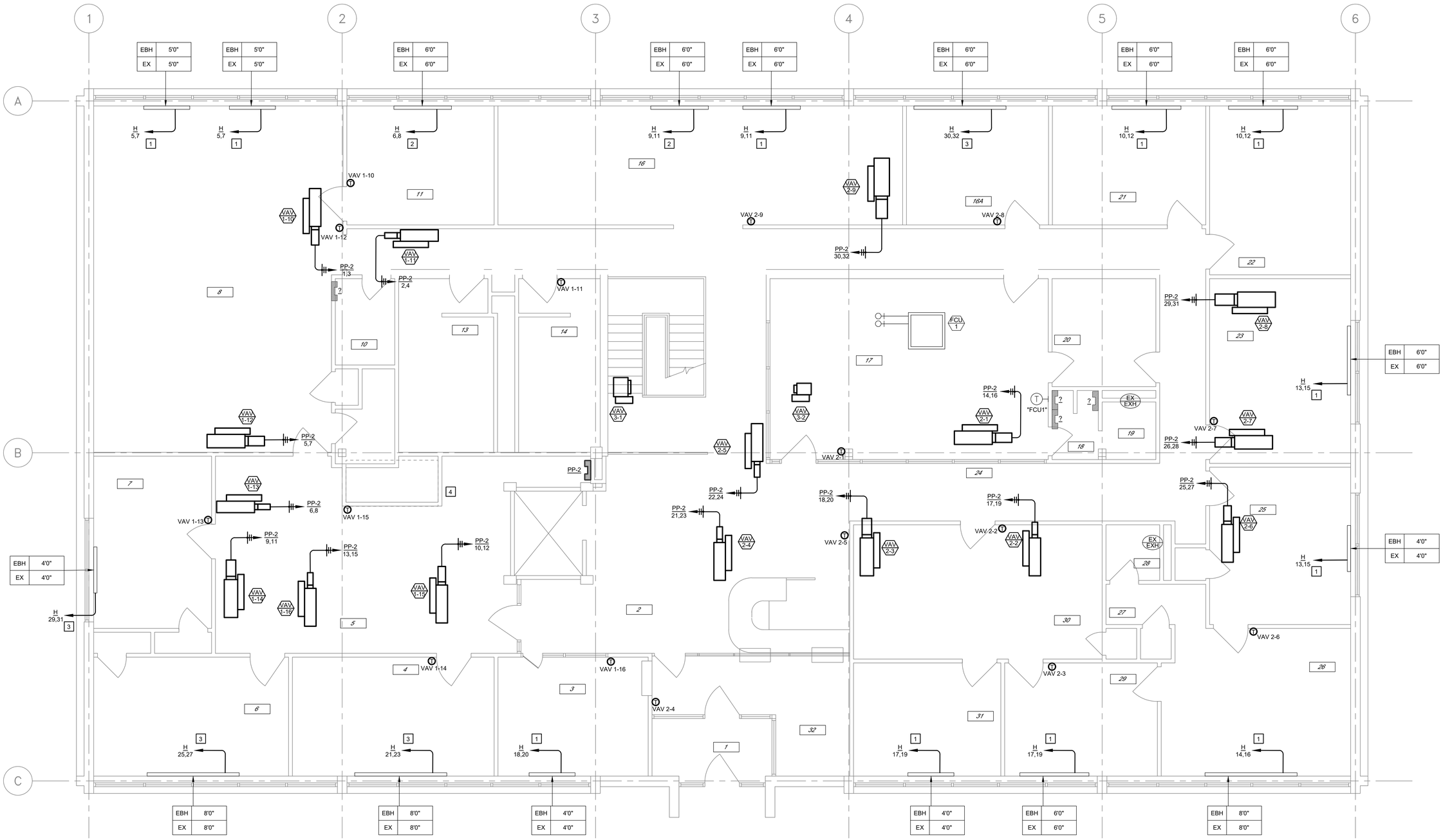
19 OF 25 SHEETS
12/07/2022

GENERAL NEW WORK NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE OWNER'S REPRESENTATIVE. NOTICE FOR SHUTDOWN SHALL BE GIVEN TO THE OWNER AT LEAST ONE WEEK PRIOR TO SHUTDOWN.
3. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
4. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
5. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
6. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
7. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
8. CONTRACTOR SHALL CHECK-IN EACH DAY THEY ARE ON SITE.

KEYED NOTES:

1. PRESERVE EXISTING BASEBOARD HEATER CIRCUIT FOR RECONNECTION TO NEW PANEL H.
2. INTERCEPT EXISTING CONDUIT AND RE-ROUTE EXISTING BASEBOARD HEATER CIRCUIT AS SHOWN.
3. INTERCEPT EXISTING CONDUIT AND PROVIDE NEW BASEBOARD HEATER CIRCUIT FROM PANEL H AS SHOWN.
4. CUT RIGID GALVANIZED COMMUNICATION CONDUIT BACK 6-12 INCHES TO ALLOW DUCT PATH. RELOCATE UNISTRUT SUPPORT AS NECESSARY.



FIRST FLOOR ELECTRICAL NEW WORK PLAN

SCALE: 1/4" = 1'0"

N

0 1' 2' 4' 1/4"=1'

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

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PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

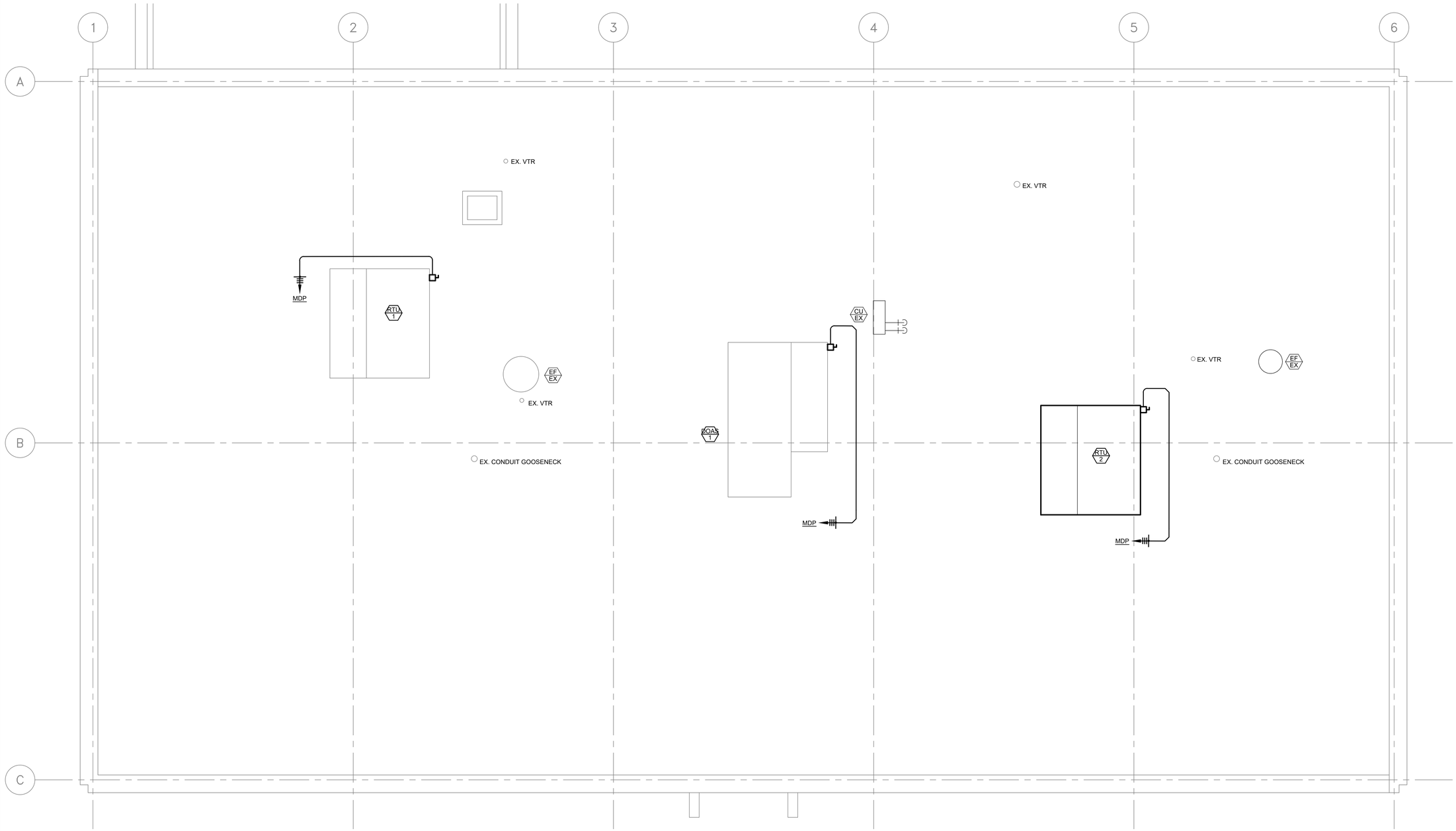
SHEET TITLE:
FIRST FLOOR ELECTRICAL NEW WORK PLAN

SHEET NUMBER:
E3.1

20 OF 25 SHEETS
12/07/2022

GENERAL NEW WORK NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE OWNER'S REPRESENTATIVE. NOTICE FOR SHUTDOWN SHALL BE GIVEN TO THE OWNER AT LEAST ONE WEEK PRIOR TO SHUTDOWN.
3. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
4. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
5. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
6. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
7. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
8. CONTRACTOR SHALL CHECK-IN EACH DAY THEY ARE ON SITE.



ROOF ELECTRICAL NEW WORK PLAN
SCALE: 1/4" = 1'0"

N

STATE OF MISSOURI
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OFFICE OF ADMINISTRATION
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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: AAC
CHECKED BY: KC
DESIGNED BY: EW

SHEET TITLE:
ROOF ELECTRICAL NEW WORK PLAN

SHEET NUMBER:
E3.2

21 OF 25 SHEETS
12/07/2022

File: S:\075109.000 REPLACE HVAC SYSTEM MSHP TROOP E HEADQUARTERS\03 ELECTRICAL\E3.2-075109.000 Saved: 2022-12-7 16:04 By: Acheatham

STEEL FRAMING SPECIFICATIONS

SUBMITTALS:

1. SHOP DRAWINGS: SHOW FABRICATION OF STRUCTURAL-STEEL COMPONENTS.
   A. INCLUDE DETAILS OF CUTS, CONNECTIONS, SPLICES, CAMBER, HOLES, AND OTHER PERTINENT DATA.
   B. INCLUDE EMBEDMENT DRAWINGS.
   C. INDICATE WELDS BY STANDARD AWS SYMBOLS, DISTINGUISHING BETWEEN SHOP AND FIELD WELDS, AND SHOW SIZE, LENGTH, AND TYPE OF EACH WELD. SHOW BACKING BARS THAT ARE TO BE REMOVED AND SUPPLEMENTAL FILLET WELDS WHERE BACKING BARS ARE TO REMAIN.
   D. INDICATE TYPE, SIZE, AND LENGTH OF BOLTS, DISTINGUISHING BETWEEN SHOP AND FIELD BOLTS. IDENTIFY PRETENSIONED AND SLIP-CRITICAL HIGH-STRENGTH BOLTED CONNECTIONS.
2. WELDING CERTIFICATES.
3. FABRICATOR QUALIFICATIONS: A QUALIFIED FABRICATOR WITH NO LESS THAN 5 YEARS EXPERIENCE IN THE FABRICATION OF STRUCTURAL STEEL.

COORDINATION:

1. COORDINATE SELECTION OF SHOP PRIMERS WITH TOPCOATS TO BE APPLIED OVER THEM. COMPLY WITH PAINT AND COATING MANUFACTURER'S RECOMMENDATIONS TO ENSURE THAT SHOP PRIMERS AND TOPCOATS ARE COMPATIBLE WITH ONE ANOTHER.
2. COORDINATE INSTALLATION OF ANCHORAGE ITEMS TO BE EMBEDDED IN OR ATTACHED TO OTHER CONSTRUCTION WITHOUT DELAYING THE WORK. PROVIDE SETTING DIAGRAMS, SHEET METAL TEMPLATES, INSTRUCTIONS, AND DIRECTIONS FOR INSTALLATION.

MATERIALS:

1. STRUCTURAL-STEEL MATERIALS
   A. W-SHAPES: ASTM A 992/A 992M.
   B. CHANNELS, ANGLES: ASTM A 36/A 36M.
   C. PLATE AND BAR: ASTM A 36/A 36M.
   D. COLD-FORMED HOLLOW STRUCTURAL SECTIONS: ASTM A 500, GRADE B, STRUCTURAL TUBING.
   E. WELDING ELECTRODES: COMPLY WITH AWS REQUIREMENTS.

2. BOLTS, CONNECTORS, AND ANCHORS
   A. HIGH-STRENGTH BOLTS, NUTS, AND WASHERS: ASTM A 325, TYPE 1, HEAVY-HEX STEEL STRUCTURAL BOLTS; ASTM A 563, GRADE C, HEAVY-HEX CARBON-STEEL NUTS; AND ASTM F 436, TYPE 1, HARDENED CARBON-STEEL WASHERS; ALL WITH PLAIN FINISH.
   B. HEADED ANCHOR RODS: ASTM F 1554, GRADE 36, STRAIGHT.
      1. NUTS: ASTM A 563 HEAVY-HEX CARBON STEEL.
      2. PLATE WASHERS: ASTM A 36/A 36M CARBON STEEL.
      3. WASHERS: ASTM F 436, TYPE 1, HARDENED CARBON STEEL.
      4. FINISH: PLAIN
   C. THREADED RODS: ASTM A 36/A 36M
      1. NUTS: ASTM A 563 HEX CARBON STEEL.
      2. WASHERS: ASTM F 436, TYPE 1, HARDENED CARBON STEEL.
      3. FINISH: PLAIN
   D. HEADED STUD ANCHORS FOR EMBEDDED ASSEMBLIES:
      1. STEEL SHALL CONFORM TO ASTM A 108 GRADES C1010-1020, MINIMUM TENSILE STRENGTH OF 60,000 PSI.
      2. HEADED FUSION WELDED SHEAR CONNECTORS WITH PROPER FERRULES, AND ACCESSORIES ESPECIALLY DESIGNED TO CREATE COMPOSITE DECK ACTION BY MATING OF SHEAR CONNECTORS, CONCRETE DECK, AND SUPPORTING BEAMS.
      3. STUDS SHALL BE OF UNIFORM DIAMETER, HEADS CONCENTRIC AND NORMAL TO SHAFT, AND WELD END CHAMFERED AND SOLID FLUX.

3. PRIMER
   A. PRIMER: FABRICATOR'S STANDARD LEAD- AND CHROMATE-FREE, NONASPHALTIC, RUST-INHIBITING PRIMER COMPLYING WITH MPI#79 AND COMPATIBLE WITH TOPCOAT.
   B. GALVANIZING REPAIR PAINT: MPI#18, MPI#19, OR SSPC-PAINT 20.
   C. ASPHALTIC MASTIC: COLD APPLIED ASPHALT EMULSION COMPLYING WITH ASTM D 1187.

4. SHRINKAGE-RESISTANT GROUT
   A. COMPRESSIVE STRENGTH IN 28 DAYS: 5000 PSI MINIMUM BUT NOT LESS THAN SPECIFIED STRENGTH OF BASE CONCRETE. NON-OXIDIZING, IF GROUT WILL BE PERMANENTLY EXPOSED TO VIEW.
      1. NONMETALLIC, SHRINKAGE RESISTANT GROUT: ASTM C 1107, FACTORY-PACKAGED, NONMETALLIC AGGREGATE GROUT, NONCORROSIVE AND NONSTAINING, MIXED WITH WATER TO CONSISTENCY SUITABLE FOR APPLICATION AND A 30-MINUTE WORKING TIME.
         ACCEPTABLE PRODUCTS:
         a. SONOGROUT 10K, MANUFACTURED BY SONNEBORN/CHEMREX, INC.
         b. MASTERFLOW 713, MANUFACTURED BY MASTER BUILDERS CO.
         c. SUPREME GROUT, MANUFACTURED BY GIFFORD HILL CO.

5. FABRICATION
   A. STRUCTURAL STEEL: FABRICATE AND ASSEMBLE IN SHOP TO GREATEST EXTENT POSSIBLE. FABRICATE ACCORDING TO AISC'S "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" AND AISC 360.
   B. STEEL BEARING PLATES: FABRICATE STEEL BEARING PLATES WITH HEADED STUD ANCHORS OF SIZES AND THICKNESSES INDICATED ON CONTRACT DRAWINGS. HOT-DIP ZINC COAT ACCORDING TO ASTM A 123/A 123M. DO NOT PAINT SURFACE TO RECEIVE ANCHORS.
   C. HEADED STUD ANCHORS:
      1. COMPLY WITH AWS D1.1, SECTION 7.
      2. CLEAN SURFACES TO BE WELDED OF RUST, OIL, GREASE, PAINT AND DIRT. REMOVE MILL SCALE BY SCRAPING OR SANDBLASTING.
      3. WELD HEADED STUDS WITH APPROPRIATE EQUIPMENT PROPERLY ADJUSTED FRO CLIMATIC CONDITIONS.
      4. REMOVE CERAMIC FERRULES AFTER WELDING.
   D. THERMAL CUTTING: PERFORM THERMAL CUTTING BY MACHINE TO GREATEST EXTENT POSSIBLE.
      1. PLANE THERMALLY CUT EDGES TO BE WELDED TO COMPLY WITH REQUIREMENTS IN AWS D1.1/D1.1M.
   E. BOLT HOLES: CUT, DRILL OR PUNCH HOLES PERPENDICULAR TO METAL SURFACES. SHORT-SLOTTED HOLES SHALL NOT BE USED FOR PRIMARY FRAME CONNECTIONS (MEMBERS CONNECTION TO COLUMNS), TRUSSES AND WIND BRACING UNLESS SPECIFICALLY ALLOWED BY THE ENGINEER OF RECORD. WHERE USED, SHORT SLOTTED HOLES SHALL BE ORIENTED NORMAL TO THE DIRECTION OF LOAD.
   F. FINISHING: ACCURATELY FINISH ENDS OF COLUMNS AND OTHER MEMBERS TRANSMITTING BEARING LOADS.
   G. CLEANING: CLEAN AND PREPARE STEEL SURFACES THAT ARE TO REMAIN UNPAINTED ACCORDING TO SSPC-SP-1, "SOLVENT CLEANING".
   H. HOLES: PROVIDE HOLES REQUIRED FOR SECURING OTHER WORK TO STRUCTURAL STEEL AND FOR OTHER WORK TO PASS THROUGH STEEL FRAMING MEMBERS.
      1. CUT, DRILL, OR PUNCH HOLES PERPENDICULAR TO STEEL SURFACES. DO NOT THERMALLY CUT BOLT HOLES OR ENLARGE HOLES BY BURNING.
      2. BASEPLATE HOLES: CUT, DRILL, MECHANICALLY THERMAL CUT, OR PUNCH HOLES PERPENDICULAR TO STEEL SURFACES. HOLES FOR ANCHOR RODS IN BASE PLATES MAY BE OVERSIZED IN ACCORDANCE WITH AISC SPECIFICATIONS. PROVIDE WASHERS AS INDICATED ON CONTRACT DRAWINGS.
      3. WELD THREADED NUTS TO FRAMING AND OTHER SPECIALTY ITEMS INDICATED TO RECEIVE OTHER WORK.

6. SHOP CONNECTIONS
   A. HIGH-STRENGTH BOLTS: SHOP INSTALL HIGH-STRENGTH BOLTS ACCORDING TO RCSC'S "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A 325 OR A 490 BOLTS" FOR TYPE OF BOLT AND TYPE OF JOINT SPECIFIED.
      1. JOINT TYPE: SNUG TIGHTENED UNLESS NOTED OTHERWISE ON CONTRACT DRAWINGS.
         a. HIGH STRENGTH BOLTS FOR BEARING CONNECTIONS SHALL BE TIGHTENED IN ACCORDANCE WITH RCSC SPECIFICATIONS TO A SNUG-TIGHT CONDITION. PROVIDE HARDENED WASHERS AS REQUIRED BY THE RCSC SPECIFICATION.
         b. HIGH STRENGTH BOLTS FOR SLIP-CRITICAL CONNECTIONS, AS NOTED ON THE CONTRACT DRAWINGS, SHALL BE TIGHTENED IN ACCORDANCE WITH RCSC SPECIFICATIONS BY CALIBRATED WRENCH METHOD. PROVIDE HARDENED WASHERS AS REQUIRED BY THE RCSC SPECIFICATIONS.
   B. WELD CONNECTIONS: COMPLY WITH AWS D1.1/D1.1M. FOR TOLERANCES, APPEARANCES, WELDING PROCEDURE SPECIFICATIONS, WELD QUALITY, AND METHODS USED IN CORRECTING WELDING WORK.
      1. ASSEMBLE AND WELD BUILT-UP SECTIONS BY METHODS THAT WILL MAINTAIN TRUE ALIGNMENT OF AXES WITHOUT EXCEEDING TOLERANCES IN AISC 303 FOR MILL MATERIAL.

7. SHOP PRIMING
   A. SHOP PRIME STEEL SURFACES EXCEPT THE FOLLOWING:
      1. SURFACES EMBEDDED IN CONCRETE OR MORTAR. EXTEND PRIMING OF PARTIALLY EMBEDDED MEMBERS TO A DEPTH OF 2 INCHES.
      2. SURFACES TO BE FIELD WELDED.
      3. SURFACES TO BE HIGH-STRENGTH BOLTED WITH SLIP-CRITICAL CONNECTIONS.
      4. SURFACES TO RECEIVE SPRAYED FIRE-RESISTIVE MATERIALS (APPLIED FIREPROOFING).
      5. GALVANIZED SURFACES.
   B. SURFACE PREPARATION: CLEAN SURFACES TO BE PAINTED. REMOVE LOOSE RUST AND MILL SCALE AND SPATTER, SLAG, OR FLUX DEPOSITS. PREPARE SURFACES ACCORDING TO THE FOLLOWING SPECIFICATIONS AND STANDARDS:
      1. SSPC-SP 3, "POWER TOOL CLEANING".
   C. PRIMING: IMMEDIATELY AFTER SURFACE PREPARATION, APPLY PRIMER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND AT RATE RECOMMENDED BY SSPC TO PROVIDE A MINIMUM DRY FILM THICKNESS OF 1/5 MILS. USE PRIMING METHODS THAT RESULT IN FULL COVERAGE OF JOINTS, CORNERS, EDGES, AND EXPOSED SURFACES.
      1. STRIPE PAINT CORNERS, CREVICES, BOLTS, WELDS, AND SHARP EDGES.
      2. APPLY TWO COATS OF SHOP PAINT TO SURFACES THAT ARE INACCESSIBLE AFTER ASSEMBLY OR ERECTION. CHANGE COLOR OF SECOND COAT TO DISTINGUISH IT FROM FIRST.
   D. PAINTING: PREPARE STEEL AND APPLY A ONE-COAT, NOASPHALTIC PRIMER COMPLYING WITH SSPC-PS GUIDE 7.00, "PAINTING SYSTEM GUIDE 7.00: GUIDE FOR SELECTING ONE-COAT SHOP PAINTING SYSTEMS", TO PROVIDE A DRY FILM THICKNESS OF NOT LESS THAN 1.5 MILS.

STRUCTURAL STEEL NOTES

1. STRUCTURAL STEEL SHALL MEET THE FOLLOWING MINIMUM YIELD STRENGTHS:

	YIELD STRENGTH	ASTM SPEC
A. W, WT SHAPES:	50 KSI	A992
B. OTHER SHAPES, BARS AND PLATES:	36 KSI	A36
C. SQUARE HSS:	46 KSI	A500, GRADE B
D. STRUCTURAL STEEL PIPE:	35 KSI	A53, GR B, OR A500
E. ANCHOR RODS:	35 KSI	F1554
F. ALL-THREAD RODS:	35 KSI	A36

2. BOLTS FOR STEEL BEAM AND COLUMN CONNECTIONS SHALL BE 3/4" DIAMETER ASTM A325 HIGH-STRENGTH BOLTS INSTALLED SNUG TIGHT, UNLESS NOTED OTHERWISE.
3. WELDING SHALL MEET ANSI, AWS D1.1, STRUCTURAL WELDING CODE. ELECTRODES FOR WELDING SHALL BE 70 KSI, LOW HYDROGEN.
4. ALL STEEL SHALL BE SHOP PRIMED & TOUCHED UP IN THE FIELD AFTER INSTALLATION.

09510 SUSPENDED ACOUSTICAL CEILINGS SPECIFICATIONS

A) Materials:

These specifications are based on lay-in acoustical panels as manufactured by Armstrong World Industries, Inc. Similar products of equal or greater quality by U.S. Gypsum or Celotex may be provided in lieu of those specified, subject to approval by Architect.

Cirrus, 24" x 24" x 5/8" tegular, 15/16" suspension system

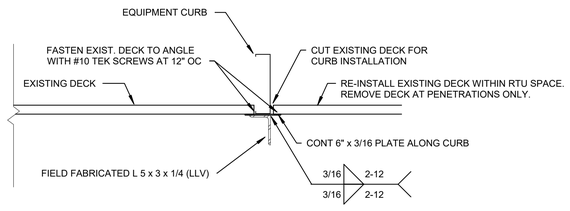
Ceiling suspension materials: Same as acoustical panel manufacturer or Chicago Metallic Corp. Comply with requirements of ASTM C 636 for intermediate-duty system, as applicable to type of suspension system required for the type of ceiling units indicated. Coordinate with other work supported by or penetrating through the ceiling, including light fixtures, HVAC equipment, and partition system. Attachment devices shall be sized for five (5) times the design load indicated in ASTM C 635, Table 1, Direct Hung. Hanger wires shall be galvanized carbon steel, ASTM A 641, soft temper, prestretched, yield-stress load of at least 3 times design load, but not less than 12 gage (0.106").

B) Installation:

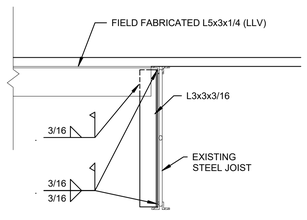
Installer must examine conditions under which acoustical ceiling work in to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid the use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

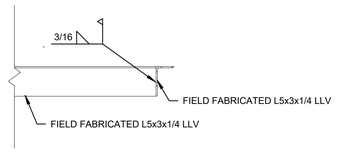
Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire resistance rating requirements as indicated, and industry standards applicable to the work.



CONNECTION D



CONNECTION A



CONNECTION B

DESIGN PARAMETERS

1. BUILDING CODE	2018 IBC
2. LIVE LOADS	
ROOF	20 PSF
3. SNOW LOADS	
A. GROUND SNOW LOAD, Pg	15 PSF
B. SNOW EXPOSURE FACTOR, Ce	1.0
C. SNOW THERMAL FACTOR, Ct	1.0
D. IMPORTANCE FACTOR, I	1.1
4. WIND LOADS	
A. NOMINAL DESIGN WIND SPEED (USD)	112 MPH
B. RISK CATEGORY	III
C. EXPOSURE CATEGORY	C
5. EARTHQUAKE LOADS	
A. SPECTRAL RESPONSE ACCELERATION (SHORT PERIOD), Ss	1.04
B. SPECTRAL RESPONSE ACCELERATION (1-SEC. PERIOD), S1	0.344
C. IMPORTANCE FACTOR, I	1.25
D. SEISMIC RISK CATEGORY	III
E. SEISMIC DESIGN CATEGORY (1-SEC PERIOD CONTROLS)	D
F. SOIL SITE CLASS (ASSUMED)	D
G. BASIC STRUCTURAL SYSTEM	N/A
H. BASIC SEISMIC FORCE RESISTING SYSTEM	N/A

GENERAL NOTE:

MODIFICATIONS MADE TO ROOF FRAMING TO SUPPORT NEW ROOF TOP UNITS HAVE BEEN DESIGNED FOR THE LOADING DESCRIBED IN THE DESIGN PARAMETERS.

1 RTU FRAMING DETAILS
1" = 1'-0"

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MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
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PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
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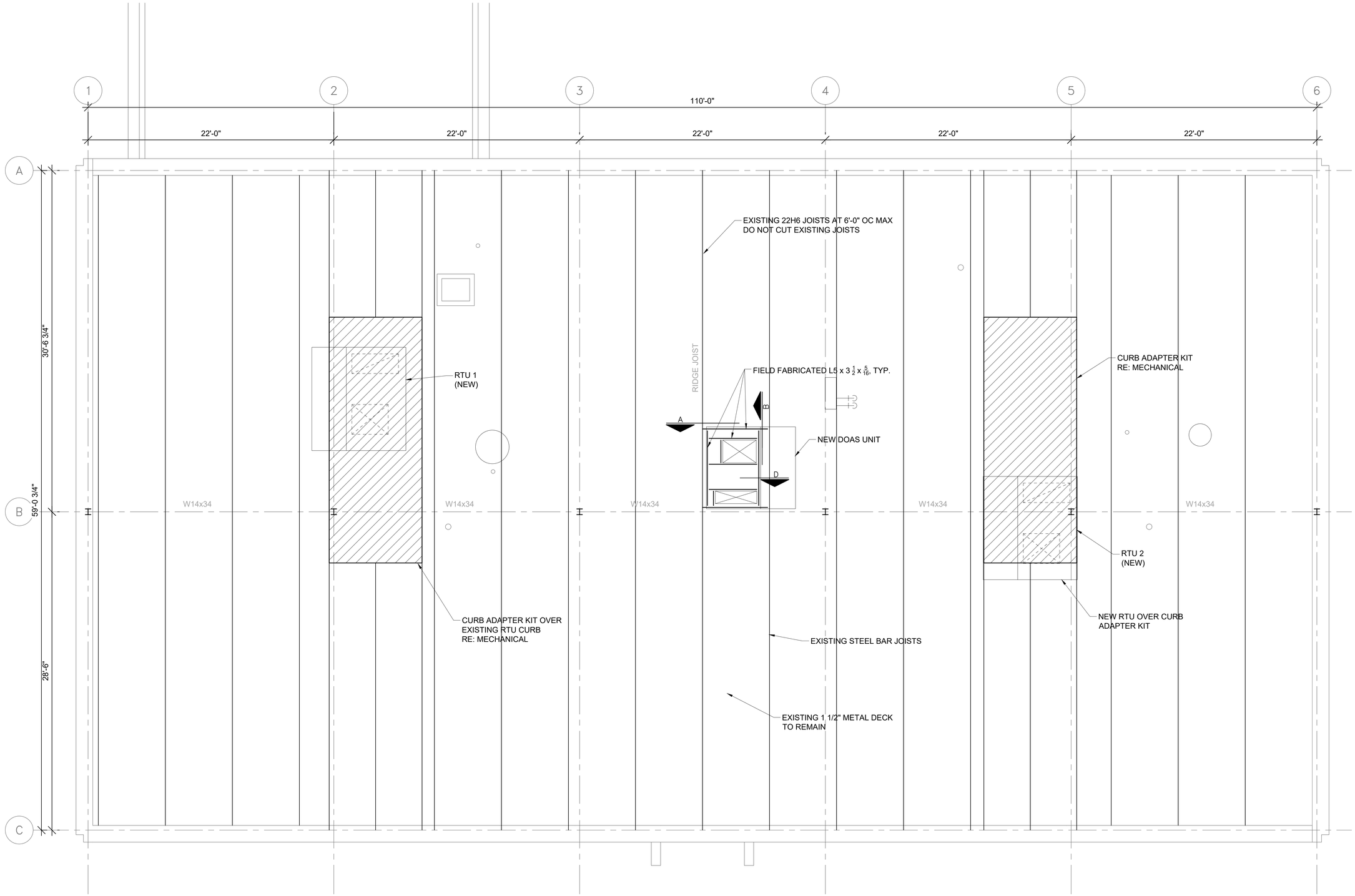
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: SLS
CHECKED BY: SLS
DESIGNED BY: SLS

SHEET TITLE:
STRUCTURAL DETAILS

SHEET NUMBER:
S1

22 OF 25 SHEETS
12/07/2022



ROOF FRAMING PLAN

SCALE: 1/4" = 1'0"

PLAN NOTES:

1. REPAIR / PATCH ROOFING AS REQUIRED TO INSTALL NEW RTU'S. ROOF WARRANTY MUST BE RETAINED. SEE APPENDIX 1 FOR WARRANTY.

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DRAWN BY: SLS
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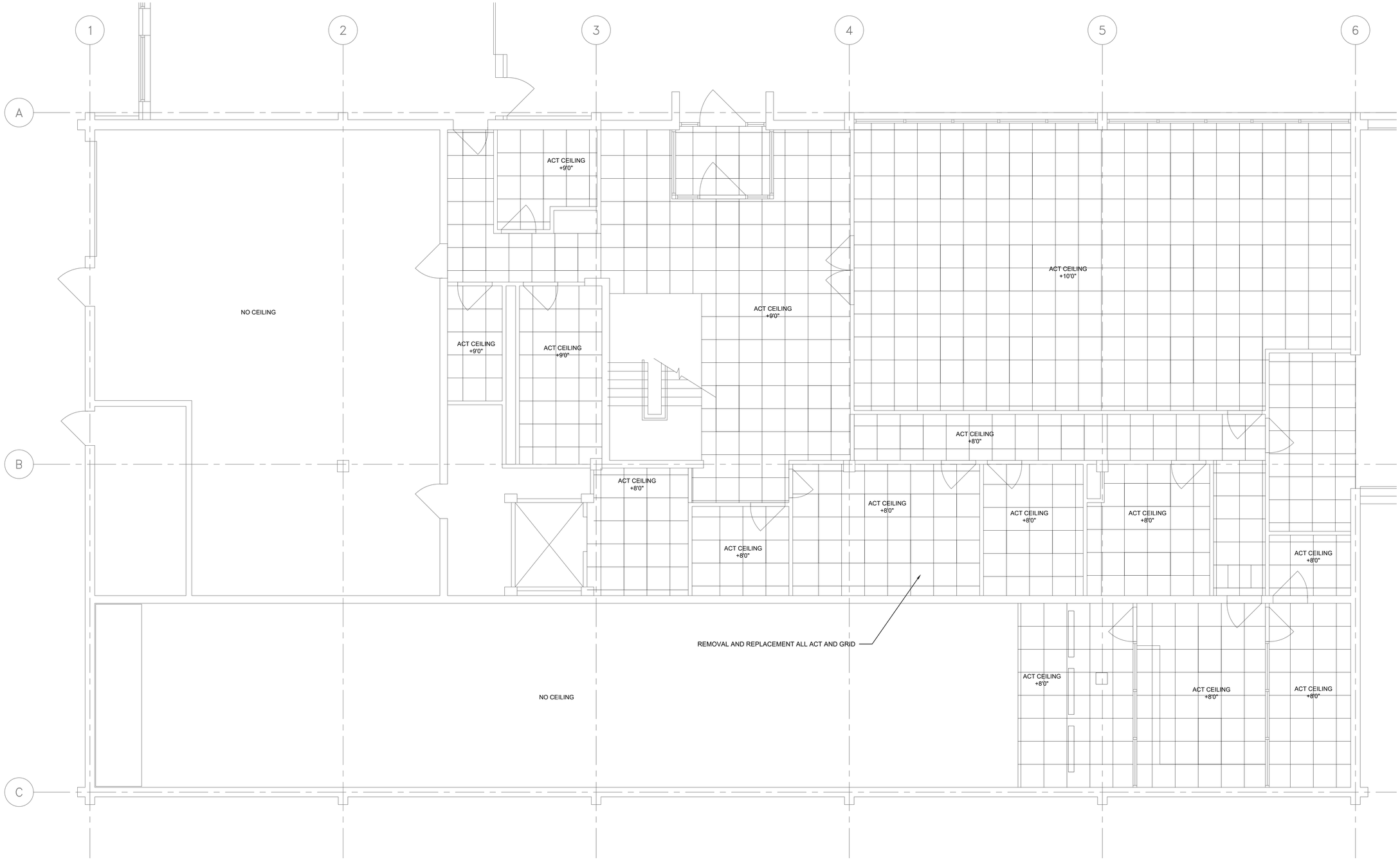
DESIGNED BY: SLS

SHEET TITLE:
ROOF
FRAMING PLAN

SHEET NUMBER:
S2

23 OF 25 SHEETS
12/07/2022



GROUND FLOOR REFLECTED CEILING PLAN

SCALE: 1/4" = 1'0"

0 1' 2' 4' 1/4"=1'

NOTES:

1. PROJECT IS SEISMIC DESIGN CATEGORY "D"
2. ACOUSTICAL TILE SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH ASTM C635, ASTM C636, AND ASTM E580.
3. WIDTH OF PERIMETER SUPPORTING CLOSURE ANGLE OR CHANNEL SHALL NOT BE LESS THAN 2 INCHES.
4. PERIMETER CLOSURE ANGLES / CHANNELS SHALL BE SCREWED TO WALL STUDS ON TWO ADJACENT WALLS.
5. PROVIDE 3/4" CLEARANCE AT PERIMETER ON UNATTACHED WALLS AND STABILIZER BARS TO PREVENT THE SPREAD OF MAIN BEAMS AND CROSS TEES.
6. USE HEAVY DUTY SUSPENSION SYSTEM.
7. 12 GA. HANGER WIRES ARE REQUIRED ON PERIMETER MAINS AND TEES WITHIN 8" OF WALL.
8. INSTALL CLUSTERS OF FOUR 12-GAUGE WIRES ARRAYED 90 DEGREES FROM ONE ANOTHER, SPACED AT 48" OC EACH WAY
9. REPLACE ALL ACT AND GRID. NEW ACT SHALL BE 2x2. SEE SPECS ON SHEET S1.

STATE OF MISSOURI
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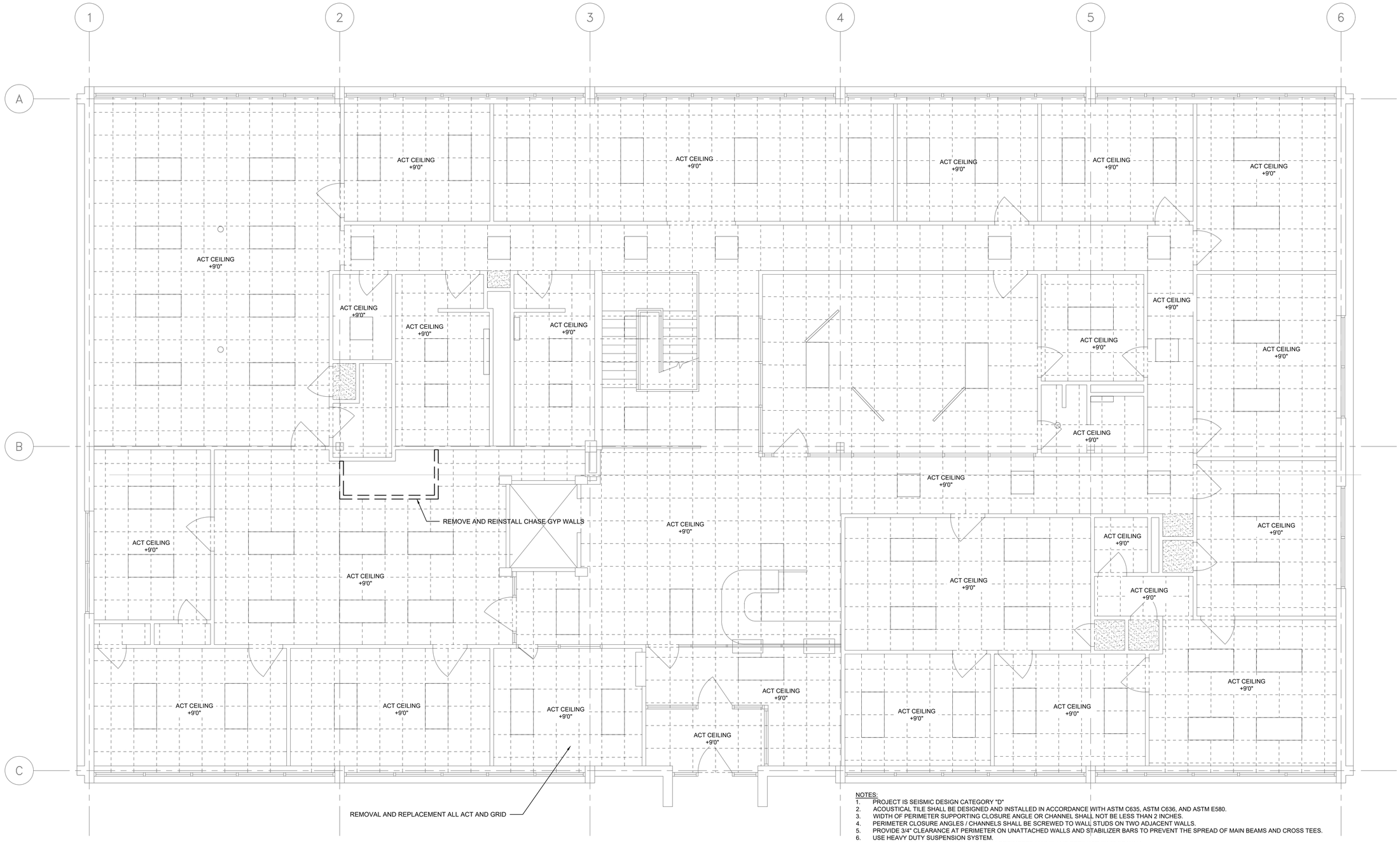
DRAWN BY: SLS
CHECKED BY: SLS
DESIGNED BY: SLS

SHEET TITLE:
GROUND FLOOR REFLECTED CEILING PLAN

SHEET NUMBER:
S3

24 OF 25 SHEETS
12/07/2022



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9. REPLACE ALL ACT AND GRID. NEW ACT SHALL BE 2x2. SEE SPECS ON SHEET S1.

FIRST FLOOR REFLECTED CEILING PLAN

SCALE: 1/4" = 1'0"

0 1' 2' 4' 1/4"=1'

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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

REPLACE HVAC
TROOP E HEADQUARTERS

4947 HIGHWAY 67 NORTH
POPLAR BLUFF, MO 63901

PROJECT # R2142-01
SITE# 4758
FACILITY# 55125

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 12/07/2022

DRAWN BY: SLS
CHECKED BY: SLS
DESIGNED BY: SLS

SHEET TITLE:
FIRST FLOOR REFLECTED CEILING PLAN

SHEET NUMBER:
S4

25 OF 25 SHEETS
12/07/2022