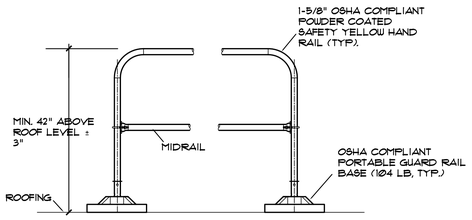


SPECIAL NOTE:
PROVIDE GUARD RAIL AT ANY UNIT WITH LESS THAN 10'-0" FROM ROOF PARAPET TO UNIT SERVICE ACCESS REQUIREMENTS AS DEFINED BY THE UNIT MANUFACTURER.

GUARD RAIL DETAIL

NOT TO SCALE

DEMOLITION NOTES

(D1) REMOVE ROOFTOP UNIT COMPLETE, INCLUDING ASSOCIATED POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. EXISTING CURB ON METAL ROOF TO REMAIN. REMOVE BI-POLAR IONIZATION KITS AND STORE FOR RE-USE.

(D2) ABANDON ROOFTOP UNIT RTU-14 ON OLD ROOF BELOW METAL ROOF DISCONNECT ASSOCIATED POWER (SEE ELECTRICAL DRAWINGS) DISCONNECT CONTROLS.

(D3) ABANDON ENERGY RECOVERY UNIT ON OLD ROOF BELOW METAL ROOF DISCONNECT ASSOCIATED POWER (SEE ELECTRICAL DRAWINGS). DISCONNECT CONTROLS.

(D4) REMOVE VARIABLE VOLUME VARIABLE TEMPERATURE (VVT) BYPASS DAMPERS AND ASSOCIATED 14"ø DUCTS FROM SUPPLY AIR TRUNK TO RETURN AIR TRUNK. PROVIDE GALV. SHEET METAL PATCHES ON TRUNK DUCTS, SCREW AND SEAL WITH DUCT SEALED. REPAIR DUCT INSULATION WITH GLASS FABRIC AND MASTIC.

(D5) REMOVE CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. REPAIR WALL AND FLOOR TO MATCH EXISTING. GROUT HOLES IN EXTERIOR WALL.

(D6) REMOVE OUTDOOR SECTION OF SPLIT SYSTEM CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIG. LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS.

(D7) REMOVE DUCTED FAN COIL UNIT CONCEALED ABOVE CEILING COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CONNECT NEW DUCTED VRF AIR HANDLING UNITS TO EXISTING SUPPLY AND RETURN AIR TRUNKS.

(D8) REMOVE TRUNK DUCT INDICATED BY HATCHING AS REQUIRED FOR NEW WORK. REMOVAL SHALL INCLUDE DUCT HANGERS AND SUPPORTS.

(D9) REMOVE SUPPLY AIR DIFFUSER AND RUNOUT DUCT COMPLETE INCLUDING DUCT HANGERS AND SUPPORTS. CAP RUNOUT AT TRUNK.

(D10) REMOVE ROOF EXHAUST FAN COMPLETE INCLUDING POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP.

(D11) REMOVE O.A. INTAKE VENT ON ROOF COMPLETE. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP. REMOVE O.A. DUCT TO EXIST. R.A. DUCT COMPLETE AND CAP AND SEAL AIR TIGHT.

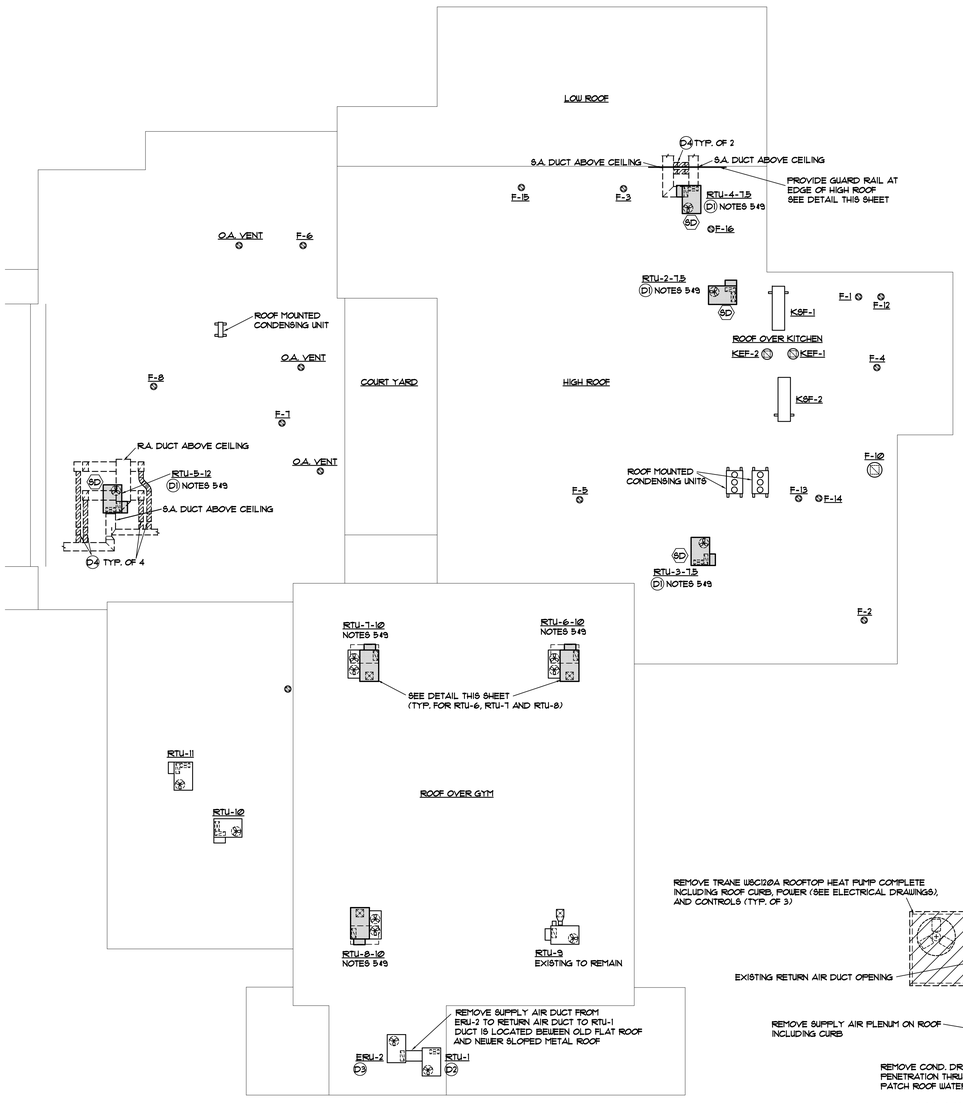
(D12) REMOVE OUTSIDE AIR SUPPLY AND RETURN AIR EXHAUST TO/FROM ENERGY RECOVERY UNIT (ERU) IN ATTIC PENTHOUSE AS REQUIRED FOR NEW OUTSIDE AIR INTAKE DUCT AND RETURN AIR EXHAUST TO/FROM NEW SPLIT SYSTEM DEDICATED OUTSIDE AIR SYSTEM (DOAS) IN MECHANICAL ROOM. ABANDON ERU IN PLACE.

SYMBOLS

- FLEXIBLE DUCT (6 FT. MAX. LENGTH)
- RIGID ROUND RUNOUT DUCT
- NEW MATERIAL
- CFM — AIR FLOWRATE, CUBIC FEET PER MINUTE
- (1) 100 — GRILLE OR DIFFUSER MARK, BALANCING CFM
- (E) 100 — EXISTING GRILLE OR DIFFUSER MARK, BALANCING CFM
- RECTANGULAR BAL. DFFR. (RUSKIN MD-35)
- TURNING VANE
- SPIN-IN TAKEOFF WITH SCOOP AND DAMPER
- D — CONDENSATE DRAIN LINE (INSULATED)
- R — REFRIGERANT LINES (REPRESENTS BOTH LINES)
- T — THERMOSTAT
- SD — DUCT SMOKE DETECTOR
- CONNECT NEW TO EXISTING

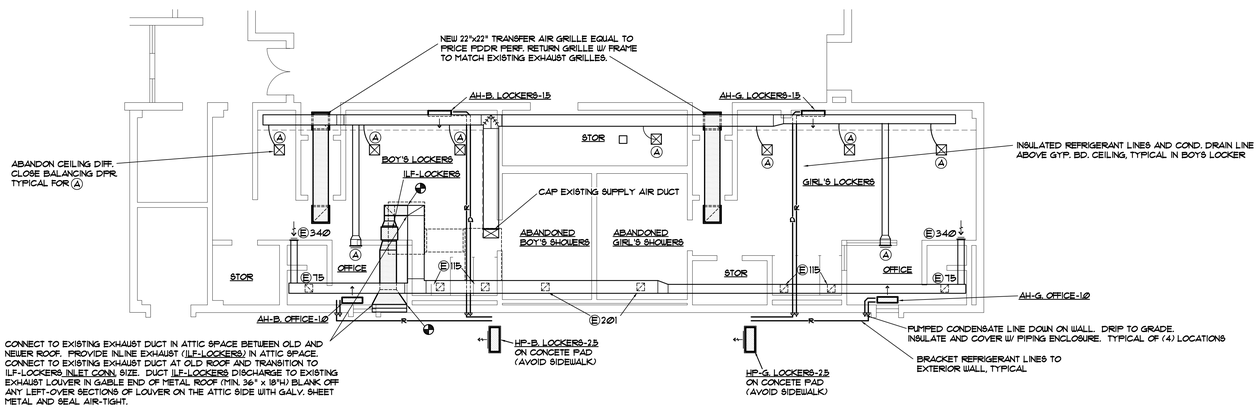
GENERAL NOTES (ALL SHEETS)

1. DO NOT SCALE DRAWINGS. ROUGH FROM EXISTING CONDITIONS AND EQUIPMENT MANUFACTURER'S DRAWINGS.
2. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED. DUCT SIZES SHOWN ON DRAWINGS ARE INTERIOR DIMENSIONS.
3. WHENEVER THE WORD "PROVIDE" IS USED IT SHALL MEAN FURNISH AND INSTALL COMPLETE AND READY FOR USE.
4. PROVIDE GLASSFAB AND MASTIC ON ALL DUCT INSULATION. DUCT TAPE WILL NOT BE ACCEPTED.
5. PROVIDE FULL SIZE CONDENSATE DRAIN LINE FOR ALL NEW ROOFTOP UNITS (RTU's) AND ROUTE ALONG STANDING SEAMS TO ROOF GUTTERS. CONDENSATE DRAIN LINES FROM NEW RTU's SHALL BE PVC. OR CONNECT TO EXISTING COND. PIPE THRU ROOF.
6. INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING, INCLUDING VIBRATION ISOLATION SHALL COMPLY WITH 2018 INTERNATIONAL BUILDING CODE FOR SEISMIC PROTECTION. SEE SPECIFICATIONS.
7. (SD) UNITS GREATER THAN 2,000 CFM, TEST EXISTING DUCT SMOKE DETECTORS AS REQUIRED BY THE AHJ. REPAIR/REPLACE ANY INOPERABLE DUCT SMOKE DETECTORS.
8. PROVIDE AND LOCATE NEW PROGRAMMABLE ZONE SENSORS IN SAME LOCATION OF EXISTING THERMOSTATS.
9. PROVIDE NEW CURBS AND DUCT ADAPTOR FOR NEW ROOFTOP HEAT PUMPS. CONNECT TO EXISTING SUPPLY AND RETURN AIR DUCTS.



HVAC RENOVATION FLOOR PLAN

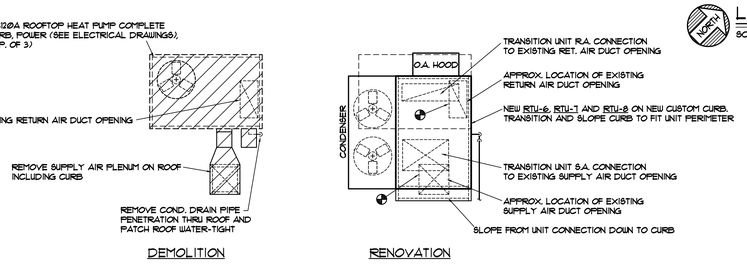
SCALE: 1/16" = 1'-0"



CONNECT TO EXISTING EXHAUST DUCT IN ATTIC SPACE BETWEEN OLD AND NEWER ROOF. PROVIDE INLINE EXHAUST (ILF-LOCKERS) IN ATTIC SPACE. CONNECT TO EXISTING EXHAUST DUCT AT OLD ROOF AND TRANSITION TO ILF-LOCKERS INLET CONN. SIZE. DUCT ILF-LOCKERS DISCHARGE TO EXISTING EXHAUST LOUVER IN GABLE END OF METAL ROOF (MIN. 36" x 18"H) BLANK OFF ANY LEFT-OVER SECTIONS OF LOUVER ON THE ATTIC SIDE WITH GALV. SHEET METAL AND SEAL AIR-TIGHT.

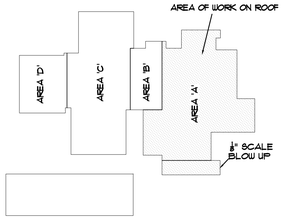
LOCKER ROOM HVAC PLAN

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



RTU-6, RTU-7 AND RTU-8 UNIT DETAIL

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



KEY PLAN

NO SCALE

Schneider Electric
1660 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 3486
www.schneiderelectric.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13696 03-23-22 DANNY WILLIS

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR BRUNSWICK COUNTY SCHOOL DISTRICT

SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE: PARTIAL HVAC ROOF PLAN and LOCKER ROOM HVAC PLAN ECM-2

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER

M101

SHT. OF

DEMOLITION NOTES

D1 REMOVE ROOFTOP UNIT COMPLETE, INCLUDING ASSOCIATED POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. EXISTING CURB ON METAL ROOF TO REMAIN. REMOVE BI-POLAR IONIZATION KITS AND STORE FOR RE-USE.

D2 REMOVE ROOFTOP UNIT RTU-14 ON OLD ROOF BELOW METAL ROOF COMPLETE INCLUDING ASSOCIATED POWER (SEE ELECTRICAL (DRAWINGS), CONTROLS AND UNIT CURB.

D3 REMOVE ENERGY RECOVERY UNIT ON OLD ROOF BELOW METAL ROOF COMPLETE INCLUDING ASSOCIATED POWER (SEE ELECTRICAL (DRAWINGS), CONTROLS AND UNIT CURB.

D4 REMOVE VARIABLE VOLUME VARIABLE TEMPERATURE (VVT) BYPASS DAMPERS AND ASSOCIATED 14"ø DUCTS FROM SUPPLY AIR TRUNK TO RETURN AIR TRUNK. PROVIDE GALV. SHEET METAL PATCHES ON TRUNK DUCTS, SCREW AND SEAL WITH DUCT SEALED. REPAIR DUCT INSULATION WITH GLASS FABRIC AND MASTIC.

D5 REMOVE CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. REPAIR WALL AND FLOOR TO MATCH EXISTING. GROUT HOLES IN EXTERIOR WALL.

D6 REMOVE OUTDOOR SECTION OF SPLIT SYSTEM CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIG. LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS.

D7 REMOVE DUCTED FAN COIL UNIT CONCEALED ABOVE CEILING COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CONNECT NEW DUCTED VRF AIR HANDLING UNITS TO EXISTING SUPPLY AND RETURN AIR TRUNKS. REMOVE BI-POLAR IONIZATION KITS, STORE AND RE-USE.

D8 REMOVE TRUNK DUCT INDICATED BY HATCHING AS REQUIRED FOR NEW WORK. REMOVAL SHALL INCLUDE DUCT HANGERS AND SUPPORTS.

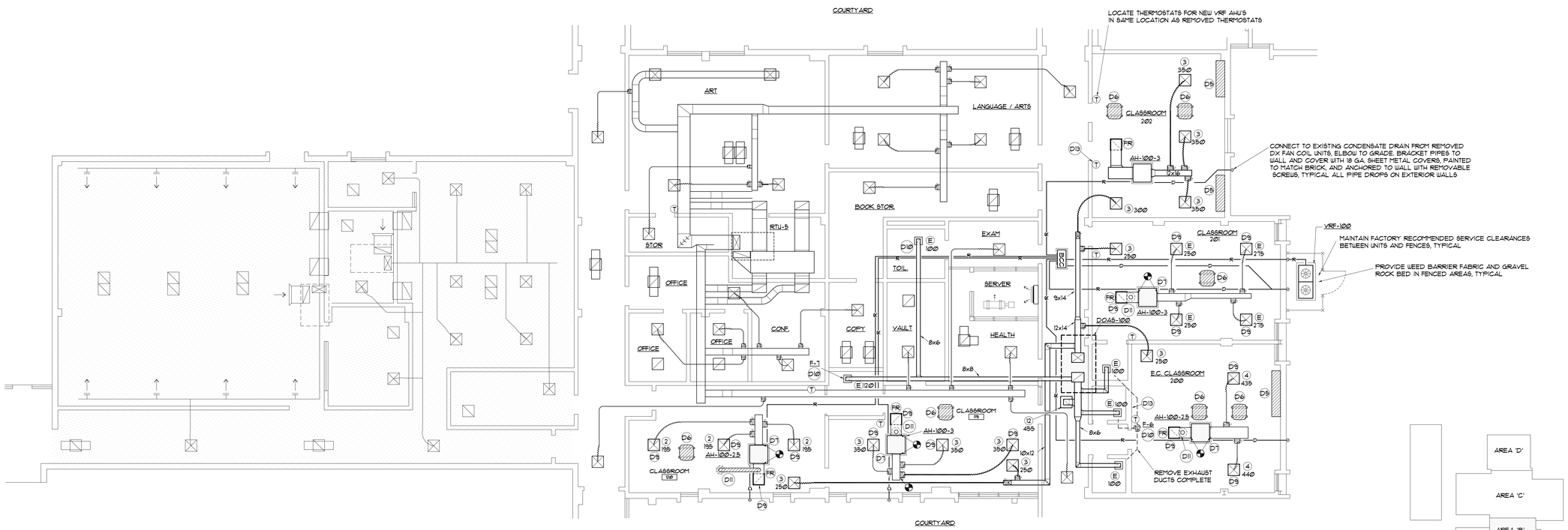
D9 REMOVE SUPPLY AIR DIFFUSER AND RUNOUT DUCT COMPLETE INCLUDING DUCT HANGERS AND SUPPORTS. CAP RUNOUT AT TRUNK.

D10 REMOVE ROOF EXHAUST FAN COMPLETE INCLUDING POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP. REMOVE ASSOCIATED EXHAUST DUCT TO EXHAUST GRILLES. CONNECT EXISTING EXHAUST GRILLES TO NEW DUCTS AS SHOWN.

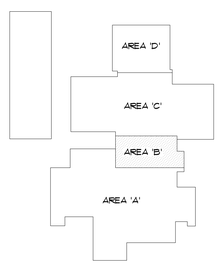
D11 REMOVE O.A. INTAKE VENT ON ROOF COMPLETE. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP. REMOVE O.A. DUCT TO EXIST. R.A. DUCT COMPLETE AND CAP AND SEAL AIR TIGHT.

D12 REMOVE OUTSIDE AIR SUPPLY AND RETURN AIR EXHAUST TO/FROM ENERGY RECOVERY UNIT (ERU) IN ATTIC PENTHOUSE AS REQUIRED FOR NEW OUTSIDE AIR INTAKE DUCT AND RETURN AIR EXHAUST TO/ FROM NEW SPLIT SYSTEM DEDICATED OUTSIDE AIR SYSTEM (DOAS) IN MECHANICAL ROOM. ABANDON ERU IN PLACE.

D13 REMOVE SECOND THERMOSTAT COMPLETE AND PROVIDE GALV. METAL COVER OVER J-BOX.



HVAC RENOVATION FLOOR PLAN - AREA 'B'
SCALE: 1/8" = 1'-Ø"



KEY PLAN
NO SCALE

Schneider Electric
1660 International Drive
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 3486
www.schneiderelectric.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13696 Ø3-23-22 DANNY WILLIS

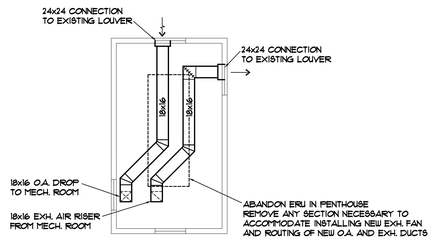
SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
PARTIAL HVAC FLOOR PLAN AERA 'B' - ECM-1C

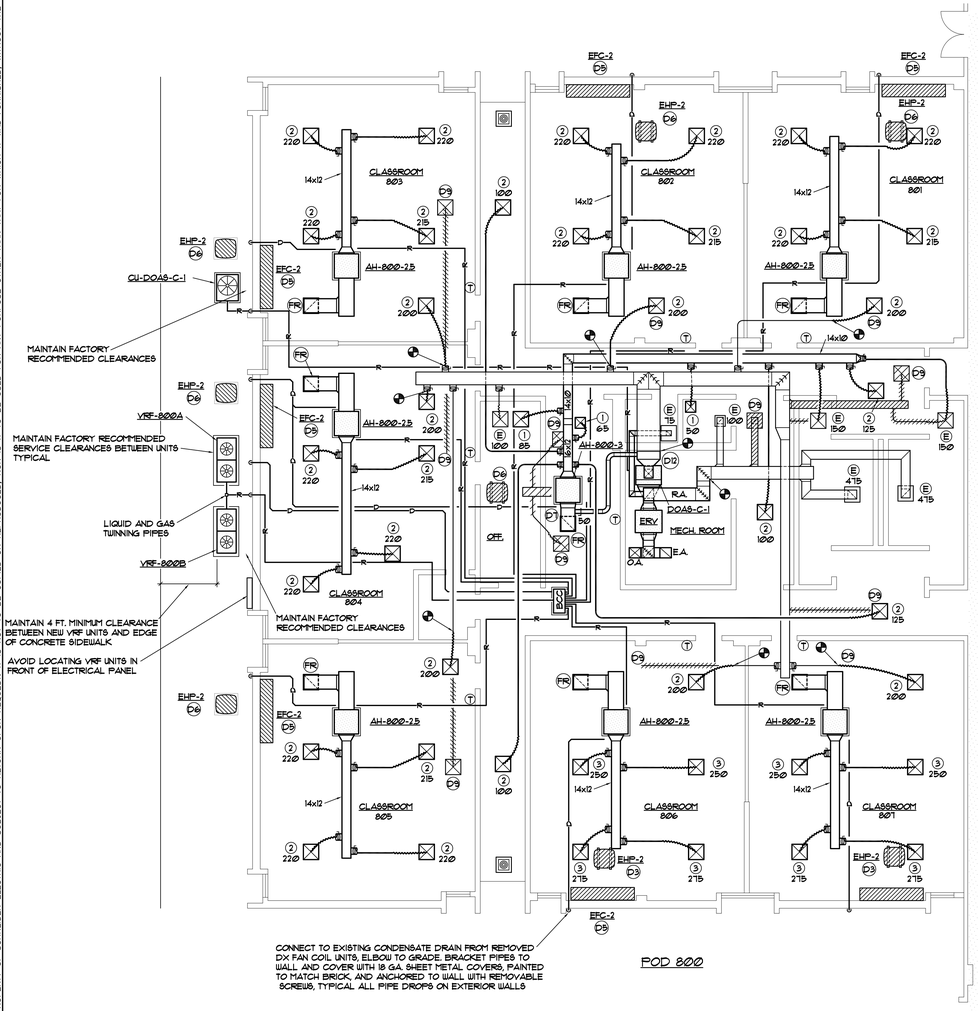
MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

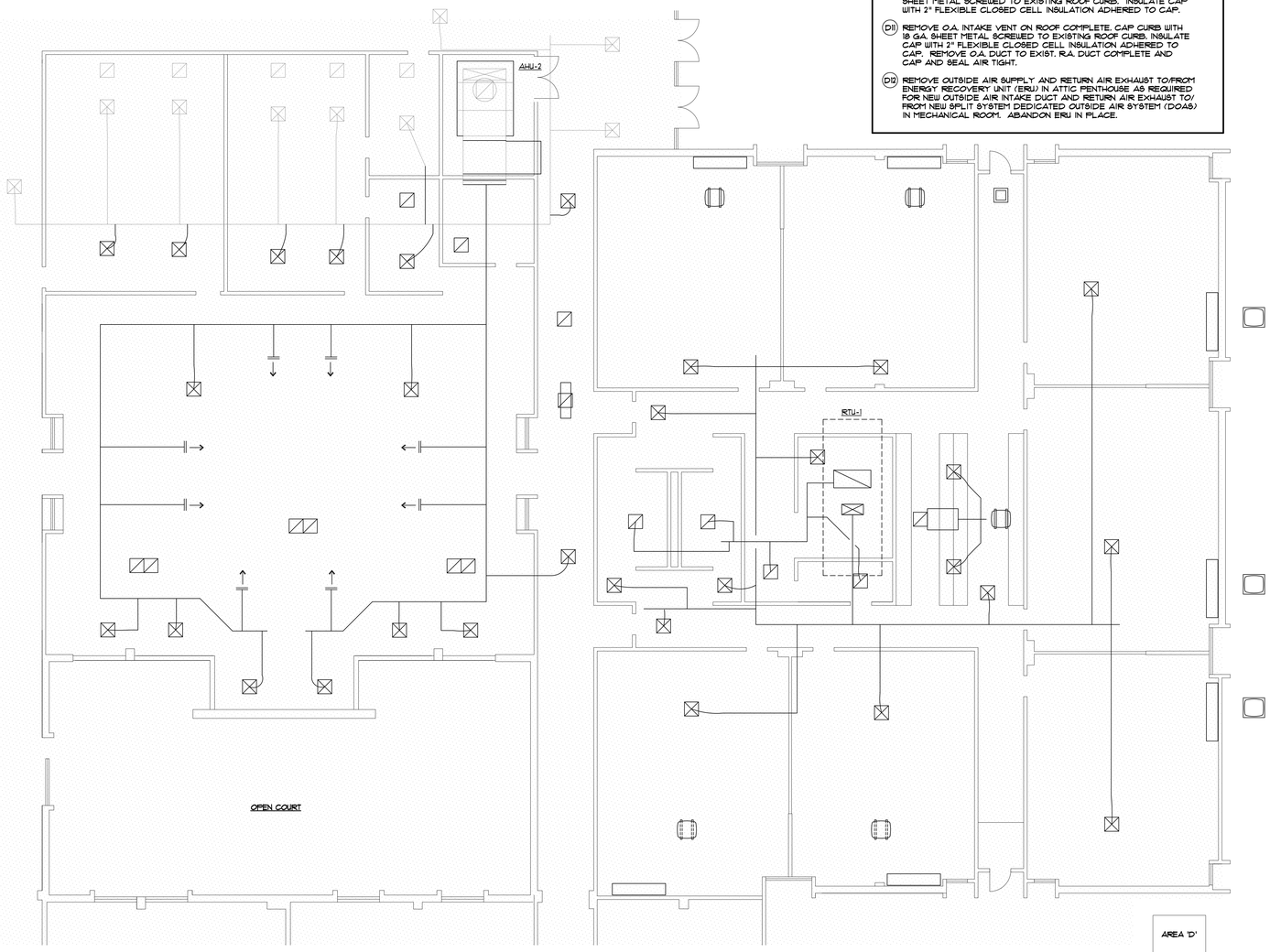
SHEET NUMBER
M201
SHT. OF



PENTHOUSE ROOM - POD 800
RENOVATION PLAN SCALE: 1/8" = 1'-0"



POD 800



HVAC RENOVATION FLOOR PLAN - AREA 'C'
SCALE: 1/8" = 1'-0"

DEMOLITION NOTES

D1 REMOVE ROOFTOP UNIT COMPLETE, INCLUDING ASSOCIATED POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. EXISTING CURB ON METAL ROOF TO REMAIN. REMOVE BI-POLAR IONIZATION KITS AND STORE FOR RE-USE.

D2 REMOVE ROOFTOP UNIT RTU-14 ON OLD ROOF BELOW METAL ROOF COMPLETE INCLUDING ASSOCIATED POWER (SEE ELECTRICAL (DRAWINGS), CONTROLS AND UNIT CURB.

D3 REMOVE ENERGY RECOVERY UNIT ON OLD ROOF BELOW METAL ROOF COMPLETE INCLUDING ASSOCIATED POWER (SEE ELECTRICAL (DRAWINGS), CONTROLS AND UNIT CURB.

D4 REMOVE VARIABLE VOLUME VARIABLE TEMPERATURE (VVT) BYPASS DAMPERS AND ASSOCIATED 14"ø DUCTS FROM SUPPLY AIR TRUNK TO RETURN AIR TRUNK. PROVIDE GALV. SHEET METAL PATCHES ON TRUNK DUCTS, SCREW AND SEAL WITH DUCT SEALED. REPAIR DUCT INSULATION WITH GLASS FABRIC AND MASTIC.

D5 REMOVE CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. REPAIR WALL AND FLOOR TO MATCH EXISTING. GROUT HOLES IN EXTERIOR WALL.

D6 REMOVE OUTDOOR SECTION OF SPLIT SYSTEM CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIG. LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS.

D7 REMOVE DUCTED FAN COIL UNIT CONCEALED ABOVE CEILING COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CONNECT NEW DUCTED VRF AIR HANDLING UNITS TO EXISTING SUPPLY AND RETURN AIR TRUNKS.

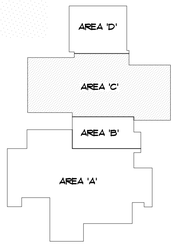
D8 REMOVE TRUNK DUCT INDICATED BY HATCHING AS REQUIRED FOR NEW WORK. REMOVAL SHALL INCLUDE DUCT HANGERS AND SUPPORTS.

D9 REMOVE SUPPLY AIR DIFFUSER AND RUNOUT DUCT COMPLETE INCLUDING DUCT HANGERS AND SUPPORTS. CAP RUNOUT AT TRUNK.

D10 REMOVE ROOF EXHAUST FAN COMPLETE INCLUDING POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP.

D11 REMOVE O.A. INTAKE VENT ON ROOF COMPLETE. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP. REMOVE O.A. DUCT TO EXIST. R.A. DUCT COMPLETE AND CAP AND SEAL AIR TIGHT.

D12 REMOVE OUTSIDE AIR SUPPLY AND RETURN AIR EXHAUST TO/FROM ENERGY RECOVERY UNIT (ERU) IN ATTIC PENTHOUSE AS REQUIRED FOR NEW OUTSIDE AIR INTAKE DUCT AND RETURN AIR EXHAUST TO/FROM NEW SPLIT SYSTEM DEDICATED OUTSIDE AIR SYSTEM (DOAS) IN MECHANICAL ROOM. ABANDON ERU IN PLACE.



KEY PLAN
NO SCALE

Schneider Electric
Schneider Electric
1660 International Drive
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 3486
www.schneiderelectric.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13696 03-23-22 DANNY WILSON

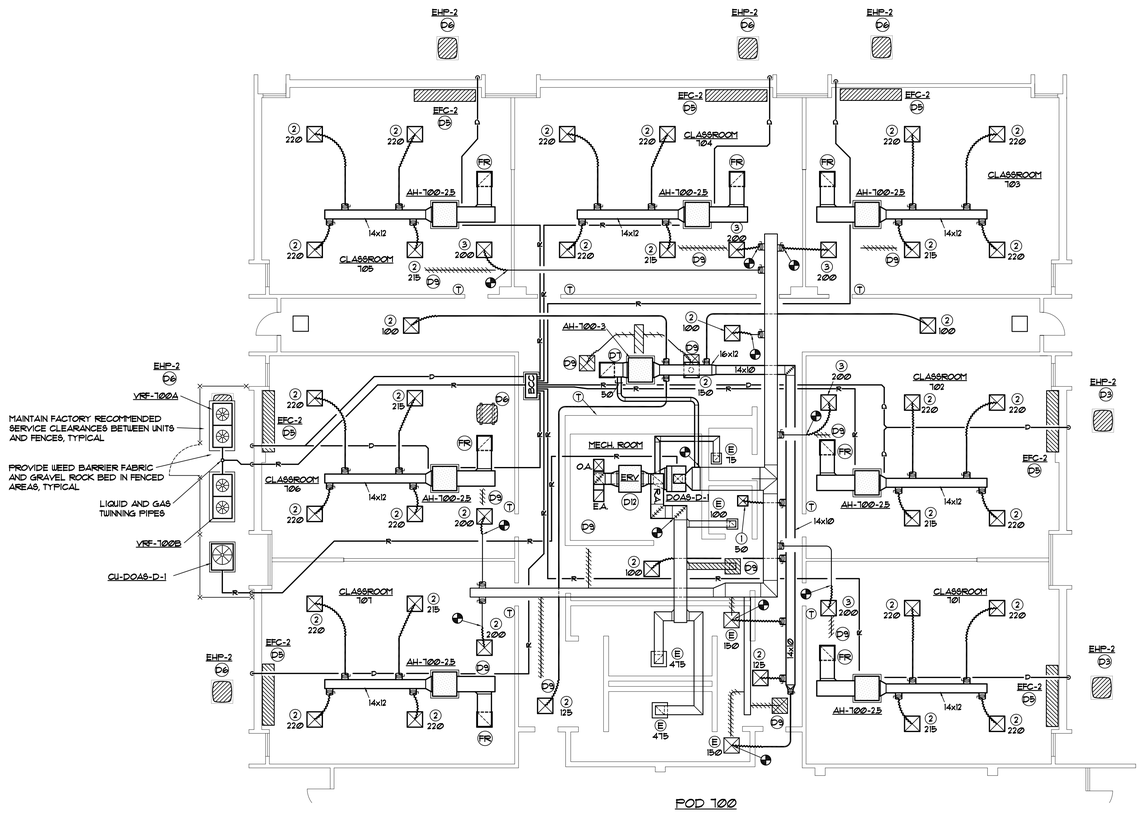
SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT
FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
PARTIAL HVAC FLOOR PLAN
AERA 'C' - ECM-1C

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER
M202
SHT. OF



POD 100

HVAC RNOVATION FLOOR PLAN - AREA 'D'

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

DEMOLITION NOTES

D1 REMOVE ROOFTOP UNIT COMPLETE, INCLUDING ASSOCIATED POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. EXISTING CURB ON METAL ROOF TO REMAIN. REMOVE BI-POLAR IONIZATION KITS AND STORE FOR RE-USE.

D2 REMOVE ROOFTOP UNIT RTU-14 ON OLD ROOF BELOW METAL ROOF COMPLETE INCLUDING ASSOCIATED POWER (SEE ELECTRICAL (DRAWINGS), CONTROLS AND UNIT CURB.

D3 REMOVE ENERGY RECOVERY UNIT ON OLD ROOF BELOW METAL ROOF COMPLETE INCLUDING ASSOCIATED POWER (SEE ELECTRICAL (DRAWINGS), CONTROLS AND UNIT CURB.

D4 REMOVE VARIABLE VOLUME VARIABLE TEMPERATURE (VVT) BYPASS DAMPERS AND ASSOCIATED 14"ø DUCTS FROM SUPPLY AIR TRUNK TO RETURN AIR TRUNK. PROVIDE GALV. SHEET METAL PATCHES ON TRUNK DUCTS, SCREW AND SEAL WITH DUCT SEALED. REPAIR DUCT INSULATION WITH GLASS FABRIC AND MASTIC.

D5 REMOVE CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. REPAIR WALL AND FLOOR TO MATCH EXISTING. GROUT HOLES IN EXTERIOR WALL.

D6 REMOVE OUTDOOR SECTION OF SPLIT SYSTEM CLASSROOM VENTILATOR UNIT COMPLETE INCLUDING ASSOCIATED REFRIG. LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. SEAL ALL ABANDONED ROOF PENETRATIONS FOR REFRIG. LINES, CONTROLS AND POWER WEATHER-TIGHT.

D7 REMOVE DUCTED FAN COIL UNIT CONCEALED ABOVE CEILING COMPLETE INCLUDING ASSOCIATED REFRIGERANT LINES, POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CONNECT NEW DUCTED VRF AIR HANDLING UNITS TO EXISTING SUPPLY AND RETURN AIR TRUNKS.

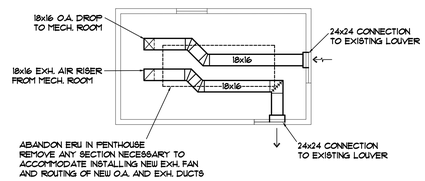
D8 REMOVE TRUNK DUCT INDICATED BY HATCHING AS REQUIRED FOR NEW WORK. REMOVAL SHALL INCLUDE DUCT HANGERS AND SUPPORTS.

D9 REMOVE SUPPLY AIR DIFFUSER AND RUNOUT DUCT COMPLETE INCLUDING DUCT HANGERS AND SUPPORTS. CAP RUNOUT AT TRUNK.

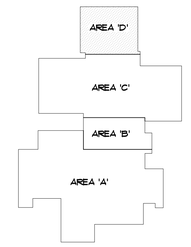
D10 REMOVE ROOF EXHAUST FAN COMPLETE INCLUDING POWER (SEE ELECTRICAL DRAWINGS) AND CONTROLS. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP.

D11 REMOVE O.A. INTAKE VENT ON ROOF COMPLETE. CAP CURB WITH 18 GA. SHEET METAL SCREWED TO EXISTING ROOF CURB. INSULATE CAP WITH 2" FLEXIBLE CLOSED CELL INSULATION ADHERED TO CAP. REMOVE O.A. DUCT TO EXIST. R.A. DUCT COMPLETE AND CAP AND SEAL AIR TIGHT.

D12 REMOVE OUTSIDE AIR SUPPLY AND RETURN AIR EXHAUST TO/FROM ENERGY RECOVERY UNIT (ERU) IN ATTIC PENTHOUSE AS REQUIRED FOR NEW OUTSIDE AIR INTAKE DUCT AND RETURN AIR EXHAUST TO/ FROM NEW SPLIT SYSTEM DEDICATED OUTSIDE AIR SYSTEM (DOAS) IN MECHANICAL ROOM. ABANDON ERU AND ASSOCIATED CONDENSING UNIT IN PLACE.



PENTHOUSE ROOM - POD 100
RENOVATION PLAN SCALE: 1/8" = 1'-0"



KEY PLAN
NO SCALE

Schneider Electric
1660 International Drive
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 3486
www.schneiderelectric.com

NORTH CAROLINA PROFESSIONAL SEAL 13696 03-23-22 ENGINEER DANNY WILSON

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
PARTIAL HVAC FLOOR PLAN
AERA 'D' - ECM-1C

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER

M203

SHT. OF

PACKAGED DEDICATED OUTDOOR AIR UNIT WITH HEAT RECLAIM SCHEDULE (4)(6)(7)(8)(9)(10)(11)(12)(13)

MARK	AAON MODEL (1)	SUPPLY FAN (3)			EXHAUST FAN (3)			SUMMER										WINTER								EFFICIENCIES			ELECTRICAL		
								ENTHALPY WHEEL				DX COIL		TOTAL	SEN	HOT GAS RE-HEAT COIL			LVG.(D) DEW.POINT	ENTHALPY WHEEL				ELECTRIC HEAT				EER	MRC	MRE	VOLTS	MCA	MAX FUSE
		O.A. SUPPLY CFM	ESP	HP	EXHAUST CFM	ESP	HP	(A) EDB/EWB	(B) LDB/LWB	(F) EDB/EWB	(G) LDB/LWB	(B) EDB/EWB	(C) LDB/LWB	MBH	MBH	MBH	(C) EDB/EWB	(D) LDB/LWB		(A) EDB	(B) LDB	(F) EDB	(G) LDB	KW	OUTPUT MBH	(D) EDB	(E) LDB		(LB/H)	(LB/KW-H)			
DOAS-100	RN-008-3-A-E619	1,200 (5)	1.0"	1.0	975	1.0"	1.0	93.5/77.9	84.6/71.7	75/63	91.1/76.6	84.6/71.7	48.3/48.1	112.5	110.3	31.0	48.3/48.1	72.0/57.9	48.0	17.0	42.9	75	24.8	20	68.3	41.1	94.2	13.2	53.8	8.0	460/3	36.0	40

(1) OR EQUAL BY VALENT, TRANE, GREENHECK OR APPROVED EQUAL.

(2) VOLTAGE SHALL MATCH AVAILABLE VOLTAGE AND PHASE AT THE SITE (SEE ELECTRICAL DRGS.)

(3) BACKWARD CURVED PLENUM FANS WITH ECM MOTORS

(4) PROVIDE WITH DESICCANT ENERGY RECOVERY WHEEL, INTERNAL PROTECTION SHALL BE DOUBLE WALL WITH 2" INSULATION, OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE NON INSULATED MOTORIZED (LOW LEAK), INTAKE AND EXHAUST HOODS, CONDENSER HAILGUARD, AND HIGH EFFICIENCY FILTRATION (O.A. SUPPLY - MERV 13, EXHAUST - MERV 8)

(5) BALANCE TOTAL OUTSIDE AIR SUPPLY AND TOTAL EXHAUST AIR FLOWS (H) FOR THE SUM OF THE GRILLES AND DIFFUSERS.

(6) VARIABLE SPEED DIGITAL SCROLL COMPRESSOR W/ 20% - 100% MODULATION (FIRST CIRCUIT ONLY)

(7) MODULATING HOT-GAS REHEAT COIL

(8) AIR COOLED VARIABLE SPEED CONDENSER WITH HEAD PRESSURE CONTROL

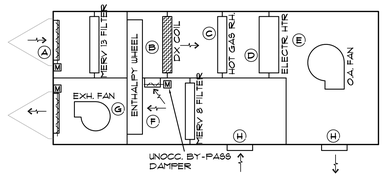
(9) DIGITAL SUPPLY AIR DUCT CONTROL W/ BACNET AND TD1 DISPLAY, AND ROOM AIR TEMPERATURE AND RELATIVE HUMIDITY SENSOR.

(10) OUTDOOR AIR HOOD WITH WASHABLE ALUMINUM MESH FILTERS, 2" PERMANENT MERV 13 FILTERS, AND 2-POSITION OUTDOOR DAMPER.

(11) NON-FUSED DISCONNECT SWITCH

(12) SUPPLY DISCHARGE SENSOR

(13) MICROPROCESSOR CONTROLS WITH BACNET COMMUNICATIONS INTERFACE



DEDICATED OUTDOOR AIR UNIT (4)(6)(7)(8)(9)(10)(11)(12)(13)

MARK	AIR HANDLING UNIT (2) (3)														CONDENSING UNIT (2)						ENERGY RECOVERY VENTILATOR (ERV) (2)													
	TRANE MODEL (1)	O.A. SUPPLY CFM	ESP	HP	TOTAL MBH	SENS. MBH	EDB/EWB (B)	LDB/LWB (C)	HOT GAS RE-HEAT COIL				ELECTRIC HEAT			ELECTRICAL			MARK	TRANE MODEL (1)	NOMINAL TONS	EER / IEER (MATCHED W/ AHU)	ELECTRICAL			OUTSIDE AIR					RETURN / EXHAUST AIR				FILTERS O.A. & R.A.	ELECTRICAL		
									MBH	(C) EDB	(D) LDB	LVG.(D) DEW.POINT	KW	MBH	STAGES	VOLTS	MCA	MOP					VOLTS	MCA	MOP	CFM	S.P.	HP	(A) EDB/EWB	(B) LDB/LWB	CFM	S.P.	HP	(F) EDB/EWB		VOLTS	MCA	MOP
DOAS-C-1	BCVD054	1,500 (5)	1.0"	1.0	90.9	47.5	80.1/71.0	53.6/53.5	37.6	53.6	76.8	53.5	11.0	37.5	SCR	460/3	20.1	25	CU-DOAS-C-1	TTA090A4AAA	7.5	11.5 / 13.0	460/3	17.0	30	1,500	0.65"	1.5	89.1/77.9	80.1/71.0	1,125	1.0"	1.5	75/62.5	2" MERV 8	460/3	5.9	15
DOAS-D-1	BCVD054	1,500 (5)	1.0"	1.0	90.9	47.5	80.1/71.0	53.6/53.5	37.6	53.6	76.8	53.5	11.0	37.5	SCR	460/3	20.1	25	CU-DOAS-D-1	TTA090A4AAA	7.5	11.5 / 13.0	460/3	17.0	30	1,500	0.65"	1.5	89.1/77.9	80.1/71.0	1,125	1.0"	1.5	75/62.5	2" MERV 8	460/3	5.9	15

(1) OR APPROVED EQUAL.

(2) VOLTAGE SHALL MATCH AVAILABLE VOLTAGE AND PHASE AT THE SITE (SEE ELECTRICAL DRGS.)

(3) F.C. CENTRIFUGAL FAN WITH ECM MOTOR.

(4) PROVIDE WITH DESICCANT ENERGY RECOVERY WHEEL, INTERNAL PROTECTION SHALL BE DOUBLE WALL WITH 2" INSULATION, OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE NON INSULATED MOTORIZED (LOW LEAK), INTAKE AND EXHAUST HOODS, CONDENSER HAILGUARD, AND HIGH EFFICIENCY FILTRATION (O.A. SUPPLY - MERV 13, EXHAUST - MERV 8)

(5) BALANCE TOTAL OUTSIDE AIR SUPPLY AND TOTAL EXHAUST AIR FLOWS (H) FOR THE SUM OF THE GRILLES AND DIFFUSERS.

(6) VARIABLE SPEED DIGITAL SCROLL COMPRESSOR W/ 20% - 100% MODULATION (FIRST CIRCUIT ONLY)

(7) MODULATING HOT-GAS REHEAT COIL

(8) AIR COOLED VARIABLE SPEED CONDENSER WITH HEAD PRESSURE CONTROL

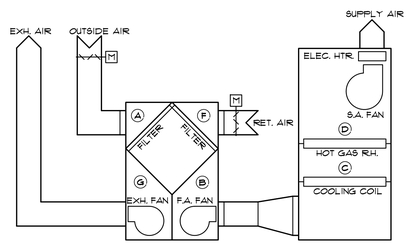
(9) PROVIDE TERMINAL STRIPS FOR ERV, AIR HANDLING UNITS, AND CONDENSING UNITS. SCHNEIDER ELECTRIC TO HANDLE FULL CONTROL OF DOAS SYSTEM.

(10) OUTDOOR AIR HOOD WITH WASHABLE ALUMINUM MESH FILTERS, 2" PERMANENT MERV 13 FILTERS, AND 2-POSITION OUTDOOR DAMPER.

(11) NON-FUSED DISCONNECT SWITCH

(12) SUPPLY DISCHARGE SENSOR

(13) MICROPROCESSOR CONTROLS WITH BACNET COMMUNICATIONS INTERFACE



DUCTLESS SPLIT SYSTEM HEAT PUMP SCHEDULE (1)

AIR HANDLING UNIT							HEAT PUMP							
MARK	MITSUBISHI (2) MODEL	CFM	COOLING		HEATING		MARK	MITSUBISHI (2) MODEL	TOTAL (3) COOLING	SEER	TOTAL (4) HEATING	HSPF	MCA AT 208/1	FUSE
			TOTAL	ENT.AIR	CAP.	ENT.AIR								
AH-B, LOCKER-1.5 (5)	NTXW18A1I2A	470	16.0	80/67	15.0	70	HP-B,LOCKER-2.0	NTXMM30A1I32AA	28.4	19.0	28.6	10.6	22.1	25
AH-B, OFFICE-1.0 (5)	NTXW12A1I2A	286	11.2	80/67	8.6	70								
AH-G, LOCKER-1.5 (5)	NTXW18A1I2A	470	16.0	80/67	15.0	70	HP-G,LOCKER-2.0	NTXMM30A1I32AA	28.4	19.0	28.6	10.6	22.1	25
AH-G, OFFICE-1.0 (5)	NTXW12A1I2A	286	11.2	80/67	8.6	70								

(1) AIR HANDLING UNIT AND HEAT PUMP OUTDOOR UNIT TO MATCH AVAILABLE ELECTRICAL SERVICE. AIR HANDLING UNIT SHALL HAVE ONE POINT OF POWER CONNECTION.

(2) OR EQUAL BY LG, DAIKIN, SAMSUNG OR APPROVED EQUAL,

(3) BASED ON 95°F CONDENSER AIR TEMPERATURE.

(4) BASED ON 47°F CONDENSER AIR TEMPERATURE.

(5) WALL MOUNTED INDOOR UNIT. PROVIDE WITH WIRED WALL THERMOSTAT (NO REMOTE CONTROL), LOW AMBIENT CONTROL, HARD START KIT, ANTI-SHORT CYCLING PROTECTION, AND CONDENSATE DRAIN KIT.

(6) PROVIDE MULTI-ZONE DUCTLESS SYSTEM WITH CONVENTIONAL THERMOSTAT ADAPTOR. SCHNEIDER ELECTRIC TO PROVIDE TEMPERATURE CONTROL AND CONNECTION TO BAS. CONTRACTOR TO PROVIDE CONTROL WIRING AND CONDUIT BETWEEN INDOOR UNITS AND OUTDOOR UNITS.

VENTILATING FAN SCHEDULE (1)

MARK	GREENHECK (2) MODEL	CFM	FAN S.P.	MOTOR SIZE	SONES	DRIVE	CONTROLLED BY
ILF-LOCKERS	SQ 130 (1)	1,700	1/2"	VG-3/4	11.9	DIRECT	BAS

(1) FANS TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL

(2) OR EQUAL BY COOK, BREIDERT, CARNES, TWIN CITY, PENN OR APPROVED EQUAL

(3) PROVIDE INLINE FANS WITH DISCONNECT, BACKDRAFT DAMPER, AND VARIABLE SPEED CONTROLLER (VG) LOCATED HIGH ON WALL FOR AIR BALANCING.

PACKAGED HEAT PUMP SCHEDULE (1)

MARK	AAON (2) MODEL	O.A. CFM	AUX. HEAT KW (NET)	INDOOR FAN					COOLING (3)				HEATING @ 47°F (4)			ELEC. at 460/3		NOTES
				TYPE	DRIVE	CFM	E.S.P.	H.P.	TOTAL	SENS.	ENT.AIR	EER	TOTAL	COP	HSPF	MCA	MOP	
RTU-2-T.5 (6)	RN-008-3-0-E689-12A	600	20 (11)	BC PLENUM	DIRECT W/ VFD	3,000	0.75"	2.0	86.7	66.0	79/66	11.2	91.7	3.2	--	34.0	35	(5)(7)(8)(9)(10)(12)(13)
RTU-3-T.5	RN-008-3-0-E689-12A	600	20 (11)	BC PLENUM	DIRECT W/ VFD	3,000	0.75"	2.0	86.7	66.0	79/66	11.2	91.7	3.2	--	34.0	35	(5)(7)(8)(9)(10)(12)(13)
RTU-4-T.5 (14)	RN-008-3-0-E689-12A	600	20 (11)	BC PLENUM	DIRECT W/ VFD	3,000	0.75"	2.0	86.7	66.0	79/66	11.2	91.7	3.2	--	34.0	35	(7)(8)(9)(10)(12)(13)
RTU-5-12 (6)(12)(14)	RN-010-3-0-E619-11A	900	20 (11)	BC PLENUM	DIRECT W/ VFD	3,000	0.75"	2.0	86.7	66.0	79/66	11.6	91.7	3.2	--	40.0	40	(7)(8)(9)(10)(12)(13)
RTU-6-10 (6)(12)(15)(16)	RN-010-3-0-E619-11A	600	20 (11)	BC PLENUM	DIRECT W/ VFD	4,000	0.50"	5.0	107.3	80.3	79/66	11.3	65.2	3.4	--	40.0	45	(5)(7)(8)(9)(10)(12)(13)
RTU-7-10 (6)(12)(15)(16)	RN-010-3-0-E619-11A	600	20 (11)	BC PLENUM	DIRECT W/ VFD	4,000	0.50"	5.0	107.3	80.3	79/66	11.3	65.2	3.4	--	40.0	45	(5)(7)(8)(9)(10)(12)(13)
RTU-8-10 (6)(12)(15)(16)	RN-010-3-0-E619-11A	600	20 (11)	BC PLENUM	DIRECT W/ VFD	4,000	0.50"	5.0	107.3	80.3	79/66	11.3	65.2	3.4	--	40.0	45	(5)(7)(8)(9)(10)(12)(13)

(1) ROOF TOP UNIT TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL. UNIT SHALL BE SINGLE POINT POWER CONNECTION.

(2) OR EQUAL BY APPROVED EQUAL.

(3) NET COOLING BASED ON 95°F CONDENSER AIR TEMPERATURE.

(4) BASED ON 70°F ENTERING AIR TEMPERATURE.

(5) PROVIDE 2-STAGE SCROLL COMPRESSOR, AND SUPPLY FAN VFD 2-STAGE FOR 2-STAGE COOLING INCLUDING REFRIGERATION AND SUPPLY FAN AIR FLOW.

(6) RE-USE EXISTING BI-POLAR IONIZATION KITS, OUTSIDE AIR FLOWS SHALL BE BASED ON IONIZATION DEVICES.

(7) PROVIDE WITH INTEGRATED ECONOMIZER WITH 100% BAROMETRIC RELIEF

(8) DIGITAL DISPLAY PROGRAMMABLE ZONE SENSOR

(9) BACNET COMMUNICATIONS INTERFACE

(10) MICROPROCESSOR CONTROLS, HINGED PANELS, POLYMER E-COATED CONDENSER COIL W/ HAIL GUARD, AND POWERED CONVENIENCE OUTLET. SEE ELECTRICAL DRAWINGS FOR FUSED DISCONNECTS.

(11) NOT TO EXCEED THE EXISTING ELECTRIC HEATER, 2 STAGES.

(12) PROVIDE ROOFTOP UNITS WITH CURB AND DUCT ADAPTERS.

(13) PROVIDE UNITS WITH HOT GAS RE-HEAT COILS AND CONTROLS COMPLETE.

(14) PROVIDE UNITS 2-STAGE SCROLL COMPRESSOR, AND SUPPLY FAN VFD FOR MODULATION OF FAN SPEED WITH DUCT STATIC PRESSURE, AND CONTROL OF DISCHARGE AIR TEMPERATURE (TRUE VAV CONTROL). SCHNEIDER ELECTRIC TO REPLACE CONTROLS OF THE ASSOCIATED ZONE DAMPERS INCLUDING PROGRAMMING A MINIMUM FLOW SETPOINT TO PREVENT UNITS FROM DROPPING BELOW THE MINIMUM CFM PER UNIT MANUFACTURER'S PRINTED RECOMMENDED MINIMUM AIR FLOW.

(15) SEE DETAIL ON M101 FOR CUSTOM CURB AND DUCT ADAPTORS.

(16) PROVIDE RTU-6, RTU-7, RTU-8 AND EXISTING RTU-9 WITH CONTROLS TERMINAL STRIP. SCHNEIDER ELECTRIC TO TAKE FULL CONTROL OF THESE (4) UNITS.

NOMENCLATURE

RTU-1-6
- RTU: ROOFTOP UNIT
- 1: ROOFTOP UNIT NO.
- 6: TONNAGE

Schneider Electric
Tel. +1 972 323 1111
Fax. +1 972 323 3498
www.schneiderelectric.com
Schneider Electric
1660 West Crosby Road
Carrollton, TX 75006 USA

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13696 03-23-22 DANNY WILLIS

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
HVAC SCHEDULES
ECM-1C

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER

M301

SHT. OF

VARIABLE REFRIGERANT HEAT RECOVERY SYSTEM SCHEDULE (8)

AIR HANDLING UNIT										HEAT PUMP									
MARK (1)	QUANTITY	DESCRIPTION	MITSUBISHI (2) MODEL	CFM	MCA (208/1)	COOLING TOTAL	COOLING ENT.AIR	HEATING CAP.	HEATING ENT.AIR	MARK	MITSUBISHI (2) MODEL	COOLING MBH (3)	HEATING MBH (4)	(5) EER	(5) IEER	(5) COP	ELEC. at 460/3 MCA	ELEC. at 460/3 MOP
AREA 'B' (POD 100)																		
AH-100-2.5 (7)	2	CEILING CONCEALED (4)	TPEFYP030MA144A	875	2.8	30.0	80/67	34.0	70.0	VRF-100	TURYP168AN40AN W/ TCMBM0108JAIN4 BRANCH CONTR. (8) BRANCH CAP. (6)	168.2	187.9	10.8	23.5	3.5	28.0	40
AH-100-3 (7)	3	CEILING CONCEALED (4)	TPEFY-P036MA144A	1,050	3.5	36.0	80/67	40.0	70.0									
AREA 'C' (POD 800)																		
AH-800-2.5 (7)	7	CEILING CONCEALED (4)	TPEFYP030MA144A	875	2.8	30.0	80/67	34.0	70.0	VRF-800	TURYP216AN40AN W/ TCMBM0108JAIN4 BRANCH CONTR. (10) BRANCH CAP. (6)	224.0	243.4	12.3	26.2	3.6	VRF-800A 18.0 VRF-800B 15.0	VRF-800A 25 VRF-800B 20
AH-800-3 (7)	1	CEILING CONCEALED (4)	TPEFY-P036MA144A	1,050	3.5	36.0	80/67	40.0	70.0									
AREA 'D' (POD 700)																		
AH-700-2.5 (7)	7	CEILING CONCEALED (4)	TPEFYP030MA144A	875	2.8	30.0	80/67	34.0	70.0	VRF-700	TURYP216BN40AN W/ TCMBM0108JAIN4 BRANCH CONTR. (10) BRANCH CAP. (6)	224.0	243.4	12.3	26.2	3.6	VRF-800A 18.0 VRF-800B 15.0	VRF-800A 25 VRF-800B 20
AH-700-3 (7)	1	CEILING CONCEALED (4)	TPEFY-P036MA144A	1,050	3.5	36.0	80/67	40.0	70.0									

(1) AIR HANDLING UNIT AND HEAT PUMP TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL.

(2) OR EQUAL BY DAIKIN, OR APPROVED EQUAL.

(3) BASED ON 95°F ENTERING CONDENSER AIR TEMPERATURE.

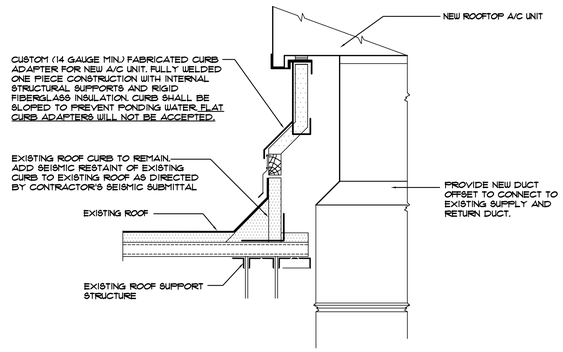
(4) MEDIUM STATIC, HORIZONTAL DUCTED. PROVIDE WITH FACTORY INSTALLED CONDENSATE PUMP W/ 15" LIFT, NAVIGATION WALL MOUNTED CONTROLLER WITH DISPLAY.

(5) EER, IEER and COP BASED ON AHRI 1230 TEST METHOD FOR DUCTED AHUs. COP IS BASED ON 47°F CONDENSER AIR.

(6) PROVIDE REFRIGERANT BALL VALVES AT EACH CONNECTION TO BRANCH SELECTOR.

(7) INDOOR AIR HANDLING UNITS BEING REPLACED - REMOVE EXISTING BI-POLAR IONIZATION KITS, STORE, AND RE-INSTALL IN NEW AH UNITS.
INDOOR AIR HANDLING UNITS - PROVIDE NEW BI-POLAR IONIZATION KITS TO MATCH EXISTING BI-POLAR IONIZATION KITS IN REPLACEMENT AH UNITS.

(8) CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONDUIT, WIRING AND PROGRAMMING BETWEEN INDOOR UNITS, OUTDOOR UNITS AND CENTRAL CONTROLLERS.
SCHNEIDER ELECTRIC TO PROVIDE CONNECTIONS AND COMMUNICATIONS FROM CENTRAL CONTROLLER TO BAS. CLOSELY COORDINATE WITH SCHEIDER ELECTRIC AUTOMATION GROUP.



CURB AND ADAPTER DETAIL

NOT TO SCALE

Schneider Electric
1660 West Crockett Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 3486
www.schneiderelectric.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13696 03-23-22 DANNY WILLIS

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR
BRUNSWICK COUNTY SCHOOL DISTRICT

SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
HVAC SCHEDULES
ECM-1C

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER

M302

SHT. OF

MECHANICAL SPECIFICATIONS

1.0 GENERAL

1.1 All material and work shall comply with the National Fire Codes of the NFPA, National and local codes and the 2018 North Carolina State Building Codes, ASHRAE Standard 90.1 – 2016 and 2017 National Electric Code.

1.2 Drawings for work under Division 23 are diagrammatic and generally, indicate reasonable arrangements. Work under Division 23 includes all work necessary to make HVAC systems complete and fully operational.

1.3 MATERIAL AND EQUIPMENT SUBMITTALS: Submit for review detailed drawings of all equipment and all material listed in this section. All submittal data shall be bound in a hardback binder. Partial submittals will not be reviewed by the Engineer . Furnish six (6) copies of equipment submittals. Review rendered on equipment submittals shall not be considered as a guarantee of measurements of building conditions. WHERE DRAWINGS ARE REVIEWED, SAID REVIEW DOES NOT MEAN THAT DRAWINGS HAVE BEEN CHECKED IN DETAIL; SAID REVIEW DOES NOT IN ANY WAY R RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY OR NECESSITY OF FURNISHING MATERIAL OR PERFORMING WORK AS REQUIRED BY THE CONTRACT DOCUMENTS. Partial submittals will not be reviewed by the Engineer. Submit for the following materials and equipment for review by the Engineer:

1. Roof Mounted Heat Pumps,
2. Variable Refrigerant Flow (VRF) Systems,
3. Packaged Dedicated Outside Air System (DOAS),
4. Split System Dedicated Outside Air Systems (DOAS)

1.4 WORKMANSHIP: Work that is not of good quality will require removal and reinstallation.

1.5 COORDINATION: No work shall be performed on this project before thoroughly coordinating all space requirements for pipes, control panels, and control components with all trades concerned and existing conditions. Temperature and equipment control wiring is included under Division 23.

1.6 The responsibility for obtaining, cutting, and patching for work under Division 23 of the specifications is included Division 23.

1.7 DAMAGES DURING CONSTRUCTION: Contractor shall be responsible for any costs of repairing any damages caused by this contractor, to the building, building contents, and site during construction and warranty period.

1.8 WARRANTY: Warrant all control components, piping and any other materials specified under Division 23. Warrant all equipment, ductwork, piping and any other materials specified under Division 23 for a period of one (1) year from the date of project acceptance unless otherwise indicated. Upon failure of any part(s) of the system during the warranty period, the affected part(s) shall be repaired or replaced promptly by and at the expense of the Contractor.

1.9 IDENTIFICATION: Identify each piece control component. Items shall be identified by name and numerical sequence. Nameplates shall be 1/16" thick plates with 1/2" high white letters on black background. Nameplates shall be attached securely with screws, not glued.

1.10 RECORD DRAWINGS: Provide record drawings for all work included in Division 23. Maintain on the job site one complete set of drawings for this project. All changes authorized by the Engineer and/or Owner as to locations, sizes and routing of equipment, ductwork, piping and other material shall be indicated in red ink on the drawings as work progresses. Before Final Completion, Contractor shall obtain the latest set of AutoCad drawings from the Engineer which shall include the information outlined above. AutoCad drawings (including schedules, details, and sections) shall be corrected to depict all substituted materials and equipment.

2.0 SEISMIC REQUIREMENTS: All materials shall comply with the 2018 International Building Code (IBC) for seismic requirements.

2.1 Provide seismic submittals including calculations to determine restraint loads resulting from seismic forces presented in IBC. Seismic calculations shall be certified and stamped by a Structural Engineer in the employ of the seismic equipment manufacturer with a minimum of 5 years experience, and licensed in the project's jurisdiction.

2.2 Provide seismic calculations and submittals for all new roof mounted equipment.

2.3 Manufacturers of seismic restraints must be a member of the Vibration Isolation and Seismic Control Manufacturers Association (VISCMA).

2.4 Provide Letter of Acceptance from the manufacturer's agent prior to project closeout indicating manufacturer review of installed seismic restraints for new equipment throughout project.

3.0 TESTING, ADJUSTING, AND BALANCING

3.1 Work under this section includes the testing, adjusting and balancing of all new heating, ventilating and air conditioning systems. The results of all tests, adjustments and balancing shall be submitted to the Engineer for approval.

3.2 Instruments used shall be of high quality and as recommended by AABC or NEBB for the application. Instruments shall be properly calibrated and certified within the last six months.

3.3 The balancing firm shall warrant, solely that the system will be set to within 10% of the values as established by the drawings and specifications and also adjust to minimize drafts in all areas. The testing, balancing and adjusting shall be performed as many times as required to prove project requirements have been met. If requested by the Engineer, tests shall be performed in his presence.

3.4 Any changes that are required for the final balancing results as determined by the balancing firm shall be provided under this section of the specifications. Such changes shall include, but not limited to, changing of pulleys, belts, dampers or adding dampers or access panels.

3.5 Prior to acceptance of the systems by the Owner, submit to the Engineer for his review, a written testing, adjusting and balancing report, in triplicate, contained in a hard-backed three ring notebook. All reports, forms and data sheets shall generally be the standards of AABC or NEBB.

4.0 INSULATION

4.1 All refrigerant lines for suction line for variable refrigerant flow systems and condensate drain piping insulation shall be 1" thick AP Armaflex flexible pipe insulation not to exceed flame spread of 25 and smoke developed rating of 50, as listed by Underwriters Laboratories. Insulation shall be as manufactured by Armstrong or approved equal. Flexible pipe insulation adhesive shall be an air drying contact adhesive for line temperatures up to 220?F. Adhesive shall be Armstrong 520 or approved equal. Sealing of pipe insulation with tape of any kind will not be accepted.

4.3 New supply air, return air, exhaust air, and outside air supply ducts concealed above ceilings shall be insulated with 2" thick duct wrap equal to Mansville Microlite "Commercial Grade", 1 lb density, R-6.0 min. with FRK vapor barrier. Adhere to clean sheet metal ducts with bonding adhesive. Secure on ducts over 24" wide with weld pins and clip washers. Staple all seams and joints, and vapor seal with glass fabric and coat with flame retardant mastic.

5.0 PIPING

5.1 Piping shall comply with best trade practice. Provide clearance between pipe and building structure so pipes can expand without damage to building structure. All work and materials to meet local requirements and comply with the 2018 International Building Code. Pipe and Equipment locations shown are approximate. Exact location of equipment and pipes to be determined in field.

5.2 Condensate drain piping shall be type L copper with soldered fittings. Provide P-traps at all condensate drain connections to floor mounted heat pumps. P-trap shall be twice the total static pressure developed by the cooling equipment fan. Slope condensate drain pipes minimum 1/4" per foot in direction of flow and connect to existing drain pipe.

5.3 REFRIGERANT PIPING

A. Refrigerant piping shall be dehydrated, ACR type"L" hard drawn copper where piping is concealed from view in chases, above ceilings, in mechanical rooms and outdoors. Pre-charged tubing is not acceptable.

B. Refrigerant line sizes shall be in strict accordance with equipment manufacturer's published recommendations. Provide all devices required by the equipment manufacturer for a complete installation. Line sizes and devices required for the installation shall be furnished by the equipment supplier based on actual site conditions. The manufacturer's representative shall perform a site visit and furnish a statement that the refrigerant piping is complete and installed in accordance with the manufacturers' guidelines.

C. Provide copper pipe sleeve where refrigerant and condensate drain piping passes through masonry wall. Seal around openings air and water tight.

D. Piping shall be supported within building using uni-strut hangers and cushioned pipe clamps. Supports inside of building shall be similar to support outside of building.

E. Dry nitrogen shall be passed through refrigerant piping during the brazing operationin order to minimize oxidation and scale formation.

F. Refrigerant system shall be triple evacuated drawing a vacuum of 20MM Hg, absolute pressure for first two evacuations, and 2.5 MM Hg (2500 microns Hg), absolute pressure for final evacuation.

G. All units with refrigerant piping exceeding 80 linear feet shall be provided with expansion valves and accumulators.

H. Contractor shall route refrigerant piping from outdoor section to cooling coils in a manner to minimize excessive lengths of refrigerant pipe and the number of elbows.

6.0 DUCTWORK

6.1 Coordinate routing of new ducts with existing conditions and other trades in the field. Provide offsets and vary sizes as required to avoid existing structural and any other interferences. Do not construct any ducts until all space requirements have been thoroughly coordinated with all other trades and existing conditions.

6.2 New supply, return, exhaust and outside air supply ducts shall be constructed in strict accordance with SMACNA Low Pressure Duct Standards. A copy of the SMACNA Low Pressure Duct Standards shall be kept on the job site. All new ducts shall be galvanized sheet metal, 26 gauge minimum.

6.3 New flexible supply air ducts to ceiling diffusers shall be minimum 1" thick U.L. 181 class 1 Air Duct. Each section shall have locking sheet metal snap-in collarings to take-off fittings and ceiling diffusers. Maximum run of flexible ducts shall be six feet (6').

6.4 Supply air duct take-offs from sheet metal trunks shall be a factory fabricated fitting with an adhesive backed collar and screw holes at each quadrant, air scoop, and balancing damper with locking mechanism. The fitting shall be secured to the trunk with sheet metal screws and coated with duct sealant.

6.5 Support ducts from the building structure with 1" wide galvanized sheet metal hangers on eight foot (8') centers and at each change in direction. Flexible ducts shall be supported on three foot (3') centers. Crimping or sagging of flexible ducts will not be accepted.

7.0 VARIABLE REFRIGERANT FLOW (VRF) SYSTEM:

7.1 The VRF system shall be variable capacity, heat recovery system equal to Mitsubishi City Multi or Daikin. The system shall include multiple ducted air handling units (evaporators), branch circuit controllers, and PID control and air cooled VRF condensing units. Each air handling unit shall be independently controlled.

7.2 The VRF system shall be tested by a Nationally Recognized Testing Laboratory in accordance with ANSI/UL 1995. Manufacturing facility shall be registered to ISO9001 and ISO14001.

7.3 Systems shall be have a one year warranty from startup, and an extended 5 year compressor warranty.

7.4 The outdoor unit shall be air cooled, vertical discharge with a sound rating not to exceed 63 dB(A). The unit shall be factory assembled and pre-wired electronic controls and include high pressure safety switch, over-current protection and DC bus protection. The unit shall be capable of operating down to 0°F ambient. Unit shall have integral microprocessors.

7.5 The refrigerant circuit shall consist of inverter driven scroll compressors, crankcase heater(s), and internal thermal overload. The compressor shall capable of modulating down to 16% of rated capacity. Unit shall include shut-off valves, oil separators, service ports, and refrigerant regulator. High/low pressure gas line liquid and suction lines shall be individually insulated between the condensing unit and air handling unit. The system shall use R-410A refrigerant.

7.6 The system shall have the following safety devices: high pressure switch, control circuit fuses, crankcase heaters, fusible plug, low pressure switch, overload relay, inverter overload protector, thermal protectors for compressors and fan motors, over current protection for the inverter, anti-recycling timers, sub-cooling feature, and oil recovery cycle.

7.7 The condensing unit shall be constructed of rust-proofed galvanized steel with powder baked enamel finish.

7.8 The control voltage between the air handling units and the condensing units shall be 16 VDC non-shielded, stranded two conductor cable. The control wiring shall be 2-wire multiplex transmission system for connection of multiple air handling units to a condensing unit.

7.9 The branch circuit controller (where applicable) shall be factory assembled, wired and piped. Branch controllers shall be run tested at the factory. The unit shall house multiple refrigerant control valves, a liquid gas separator and a tube-in-tube heat exchanger. The unit shall be furnished with electronic expansion valves. Refrigerant connections shall be brazed.

7.10 Concealed ducted air handlers shall have forward curved with double inlet fans, mounted on motor shaft, dynamically and statically balanced. Fan motor shall be multi-speed with internal overload protection and be resiliently mounted. Fan-motor shall be removable. Air handling units shall be medium static with return air inlet connection and supply air outlet connection. Provide 18 ga. galvanized auxiliary drain below each air handling unit with auxiliary drain line connection and normally closed ball valve. Provide float switch in drain pan to shut air handling unit when auxiliary drain pan floods.

7.10 The wall mounted indoor units shall be slim silhouette, and shall have a modulating linear expansion device. Unit shall be factory wired, and shall include control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay, an auto restart and test run switch. Fan shall be one or two line-low with direct driven motor. A motorized air sweep louver shall provide an automatic change in airflow and consist of various speeds, Low-Mid1-Mid2-High. The coils shall have smooth plate fins brazed to copper tubing, factory pressure tested.

7.11 The controls network shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, and system integration to BMS systems via BACnet. The interface shall be compliant with BACnet/IP (ANSI/ASHRAE 135-1995, 135a) and UDP/IP of Ethernet (ANSI/ASHRAE 135-1995, 135b).

7.12 The VRF system shall be installed complete in strict accordance with the manufacturer's printed installation instructions.

8.0 ROOF MOUNTED HEAT PUMPS:

8.1 Roof mounted heat pumps shall be single package, designed for outdoor application. Unit shall provide complete protection for all components. The total unit shall listed by U.L. and carry a U.L. label. All units shall have microprocessor controls.

8.2 All units shall have a one year parts warranty for the entire unit. Labor for the one year warranty shall be covered by the Contractor. All units shall have a five year compressor warranty (parts only).

8.3 Heat pumps shall be a one-piece, air-to-air heat pump with auxiliary electric heat as manufactured by Aaon or equal by Trane, or Johnson Controls.

8.4 All units shall be provided with condenser coil hail guards.

8.5 Electric resistance heaters shall be internally wired nickel chromium elements with controls necessary for complete operation. Safety controls shall include primary high temperature and overcurrent protection. Heaters shall be U.L. listed and shall comply with N.E.C.

8.6 Units shall include high efficiency scroll compressors, variable where noted in the schedule. Compressors shall have centrifugal type oil pumps. Motors shall suction gas cooled, and shall have a voltage utilization range of plus or minus 10% of unit nameplate voltage. Internal overloads shall be provided with the scroll compressors.

8.7 Indoor and outdoor coils shall be aluminum plate fins mechanically bonded to seamless copper tubes. Condenser coils shall be epoxy coated.

8.8 Indoor air fan shall be forward curved, centrifugal type or backward curved, plenum type as listed in the schedule. Fan drives shall be belt or direct as listed in the schedule. Belt driven unit motor pulleys shall be adjustable pitch. Indoor fan motor shall have permanently lubricated bearings. Outdoor fans shall be propeller type with direct driven permanently lubricated motor. Fans shall discharge upward. Indoor fans shall have internal thermal overload protection.

8.9 Indoor air fans, where noted on schedule, shall include variable speed drives (VFDs) for setting supply air fans at 67% on cooling stage 1.

8.10 Unit cabinet shall be constructed of galvanized steel, phosphatized, and finished with an air-dry paint coating with hinged access panels. Structural members shall be 16 gauge with access doors and removable panels of minimum 20 gauge. Cabinet interior shall be insulated with ½" thick neoprene-coated fiberglass. Cabinet panels shall be easily removable for service to all operating components. All units shall have thru-the-base electrical and controls conduit (liquid-tight). A condensate drain for the indoor coil shall be provided.

8.11 Safety Controls: The heat pump heating/cooling system shall be protected with high pressurestat, low pressurestats, loss-of-charge protection, indoor coil freezestats, and current and temperature sensitive overload devices. Each of these devices shall be wired to prevent compressor restart.

8.12 An outdoor coil defrost system shall be incorporated into the base unit for heat pumps during heating cycle. The defrost cycle shall function on the basis of time and coil temperature. A 90-minute timer shall actuate a defrost mode only if coil temperature is low enough to indicate a heavy frost condition. Defrost shall have a positive termination time of a maximum of 10 minutes or when the defrost thermostat is satisfied to prevent prolonged operation on a defrost cycle. Electric resistance heaters shall operate automatically during the defrost cycle.

8.13 Provide 100% outside air economizer with outdoor air hood, motor operated outdoor air (OA) dampers, motor operated return air (RA) dampers, and controls to provide 55°F supply air when the outside air enthalpy is lower than the return air enthalpy. The OA dampers and return air dampers shall modulate and mix OA and RA streams to prevent the supply air (SA) from dropping below 55°F. Provide field fabricated 100% relief hoods on the return air ducts with low leakage motor operated relief damper set to maintain a slightly positive pressure in the building. Economizer shall be integrated.

8.14 Where noted in the schedule, provide units with Demand Control Ventilation (DCV) including controls and CO2 sensor to modulate the OA damper as required to maintain the CO2 level setpoint in the space served.

8.15 Where noted in the schedule, provide units with BACnet Communication Interface to allow the units to communicate directly with a generic open protocol BACnet MS/TP Network Building Automation System Controls. A programmable zone sensor shall be provided.

8.16 Emergency heat control in heat pump shall consist of emergency heat control box containing emergency heat relays and outdoor thermostats; and an emergency heat thermostat subbase (with warning light). Control shall allow for manual bypass of compressor and outdoor thermostats if compressor becomes inoperative, or for service. Outdoor thermostats shall provide for staging of electric resistance heat according to outdoor temperature. Thermostats shall be wired into the electric heater contactors and shall have an adjustable set point to provide economical resistance heat staging.

8.17 Provide factory installed refrigerant piping, 3-way modulating hot gas reheat valve, reheat coil, liquid line receiver, and modulating hot gas reheat controller. Supply air temperature sensor shall be factory provided for field installation in the supply air ductwork. Modulating hot gas reheat controller shall be factory configured and ready to accept inputs from the field mounted, factory provided supply air temperature sensor in the ductwork, and field mounted dehumidistat. Controller shall have a built-in logic to ensure positive oil return to the compressors. Controller also shall an LCD display for status, setpoint changes, and forced control of the valve for for startup and maintenance.

8.18 Time delay circuit shall prevent compressor short cycling as a result of a rapid change in thermostat setting and automatically prevents compressor restart at least 5 minutes after shutdown.

8.19 Provide for each stage of electric heat an outdoor thermostat to lock out electric heat in heat pumps when outdoor temperature is below its setpoint. Provide emergency heat switch on thermostat to bring on heat if the compressor fails.

8.20 Provide units with filter racks with 2" MERV 8 filters and hinged access doors.

8.21 Mount units curbs on new curb adaptors in compliance with the seismic submittals from the seismic vendor and seismic engineer. Install units complete in strict accordance with the manufacturer's printed installation instructions.

8.22 Set the minimum position of the outside air hood motorized damper at O.A. CFM listed in schedule on drawings.

8.23 POWER PACKAGE:

A. Each rooftop unit shall be completely factory wired with necessary controls and contactor pressure lugs or terminal block. Unit shall provide an external location for mounting a fused disconnect device. The microprocessor controls shall provide for volt control functions. Control algorithm shall maintain accurate temperature control, and minimize drift from setpoint. The microprocessor shall provide anti-short cycle timing and time delay between compressor stages to provide a higher level of machine protection.

B. Units shall include powered 120v/15 amp, 2 plug convenience outlet powered from the line side of the disconnector circuit breaker, and shall not be affected by the position of the disconnect or circuit breaker.

9.1 Remove, store and re-install Ionization Generators in all new rooftop units
. Install the devices in the supply air ducts of all rooftop heat pumps.
The devices shall neutralize odors; prevent mold, bacteria and virus; help to control allergens and asthma, and reduce particles.
Input Voltage: determine existing in field
– Power Required: determine existing in field
– Frequency: determine existing in field
– Capacity: 0 – 5,000 cfm
– Electrical Approvals: UL, cUL, ETL

10.1 PACKAGED DEDICATED OUTSIDE AIR SYSTEM (DOAS):

10.2 The DOAS system shall be roof mounted, vertical discharge for supply and exhaust air, and include an intake hood for outside air intake. Performance shall be rated in accordance with AHRI. Units shall be factory assembled, internally wired, fully charged with R0410A, and run tested. Units shall be ETL listed and labeled, classified in accordance to UL 1995/CAN/CSA No. 236-M40.

10.3 The unit casing shall be constructed of zinc coated, heavy gauge galvanized steel. Exterior surfaces shall be phosphatized and finished with a weather resistant baked enamel finish. Units shall have a 2" thick antimicrobial insulation with edges sealed. Unit top shall be one piece construction double-hemmed and gasket-sealed for water removal.

10.4 The DOAS system shall have factory installed combination outdoor air sensor located in the in the supply air duct, designed to sense both temperature and relative humidity to make ventilation, cooling, dehumidification and heating decisions. A factory installed sensing tube shall sense supply air temperature from the unit.

10.5 The evaporator shall be 5/16" copper tubes mechanically bonded to a configured aluminum plate fins, factory pressure tested to 500 psig. A stainless steel sloped condensate drain pan shall be piped thru the casing wall.

10.6 The unit shall include modulating hot gas reheat on the leaving face of the evaporator coil, pre-piped and circuited with a low pressure switch.

10.7 The unit compressor shall be direct drive digital scroll with centrifugal oil pumps. Compressor(s) shall be provided with internal overloads and crankcase heaters. Compressor shall be able to fully modulate.

10.8 The unit condenser shall be internally finned, 5/16" copper tubes mechanically bonded to aluminum fins, factory tested at 500 psig. Fans shall be direct drive vertical discharge, low-noise, glass reinforced plopropyolene props, with powder coated wire discharge guards. Fan shall be controlled by a VFD to maintain adjustable pressure to increase reheat capacity when applicable. Provide units with metal hail guards.

10.9 The unit supply air plenum fan shall be high efficiency backward curved impeller with with ECM motor and integrated power electronics.

10.10 Energy recovery wheel shall be constructed of corrugated synthetic fibrous media, with a desiccant intimately bound and uniformly and permanently dispersed throughout the matrix structure of the media. Rotors with desiccants coated bonded, or synthesized onto the media are not acceptable due to delaminating or erosion of the desiccant material. Media shall be synthetic to provide corrosion resistant and resistance against attack from laboratory chemicals present in pharmaceutical, hospital, etc. environments as well as attack from external outdoor air conditions. Coated aluminum is not acceptable. Face flatness of the wheel shall be maximized in order to minimize wear on inner seal surfaces and to minimize cross leakage. Rotor shall be constructed of alternating layers of flat and corrugated media. Wheel layers should be uniform in construction forming uniform aperture sizes for airflow. Wheel construction shall be fluted or formed honeycomb geometry so as to eliminate internal wheel bypass. Wheel layers that can be separated or spread apart by airflow are unacceptable due to the possibility of channeling and performance degradation. The minimum acceptable performance shall be as specified in the unit schedule.
Desiccant Material: The desiccant material shall be a molecular sieve, and specifically a 4A or smaller molecular sieve to minimize cross contamination.
Wheel Media Support System: The wheel frames shall consist of evenly spaced steel spokes, galvanized steel outer band and rigid center hub. The wheel construction should allow for post fabrication wheel alignment. Wheel Seals: The wheel seals shall be full contact type brush seals or equivalent. Seals should be easily adjustable.
Wheel cassette: Cassettes shall be fabricated of heavy duty reinforced galvanized steel or welded structural box tubing. Cassettes shall have a built in adjustable purge section minimizing cross contamination of supply air. Bearings shall be inboard, zero maintenance, permanently sealed roller bearings, or alternatively, external flanged or pillow block bearings. Drive systems shall consist of fractional horsepower AC drive motors with multi-link drive belts. Face and bypass dampers shall be furnished as shown on unit schedule and drawings.
Certification: The wheel shall be AHRI certified by the energy recovery wheel supplier to AHRI Standard 1060 and must bear the AHRI certification stamp. Private independent testing performed "in accordance with" various standards is not a substitute for AHRI certification and shall not be accepted. The wheel shall be listed or recognized by UL or equivalent.

10.11 The unit shall include microprocessor controls with algorithms to make all heating, cooling, dehumidificating and/or ventilating decisions in response from temperature and humidity sensors. This algorithm shall maintain accurate temperature control, and minimize drift from set point. The controller will provide anti-short cycle timing for a higher level of machine operation. Terminals shall be provided for a field installed dry contact or switch closure for Occupied and Unoccupied modes.

10.12 Provide units with 2" MERV 8 filters. Filter frame shall be adjustable to match any filter combination.

10.13 Provide units with Piezo Rings for measurement of ouside air supply from the units.

10.14 Install units complete in strict accordance with the manufacturer's printed installation instructions.

11.1 SPLIT SYSTEM DEDICATED OUTSIDE AIR SYSTEM (DOAS):

11.2 The DOAS system shall include an energy recovery ventilator (ERV), DX air handling unit with vertical discharge, and outside condensing unit.

11.3 Provide all condensing units and air handling units, as shown on plans. The units shall be properly assembled and tested at the factory. Cooling equipment shall designed for use with Refrigerant 410.

11.4 The air handling unit and condensing units shall be Trane models, capacities, and models, capacities, and efficiencies as listed on the drawings or equal by Carrier or approved equal.

11.5 AIR HANDLING UNITS: Provide direct-expansion fan coils in the location and manner shown on drawings. Air handling unit shall be equipped with supplementary electric heater.

11.6 Coil shall be constructed with aluminum plate fins mechanically bonded to nonferrous tubing with all joints brazed. Coil shall have refrigerant metering device, check valve, and refrigerant line fittings. Unit shall have condensate drain pan with primary and auxiliary drain connections.

11.7 Casings shall be insulated and constructed of cold-rolled steel, bonderized and finished with baked enamel. Provide unit with access panels.

11.8 Fan shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. Fan motor shall be multi-speed with internal overload protection and be resiliently mounted. Fan-motor shall be removable.

11.9 Condensate drain piping shall be type "L" copper with drainage pattern fittings. Insulate with 1" thick flexible pipe insulation equal to Armaflex.

11.10 OUTDOOR CONDENSING UNITS: Outdoor unit coil shall be of nonferrous construction. Coil shall have aluminum plate fins, mechanically bonded to seamless copper tubes. Coil shall be protected by a grille. Factory-installed coil refrigerant metering device shall be mounted on unit.

11.11 Unit shall be furnished with direct-driven, propeller type fans. Condenser fan motors shall have inherent protection. Fan motors shall be permanently lubricated and resiliently mounted. Each fan shall have a safety guard. Controls shall be included for cycling fan(s) for intermediate season operation.

11.12 Compressors shall be hermetically designed with internal spring isolators. Compressors shall have both thermal and current sensitive overload device. Compressor shall be equipped with a crankcase heater and have high-pressure protection. Compressor shall have a 5-year non-prorated warranty. Compressor shall be same manufacturer as unit.

11.13 Safety devices shall consist of low pressure switches, pressure relief device and compressor overload devices. An automatic defrost control shall be included to accomplish defrosting of outdoor coil. Control wiring terminal board shall be designed to match indoor unit terminal board and accessory thermostat terminals for standardized point-to-point connectors.

END OF DIVISION 23

Schneider Electric
1660 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 3498
www.schneiderelectric.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13696 03-23-22 DANNY WILLIS

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
HVAC SPECIFICATIONS
ECM-1C

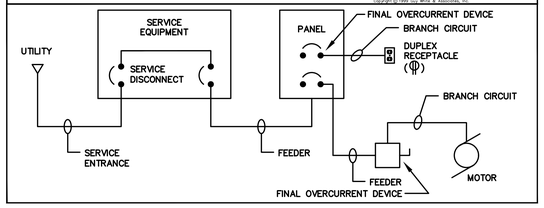
MARK	DATE	SUBMISSION / REVISION DESCRIPTION

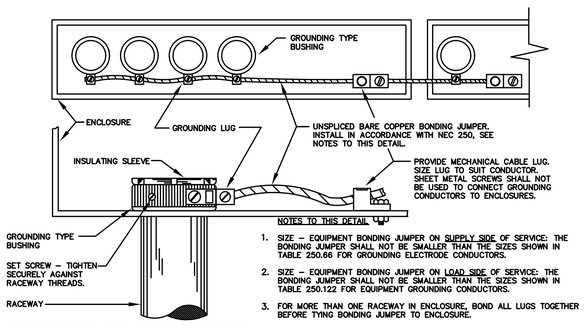
DRAWN BY: DJ	CHECKED BY: CDW
DESIGNED BY: DJ	APPROVED BY: CDW
DATE: 03-23-22	PROJECT: PC21P0006

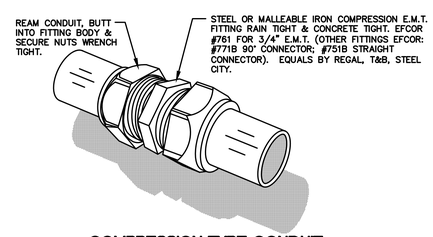
SHEET NUMBER

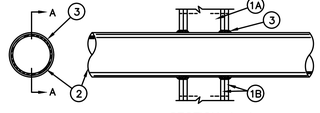
M401

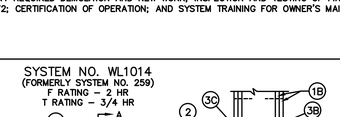
SHT. OF











RACEWAY MATERIAL USE TABLE

APPLICATION										
	CONTRACTOR MAY USE ANY MATERIAL MARKED (●) FOR APPLICATION LISTED. IF MATERIAL IS NOT MARKED FOR AN APPLICATION, IT SHALL NOT BE USED FOR THAT APPLICATION.	EMT	IMC	GRS	RAC	ENT	SCH. 40 PVC	HDPE	AC/MC CABLE	MFD. WIRING
BRANCH CIRCUITS	CONCEALED ABOVE CEILING	●	●	●	●	NOT PERMITTED			NOT PERMITTED	NOT PERMITTED
	CONCEALED IN WALLS	●	●	●	●					
	EXPOSED FROM FLOOR TO 7'-0" A.F.F. (INTERIOR)		●	●	●					
	EXPOSED FROM 7'-0" A.F.F. AND ABOVE (INTERIOR)	●	●	●	●					
	IN OR UNDER CONCRETE FLOORS		(1) ●	(1) ●			●	●		
	OUTDOORS – BELOW GRADE		(1) ●	(1) ●			●	●		
	OUTDOORS – EXPOSED		●	●	●					
	STUB-UPS BELOW PANELS & ENCLOSURES		●	●	●					
FEEDER CONDUITS			●	●	●		(2) ●			
SERVICE ENTRANCE			●	●			(2) ●			

(1) WITH BITUMINOUS COATING. SEE SPEC.
(2) OUTDOORS – BELOW GRADE.

NOTES TO THIS DETAIL

1. SIZE – EQUIPMENT BONDING JUMPER ON SUPPLY SIDE OF SERVICE: THE BONDING JUMPER SHALL NOT BE SMALLER THAN THE SIZES SHOWN IN TABLE 250.66 FOR GROUNDING ELECTRODE CONDUCTORS.
2. SIZE – EQUIPMENT BONDING JUMPER ON LOAD SIDE OF SERVICE: THE BONDING JUMPER SHALL NOT BE SMALLER THAN THE SIZES SHOWN IN TABLE 250.122 FOR EQUIPMENT GROUNDING CONDUCTORS.
3. FOR MORE THAN ONE RACEWAY IN ENCLOSURE, BOND ALL LUGS TOGETHER BEFORE TYING BONDING JUMPER TO ENCLOSURE.
4. BOND BOTH ENDS OF EACH CONDUIT 1"C. AND LARGER.
5. EXTEND BONDING JUMPER TO EACH PANEL INCLUDING TWO-SECTION PANELS WITH FEED-THRU NIPPLES.

GROUNDING OF CONDUITS 1" C. AND LARGER

NO SCALE

DEMOLITION NOTES

1. BIDDERS SHALL VISIT THE SITE OF WORK PRIOR TO BIDDING AND SHALL INCLUDE IN BID ALL WORK REQUIRED TO PROVIDE NEW WORK AND TO MODIFY EXISTING WORK AS REQUIRED TO CONTINUE IN OPERATION.
2. DEMOLITION WORK SHALL COMPLY WITH ANSI 10.6, NFPA 241, OSHA, AHERA AND ALL OTHER APPLICABLE LOCAL, STATE AND FEDERAL STANDARDS, CODES AND GUIDELINES.
3. CONTRACTOR IS CAUTIONED THAT DEMOLITION PLANS ARE BASED ON RECORD DRAWINGS AND VISUAL FIELD OBSERVATION AND ARE INTENDED TO COMMUNICATE INTENT OF DEMOLITION AND DO NOT INDICATE EVERY COMPONENT OF ELECTRICAL SYSTEMS.
4. OWNER SHALL RETAIN FIRST RIGHT OF REFUSAL ON ELECTRICAL EQUIPMENT BEING DEMOLISHED. PRIOR TO BEGINNING DEMOLITION WORK, CONTRACTOR SHALL WALL DEMOLITION AREA WITH OWNER REPRESENTATIVE AND IDENTIFY ITEMS TO BE REMOVED AND TURNED OVER TO OWNER. ALL SUCH ITEMS SHALL BE CAREFULLY REMOVED, PROTECTED AND DELIVERED TO OWNER.
5. EXISTING RACEWAY AND WIRING SYSTEMS REUSED AS PART OF THIS CONTRACT SHALL BE REWORKED AS REQUIRED TO COMPLY WITH REQUIREMENTS FOR NEW WORK AND CURRENT CODES AND STANDARDS.
6. CONTRACTOR SHALL EXAMINE DEMOLITION AND NEW WORK PLANS FOR ALL TRADES AND INCLUDE IN BID ALL REQUIRED REWORK AND/OR RELOCATION OF EXISTING RACEWAY, JUNCTION BOXES, DEVICES, WIRING SYSTEMS AND THE LIKE AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION.
7. SEE MECHANICAL DRAWINGS FOR EXTENT OF DEMOLITION WORK REQUIRED. REMOVE ELECTRICAL WORK COMPLETE FOR MECHANICAL SYSTEMS BEING REMOVED BY OTHERS. CONTRACTOR IS CAUTIONED THAT THIS EQUIPMENT MAY BE LOCATED OUTSIDE OF GENERAL DEMOLITION AREA (SUCH AS IN MECHANICAL ROOMS, MEZZANINES, ROOFTOP OR SIMILAR LOCATIONS).
8. INCLUDE IN BID ALL WORK REQUIRED FOR TEMPORARY WIRING AND ASSOCIATED ELECTRICAL WORK REQUIRED TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING DEMOLITION PHASE. INTERRUPTIONS IN ANY ELECTRICAL SERVICE OR SYSTEM (POWER, LIGHTING, COMMUNICATION, FIRE ALARM, ETC.) SHALL BE COORDINATED WITH AND APPROVED BY OWNER A MINIMUM OF 48 HOURS PRIOR TO PERFORMING WORK U.N.O.
9. ELECTRICAL DEMOLITION GENERALLY INCLUDES REMOVAL OF EXISTING OUTLETS, DEVICES, AND OTHER ELECTRICAL COMPONENTS. WHERE ALL CIRCUIT LOADS ARE REMOVED, DEMOLISH CIRCUITS BACK TO PANELBOARD(S). WHERE ONLY PORTIONS OF CIRCUIT LOADS ARE REMOVED, REWORK CIRCUITS BY EXTENSION AND RECONNECTION TO CONTINUE REMAINING LOADS IN SERVICE BEYOND THE DEMOLITION AREA.
10. WIRING SYSTEMS SHALL BE REMOVED BACK TO THE SOURCE OF SUPPLY UNLESS NOTED OTHERWISE. CIRCUIT BREAKERS, FUSIBLE SWITCHES, ETC. SUPPLYING LOADS DEMOLISHED AS PART OF THIS CONTRACT SHALL BE LABELED AS SPARE AND SET TO THE OFF POSITION.
11. PROVIDE REVISED CIRCUIT DIRECTORIES IN ALL PANELBOARDS AFFECTED BY NEW OR DEMOLITION WORK. INDICATE ALL LOADS, NEW, SPARE OR MODIFIED.
12. FOR ALL LIGHTING BEING RELOCATED OR NOTED AS EXISTING TO REMAIN, REMOVE, CLEAN, RE-LAMP AND REINSTALL COMPLETE IN LOCATIONS AS INDICATED ON NEW WORK PLANS. PROVIDE NEW CONTROL AS INDICATED.
13. ALL ELECTRICAL COMPONENTS AND DEVICES INDICATED AS TO REMAIN OR TO BE RELOCATED SHALL BE PROTECTED AGAINST DAMAGE DURING DEMOLITION PROCESS AND CLEANED PRIOR TO BEING RESTORED INTO SERVICE.
14. REMOVE ALL EXISTING, ABANDONED WIRING SYSTEMS IN CEILING SPACE, EQUIPMENT ROOMS, SHAFTS, CRAWL SPACES AND SIMILAR CAVITIES OF THE WORK AREA, INCLUDING WIRING, RACEWAYS, BOXES AND SUPPORTS.
15. EXISTING CEILING SYSTEMS ARE BEING REMOVED AND REPLACED IN SOME AREAS UNDER THIS CONTRACT. INCLUDE IN BID ALL WORK AS REQUIRED FOR RELOCATION OF ALL EXISTING CEILING MOUNTED ELECTRICAL DEVICES (FIRE ALARM, SENSORS, CAMERAS, CLOCKS, SPEAKERS, ETC.) TO NEW CEILING SYSTEM. PROVIDE REMOVAL, PROTECTION OF, TEMPORARY SUPPORT AND REINSTALLATION COMPLETE.
16. COORDINATE WITH PRIME CONTRACTOR FOR ALL PATCHING AND PAINTING AS REQUIRED DUE TO DEMOLITION WORK. NEW FINISHES SHALL MATCH ADJACENT SURFACES.

ABBREVIATIONS

THE FOLLOWING STANDARD ABBREVIATIONS ARE USED IN THESE PLANS AND SPECIFICATIONS. CONTRACTOR IS CAUTIONED THAT ALL ABBREVIATIONS LISTED MAY NOT BE USED; CONSULT PLANS AND SPECIFICATIONS FOR ABBREVIATIONS APPLICABLE TO THIS PROJECT.

A.F.F.	ABOVE FINISHED FLOOR
B.F.F.	BELOW FINISHED FLOOR
A.F.G.	ABOVE FINISHED GRADE
B.F.G.	BELOW FINISHED GRADE
U.N.O.	UNLESS NOTED OTHERWISE
CKT.	CIRCUIT
C.	CONDUIT
E.C.	EMPTY CONDUIT
FLX.	FLEXIBLE CONDUIT
WFLX	WEATHERPROOF FLEXIBLE CONDUIT
EHWH	ELECTRIC WATER HEATER
VF	VENTILATING FAN
CEF	VENTILATING FAN (CEILING EXHAUST FAN)
AHU	AIR HANDLING UNIT
FCU	FAN COIL UNIT
CU	CONDENSING UNIT
RTU	ROOF TOP HEATING/COOLING UNIT
P	PUMP
EDH	ELECTRIC DUCT HEATER
RAC	ROOM AIR CONDITIONING/HEATING UNIT
CHLR	CHILLER
HP	HEAT PUMP OR HORSEPOWER

BRANCH CIRCUIT WIRING – HASHMARK CODE

NO SCALE

BRANCH CIRCUITS SHOWN ON THESE DRAWINGS MAY INCLUDE HASHMARKS WHICH INDICATE THE NUMBER OF WIRES TO BE PROVIDED IN A CONDUIT RUN BETWEEN OUTLETS OR JUNCTION BOXES. WIRE SIZES SHALL BE AS TABULATED IN PANELBOARD SCHEDULES UNLESS OTHERWISE INDICATED ON PLAN. SEE SYMBOL SCHEDULE FOR CONDUIT ROUTING NOTATION. HASHMARK CODE IS AS FOLLOWS:

EACH PHASE AND NEUTRAL WIRE IN A CONDUIT RUN IS REPRESENTED BY A HASHMARK. FOR EXAMPLE –

TWO WIRES (NO HASHMARKS)
THREE WIRES (3 HASHMARKS)
FOUR WIRES (4 HASHMARKS)
FIVE WIRES (5 HASHMARKS)
. . . AND SO FORTH.

NOTE: GROUND WIRES ARE NOT GENERALLY SHOWN. EXAMINE SPECIFICATIONS AND GENERAL NOTES TO DETERMINE REQUIREMENTS FOR GROUND WIRES AND WHERE SPECIFIED, PROVIDE IN ADDITION TO THE NUMBER OF WIRES INDICATED BY HASHMARK CODE.

NOTE: CONTRACTOR IS CAUTIONED THAT MULTIWIRE (LINE-TO-NEUTRAL) BRANCH CIRCUITS DO NOT INDICATE ALL REQUIRED NEUTRAL CONDUCTORS. PROVIDE SEPARATE NEUTRAL CONDUCTORS (WITH COLORED STRIPE TO MATCH PHASE CONDUCTOR) FOR EACH PHASE CONDUCTOR.

EMPTY CONDUITS ARE NOTED BY "EC" WITH TRADE SIZE.

TYPICAL NEMA 1 ENCLOSURE

NOTES TO THIS DETAIL

1. ALL SWITCHES SHALL BE HEAVY DUTY TYPE, FED. SPEC. W-S-865, U.L. 98, NEMA KSI-1975; 240 V. OR 600 V. TO SUIT CIRCUIT VOLTAGE. QUICK MAKE-QUICK BREAK OPERATION
2. ALL SWITCHES FUSIBLE UNLESS NOTED ON DRAWINGS. PROVIDE FUSES TO SUIT LOAD.
3. ENCLOSURES NEMA 3R OUTDOORS AND IN WET LOCATIONS, NEMA 1 ELSEWHERE UNLESS NOTED ON DRAWINGS.
4. PROVIDE ENGRAVED LABELS AS SPECIFIED.
5. PROVIDE FACTORY INSTALLED AUXILARY CONTACTS FOR ALL SAFETY SWITCHES USED AS MOTOR DISCONNECT AND LOCATED ON LOAD SIDE OF VARIABLE FREQUENCY DRIVES (VFD). COORDINATE WITH VFD VENDOR AND PROVIDE SIGNALING CABLE VIA CONTACTS TO COMMUNICATE DISCONNECT POSITION TO VFD.

SAFETY SWITCH SCHEDULE		
SYMBOL	AMP	POLES
S-1	30	2
S-2	30	3
S-3	30	4WSN
S-4	60	2
S-5	60	3
S-6	60	4WSN
S-7	100	2
S-8	100	3
S-9	100	4WSN
S-10	200	2
S-11	200	3
S-12	200	4WSN
S-13	400	2
S-14	400	3
S-15	400	4WSN
S-16	600	2
S-17	600	3
S-18	600	4WSN
S-19	800	2
S-20	800	3
S-21	800	4WSN
S-22	1200	2
S-23	1200	3
S-24	1200	4WSN

SAFETY SWITCH DETAIL AND SCHEDULE

NO SCALE

GENERAL NOTES

1. DO NOT SCALE DRAWINGS UNLESS DIMENSIONS ARE SHOWN. LOCATE OUTLETS AND EQUIPMENT AS OBVIOUSLY INDICATED AND COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.
2. MINIMUM SIZE CONDUCTOR FOR POWER SHALL BE NO. 12 AWG.
3. ALL FUSES SHALL BE DUAL-ELEMENT TYPE, "FUSETRON" BY BUSSMAN, OR "ECON" BY ECONOMY.
4. BRANCH CIRCUIT SIZES ARE AWG 12-1/2"C. UNLESS OTHERWISE NOTED IN PANELBOARD SCHEDULES.
5. ALL BRANCH CIRCUIT LOADS SHALL BE BALANCED ACROSS PANELBOARD BUSSES TO OBTAIN MINIMUM NEUTRAL CURRENT.
6. ALL FLEXIBLE CONDUIT SHALL CONTAIN A GREEN WIRE BONDED TO RIGID RACEWAY, BOX OR FIXTURE AT EACH END OF FLEX. SIZE GROUND WIRE PER N.E.C. TABLE 250-122.
7. ALL ELECTRICAL WORK ABOVE CEILINGS UTILIZED AS RETURN AIR PLENUMS SHALL COMPLY WITH N.E.C. AND LOCAL CODES FOR WIRING USED IN ENVIRONMENTAL AIR.
8. CONTRACTOR SHALL MINIMIZE REMOVAL OF STRUCTURAL STEEL FIREPROOFING FOR INSTALLATION OF CONDUIT AND EQUIPMENT HANGERS. OBTAIN APPROVAL OF GENERAL CONTRACTOR PRIOR TO REMOVAL.
9. COORDINATE WITH OTHER TRADES TO CONCEAL ELECTRICAL WORK AND PROVIDE OUTLETS IN CORRECT LOCATIONS FOR EACH PIECE OF MECHANICAL OR ELECTRICAL EQUIPMENT CONNECTED.
10. COORDINATE DEVICE REQUIREMENTS AND MOUNTING HEIGHTS FOR THRU-WALL UNITS AND THE LIKE WITH EQUIPMENT FURNISHED.
11. ALL PENETRATIONS THRU WALLS, FLOORS, BARRIERS, PARTITIONS AND THE LIKE SHALL BE SEALED TIGHT. SEAL ALL PENETRATIONS THRU SMOKE TIGHT PARTITIONS WITH U.L. LISTED ASSEMBLIES OR METHODS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF SMOKE PARTITIONS.
12. FIRESTOP ALL RACEWAYS PASSING THRU FIRE-RATED WALLS, FLOORS OR PARTITIONS. USE U.L. LISTED THROUGH-PENETRATION FIRESTOP SYSTEMS APPROPRIATE FOR CONSTRUCTION AND WITH RATING EQUAL TO THAT BEING PENETRATED. SUBMIT SHOP DRAWINGS FOR SYSTEM(S) PROPOSED. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS AND RATINGS.
13. OPENINGS GREATER THAN SIXTEEN(16) SQUARE INCHES IN FIRE-RATED WALLS AND PARTITIONS SHALL BE PROTECTED WITH U.L. LISTED SYSTEMS, COMPONENTS AND METHODS AS REQUIRED TO MAINTAIN RATING. PROVIDE PUDDY PADS, LIGHT COVERS, INSERTS, WRAPS, COLLARS AND THE LIKE AS REQUIRED.
14. ALL TYPEWRITTEN PANELBOARD DIRECTORIES, FIRE ALARM PROGRAMMING, LIGHTING CONTROL PROGRAMMING, LABELING AND THE LIKE SHALL UTILIZE FINAL OPERATIONAL ROOM NAMING SYSTEM AND SHALL REFLECT FINAL ROOM DESIGNATIONS. COORDINATE WITH ARCHITECT AND OWNER FOR FINAL NAMING.
15. WHERE DUCT SMOKE DETECTORS ARE SHOWN, PROVIDE NEW DEVICES TO EXISTING FIRE ALARM SYSTEM COMPLETE.

COMPRESSION TYPE CONDUIT FITTING

NO SCALE

SYSTEM NO. W-L-1001

F RATINGS – 1, 2, 3 AND 4 HR (SEE ITEMS 2 AND 3)
T RATINGS – 0, 1, 2, 3 AND 4 HR (SEE ITEM 3)
L RATING AT AMBIENT – LESS THAN 1 CFM/SF FT
L RATING AT 400 F – LESS THAN 1 CFM/SQ FT

SECTION A–A

1. WALL ASSEMBLY – THE 1, 2, 3 OR 4 HR FIRE RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
   A. STUDS – WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS (MAX 2 H FIRE RATED ASSEMBLIES)OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM. 2 BY 4 IN. LUMBER SPACED 16" OC WITH NOM. 2 BY 4 IN. LUMBER END PLATES AND CROSS BRACES. STEEL STUDS TO BE MIN. 3-5/8 IN. WIDE BY 1-3/8 IN. DEEP CHANNELS SPACED MAX. 24 IN. OC.
   B. WALLBOARD GYPSUM* –NOM. 1/2 OR 5/8 IN. THICK, 4 FT. WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPES AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX. DIAM. OF OPENING IS 13-1/2 IN.
2. PIPE OR CONDUIT – NOM. 12 IN. DIAM. (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE, NOM. 12 IN. DIAM. (OR SMALLER) SERVICE WEIGHT (OR HEAVIER) CAST IRON SOIL PIPE, NOM 12 IN. DIAM. (OR SMALLER) CLASS 50 (OR HEAVIER) DUCTILE IRON PRESSURE PIPE, NOM 6 IN. DIAM. (OR SMALLER) STEEL CONDUIT, NOM. 4 IN. DIAM. (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING, NOM. 6 IN. DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING OR NOM. 1 IN. DIAM. (OR SMALLER) FLEXIBLE STEEL CONDUIT. WHEN COPPER PIPE IS USED, MAX. F RATING OF FIRESTOP SYSTEM (ITEM 3) IS 2 H. STEEL PIPES OR CONDUITS LARGER THAN NOM. 4 IN. DIAM. MAY ONLY BE USED IN WALLS CONSTRUCTED USING STEEL CHANNEL STUDS. A MAX. OF ONE PIPE OR CONDUIT IS PERMITTED IN THE FIRESTOP SYSTEM. PIPE OR CONDUIT TO BE INSTALLED NEAR CENTER OF STUD CAVITY WIDTH AND TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY.
3. FILL VOID OR CAVITY MATERIAL* – CAULK – CAULK FILL MATERIAL INSTALLED TO COMPLETELY FILL ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND GYPSUM WALLBOARD AND WITH A MIN. 1/4 IN. DIAM. BEAD OF CAULK APPLIED TO PERIMETER OF PIPE OR CONDUIT AT ITS EGRESS FROM THE WALL. CAULK INSTALLED SYMMETRICALLY ON BOTH SIDES OF WALL ASSEMBLY. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS SHOWN IN THE FOLLOWING TABLE. THE HOURLY T RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE TYPE OR SIZE OF THE PIPE OR CONDUIT AND THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS TABULATED BELOW:

MAX. PIPE OR CONDUIT DIAM., IN.	ANNULAR SPACE IN.	F RATING HR	T RATING HR
1	0 TO 3/16	1 OR 2	0+, 1 OR 2
1	1/4 TO 1/2	3 OR 4	3 OR 4
4	0 TO 1/4	1 OR 2	0
4	0 TO 1-1/2#	1 OR 2	0
6	1/4 TO 1/2	3 OR 4	0
12	3/16 TO 3/8	1 OR 2	0

+ WHEN COPPER PIPE IS USED, T RATING IS 0 H.
# 0 TO 1-1/2 IN. ANNULAR SPACE APPLIES ONLY WHEN TYPE CP-25 WB – CAULK IS USED AND ONLY WHEN THE MIN. THICKNESS OF THE GYPSUM WALLBOARD IS 5/8 IN. FOR 1 HR RATED WALLS AND 1-1/4 IN. FOR 2 HR RATED WALLS.
CAULK=3M COMPANY-TYPE CP 25WB+ OR FB-3000WT
* BEARING THE UL CLASSIFICATION MARKING.

ELECTRICAL SYMBOLS

T	TRANSFORMER	Ⓔ	CONNECTION TO EXISTING CIRCUIT
▬	PANELBOARD	⌒	BRANCH CIRCUIT RACEWAY – CONCEALED IN WALL OR CEILING
☐	SAFETY SWITCH	⌒	BRANCH CIRCUIT RACEWAY – CONCEALED IN FLOOR OR UNDERGROUND
⊡	ENCLOSED, MOLDED CASE CIRCUIT BREAKER	⌒	BRANCH CIRCUIT RACEWAY – EXPOSED
☒	MOTOR CONTROLLER OR CONTACTOR	EX	EXISTING; TO REMAIN
Ⓙ	FLUSH JUNCTION BOX CEILING (Ⓙ⊣WALL)	ER	EXISTING; BEING RELOCATED
J	PULL BOX OR JUNCTION BOX IN FLOOR	EN	EXISTING; NEW LOCATION
◪	TRANSIENT VOLTAGE SURGE SUPPRESSOR(TVSS)		
⌀	ELECTRIC MOTOR	⊗	TYPICAL: SYMBOLS DENOTE EXISTING. REMOVE COMPLETE.
○	CONDUIT STUB	☒	TYPICAL: "X" ON PLAN SYMBOLS DENOTES EXISTING. REMOVE COMPLETE.
$	MOTOR RATED SWITCH		
DSD▲	DUCT SMOKE DETECTOR		

NOTE: ALL DEVICES SHOWN ON THIS SCHEDULE ARE SYMBOLIC ONLY. SEE ELECTRICAL SPECIFICATIONS FOR EXACT DEVICE REQUIREMENTS AND PERFORMACE CHARACTERISTICS.

NOTES TO THROUGH PENETRATION FIRESTOPPING

1. WHERE RACEWAYS PASS THRU FIRE-RATED WALLS, FLOORS OR OTHER PARTITIONS, PROVIDE A UL-LISTED THROUGH PENETRATION SYSTEM WITH RATING EQUAL TO THAT OF CONSTRUCTION BEING PENETRATED.
2. EACH ASSEMBLY SHALL BE SPECIFIC TO THE PENETRATING DEVICE (E.G., SINGLE CONDUIT, MULTIPLE CONDUITS, CABLE TRAY, ETC.) AND SHALL BE A UL LISTED SYSTEM AS PUBLISHED IN THE UL FIRE RESISTANCE DIRECTORY, LATEST EDITION.
3. FIRESTOP SYSTEMS SHALL MEET REQUIREMENTS OF ASTM E-814/UL 1749 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO THAT OF CONSTRUCTION BEING PENETRATED.
4. FOR THOSE FIRESTOP APPLICATIONS THAT EXIST FOR WHICH NO UL TESTED SYSTEM IS AVAILABLE THROUGH THE MANUFACTURER, A MANUFACTURER'S ENGINEERING JUDGEMENT DERIVED FROM SIMILAR UL SYSTEM DESIGNS OOR OTHER TESTS SHALL BE SUBMITTED TO LOCAL AUTHORITY HAVING JURISDICTION FOR THEIR APPROVAL PRIOR TO INSTALLATION. ENGINEERING JUDGEMENT DRAWINGS SHALL FOLLOW REQUIREMENTS SET FORTH BY THE INTERNATIONAL FIRESTOP COUNCIL.
5. INSTALLATION SHALL BE IN COMPLIANCE WITH MANUFACTURER'S INSTRUCTION AND IN ACCORDANCE WITH UL FIRE RESISTANCE DIRECTORY FOR EACH SYSTEM UTILIZED.
6. FIRESTOP MATERIALS SHALL BE BY 3M COMPANY, LILTI USA, SPECIFIED TECHNOLOGIES INC (STI). METACAULK, TREMCO OR APPROVED EQUAL.
7. SUBMIT UL SYSTEM DETAIL AND PRODUCT DATA FOR EACH FIRE STOP COMPONENT UTILIZED, INCLUDING DETAILED DRAWINGS, INSTALLATION INSTRUCTIONS, ASSEMBLY LISTING NUMBER, CERTIFICATED OF CONFORMANCE AND MATERIAL SAFETY DATA SHEETS. MAINTAIN A COPY OF APPROVED SHOP DRAWINGS ON SITE FOR REVIEW BY ENGINEER, THIRD PARTY INSPECTOR AND AHJ.
8. COORDINATE WITH OTHER TRADES AND CONTRACT REQUIREMENTS FOR ADDITIONAL FIRESTOPPING REQUIREMENTS. WHERE REQUIRED, ALL FIRESTOP MATERIAL SHALL BE BY SAME MANUFACTURER AND/OR SAME FIRESTOPPING SUB-CONTRACTOR.

NOTES TO FIRE ALARM SYSTEM

1. PROVIDE COMPLETE AND READY FOR OPERATION, A FIRE ALARM SYSTEM EXTENSION OF THE EXISTING SIMPLEX SYSTEM AS INDICATED. ALL ELECTRONICS WORK SHALL BE PROVIDED BY A FRANCHISED DISTRIBUTOR-REPRESENTATIVE OF THE SYSTEM EQUIPMENT MANUFACTURER.
2. ALL WORK SHALL BE IN ACCORDANCE WITH NC IBC (2018), NC IFC (2018), NFPA 70 (2017), NFPA 72 (2013), ADA AND ICC/ANSI A117.1, AND ALL LOCAL CODES AND REGULATIONS.
3. ALL DEVICES AND SYSTEM COMPONENTS SHALL BE UL LISTED FOR APPLICATION AND SHALL BE COMPATIBLE WITH EXISTING FIRE ALARM SYSTEM.
4. SYSTEM COMPONENTS AND RACEWAY SHALL BE SUPPORTED IN COMPLIANCE WITH IBC SEISMIC REQUIREMENTS.
5. ALL RACEWAYS SHALL BE METALLIC CONDUIT, MINIMUM 3/4" SIZE. ALL CONDUCTORS AND CABLES SHALL BE AS REQUIRED BY SYSTEM MANUFACTURER FOR EQUIPMENT FURNISHED AND SHALL BE IN COMPLIANCE WITH UL, NFPA, NEC, AND IFC IN RATE, TYPE, SURVIVABILITY AND INSTALLATION.
6. FIRESTOP ALL PENETRATIONS THRU RATED PARTITIONS AND FLOORS. USE UL LISTED THROUGH-PENETRATION FIRESTOP SYSTEMS APPROPRIATE FOR CONSTRUCTION TYPE AND WITH RATING EQUAL TO THAT BEING PENETRATED.
7. DUCT SMOKE DETECTORS AND SMOKE DAMPERS:
   - REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MECHANICAL CONTRACTOR FOR SMOKE DAMPERS, MECHANICAL UNIT TYPES AND CHARACTERISTICS, LOCATIONS, QUANTITIES AND FUNCTIONS.
   - PROVIDE DUCT AND AREA DETECTORS COMPLETE, INCLUDING POWER INPUT AND FIRE ALARM CIRCUITS. CONTROL WIRING FOR FANS AND DAMPERS SHALL BE BY MECHANICAL CONTRACTOR.
   - DUCT DETECTORS SHALL HAVE ENCLOSED DETECTOR UNIT AND CONTACTS MOUNTED EXTERIOR TO DUCT WITH AIR INLET TUBE EXTENDING INTO DUCT. COORDINATE INLET TUBE LENGTHS AND LOCATIONS WITH MECHANCIAL CONTRACTOR. MOUNTING IN DUCTS SHALL BE IN ACCORDANCE WITH CODES AND MANUFACTURER GUIDELINES.
   - PROVIDE DETECTORS WITH AT LEAST TWO(2) SETS OF SPDT AUXILARY CONTRACTS FOR CONNECTION OF FAN AND SMOKE DAMPER CONTROLS.
   - CONNECT COMPLETE AND PROVIDE FIRE ALARM PROGRAMMING MODIFICATIONS AS REQUIRED FOR AIR HANDLER SHUTDOWN IN ACCORDANCE WITH LOCAL CODES.
8. PROVIDE SHOP DRAWINGS, CALCULATIONS AND PRODUCT DATA IN COMPLIANCE WITH NFPA 72.
9. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE FOR ALL MODIFICATIONS TO CURRENT FIRE ALARM PROGRAMMING TO SUIT ANY REQUIRED DEMOLITION AND NEW WORK; INSPECTION AND TESTING OF FIRE ALARM SYSTEM IN COMPLIANCE WITH NFPA 72; CERTIFICATION OF OPERATION; AND SYSTEM TRAINING FOR OWNER'S MAINTENANCE PERSONNEL.

SYSTEM NO. WL1014

(FORMERLY SYSTEM NO. 259)
F RATING – 2 HR
T RATING – 3/4 HR

SECTION A–A

1. WALL ASSEMBLY – THE FIRE RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION :
   A. STUDS – WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM. 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN. 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC.
   B. WALLBOARD GYPSUM* – TWO LAYERS OF NOM. 5/8 IN. THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX. AREA OF OPENING IS 78 SQ. IN. WITH MAX. DIMENSION OF 12 IN.
2. METALLIC PIPE – NOM. 3-1/2 IN. DIAM. (OR SMALLER) SCHEDULE 5 (OR HEAVIER STEEL PIPE, CONDUIT OR STEEL ELECTRICAL METALLIC TUBING. THE SPACE BETWEEN PIPES, CONDUITS, OR TUBING SHALL MIN. BE 1 IN. TO MAX. 2-5/8" THE SPACE BETWEEN PIPES, CONDUITS OR TUBING AND PERIPHERY OF OPENING SHALL BE MIN. 1 IN. TO MAX. 2-5/8. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. FIRESTOP SYSTEM – THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
   A. STEEL WIRE MESH – NO. 8 STEEL WIRE MESH HAVING A MIN. 1 IN. LAP ALONG THE LONGITUDINAL SEAM. LENGTH OF STEEL WIRE MESH TO BE 4 IN., CENTERED AND FORMED TO FIT PERIPHERY OF THROUGH OPENING.
   B. FILL, VOID OR CAVITY MATERIAL* – PILLOW-LIKE MATERIAL TIGHTLY PACKED INTO THE ANNULAR SPACE BETWEEN THE PIPES AND PERIMETER OF THROUGH OPENING. PRIOR TO INSTALLATION, THE PILLOW-LIKE MATERIAL SHALL BE PATTED DOWN BY HAND OR WITH A FLAT BOARD TO EVENLY DISTRIBUTE CONTENTS. THE PILLOW-LIKE MATERIAL SHALL BE INSTALLED HORIZONTALLY SUCH THAT IT IS FLUSH WITH THE SURFACES OF THE WALL.
      METALINES, INC. – METACAULK 910 RETROFIT BAGS.
      RECTORSEAL CORP. – METACAULK 910 RETROFIT BAGS
   C. FILL, VOID OR CAVITY MATERIAL* – CAULK – APPLIED TO ALL RETROFIT BAG JOINTS, VOIDS, PERIMETER OF PIPES, AND PERIMETER OF THROUGH OPENING TO A MIN. DEPTH OF 1/8 IN. THE RECTORSEAL CORP. – METACAULK 950.

* BEARING THE UL CLASSIFICATION MARKING.

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net

Schneider Electric
Schneider Electric
1650 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 5498
www.scheider-electric.com

S. DICKSON O'BRIEN
SEAL 025412
3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT
FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUUGAR ROAD
SOUTHPORT, NC 28461

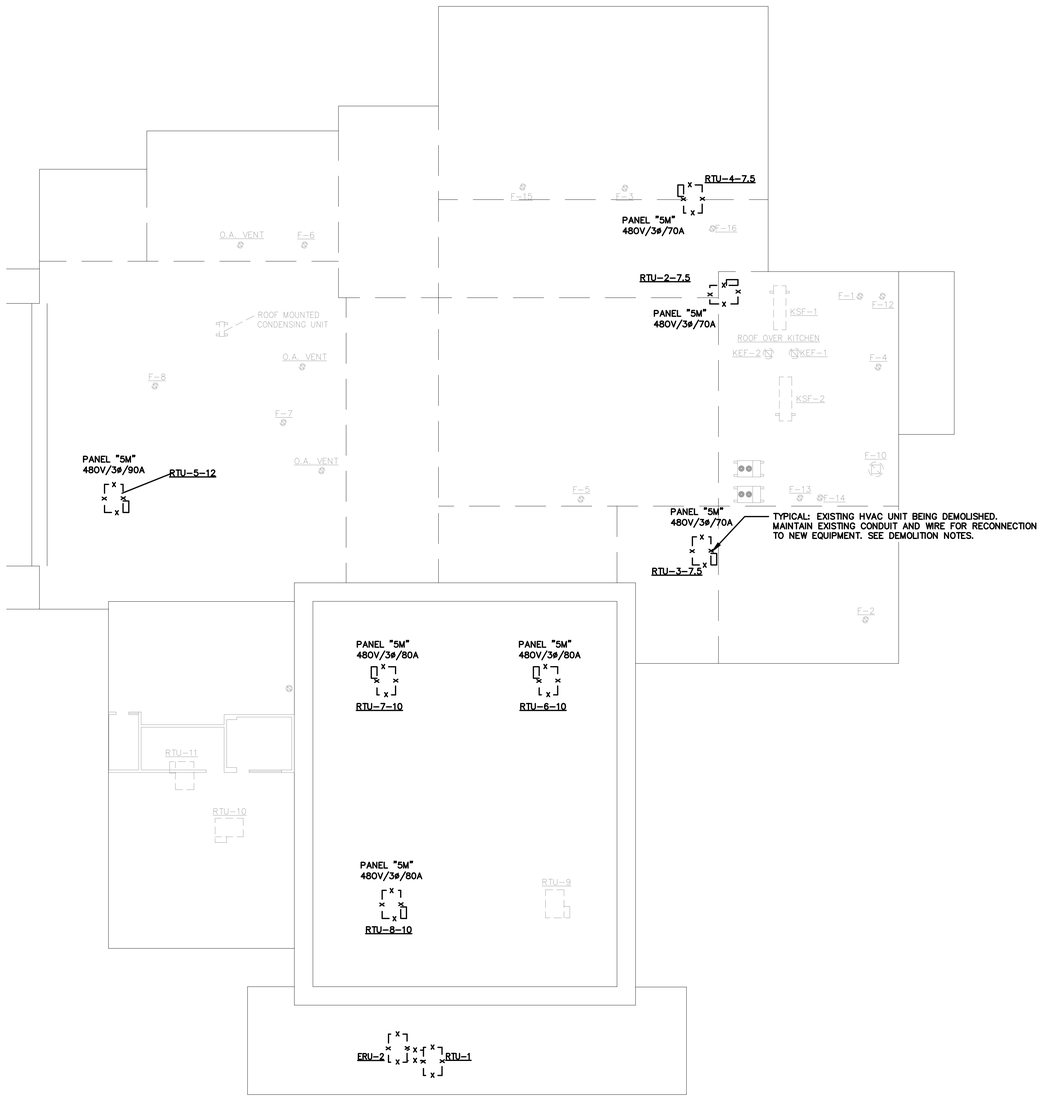
SHEET TITLE
ELECTRICAL SYMBOLS,
SCHEDULES AND DETAILS

MARK	DATE	DESCRIPTION

SUBMISSION / REVISION

DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER
E001
SHT. 1 OF 7



ELECTRICAL PLAN - DEMOLITION - AREA "A"

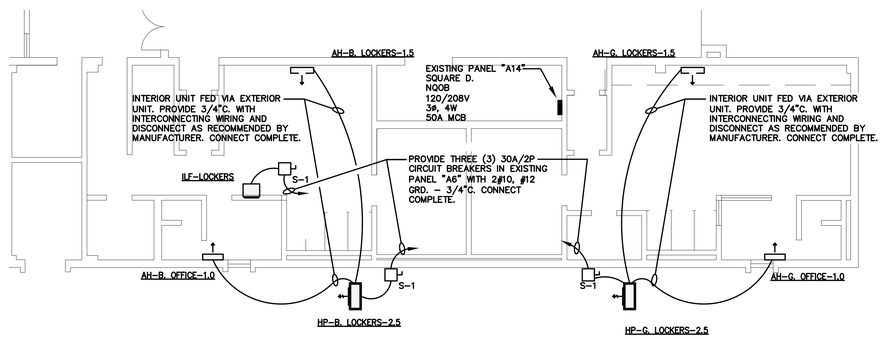
SCALE: 1/16" = 1'-0"

ELECTRICAL PLAN - NEW WORK - AREA "A"

SCALE: 1/16" = 1'-0"

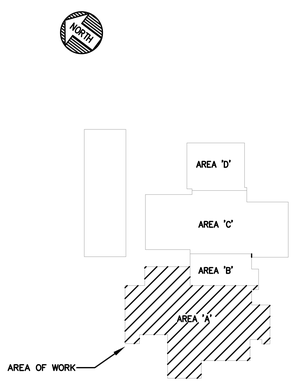
NOTES TO ELECTRICAL WORK – THIS SHEET

1. CIRCUITS INDICATED ON EXISTING EQUIPMENT ARE BASED ON VISUAL OBSERVATION – CONTRACTOR SHALL VERIFY AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO NEW WORK BEING COMPLETED.
2. PROVIDE FUSING IN SAFETY SWITCHES (FUSED DISCONNECTS) TO SUIT NAMEPLATE OF EQUIPMENT CONNECTED. FUSE RATING SHALL NOT EXCEED MOCP/MFS RATING OF MECHANICAL EQUIPMENT SERVED.
3. PROVIDE UPDATED PANELBOARD DIRECTORIES FOR ALL CIRCUITS AFFECTED BY THIS WORK. SEE DEMOLITION NOTES AND SPECIFICATIONS.



ENLARGED ELECTRICAL PLAN - NEW WORK

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



KEY PLAN

SCALE: NONE

Schneider Electric
Tel. +1 972 323 1111
Fax +1 972 323 1488
1650 West Crosby Road
Carrollton, TX 75006 USA
www.schneider-electric.com

3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
ELECTRICAL PLAN - DEMO AND NEW WORK - AREA A

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

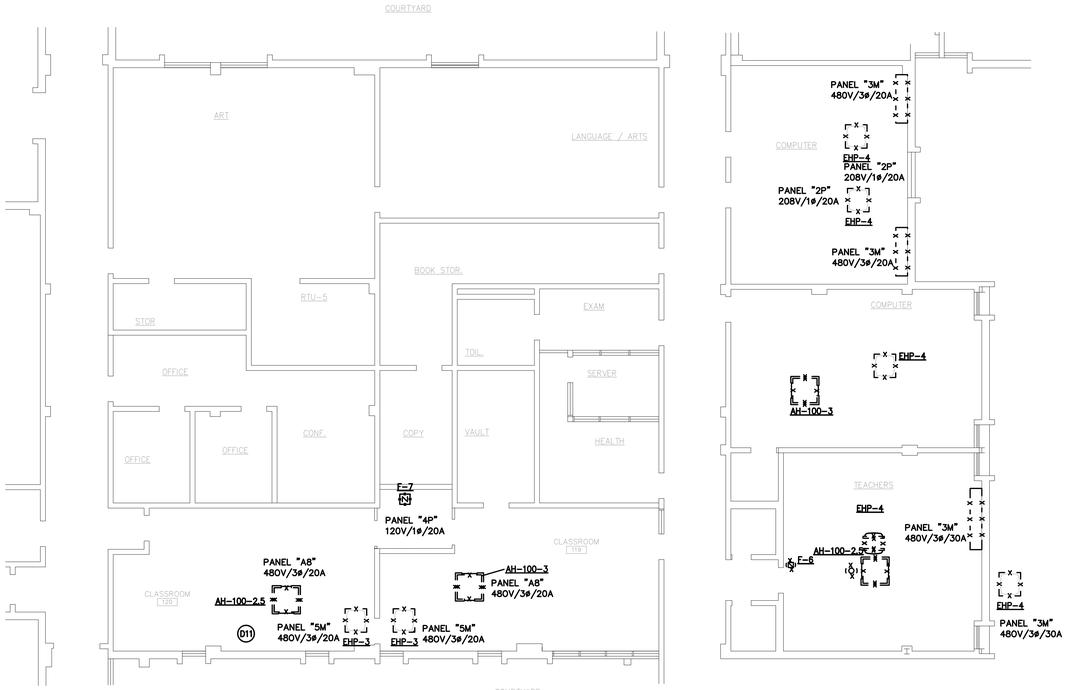
DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER

E101

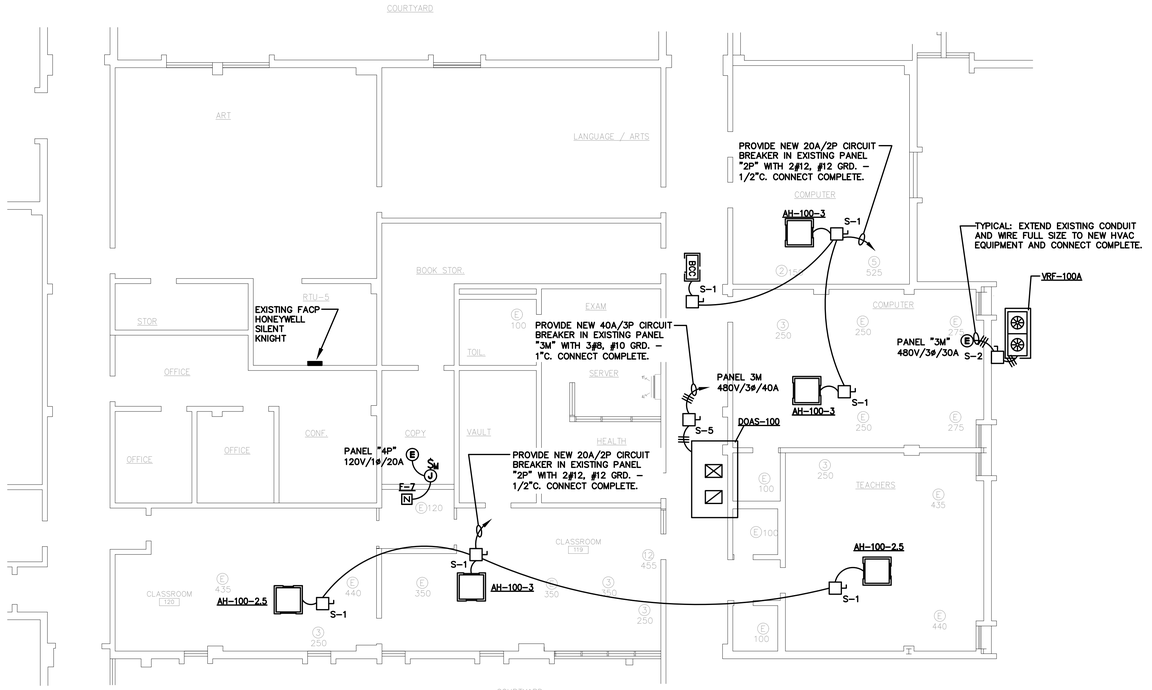
SHT. 2 OF 7

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net



ELECTRICAL PLAN - DEMOLITION - AREA "B"

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

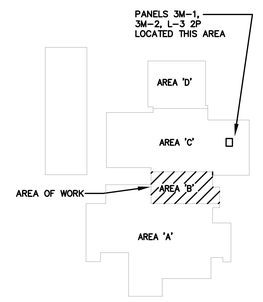


ELECTRICAL PLAN - NEW WORK - AREA "B"

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

NOTES TO ELECTRICAL WORK – THIS SHEET

1. CIRCUITS INDICATED ON EXISTING EQUIPMENT ARE BASED ON VISUAL OBSERVATION – CONTRACTOR SHALL VERIFY AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO NEW WORK BEING COMPLETED.
2. PROVIDE FUSING IN SAFETY SWITCHES (FUSED DISCONNECTS) TO SUIT NAMEPLATE OF EQUIPMENT CONNECTED. FUSE RATING SHALL NOT EXCEED MOCP/MFS RATING OF MECHANICAL EQUIPMENT SERVED.
3. PROVIDE UPDATED PANELBOARD DIRECTORIES FOR ALL CIRCUITS AFFECTED BY THIS WORK. SEE DEMOLITION NOTES AND SPECIFICATIONS.



KEY PLAN

SCALE: NONE

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net

Schneider Electric
Tel. +1 972 323 1111
Fax +1 972 323 1488
Schneider Electric
1650 West Crosby Road
Carrollton, TX 75006 USA
www.schneider-electric.com

3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
ELECTRICAL PLAN - DEMO AND NEW WORK - AREA B

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER

E102

SHT. 3 OF 7

EXISTING PANEL

SCHEDULE – PANELBOARD 2M-1 TYPE: ■ G.E. A SERIES SERVICE: □ 208/120V, 3ø, 4W, WYE ■ 480/277V, 3ø, 4W, WYE MOUNTING: □ FLUSH ■ SURFACE AIC RATING ____ 400 AMP ■ MLO □ MCB ACCESSORY: ■ FEED-THRU LUGS TOTAL SPACES 42

NO.	LOAD DESCRIPTION	REMARK	BRKR AMP	BRKR ø	CIRCUIT WIRE	CIRCUIT COND	LOAD KVA A	LOAD KVA B	LOAD KVA C	LOAD KVA A	LOAD KVA B	LOAD KVA C	CIRCUIT COND	CIRCUIT WIRE	BRKR ø	BRKR AMP	REMARK	LOAD DESCRIPTION	NO.
1	VRF-800B	EXIST	30	3	10	3/4	4.2			4.8					3	30	EXIST	CU-DOAS-C1	2
3	"							4.2			4.8							"	4
5	"								4.2			4.8						"	6
7	SPARE	EXIST	30	3						5.6			3/4	10	3	30	EXIST	DOAS-C1	8
9	"										5.6							"	10
11	"											5.6						"	12
13	SPARE	EXIST	30	3						1.7			1/2	12	3	20	NEW	ERV	14
15	"										1.7							"	16
17	"											1.7						"	18
19	VRF-800A	EXIST	30	3			5.0								3	100	EXIST	ERV 1	20
21	"							5.0										"	22
23	"								5.0									"	24
25	SPACE ONLY																	SPACE ONLY	26
27																			28
29																			30
31																			32
33																			34
35																			36
37	PANEL 1P	EXIST	100	3															38
39	"																		40
41	"																		42

CONNECTED LOAD, KVA: A 9.2 B 9.2 C 9.2 — NEUTRAL — A 12.1 B 12.1 C 12.1 CONNECTED LOAD, KVA:

PANEL SECTIONS:
■ SECT. 1 OF 2-SECT. PANEL
□ SECT. 2 OF 2-SECT. PANEL

KVA, THIS SECTION: A 21.3 B 21.3 C 21.3
KVA, BOTH SECTIONS: A # B # C #

REMARK ABBREVIATION LEGEND:
EXIST = EXISTING BRKR. GFI = GFI BRKR.
NEW = NEW BRKR. VFY = VERIFY LOAD

EXISITNG LOADS BEING DEMOLISHED. RE-USE EXISTING BREAKERS AND PROVIDE NEW BREAKERS AS INDICATED. CONNECT COMPLETE.

EXISTING PANEL

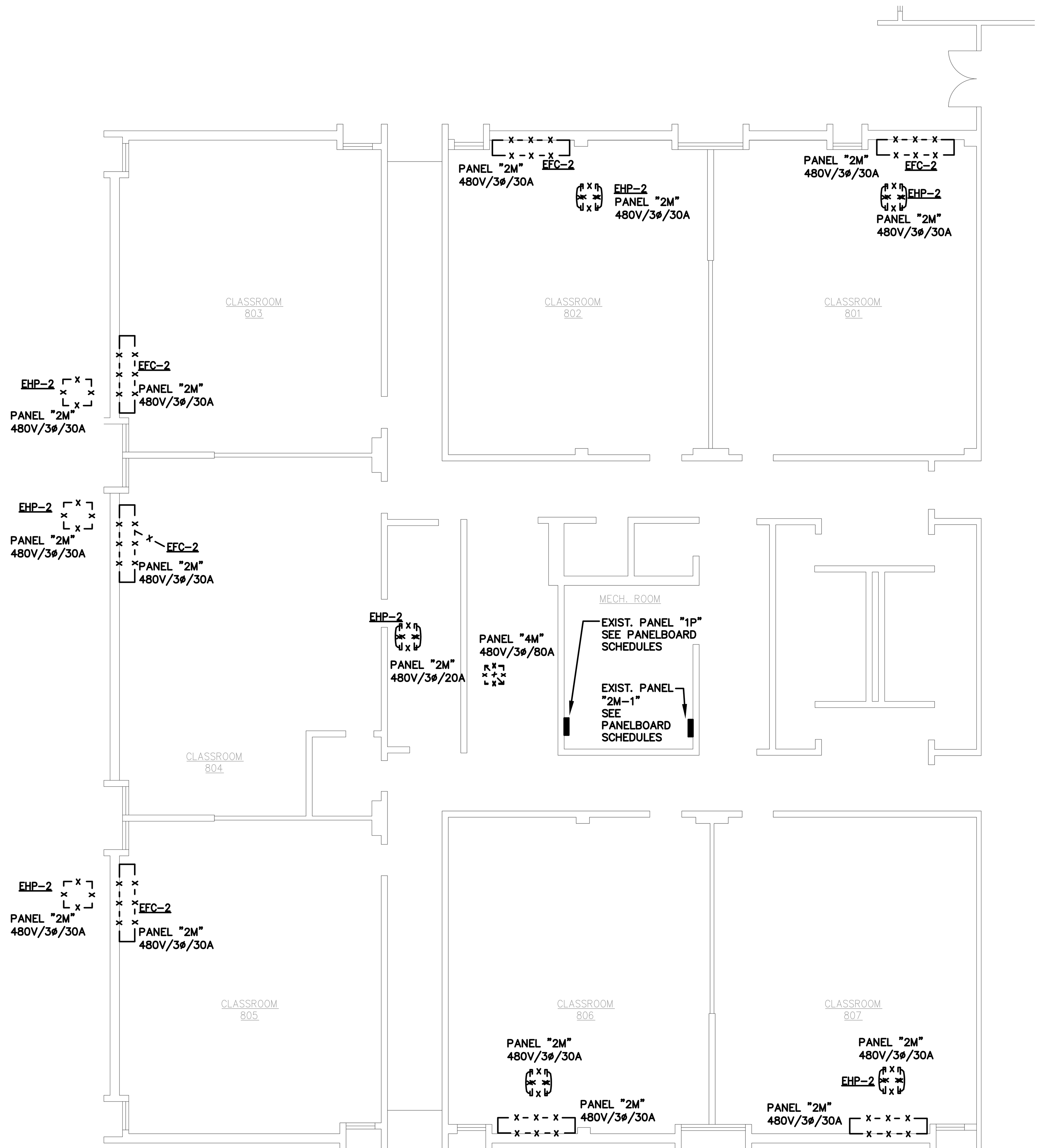
SCHEDULE – PANELBOARD 1P TYPE: ■ G.E. A SERIES VOLTAGE ■ 208/120V, 3ø, 4W, WYE □ 480/277V, 3ø, 4W, WYE MOUNTING: □ FLUSH ■ SURFACE AIC RATING ____ 400 AMP □ MLO ■ MCB ACCESSORY: □ FEED-THRU LUGS TOTAL SPACES ____

NO.	LOAD DESCRIPTION	REMARK	BRKR AMP	BRKR ø	CIRCUIT WIRE	CIRCUIT COND	LOAD KVA A	LOAD KVA B	LOAD KVA C	LOAD KVA A	LOAD KVA B	LOAD KVA C	CIRCUIT COND	CIRCUIT WIRE	BRKR ø	BRKR AMP	REMARK	LOAD DESCRIPTION	NO.
1	EXISTING LOAD		20	1											2	20		EXISTING LOAD	2
3																		" "	4
5															1	20		EXISTING LOAD	6
7																			8
9																			10
11																			12
13	EXISTING LOAD		25	2															14
15	" "																		16
17	EXISTING LOAD		20	1															18
19																			20
21															2	20		EXISTING LOAD	22
23																		" "	24
25	EXISTING LOAD		100	3											2	20		EXISTING LOAD	26
27	" "																	" "	28
29	" "											1.0	1/2	12	1	20		AH-805,806,807	30
31	AH-801,802,803	NEW	20	1	12	1/2	1.0			1.0								" "	32
33	" "							1.0			1.0							SPACE ONLY	34
35	AH-800,804,BCC	NEW	20	1	12	1/2			1.0										36
37	" "						1.0												38
39	SPACE ONLY																		40
41	SPACE ONLY																		42

CONNECTED LOAD, KVA: A 2.0 B 1.0 C 1.0 — NEUTRAL — A 1.0 B 1.0 C 1.0 CONNECTED LOAD, KVA:

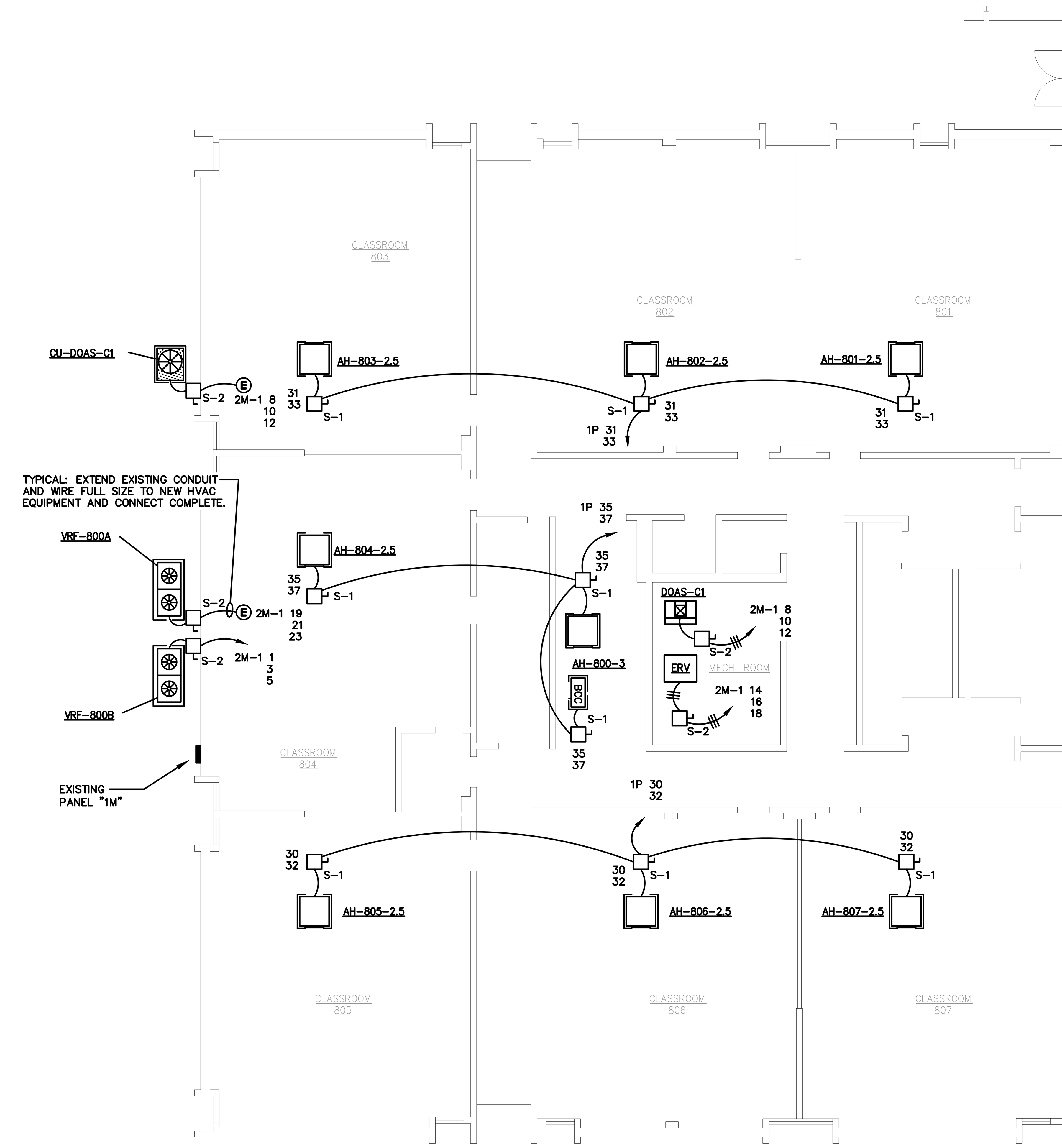
ADDED KVA, THIS PANEL: A 3.0 B 2.0 C 2.0

REMARK ABBREVIATION LEGEND:
EXIST = EXISTING BRKR. GFI = GFI BRKR.
NEW = NEW BRKR. VFY = VERIFY LOAD



ELECTRICAL PLAN - DEMOLITION - AREA "C"

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

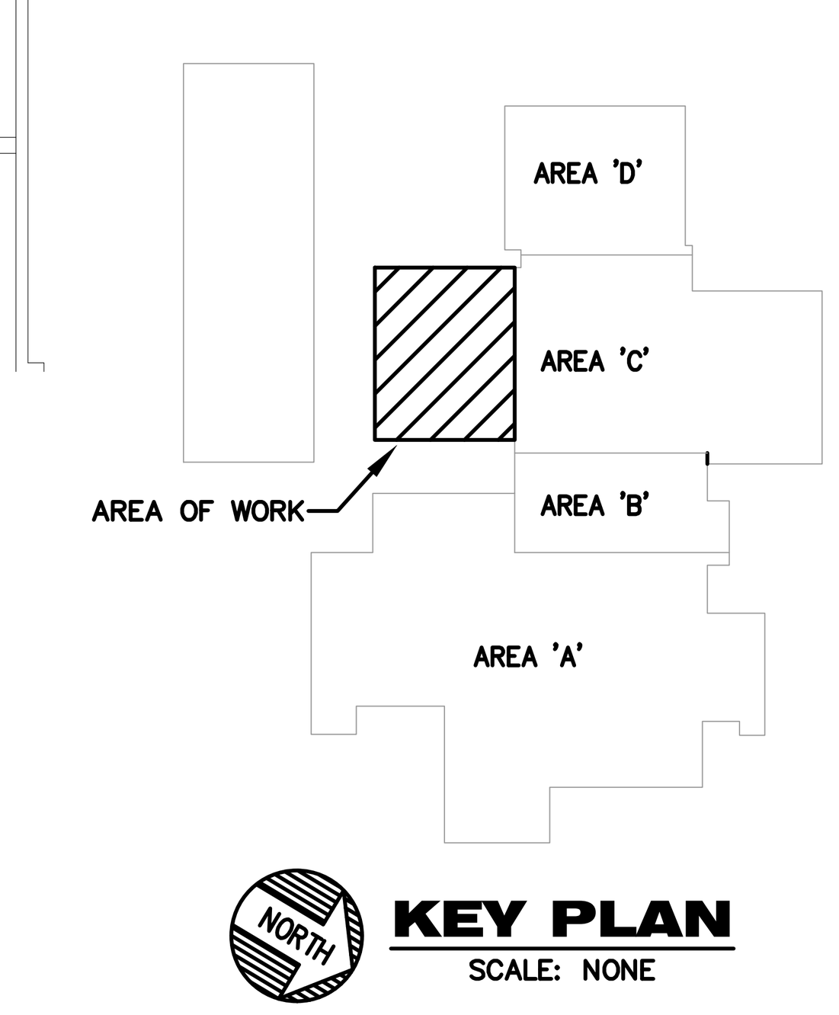


ELECTRICAL PLAN - NEW WORK - AREA "C"

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

NOTES TO ELECTRICAL WORK – THIS SHEET

1. CIRCUITS INDICATED ON EXISTING EQUIPMENT ARE BASED ON VISUAL OBSERVATION – CONTRACTOR SHALL VERIFY AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO NEW WORK BEING COMPLETED.
2. PROVIDE FUSING IN SAFETY SWITCHES (FUSED DISCONNECTS) TO SUIT NAMEPLATE OF EQUIPMENT CONNECTED. FUSE RATING SHALL NOT EXCEED MOCP/MFS RATING OF MECHANICAL EQUIPMENT SERVED.
3. PROVIDE UPDATED PANELBOARD DIRECTORIES FOR ALL CIRCUITS AFFECTED BY THIS WORK. SEE DEMOLITION NOTES AND SPECIFICATIONS.



KEY PLAN

SCALE: NONE

Schneider Electric
Schneider Electric
1650 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 5498
www.schneider-electric.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025412 S. DICKSON O'BRIEN

3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR BRUNSWICK COUNTY SCHOOL DISTRICT

SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE

ELECTRICAL PLAN - DEMO AND NEW WORK - AREA C

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net

SHEET NUMBER

E103

EXISTING PANEL

SCHEDULE – PANELBOARD 4M-1 TYPE: ■ G.E. A SERIES SERVICE: □ 208/120V, 3Ø, 4W, WYE ■ 480/277V, 3Ø, 4W, WYE MOUNTING: □ FLUSH ■ SURFACE AIC RATING ____
225 AMP ■ MLO □ MCB ACCESSORY: ■ FEED-THRU LUGS TOTAL SPACES 42

NO.	LOAD DESCRIPTION	REMARK	BRKR AMP	BRKR Ø	CIRCUIT WIRE	CIRCUIT COND	LOAD KVA A	LOAD KVA B	LOAD KVA C	LOAD KVA A	LOAD KVA B	LOAD KVA C	CIRCUIT COND	CIRCUIT WIRE	BRKR Ø	BRKR AMP	REMARK	LOAD DESCRIPTION	NO.
1	VRF-700A	EXIST	30	3	10	3/4	5.0			5.8			3/4	10	3	30	EXIST	DOAS-D-1	2
3	"							5.0			5.8							"	4
5	"								5.0			5.8						"	6
7	VRF-700B	EXIST	30	3			4.2			1.7			1/2	12	3	20	NEW	ERV	8
9	"							4.2			1.7							"	10
11	"								4.2			1.7						"	12
13	CU-DOAS-D1	EXIST	30	3	10	3/4	4.8								3	30	EXIST	SPARE	14
15	"							4.8										"	16
17	"								4.8									"	18
19	SPARE	EXIST	30	3											3	100	EXIST	ERV 1	20
21	"																	"	22
23	"																	"	24
25	SPACE ONLY																	SPACE ONLY	26
27																			28
29																			30
31																			32
33																			34
35																			36
37																			38
39																			40
41																			42

CONNECTED LOAD, KVA: A 14.0 B 14.0 C 14.0 — NEUTRAL — A 7.5 B 7.5 C 7.5 CONNECTED LOAD, KVA:

PANEL SECTIONS:
■ SECT. 1 OF 2-SECT. PANEL
□ SECT. 2 OF 2-SECT. PANEL

KVA, THIS SECTION: A 21.5 B 21.5 C 21.5
KVA, BOTH SECTIONS: A # B # C #

REMARK ABBREVIATION LEGEND:
EXIST = EXISTING BRKR. GFI = GFI BRKR.
NEW = NEW BRKR. VFY = VERIFY LOAD

EXISITNG LOADS BEING DEMOLISHED. RE-USE EXISTING BREAKERS AND PROVIDE NEW BREAKERS AS INDICATED. CONNECT COMPLETE.

EXISTING PANEL

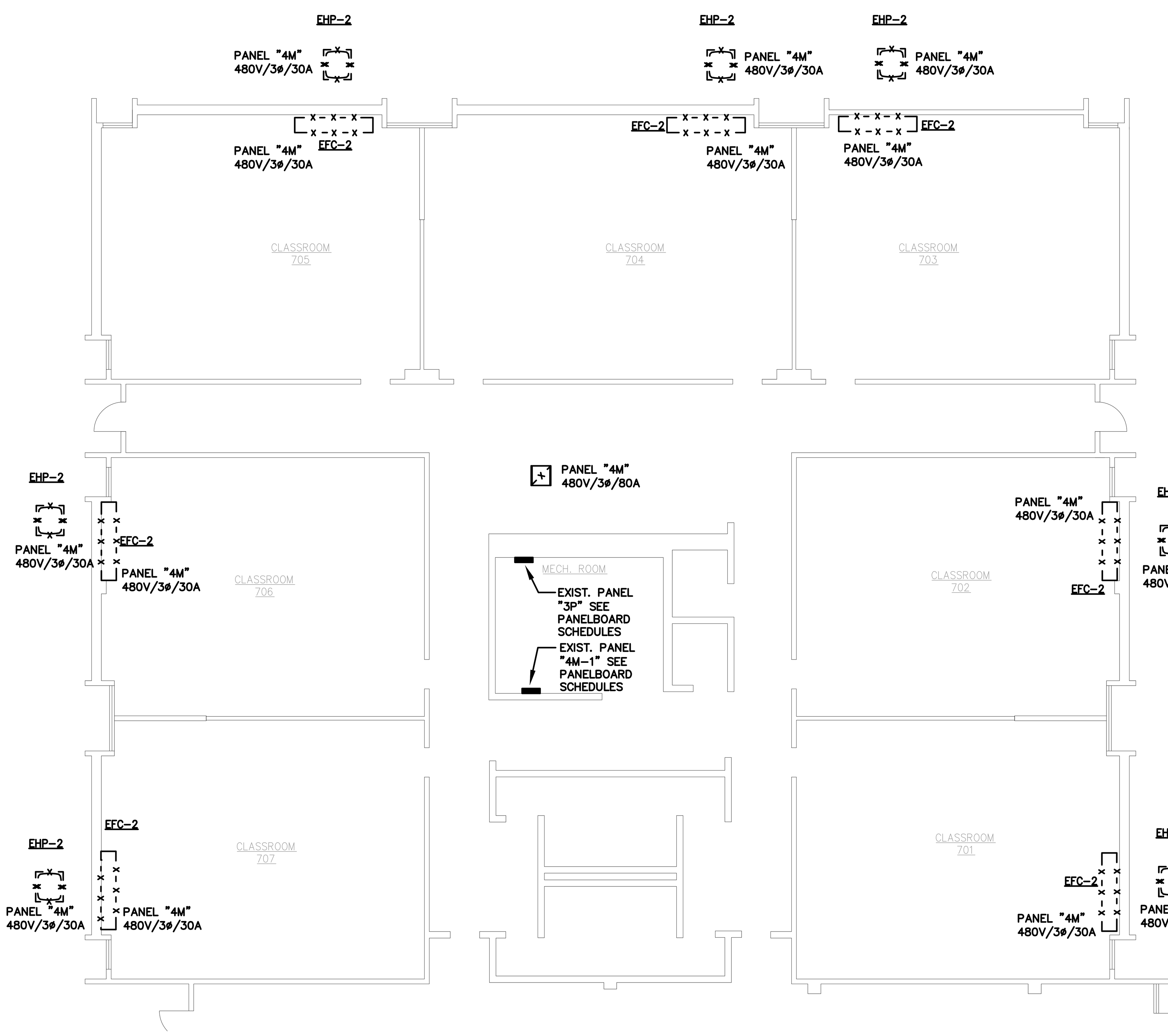
SCHEDULE – PANELBOARD 3P TYPE: ■ G.E. A SERIES VOLTAGE ■ 208/120V, 3Ø, 4W, WYE □ 480/277V, 3Ø, 4W, WYE MOUNTING: □ FLUSH ■ SURFACE AIC RATING ____
125 AMP ■ MLO □ MCB ACCESSORY: □ FEED-THRU LUGS TOTAL SPACES 42

NO.	LOAD DESCRIPTION	REMARK	BRKR AMP	BRKR Ø	CIRCUIT WIRE	CIRCUIT COND	LOAD KVA A	LOAD KVA B	LOAD KVA C	LOAD KVA A	LOAD KVA B	LOAD KVA C	CIRCUIT COND	CIRCUIT WIRE	BRKR Ø	BRKR AMP	REMARK	LOAD DESCRIPTION	NO.
1	EXISTING LOAD		20	1											2	20		EXISTING LOAD	2
3																		" "	4
5															1	20		EXISTING LOAD	6
7																			8
9																			10
11																			12
13	EXISTING LOAD		25	2															14
15	" "																		16
17	EXISTING LOAD		20	1															18
19															2	20		EXISTING LOAD	20
21																		" "	22
23															2	20		EXISTING LOAD	24
25	AH-700,701,702	NEW	20	1	12	1/2	1.9											" "	26
27	" "							1.9										SPACE ONLY	28
29	AH-703,704,705	NEW	20	1	12	1/2			1.9										30
31	" "						1.9												32
33	AH-706,707,BCC	NEW	20	1	12	1/2		1.9											34
35	" "								1.9										36
37	SPACE ONLY																		38
39	SPACE ONLY																		40
41	SPACE ONLY																		42

CONNECTED LOAD, KVA: A 3.8 B 3.8 C 3.8 — NEUTRAL — A ### B ### C ### CONNECTED LOAD, KVA:

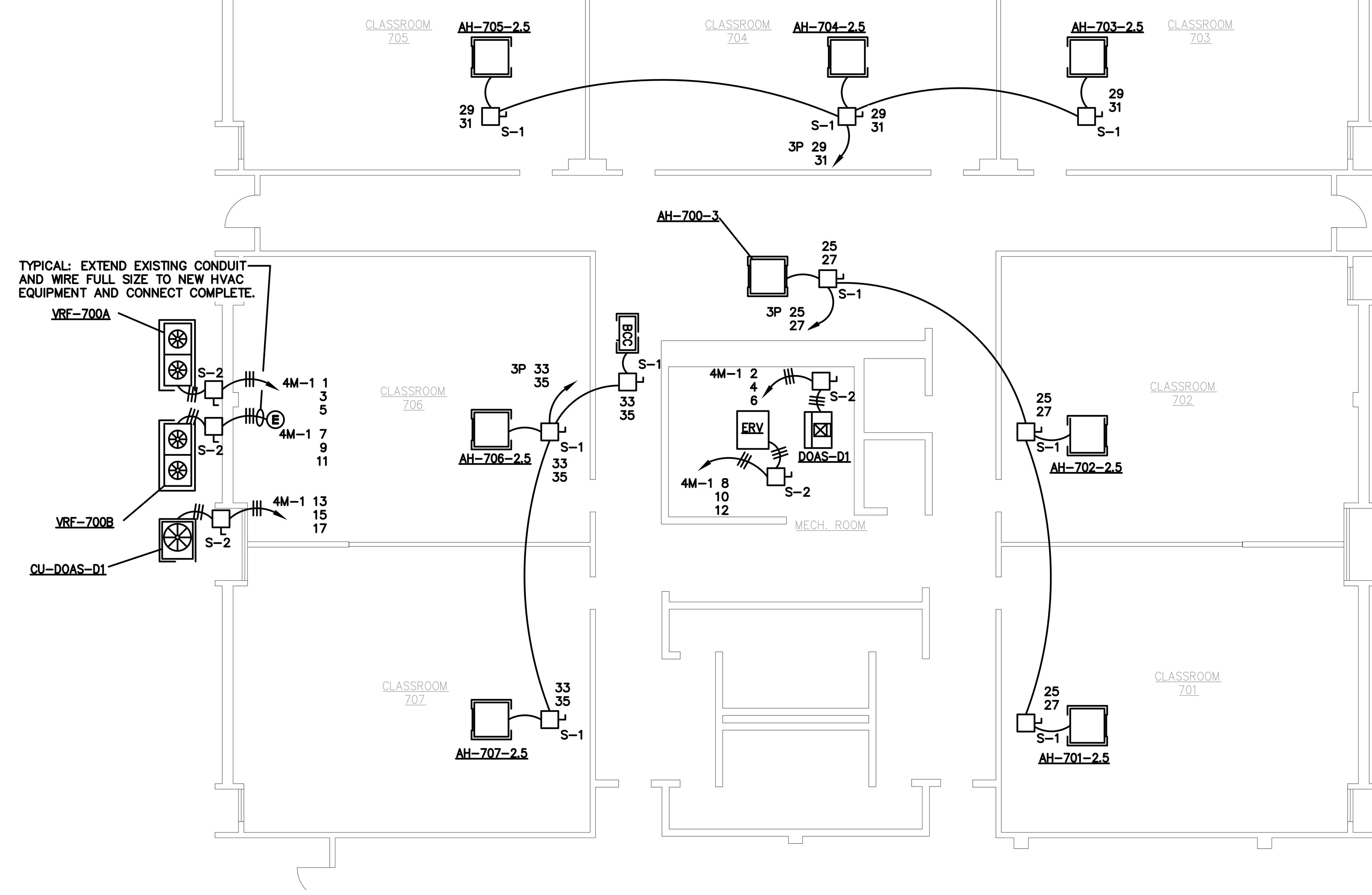
ADDED KVA, THIS PANEL: A 3.8 B 3.8 C 3.8

REMARK ABBREVIATION LEGEND:
EXIST = EXISTING BRKR. GFI = GFI BRKR.
NEW = NEW BRKR. VFY = VERIFY LOAD



ELECTRICAL PLAN - DEMOLITION - AREA "D"

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

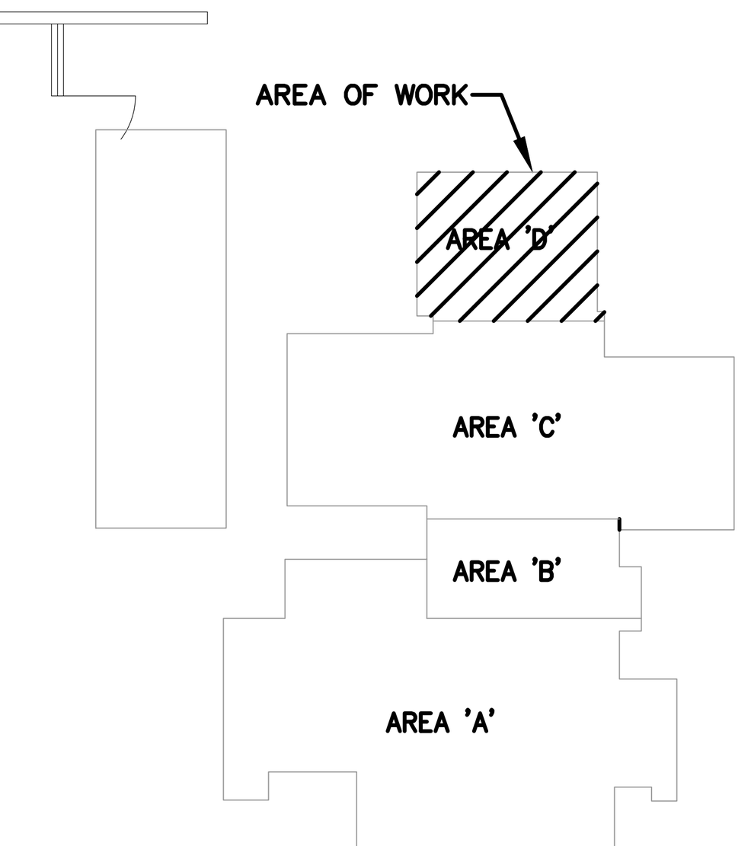


ELECTRICAL PLAN - NEW WORK - AREA "D"

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

NOTES TO ELECTRICAL WORK – THIS SHEET

1. CIRCUITS INDICATED ON EXISTING EQUIPMENT ARE BASED ON VISUAL OBSERVATION – CONTRACTOR SHALL VERIFY AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO NEW WORK BEING COMPLETED.
2. PROVIDE FUSING IN SAFETY SWITCHES (FUSED DISCONNECTS) TO SUIT NAMEPLATE OF EQUIPMENT CONNECTED. FUSE RATING SHALL NOT EXCEED MOCP/MFS RATING OF MECHANICAL EQUIPMENT SERVED.
3. PROVIDE UPDATED PANELBOARD DIRECTORIES FOR ALL CIRCUITS AFFECTED BY THIS WORK. SEE DEMOLITION NOTES AND SPECIFICATIONS.



KEY PLAN

SCALE: NONE

Schneider Electric
Schneider Electric
1650 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 5498
www.schneider-electric.com

3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT FOR BRUNSWICK COUNTY SCHOOL DISTRICT

SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
ELECTRICAL PLAN - DEMO AND NEW WORK - AREA D

MARK	DATE	DESCRIPTION

SUBMISSION / REVISION

DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net

SHEET NUMBER
E104

SECTION 26 05 00 – ELECTRICAL, GENERAL

PART 1 – GENERAL

1.1 FEES

A. FEES FOR PERMITS [AND INSPECTIONS] ARE INCLUDED. DELIVER PERMITS [AND CERTIFICATES] TO THE ARCHITECT.

1.2 SITE VISIT

A. PRIOR TO BIDDING, THIS CONTRACTOR SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK IS TO BE PERFORMED AND SHALL INCLUDE IN HIS BID ALL LABOR, MATERIAL AND OPERATIONS REQUIRED FOR A COMPLETE JOB.

1.3 DRAWINGS AND SPECIFICATIONS

A. DRAWINGS DO NOT INDICATE ALL HARDWARE AND FITTINGS. EXAMINE ALL PLANS AND SPECIFICATIONS FOR THE PROJECT AND CONDITIONS AT SITE AND ARRANGE WORK ACCORDINGLY, FURNISHING REQUIRED FITTINGS AND HARDWARE WITHOUT EXTRA CHARGE. IF A CONFLICT EXISTS, THE GREATER QUANTITY OR BETTER QUALITY, IN THE OPINION OF THE ENGINEER, GOVERNS.

B. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY; WORK CALLED FOR IN EITHER SHALL BE PROVIDED AS IF CALLED FOR BY BOTH.

1.4 CODES AND STANDARDS

A. MATERIALS, EQUIPMENT AND INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE CODES AND STANDARDS (LATEST EDITIONS) LISTED BELOW. IN ADDITION, ALL MATERIALS, EQUIPMENT, AND DEVICES SHALL MEET THE REQUIREMENTS OF THE UNDERWRITERS' LABORATORIES, INC. THE LABEL OF, OR LISTING BY, THE UNDERWRITERS' LABORATORIES, INC. WILL BE ACCEPTED AS CONFORMING WITH THIS REQUIREMENT. IN LIEU OF THE LABEL OR LISTING, THE CONTRACTOR MAY SUBMIT INDEPENDENT PROOF SATISFACTORY TO THE ENGINEER THAT THE MATERIALS, EQUIPMENT OR DEVICES CONFORM TO THE PUBLISHED STANDARDS, INCLUDING METHODS OF TESTS, OF THE UNDERWRITERS' LABORATORIES, INC. (UL), NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL SAFETY CODE, AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE), NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA), ILLUMINATING ENGINEERING SOCIETY (IES), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONTRACTING (NECA 1), INTERNATIONAL BUILDING CODE (IBC) WITH NORTH CAROLINA MODIFICATIONS, AND AMERICANS WITH DISABILITIES ACT (ADA).

1.5 BASIC MATERIALS AND METHODS

A. ALL MATERIALS INSTALLED SHALL BE NEW, CLEAN, IN GOOD CONDITION AND SHALL MEET APPLICABLE PROVISIONS OF CODES AND STANDARDS LISTED ABOVE.

B. WORKMANSHIP SHALL BE IN ACCORDANCE WITH BEST PRACTICE. COMPLY WITH NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONTRACTING (NECA 1).

C. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER GUIDELINES AND INSTALLATION INSTRUCTIONS.

1.6 SCOPE

A. PROVIDE ALL LABOR, EQUIPMENT, MATERIAL, AND OPERATIONS REQUIRED FOR COMPLETE, SAFE AND QUIETLY–OPERATING ELECTRICAL SYSTEMS IN ACCORDANCE WITH SPECIFICATIONS AND DRAWINGS AND SUBJECT TO TERMS AND CONDITIONS OF THE CONTRACT.

B. THE WORK INCLUDES:

1. GROUNDING IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS AND CODES;
2. COMPLETE DISTRIBUTION SYSTEM FOR POWER INCLUDING PANELBOARDS, SAFETY SWITCHES, FEEDERS, BRANCH CIRCUITS, AND CONNECTIONS TO OUTLETS AND DEVICES FOR POWER UTILIZATION;
3. FIRE ALARM SYSTEM EXTENSION;
4. POWER SUPPLY CONNECTIONS TO MECHANICAL EQUIPMENT;
5. CUTTING, PATCHING, TRENCHING, AND BACKFILLING AS REQUIRED FOR PROVISION OF THE WORK;
6. FIREPROOFING AND CAULKING AS REQUIRED;
7. SEISMIC RESTRAINT FOR ELECTRICAL SYSTEM COMPONENTS;
8. PARTIAL DEMOLITION OF EXISTING ELECTRICAL SYSTEM.

1.7 CUTTING AND PATCHING

A. PROVIDE UNDER THIS CONTRACT ALL CUTTING AND PATCHING OF WALLS, FLOORS, PARTITIONS, CEILINGS, ETC. REQUIRED FOR PROPER INSTALLATION OF THE NEW SYSTEM.

B. PROVIDE PATCHING TO MATCH EXISTING ADJACENT FINISHES. PAINT TYPE, BRAND AND COLOR SHALL BE IN ACCORDANCE WITH OWNER'S PAINTING STANDARDS.

C. DO NOT CUT JOISTS, BEAMS, GIRDERS, COLUMNS, OR OTHER STRUCTURAL MEMBERS WITHOUT WRITTEN PERMISSION FROM OWNER.

D. RELOCATION OF EXISTING CONDUIT, EQUIPMENT, WIRING, ETC. AS REQUIRED FOR INSTALLATION OF NEW SYSTEM IS INCLUDED IN THIS WORK. PERFORM ALL WORK IN ACCORDANCE WITH SPECIFICATIONS FOR NEW WORK OF THE PARTICULAR TYPE INVOLVED.

1.8 EXCAVATING AND BACKFILLING

A. PROVIDE UNDER THIS CONTRACT ALL EXCAVATING, AND BACKFILLING REQUIRED FOR THE INSTALLATION OF ELECTRICAL WORK.

B. CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO BACKFILLING. DO NOT BEGIN BACKFILLING UNTIL OWNER'S REPRESENTATIVE HAS OBSERVED THE WORK. EXCAVATIONS SHALL BE FILLED AS SOON AS POSSIBLE AND NOT LEFT OPEN FOR PROLONGED PERIODS.

C. PROVIDE SAFETY (WARNING) BARRICADES AROUND ALL OPEN TRENCHES AND HOLES BEFORE LEAVING UNATTENDED. DO NOT LEAVE EXPOSED WIRING IN A TRENCH UNATTENDED.

D. BACKFILLED SHALL BE DONE IN LAYERS OF 6 INCHES FILL, WETTED DOWN AND TAMPED FOR EACH CONSECUTIVE LAYER UP TO GRADE TO A COMPACTION OF AT LEAST 95 PERCENT OF AASHTO T–99–49 PROCTOR CURVE.

E. WHENEVER TRENCHES HAVE NOT BEEN PROPERLY FILLED, OR IF SETTLEMENT OCCURS, THEY SHALL BE REFILLED, SMOOTHED OFF AND FINALLY MADE TO CONFORM TO THE SURFACE OF THE GROUND. BACKFILLING SHALL BE CAREFULLY PERFORMED AND THE ORIGINAL SURFACE RESTORED TO ORIGINAL CONDITIONS TO THE FULL SATISFACTION OF THE ENGINEER.

1.9 ROOF PENETRATIONS

A. CONTRACTOR SHALL COORDINATE ROOF PENETRATIONS WITH OTHER TRADES AND SHALL PROVIDE ALL WORK REQUIRED FOR COMPLETE RACEWAYS AND RACEWAY SUPPORTS FOR ELECTRICAL WORK FOR ROOF–MOUNTED EQUIPMENT AND DEVICES.

B. PROVIDE FLASHING DEVICES NOT INCLUDED UNDER OTHER DIVISIONS OF THESE SPECIFICATIONS. ALL WORK SHALL COMPLY WITH REQUIREMENTS FOR ROOF CONSTRUCTION AND SHALL IN NO WAY ALTER ANY SPECIFIED ROOF PERFORMANCE OR WARRANTIES.

C. WHERE SEVERAL SERVICES (E.G., ELECTRICAL AND REFRIGERATION) ARE CONNECTED TO A SINGLE EQUIPMENT, COORDINATE WITH OTHER TRADES INVOLVED TO MINIMIZE ROOF PENETRATIONS AND TO PERFORM WORK IN A WORKMANLIKE MANNER.

D. LAY OUT WORK IN ADVANCE AND LOCATE RACEWAY PENETRATIONS AS NEAR EQUIPMENT CONNECTION POINTS AS POSSIBLE. WHERE MORE THAN ONE RACEWAY SERVES EQUIPMENT, EXTEND ALL RACEWAYS THROUGH A COMMON FLASHING DEVICE WITH ONE ROOF PENETRATION AND LEAVE SUFFICIENT SPACE BETWEEN RACEWAYS TO AFFECT A LEAKPROOF SEAL.

E. CONTRACTOR SHALL EXAMINE OTHER DIVISIONS OF THESE SPECIFICATIONS AND SHALL COMPLY WITH ALL REQUIREMENTS FOR A COMPLETE PROJECT.

1.10 PENETRATIONS AND FIRESTOPPING

A. ALL PENETRATIONS THROUGH WALLS, FLOORS, PARTITIONS AND THE LIKE SHALL BE SEALED TIGHT.

B. WHERE CONDUITS PASS THROUGH FIRE–RATED WALLS, FLOORS OR OTHER PARTITIONS, PROVIDE A UL–LISTED THROUGH–PENETRATION ASSEMBLY WITH FIRE RATING EQUAL TO CONSTRUCTION BEING PENETRATED. EACH ASSEMBLY SHALL BE SPECIFIC TO THE PENETRATING DEVICE, E.G., SINGLE CONDUIT, MULTIPLE CONDUITS, CABLE TRAY, BUSWAY, ETC. AND SHALL BE SPECIFIC TO THE CONSTRUCTION PENETRATED, E.G., CONCRETE, GYPSUM BOARD ON WALL STUDS, ETC. INSTALL ASSEMBLIES IN ACCORDANCE WITH MATERIAL MANUFACTURER'S INSTRUCTIONS AND UL BUILDING MATERIALS DIRECTORY, LATEST EDITION.

C. FIRESTOP SYSTEMS SHALL MEET REQUIREMENTS OF ASTM E–814/UL 1749 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO THAT OF CONSTRUCTION BEING PENETRATED.

D. FOR THOSE FIRESTOP APPLICATIONS THAT EXIST FOR WHICH NO UL TESTED SYSTEM IS AVAILABLE THROUGH THE MANUFACTURER, A MANUFACTURER'S ENGINEERING JUDGEMENT DERIVED FROM SIMILAR UL SYSTEM DESIGNS OR OTHER TESTS SHALL BE SUBMITTED TO LOCAL AUTHORITY HAVING JURISDICTION FOR THEIR APPROVAL PRIOR TO INSTALLATION. ENGINEERING JUDGEMENT DRAWINGS SHALL FOLLOW REQUIREMENTS SET FORTH BY THE INTERNATIONAL FIRESTOP COUNCIL.

E. FIRESTOP MATERIALS SHALL BE BY 3M COMPANY, HILTI USA, SPECIFIED TECHNOLOGIES INC (STI), METACAULK, TREMCO OR APPROVED EQUAL.

F. SUBMIT UL SYSTEM DETAIL AND PRODUCT DATA FOR EACH FIRE STOP COMPONENT UTILIZED, INCLUDING DETAILED DRAWINGS, INSTALLATION INSTRUCTIONS, ASSEMBLY LISTING NUMBER, CERTIFICATE OF CONFORMANCE AND MATERIAL SAFETY DATA SHEETS.

G. MAINTAIN A COPY OF APPROVED FIRESTOP SYSTEM DETAILS AND PRODUCT DATA ON SITE FOR REVIEW BY ENGINEER, THIRD PARTY INSPECTOR AND AHJ.

H. COORDINATE WITH OTHER TRADES AND CONTRACT REQUIREMENTS FOR ADDITIONAL FIRESTOPPING REQUIREMENTS. WHERE REQUIRED, ALL FIRESTOP MATERIAL SHALL BE BY SAME MANUFACTURER AND/OR SAME FIRESTOPPING SUB–CONTRACTOR.

1.11 SEISMIC RESTRAINTS

A. PROVIDE SEISMIC RESTRAINT OF NEW ELECTRICAL SYSTEMS AND EQUIPMENT AS REQUIRED BY APPLICABLE VERSIONS OF INTERNATIONAL BUILDING CODE (IBC) AND ASCE 7. SEISMIC RESTRAINT PRODUCTS SHALL BE BY MASON INDUSTRIES, TOLCO, UNISTRUT CORPORATION, GRINNELL CORPORATION, AMBER BOOTH, PEABODY OR APPROVED EQUAL.

B. FIRE ALARM NAC PANELS, AND RACEWAYS SHALL WITHSTAND THE EFFECTS OF EARTHQUAKE MOTIONS DETERMINED ACCORDING TO ASCE/SEI 7.

1.12 DAMAGES

A. COST OF REPAIRING DAMAGE TO BUILDING, BUILDING CONTENTS, AND SITE DURING CONSTRUCTION AND GUARANTEE PERIOD RESULTING FROM THIS WORK IS A PART OF THIS CONTRACT.

1.13 MATERIAL AND EQUIPMENT

A. NEW AND AS SPECIFIED OR APPROVED EQUAL.

B. WHERE SEVERAL UNITS OF ONE TYPE OF EQUIPMENT ARE USED, ALL UNITS SHALL BE PRODUCTS OF THE SAME MANUFACTURER.

C. ANY INCREASE IN THE COST OF THIS WORK, RESULTING FROM SUBSTITUTION OF ANY PRODUCT OR PRODUCTS FOR THOSE SPECIFIED IS PART OF THIS CONTRACT. SUCH WORK SHALL BE ACCOMPLISHED IN AN APPROVED MANNER AT NO EXTRA COST TO THE OWNER.

1.14 OPERATING INSTRUCTIONS, PANELBOARD DIRECTORIES AND NAMEPLATES

A. INSTRUCT OWNER IN OPERATION OF ALL SYSTEMS.

B. INSTALL IN EACH PANELBOARD A SINGLE–SIDED PLASTIC–COVERED, TYPEWRITTEN CIRCUIT DIRECTORY IN METAL FRAME. INDICATE NAME, ADDRESS AND SERVICE TELEPHONE NUMBER OF INSTALLER. DIRECTORY SHALL LIST THE LOAD SERVED AND THE LOCATION OF THE LOAD FOR EACH BREAKER.

C. NAMEPLATES PROVIDED BY CONTRACTOR: ON ALL PANELBOARDS, DISCONNECT SWITCHES, TRANSFORMERS AND ENCLOSURES, PROVIDE ENGRAVED PLASTIC LAMINATE NAMEPLATES. UNLESS OTHERWISE NOTED, NAMEPLATES TO BE 1/16" THICK PLASTIC WITH 1/4" HIGH WHITE LETTERS ON BLACK BACKGROUND. ATTACH NAMEPLATES WITH EPOXY CEMENT OR SCREWS. ON MAIN SWITCHBOARD/PANELBOARD AND FEEDER DISTRIBUTION PANELBOARDS, PROVIDE NAMEPLATE FOR EACH CIRCUIT BREAKER.

D. NAMEPLATES PROVIDED BY EQUIPMENT MANUFACTURERS: ALL SWITCHBOARDS, PANELBOARDS, TRANSFORMERS, SAFETY SWITCHES AND THE LIKE SHALL BE PROVIDED WITH ENGRAVED METAL NAMEPLATES WHICH STATE ALL INDUSTRY–STANDARD REQUIRED DATA ABOUT THE LABELED EQUIPMENT. NAMEPLATES SHALL BE AFFIXED WITH SCREWS OR RIVETS. THE USE OF PAPER NAMEPLATES ONLY WILL NOT BE ACCEPTED.

1.15 SHOP DRAWINGS

A. THE ENGINEER WILL REVIEW AND TAKE APPROPRIATE ACTION ON SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND OTHER SUBMITTALS REQUIRED BY THE CONTRACT DOCUMENTS. SUCH REVIEW SHALL BE ONLY FOR GENERAL COMPLIANCE WITH THE DESIGN AND WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. IT SHALL NOT INCLUDE REVIEW OF QUANTITIES, DIMENSIONS, WEIGHTS, FABRICATION PROCESSES, CONSTRUCTION METHODS, COORDINATION WITH THE WORK OF OTHER TRADES, OR CONSTRUCTION SAFETY PRECAUTIONS, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ENGINEER'S REVIEW SHALL BE CONDUCTED WITH REASONABLE PROMPTNESS CONSISTENT WITH SOUND PROFESSIONAL PRACTICE. REVIEW OF A SPECIFIC ITEM SHALL NOT INDICATE ACCEPTANCE OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. THE ENGINEER SHALL NOT BE REQUIRED TO REVIEW AND SHALL NOT BE RESPONSIBLE FOR ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS NOT CLEARLY NOTED BY THE CONTRACTOR, NOR SHALL THE ENGINEER BE REQUIRED TO REVIEW PARTIAL SUBMISSIONS OR THOSE FOR WHICH SUBMISSIONS FOR CORRELATED ITEMS HAVE NOT BEEN MADE.

B. PRIOR TO SUBMITTAL OF SHOP DRAWINGS TO THE ENGINEER, THE GENERAL CONTRACTOR AND THE ELECTRICAL SUBCONTRACTOR SHALL REVIEW AND APPROVE SHOP DRAWINGS. SHOP DRAWINGS WHICH HAVE NOT BEEN REVIEWED AND APPROVED IN WRITING BY THE ELECTRICAL SUBCONTRACTOR WILL NOT BE REVIEWED BY THE ENGINEER. ELECTRICAL SUBCONTRACTOR SHALL STATE IN WRITING ON SHOP DRAWINGS, ANY PROPOSED DEVIATIONS FROM CONTRACT DOCUMENTS. SUCH DEVIATIONS, IF NOT STATED IN SHOP DRAWINGS SUBMITTAL, SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL SUBCONTRACTOR.

NOTE: IN ADDITION TO THE GENERAL CONTRACTOR'S APPROVAL AND STAMP, THE FIRST PAGE OF EACH SHOP DRAWING SUBMITTAL SHALL CONTAIN THE WORDS "APPROVED" OR "APPROVED AS NOTED," AND SHALL BE SIGNED, AND DATED BY THE ELECTRICAL SUBCONTRACTOR BEFORE THE ENGINEER WILL REVIEW THEM.

C. ELECTRICAL SUBCONTRACTOR SHALL SUBMIT FOR REVIEW BY THE ENGINEER DETAILED SHOP DRAWINGS OF ALL EQUIPMENT AND ALL MATERIAL LISTED BELOW. ALL SUBMITTAL DATA SHALL BE SUBMITTED AT ONE TIME – PARTIAL SUBMITTALS WILL NOT BE REVIEWED BY THE ENGINEER. NO MATERIAL OR EQUIPMENT FOR WHICH ENGINEER'S REVIEW IS REQUIRED SHALL BE DELIVERED TO THE JOB SITE OR INSTALLED UNTIL THIS CONTRACTOR HAS IN HIS POSSESSION THE REVIEWED SHOP DRAWINGS FOR THE PARTICULAR MATERIAL OR EQUIPMENT. THE SHOP DRAWINGS SHALL BE COMPLETE AS DESCRIBED HEREIN. THIS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS DIRECTED BY ARCHITECT OR, IF NO PROCEDURE IS SPECIFIED BY THE ARCHITECT, SUBMIT ONE ELECTRONIC .PDF COPY TO ENGINEER VIA EMAIL: GWA@GWAINC.NET.

D. SHOP DRAWINGS SUBMITTED FOR REVIEW SHALL BE DETAILED, DIMENSIONED DRAWINGS OR CATALOG PAGES SHOWING CONSTRUCTION, SIZE, ARRANGEMENT, OPERATING CLEARANCES, PERFORMANCE CHARACTERISTICS AND CAPACITY.

E. SAMPLES, DRAWINGS, SPECIFICATIONS, CATALOGS, SUBMITTED FOR REVIEW SHALL BE PROPERLY LABELED INDICATING SPECIFIC SERVICE FOR WHICH MATERIAL OR EQUIPMENT IS TO BE USED, SECTION AND ARTICLE NUMBER OF SPECIFICATIONS GOVERNING, CONTRACTOR'S NAME, AND PROJECT NAME.

F. CATALOGS, PAMPHLETS, OR OTHER DOCUMENTS SUBMITTED TO DESCRIBE ITEMS ON WHICH REVIEW IS BEING REQUESTED, SHALL BE SPECIFIC AND IDENTIFICATION IN CATALOG, PAMPHLET, ETC. OF ITEM SUBMITTED SHALL BE CLEARLY MADE IN INK. DATA OF A GENERAL NATURE WILL NOT BE ACCEPTED.

G. REVIEW RENDERED ON SHOP DRAWINGS SHALL NOT BE CONSIDERED AS A GUARANTEE OF MEASUREMENTS OF BUILDING CONDITIONS. WHERE DRAWINGS ARE REVIEWED, SAID REVIEW DOES NOT MEAN THAT DRAWINGS HAVE BEEN CHECKED IN DETAIL; SAID REVIEW DOES NOT IN ANY WAY RELIEVE THIS CONTRACTOR FROM HIS RESPONSIBILITY OR NECESSITY OF FURNISHING MATERIAL OR PERFORMING WORK AS REQUIRED BY THE CONTRACT DRAWINGS AND SPECIFICATIONS.

H. FAILURE OF CONTRACTOR TO SUBMIT SHOP DRAWINGS IN TIME FOR REVIEW BY ENGINEER WITH REASONABLE PROMPTNESS CONSISTENT WITH SOUND PROFESSIONAL PRACTICE SHALL NOT ENTITLE HIM TO AN EXTENSION OF CONTRACT TIME, AND NO CLAIM FOR EXTENSION BY REASON OF SUCH DEFAULT WILL BE ALLOWED.

I. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR THE FOLLOWING MATERIALS AND EQUIPMENT FOR REVIEW BY ENGINEER: *SEE "NOTE" IN PARAGRAPH B, ABOVE.

1. FIRE ALARM SYSTEM EXTENSION INCLUDING BATTERY CALCULATIONS
2. PANELBOARDS
3. CIRCUIT BREAKERS
4. SAFETY SWITCHES
5. BASIC MATERIALS: WIRE, CONDUIT, FITTINGS, CONNECTORS

1.16 RECORD DATA

A. PRESERVE ONE SET OF APPROVED SHOP DRAWINGS AND DELIVER TO OWNER PRIOR TO SUBSTANTIAL COMPLETION OF THE WORK. OWNER'S SHOP DRAWINGS SHALL BE BOUND IN A 3–RING BINDER OF GOOD QUALITY, WITH STIFF VINYL OR CLOTH FRONT AND BACK. NUMBER OF COPIES SHALL BE AS DIRECTED BY ARCHITECT. IN ADDITION, PROVIDE ONE ELECTRONIC COPY (.PDF FORMAT) TO OWNER.

1.17 RECORD DRAWINGS

A. CONTRACTOR SHALL MAINTAIN ON THE JOB SITE ONE COMPLETE SET OF DRAWINGS FOR THIS PROJECT. ALL CHANGES AUTHORIZED BY THE ENGINEERS AND/OR THE OWNER AS TO THE LOCATIONS, SIZES, ETC. OF EQUIPMENT, CONDUIT, FIXTURES, AND/OR OTHER MATERIAL AND EQUIPMENT SHALL BE INDICATED IN RED PENCIL ON THE DRAWINGS AS THE WORK PROGRESSES. AT THE COMPLETION OF THE PROJECT, CONTRACTOR SHALL OBTAIN A COMPLETE SET OF REPRODUCIBLES OF THE DRAWINGS, AND SHALL TRANSFER ALL CHANGES TO THESE REPRODUCIBLES. THE NUMBER OF RECORD PRINTS SPECIFIED BY THE ARCHITECT SHALL BE DELIVERED TO THE ARCHITECT. IN ADDITION, PROVIDE ONE ELECTRONIC COPY (.PDF FORMAT) TO OWNER.

1.18 COORDINATION WITH OTHER TRADES

A. COORDINATE WITH OTHER TRADES TO CONCEAL ELECTRICAL WORK AND PROVIDE ELECTRICAL WORK IN CORRECT LOCATIONS FOR EACH PIECE OF MECHANICAL OR ELECTRICAL EQUIPMENT CONNECTED.

B. CONCEAL OUTLETS FOR ALL MECHANICAL EQUIPMENT, ETC., IN FINISHED AREAS. OBTAIN ROUGHING DIAGRAMS FOR ALL DEVICES AND INSTALL ELECTRICAL WORK ACCORDING TO DIAGRAMS.

C. LOCATE ALL OUTLETS AT UNIFORM HEIGHTS TO SUIT BLOCK COURSING. HEIGHTS SHOWN IN DRAWINGS MAY BE VARIED TO SUIT COURSING, BUT SHALL IN ALL CASES COMPLY WITH CODES.

1.19 ELECTRICAL WORK FOR MECHANICAL SYSTEMS

A. PROVIDE COMPLETE POWER WIRING AND CONNECTIONS FOR MECHANICAL SYSTEMS SPECIFIED UNDER DIVISION 23. THIS WORK INCLUDES ALL RACEWAYS, CONDUCTORS, OUTLET AND PULL BOXES, LINE VOLTAGE ON–OFF SWITCHES WHERE INDICATED AND DISCONNECTING MEANS AS INDICATED AND REQUIRED BY APPLICABLE CODES. WHERE MAGNETIC MOTOR STARTERS, VARIABLE FREQUENCY DRIVES OR OTHER CONTROLLERS ARE FURNISHED BY OTHERS, INSTALL AND WIRE COMPLETE; WHERE CONTROLLERS ARE PROVIDED ALREADY MOUNTED ON EQUIPMENT, WIRE COMPLETE. IN ALL CASES PROVIDE POWER WIRING THROUGH CONTROLLER TO LOAD; DO NOT REDUCE. MAKE ALL CONNECTIONS AND COLOR CODE PER THIS DIVISION. UNLESS NOTED OTHERWISE, SAFETY SWITCH ENCLOSURES SHALL BE NEMA TYPE 3R OUTDOORS AND IN WET LOCATIONS; NEMA TYPE 4X IN CORROSIVE ENVIRONMENTS; NEMA TYPE 1, ELSEWHERE. NOT INCLUDED IN THIS DIVISION IS TEMPERATURE CONTROL WIRING, EQUIPMENT CONTROL WIRING, AND INTERLOCK WIRING REQUIRED TO OPERATE THE MECHANICAL SYSTEM, EXCEPT AS SPECIFIED BELOW FOR WATER HEATERS. REFER TO DIVISION 23 FOR EQUIPMENT PROVIDED UNDER THAT DIVISION.

B. COORDINATE LOCATIONS FOR STARTERS, DRIVES AND OTHER CONTROLLERS WITH MECHANICAL AND OTHER TRADES AND INSTALL SO THAT ADEQUATE WORKSPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR SAFE OPERATION. COMPLY WITH NEC REQUIREMENTS.

C. SAFETY SWITCHES, ENCLOSED CIRCUIT BREAKERS, MOTOR–RATED TOGGLE SWITCHES AND SIMILAR DISCONNECTING MEANS SHALL BE LOCATED WITHIN LINE OF SIGHT OF EQUIPMENT AND INSTALLED AS REQUIRED TO PROVIDE ADEQUATE WORKSPACE AND CLEARANCES IN ACCORDANCE WITH NEC REQUIREMENTS. COORDINATE LOCATIONS WITH MECHANICAL CONTRACTOR AND OTHER TRADES PRIOR TO ROUGHING.

D. WHERE WATER HEATERS ARE EQUIPPED WITH CIRCULATING PUMPS, AQUASTATS AND OTHER FIELD–INSTALLED CONTROL OR SAFETY DEVICES, WIRE COMPLETE INCLUDING POWER AND CONTROLS.

1.20 EQUIPMENT FOUNDATIONS AND MOUNTING

A. PROVIDE ALL REQUIRED MOUNTING DEVICES, HARDWARE, SUPPLEMENTARY STEEL AND OTHER MATERIALS TO MOUNT EQUIPMENT AND RACEWAY SYSTEM. MOUNTINGS SHALL BE SECURED TO STRUCTURE AND SEISMICALLY BRACED TO COMPLY WITH CODES. WHERE ADDITIONAL STRUCTURAL MEMBERS SUCH AS COLUMNS, BEAMS, AND THE LIKE ARE REQUIRED TO MOUNT EQUIPMENT, THEY SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

1.21 TESTS, PERFORMANCE

A. UPON COMPLETION OF WORK, THE SYSTEM SHALL BE FREE OF FAULTS, INCLUDING SHORT CIRCUITS, GROUNDS AND OPEN CIRCUITS AND LOADS SHALL BE BALANCED ACROSS PHASES TO OBTAIN MINIMUM NEUTRAL CURRENT IN ALL FEEDERS AND BRANCH CIRCUITS. TEST SYSTEMS AS REQUIRED IN THE PRESENCE OF THE ENGINEER OR HIS REPRESENTATIVE, AND OPERATE TO COMPLY WITH APPLICABLE CODES AND CONTRACT DOCUMENTS.

B. FOR ALL FIRE SAFETY SYSTEMS, TEST SYSTEMS COMPLETELY AND EXERCISE ALL USER STATIONS, INITIATION/ACTIVATION STATIONS AND WARNING/OUTPUT DEVICES PRIOR TO SUBSTANTIAL COMPLETION BY THE ENGINEER. FURNISH CERTIFICATE TO ENGINEER STATING THAT SYSTEMS ARE COMPLETE AND OPERATIONAL AND HAVE BEEN OPERATED BY THE CONTRACTOR AS SPECIFIED ABOVE.

C. ALL COSTS ASSOCIATED WITH CORRECTION OF DEFICIENCIES IN THE WORK SHALL BE BORNE BY THE CONTRACTOR. DEFECTIVE MATERIAL AND EQUIPMENT SHALL BE REPLACED; DO NOT REPAIR.

D. ALL DEVICES WHICH MUST BE ADJUSTED OR SET TO OPERATE ON A SCHEDULE (TIME CLOCKS, PROGRAM MECHANISMS, ETC.) SHALL BE SET PRIOR TO SUBSTANTIAL COMPLETION TO OPERATE ON SCHEDULES DIRECTED BY THE OWNER.

E. ALL ADJUSTABLE BREAKERS SHALL BE ADJUSTED IN FIELD TO SETTINGS DETERMINED BY AN ENGINEERING COORDINATION STUDY AS REQUIRED TO DETERMINE APPROPRIATE SETTINGS FOR OPTIMAL POWER DISTRIBUTION COORDINATION. INCLUDE IN BID ALL REQUIRED WORK AND ENGINEERING SERVICES AS REQUIRED FOR THIS STUDY AND ADJUSTMENT.

1.22 DEMONSTRATION

A. INSTRUCT OWNER IN OPERATION OF ALL SYSTEMS. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN EQUIPMENT.

1.23 WARRANTIES

A. THE CONTRACTOR AGREES:

1. TO CORRECT DEFECTS IN WORKMANSHIP, MATERIALS, EQUIPMENT, AND OPERATION OF ALL SYSTEMS FOR A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.
2. TO REMOVE ANY ITEM NOT SPECIFIED OR GIVEN WRITTEN APPROVAL AND REPLACE IT WITH AN APPROVED ITEM.
3. THAT ALL SYSTEMS PROVIDED WILL SAFELY, QUIETLY, AND EFFICIENTLY OPERATE IN ACCORDANCE WITH THE DESIGN.

B. THIS DOES NOT SUPERSEDE MANUFACTURER'S WARRANTIES WHICH MAY EXTEND BEYOND ONE YEAR.

1.24 CONSTRUCTION SEQUENCE

A. THE CONTRACTOR IS CAUTIONED THAT THE PROJECT MAY BE CONSTRUCTED IN STAGES TO ACCOMMODATE THE OWNER'S USE OF THE BUILDING. THIS CONTRACTOR SHALL VERIFY REQUIREMENTS PRIOR TO BIDDING AND SHALL COOPERATE IN ALL RESPECTS WITH OTHER CONTRACTORS AND TRADES ON THE JOB TO CARRY OUT THE WORK WITH MINIMUM DISRUPTION OF BOTH THE OWNER'S REQUIREMENTS AND CONSTRUCTION OF THE PROJECT.

1.25 DETAILS

A. THE DETAILS AND SKETCHES IN THE DRAWINGS ARE CONSTRUCTION STANDARDS APPLICABLE TO THIS PROJECT.

B. THE CONTRACTOR SHALL COMPLY WITH DETAILS AS APPLICABLE TO THE WORK INDICATED AND SHALL RETAIN ON THE JOB SITE AT ALL TIMES, A COMPLETE SET OF DRAWINGS AND SPECIFICATIONS.

1.26 DEFINITIONS

A. IN THIS DIVISION OF THE SPECIFICATIONS AND ACCOMPANYING DRAWINGS, THE FOLLOWING DEFINITIONS APPLY:

1. PROVIDE: TO PURCHASE, PAY FOR, TRANSPORT TO THE JOB SITE, UNPACK, INSTALL AND CONNECT COMPLETE AND READY FOR OPERATION; TO INCLUDE ALL PERMITS, INSPECTIONS, EQUIPMENT, MATERIAL, LABOR, HARDWARE AND OPERATIONS REQUIRED FOR COMPLETION.
2. INSTALL: TO RECEIVE FROM ANOTHER CONTRACTOR, THE OWNER OR ANOTHER ENTITY AND INSTALL COMPLETE AND READY FOR OPERATION. UNLESS OTHERWISE INDICATED, RECEIPT IS ASSUMED TO BE AT THE JOB SITE.
3. FURNISH: TO PURCHASE, PAY FOR AND DELIVER TO THE JOB SITE FOR INSTALLATION BY OTHERS.
4. THE CONTRACTOR IS CAUTIONED THAT "FURNISH" AND "INSTALL" REQUIRE COORDINATION WITH OTHERS. SUCH COORDINATION SHALL BE ACCOMPLISHED PRIOR TO BIDDING AND BID AMOUNTS SHALL INCLUDE ALL REQUIRED LABOR, MATERIAL AND OPERATIONS FOR COMPLETION OF ALL ITEMS AND SYSTEMS SPECIFIED AND INDICATED.
5. AS INDICATED: AS SHOWN IN DRAWINGS.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 26 05 00

SECTION 26 05 10 – ELECTRICAL, DEMOLITION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. THE FOLLOWING APPLY TO THE WORK UNDER THIS SECTION:

1. SECTION 26 05 00, ELECTRICAL, GENERAL
2. SECTION 26 20 00, INTERIOR WIRING SYSTEMS

1.2 SCOPE

A. PROVIDE ALL LABOR, MATERIAL AND OPERATION REQUIRED FOR REMOVAL OF EXISTING ELECTRICAL SYSTEMS AS INDICATED.

B. BIDDERS SHALL VISIT THE SITE OF THE WORK PRIOR TO BIDDING AND SHALL INCLUDE IN BID ALL WORK REQUIRED TO PROVIDE NEW WORK AND TO MODIFY EXISTING WORK AS REQUIRED TO CONTINUE IN OPERATION.

C. CONTRACTOR SHALL EXAMINE DEMOLITION AND NEW WORK PLANS FOR ALL TRADES AND INCLUDE IN BID ALL REWORK AND/OR RELOCATION OF EXISTING RACEWAY, JUNCTION BOXES, PANELBOARDS, SAFETY SWITCHES, DEVICES, WIRING SYSTEMS AND ALL OTHER RELATED ELECTRICAL EQUIPMENT AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION.

D. ELECTRICAL DEMOLITION WORK GENERALLY INCLUDES:

1. EXISTING CIRCUIT BREAKERS, SAFETY SWITCHES AND OTHER ELECTRICAL EQUIPMENT AS INDICATED;
2. EXISTING FIRE ALARM DEVICES AS REQUIRED. EXISTING FIRE ALARM SYSTEM SHALL REMAIN IN OPERATION DURING CONSTRUCTION;
3. EXPOSED CONDUITS, SURFACE METAL RACEWAYS AND EXPOSED OUTLET BOXES AND DEVICES AS INDICATED;
4. CONDUCTORS EXPOSED AND CONCEALED AS INDICATED;
5. EXISTING WIRING DEVICES AS INDICATED. WHERE NEW WIRING DEVICES ARE SHOWN IN EXISTING LOCATIONS, THE CONTRACTOR MAY RE–USE THE EXISTING OPENING AND OUTLET BOX FOR NEW DEVICE;
6. EXISTING ELECTRICAL WORK FOR MECHANICAL EQUIPMENT BEING REMOVED BY OTHERS;
7. WHERE INDICATED ON DRAWINGS, EXISTING RACEWAYS MAY BE REUSED FOR NEW CIRCUITS. CONTRACTOR SHALL MANDREL BRUSH AND SWAB EXISTING FEEDER CONDUITS PRIOR TO PULLING NEW CONDUCTORS.

E. INCLUDE IN BID ALL WORK REQUIRED FOR TEMPORARY WIRING AND ASSOCIATED ELECTRICAL WORK REQUIRED TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING DEMOLITION PHASE.

F. ALL INTERRUPTIONS IN ELECTRICAL SYSTEMS (POWER, LIGHTING, COMMUNICATION, FIRE ALARM AND OTHER SYSTEMS) AS REQUIRED FOR THIS WORK SHALL BE COORDINATED WITH AND APPROVED BY OWNER PRIOR TO PERFORMING WORK. NOTICE SHALL BE PROVIDED TO OWNER IN WRITING A MINIMUM OF 48 HOURS IN ADVANCE, BUT NOT LESS THAN THE TIME SPECIFIED IN OTHER PORTIONS OF CONTRACT DOCUMENTS.

G. THE INTENT OF THIS SPECIFICATION IS TO OBTAIN REMOVAL OF THE EXISTING ELECTRICAL SYSTEM TO THE EXTENT REQUIRED TO ENABLE THE OWNER TO IDENTIFY, SERVICE, REPAIR OR MODIFY THE NEW WIRING SYSTEM EFFICIENTLY AND SAFELY.

1.3 STANDARDS

A. DEMOLITION WORK SHALL COMPLY WITH ANSI A10.6, NFPA 241, OSHA, AHERA AND ALL APPLICABLE LOCAL, STATE AND FEDERAL STANDARDS AND GUIDELINES.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 EXAMINITATION

A. VERIFY THAT UTILITIES IN WORK AREA HAVE BEEN DISCONNECTED AND CAPPED AS REQUIRED.

B. SURVEY EXISTING CONDITIONS AND CORRELATE WITH DEMOLITION AND NEW WORK INDICATED IN CONTRACT DOCUMENTS TO DETERMINE EXTENT OF DEMOLITION REQUIRED.

C. WHEN UNANTICIPATED MECHANICAL, ELECTRICAL, ENVIRONMENTAL OR STRUCTURAL ELEMENTS THAT CONFLICT WITH INTENDED FUNCTION OR DESIGN ARE ENCOUNTERED, INVESTIGATE AND MEASURE THE NATURE AND EXTENT OF CONFLICT. PROVIDE PROMPT WRITTEN NOTICE TO ENGINEER OF ANY CONFLICTS.

3.2 DEMOLITION

A. OWNER SHALL RETAIN FIRST RIGHT OF REFUSAL ON ALL ELECTRICAL EQUIPMENT BEING DEMOLISHED. PRIOR TO BEGINNING DEMOLITION WORK, CONTRACTOR SHALL WALK THROUGH DEMOLITION AREA WITH OWNER'S REPRESENTATIVE AND IDENTIFY ITEMS TO BE REMOVED AND TURNED OVER TO OWNER. CONTRACTOR SHALL CAREFULLY REMOVE, PROTECT AND STORE ITEMS TO BE TURNED OVER TO OWNER AND DELIVER TO OWNER AT LOCATION ON SITE AS DIRECTED BY OWNER.

B. MAINTAIN SERVICES AND SYSTEMS INDICATED TO REMAIN AND PROTECT THEM AGAINST DAMAGE DURING DEMOLITION PROCESS.

C. ALL DEVICES INDICATED AS TO REMAIN OR TO BE RELOCATED SHALL BE PROTECTED AGAINST DAMAGE DURING DEMOLITION PROCESS AND CLEANED PRIOR TO BEING RESTORED INTO SERVICE.

D. CONTRACTOR SHALL PATCH AND RESTORE FINISH TO MATCH ADJACENT SURFACE AT ALL LOCATIONS RESULTING FROM DEMOLITION AT WHICH NEW WORK IS NOT INSTALLED, AS REQUIRED UNDER SECTION 26 05 00, ELECTRICAL, GENERAL.

E. PROVIDE TEMPORARY BARRICADES, DUST BARRIERS AND OTHER PROTECTION REQUIRED TO PREVENT INJURY TO PEOPLE AND DAMAGE TO BUILDING CONTENTS, ADJACENT AREA OF BUILDING AND FACILITIES TO REMAIN.

F. MAINTAIN PROTECTED EGRESS AND ACCESS AT ALL TIMES. DO NOT CLOSE OR OBSTRUCT ROADWAYS OR SIDEWALKS WITHOUT PERMISSION FROM OWNER.

G. CONDUCT DEMOLITION TO MINIMIZE INTERFERENCE WITH OWNER'S USE OF SITE.

H. CONDUCT OPERATIONS WITH MINIMUM INTERFERENCE TO PUBLIC OR PRIVATE ACCESS.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

A. DEMOLISHED MATERIAL SHALL BE PROMPTLY REMOVED FROM SITE.

B. REMOVE AND TRANSPORT MATERIALS IN A MANNER THAT WILL PREVENT CONTAMINATION OR DAMAGE TO ADJACENT SURFACES AND AREAS.

C. BURNING OF DEMOLISHED MATERIALS WILL NOT BE PERMITTED ON SITE.

D. ALL MATERIALS SHALL BE PROPERLY AND LEGALLY DISPOSED OF. CONTRACTOR IS RESPONSIBLE FOR ALL HANDLING, STORAGE, TRANSPORTATION AND DISPOSAL FEES.

3.4 CLEANING

A. CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF DUST, DIRT AND DEBRIS CAUSED BY DEMOLITION OPERATIONS.

B. RETURN ADJACENT AREAS TO CONDITION EXISTING BEFORE DEMOLITION OPERATIONS BEGAN.

END OF SECTION 26 05 10

SECTION 26 20 00 – INTERIOR WIRING SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. SECTION 26 05 00, ELECTRICAL, GENERAL, APPLIES TO THE WORK UNDER THIS SECTION.

1.2 SCOPE

A. PROVIDE INTERIOR WIRING SYSTEMS COMPLETE AND READY FOR OPERATION, AS INDICATED, SPECIFIED HEREIN AND IN COMPLIANCE WITH APPLICABLE CODES AND STANDARDS.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. MATERIALS OF LIKE TYPE SHALL BE MANUFACTURED BY THE SAME COMPANY.

B. PANELBOARDS, CIRCUIT BREAKERS, SAFETY SWITCHES, MOTOR STARTERS, CONTACTORS AND THE LIKE: GE/ABB, SIEMENS–ITE, SQUARE D, EATON, OR APPROVED EQUAL.

C. FITTINGS, CONDULETS, BOXES AND THE LIKE: STEEL CITY, THOMAS AND BETTS, O–Z ELECTRICAL MANUFACTURING COMPANY, APPLETON, EFCOR, CROUSE–HINDS, GARVIN INDUSTRIES, OR APPROVED EQUAL.

D. CONDUCTORS AND CABLES: ALPHA WIRE COMPANY, BELDEN, CERRO WIRE, SOUTHWIRE COMPANY, GENERAL CABLE OR APPROVED EQUAL.

E. CABLE MARKERS: 3M COMPANY, E–Z CODE, BRADY, OR APPROVED EQUAL.

F. CONNECTORS, LUGS AND TERMINALS AND THE LIKE: 3M COMPANY, IDEAL, THOMAS AND BETTS, O–Z ELECTRICAL MANUFACTURING COMPANY, OR APPROVED EQUAL.

G. WIRING DEVICES AND THE LIKE: BEST SPECIFICATION GRADE; ARROW HART/COOPER, HUBBELL, LEGRAND/P&S, LEVITON, OR APPROVED EQUAL.

H. FUSES: DUAL–ELEMENT TYPE, "FUSETRON" BY BUSSMAN OR "ECON" BY ECONOMY OR APPROVED EQUAL.

I. GROUNDING DEVICES, AND THE LIKE: CADWELD, THOMAS AND BETTS, APPLETON, ERICO, O–Z ELECTRICAL MANUFACTURING COMPANY, OR APPROVED EQUAL.

2.2 CONDUIT AND FITTINGS

A. RIGID STEEL CONDUIT (ZINC–COATED): ANSI C80.1.

B. RIGID NONMETALLIC CONDUIT: PVC TYPE EPC–40 IN ACCORDANCE WITH NEMA TC2.

C. INTERMEDIATE METAL CONDUIT (IMC): UL 1242, ZINC–COATED STEEL ONLY.

D. ELECTRICAL METALLIC TUBING (EMT): ANSI C80.3.

E. FLEXIBLE METAL CONDUIT: UL 1.

1. LIQUID–TIGHT FLEXIBLE METAL CONDUIT (STEEL): UL 360.

F. FITTINGS FOR METAL CONDUIT, ELECTRICAL METALLIC TUBING, AND FLEXIBLE METAL CONDUIT: UL 514. ALL FERROUS FITTINGS SHALL BE CADMIUM– OR ZINC–COATED IN ACCORDANCE WITH UL 514.

1. FITTINGS FOR RIGID METAL CONDUIT AND IMC SHALL BE THREADED TYPE. SPLIT COUPLINGS ARE NOT ACCEPTABLE.
2. FITTINGS FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE THE COMPRESSION TYPE.

G. FITTINGS FOR RIGID NONMETALLIC CONDUIT: NEMA TC3.

H. ELECTRICAL NONMETALLIC TUBING (ENT): NOT PERMITTED.

2.3 OUTLET BOXES AND COVERS

A. UL 514, CADMIUM– OR ZINC–COATED IF OF FERROUS METAL.

B. PROVIDE OUTLET BOXES OF SIZE AND TYPE REQUIRED BY NEC, AND IN NO CASE SMALLER THAN THE FOLLOWING:

1. BOXES FOR SWITCHES AND RECEPTACLES: 3" X 2" X 2–3/4" OR 4" X 4" X 1–1/2" WITH PLASTER RING TO SUIT CONSTRUCTION

C. PROVIDE SUITABLE EXTENSIONS, RINGS OR SUBCOVERS SET TO COME FLUSH WITH THE FINISHED SURFACE IN WHICH BOXES ARE MOUNTED.

D. BOXES FOR EXPOSED RACEWAY SHALL BE THREADED–HUB CAST METAL, SIZES AS SPECIFIED ABOVE.

2.4 CABINETS, JUNCTION BOXES, AND PULL BOXES

A. UL 50, HOT–DIP ZINC–COATED, CODE GAUGE SHEET STEEL, SCREW COVER UNLESS INDICATED OTHERWISE.

2.5 WIRES AND CABLES

A. WIRES AND CABLES SHALL MEET THE APPLICABLE REQUIREMENTS OF NFPA 70 AND UL FOR THE TYPE OF INSULATION, JACKET, AND CONDUCTOR SPECIFIED OR INDICATED. ALL WIRE AND CABLE SHALL BE NEW, WITH SIZE, GRADE OF INSULATION, VOLTAGE AND MANUFACTURER'S NAME PERMANENTLY IMPRINTED ON OUTER COVERING AT REGULAR INTERVALS AND DELIVERED TO THE JOB SITE IN COMPLETE COILS AND REELS.

B. CONDUCTORS: CONDUCTORS NO. 10 AWG AND SMALLER SHALL BE SOLID, AND THOSE NO. 8 AWG AND LARGER SHALL BE STRANDED. UNLESS INDICATED OTHERWISE, CONDUCTOR SIZES SHOWN ARE BASED ON COPPER. ALL CONDUCTORS SHALL BE COPPER.

C. MINIMUM CONDUCTOR SIZES: MINIMUM SIZE FOR BRANCH CIRCUITS SHALL BE NO. 12 AWG; FOR CLASS 1 REMOTE–CONTROL AND SIGNAL CIRCUITS, NO. 14 AWG; AND FOR CLASS 2 LOW–ENERGY REMOTE–CONTROL AND SIGNAL CIRCUITS, NO. 16 AWG. ALL 120 V. BRANCH CIRCUITS EXCEEDING 100' IN LENGTH AND ALL 277 V. BRANCH CIRCUITS EXCEEDING 250' IN LENGTH SHALL BE NO. 10 AWG, MINIMUM.

D. COLOR CODING: PROVIDE FOR ALL SERVICE, FEEDER, BRANCH, CONTROL AND SIGNALING CIRCUIT CONDUCTORS. COLOR SHALL BE GREEN FOR GROUNDING CONDUCTORS, AND WHITE FOR NEUTRALS, EXCEPT WHERE NEUTRALS OF MORE THAN ONE SYSTEM ARE INSTALLED IN SAME RACEWAY OR BOX, THE NEUTRAL OF THE HIGHER–VOLTAGE SYSTEM SHALL BE WHITE WITH A YELLOW STRIPE OR SHALL BE GRAY. THE COLOR OF THE UNGROUNDED CONDUCTORS IN DIFFERENT VOLTAGE SYSTEMS SHALL MATCH EXISTING.

E. COLOR CODING FOR FIRE ALARM CONDUCTORS SHALL BE THE MANUFACTURER'S STANDARD AND SHALL BE CONSISTENT THROUGHOUT THE SYSTEM. INCLUDE COLOR CODING KEY WITH RECORD DATA.

F. INSULATION: UNLESS SPECIFIED OR INDICATED OTHERWISE, OR REQUIRED TO BE OTHERWISE BY NFPA 70, ALL POWER AND LIGHTING WIRES SHALL BE 600–VOLT, TYPE THHN, THWN, OR XHHW; REMOTE–CONTROL AND SIGNAL CIRCUITS SHALL BE TYPE TW, THHN, TF, THWN OR XHHW.

G. BONDING CONDUCTORS: ASTM B 1, SOLID BARE COPPER WIRE FOR SIZES NO. 8 AWG AND SMALLER; ASTM B 8, CLASS B, STRANDED BARE COPPER WIRE FOR SIZES NO. 6 AWG AND LARGER.

H. NONMETALLIC–SHEATHED CABLE: NOT PERMITTED.

2.6 ELECTRICAL CONNECTIONS

A. COMPLY WITH NEC ARTICLE 110–14.

B. ALL TERMINATION DEVICES, SUCH AS CONNECTORS, SPLICING DEVICES, EQUIPMENT TERMINALS, DEVICE TERMINALS AND THE LIKE SHALL BE RATED AND LISTED FOR OPERATION AT 75 DEGREES C.

2.7 SPLICES AND TERMINATION COMPONENTS

A. UL 486A AND UL 486B, AS APPLICABLE FOR WIRE CONNECTORS, AND UL 510 FOR INSULATING TAPES. CONNECTORS FOR WIRES NO. 10 AWG AND SMALLER SHALL BE INSULATED PRESSURE–TYPE IN ACCORDANCE WITH UL 486A OR UL 486C (TWIST–ON SPLICING CONNECTOR). PROVIDE SOLDERLESS TERMINAL LUGS ON STRANDED CONDUCTORS.

B. SPLICES AND/OR TAPS FOR #8 AND LARGER CONDUCTORS SHALL BE CRIMP TYPE BY T&B, BURNDY, OZ, OR APPROVED EQUAL; OR ILSCO KUP–L–TAP®, CLEARTAP, OR APPROVED EQUAL.

2.8 DEVICE PLATES

A. PROVIDE UL LISTED, ONE–PIECE DEVICE PLATES FOR OUTLETS AND FITTINGS TO SUIT THE DEVICES INSTALLED. PLATES ON UNFINISHED WALLS AND ON FITTINGS SHALL BE OF ZINC–COATED SHEET STEEL OR CAST METAL HAVING ROUND OR BEVELED EDGES. PLATES ON FINISHED WALLS SHALL BE UREA OR PHENOLIC, MINIMUM 0.10 INCH WALL THICKNESS, AND SHALL BE THE SAME COLOR AS THE RECEPTACLE OR TOGGLE SWITCH WITH WHICH IT IS MOUNTED, OR SHALL BE SATIN FINISH STAINLESS STEEL OR BRUSHED–FINISH ALUMINUM, MINIMUM OF 0.03 INCH THICK AS DIRECTED BY ARCHITECT. SCREWS SHALL BE MACHINE TYPE WITH COUNTERSUNK HEADS IN A COLOR TO MATCH THE FINISH OF THE PLATE. THE USE OF SECTIONAL TYPE DEVICE PLATED WILL NOT BE PERMITTED. PLATES INSTALLED IN WET LOCATIONS SHALL BE GASKETED. ALL PLATES SHALL BE OVERSIZE TYPE.

2.9 SWITCHES

A. TOGGLE SWITCHES: FED. SPEC. W–S–896, TOTALLY ENCLOSED WITH BODIES OF THERMOSETTING PLASTIC AND A MOUNTING STRAP. HANDLES SHALL BE WHITE, GRAY, BROWN OR IVORY. WIRING TERMINALS SHALL BE OF THE SCREW TYPE, SIDE WIRED. SWITCHES SHALL BE RATED QUIET–TYPE AC ONLY, 120/277 VOLTS, WITH THE CURRENT RATING AND NUMBER OF POLES INDICATED. COLORS SHALL BE AS DIRECTED BY ARCHITECT.

B. DISCONNECT SWITCHES: NEMA KS1. PROVIDE HEAVY DUTY, FUSIBLE TYPE. GENERAL DUTY AND NON–FUSIBLE SWITCHES ARE NOT PERMITTED.

1. OPERATING MECHANISMS SHALL BE OF THE QUICK–MAKE, QUICK–BREAK TYPE, WITH ARC–SUPPRESSING CHARACTERISTICS.
2. ENCLOSURES SHALL BE NEMA 1 INDOORS AND NEMA 3R OUTDOORS AND IN WET LOCATIONS UNLESS OTHERWISE INDICATED, EQUIPPED WITH COVER INTERLOCK AND PROVISIONS FOR PADLOCKING OPERATING HANDLE IN OFF POSITION. SAFETY SWITCHES SHALL BE BY THE SAME MANUFACTURER AS PANELBOARDS.
3. SAFETY SWITCHES USED AS MOTOR DISCONNECTION MEANS AND LOCATED ON LOAD SIDE OF VARIABLE FREQUENCY DRIVES (VFDS) SHALL BE PROVIDED WITH FACTORY MOUNTED AUXILIARY CONTACTS TO ALLOW COMMUNICATION OF SWITCH POSITION TO VFD.

2.10 RECEPTACLES

A. NEMA WD1, HEAVY–DUTY, GROUNDING TYPE. RATINGS AND CONFIGURATIONS SHALL BE AS INDICATED. BODIES SHALL BE OF WHITE, GRAY, BROWN OR IVORY THERMOSETTING PLASTIC SUPPORTED ON A METAL MOUNTING STRAP. WIRING TERMINALS SHALL BE OF THE SCREW TYPE, SIDE WIRED. CONNECT GROUNDING POLE TO THE MOUNTING STRAP. COLORS SHALL MATCH EXISTING.

B. WEATHERPROOF RECEPTACLES: IN ALL DAMP OR WET LOCATIONS, PROVIDE IN A CAST METAL BOX WITH A GASKETED, WEATHERPROOF, CAST–METAL COVER PLATE AND A GASKETED CAP OVER EACH RECEPTACLE OPENING. THE CAP(S) SHALL BE PROVIDED WITH A SPRING–HINGED FLAP. COVER SHALL BE "IN USE" TYPE WHERE REQUIRED BY LOCAL CODES. RECEPTACLE SHALL BE UL LISTED FOR USE IN "DAMP LOCATION" OR "WET LOCATION" TO SUIT INSTALLATION LOCATION.

C. GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES: UL 943, AND SHALL BE DUPLEX TYPE FOR MOUNTING IN A STANDARD OUTLET BOX. THE DEVICE SHALL BE CAPABLE OF DETECTING A CURRENT LEAK OF 5 MILLIAMPERES.

D. RECEPTACLES SHALL BE BY SAME MANUFACTURER AS TOGGLE SWITCHES, AS SPECIFIED ABOVE.

E. INSTALL GROUNDING TYPE RECEPTACLES WITH THE GROUNDING TERMINAL AT THE TOP.

2.11 PANELBOARDS

A. UL 67 AND UL 50. PANELBOARDS FOR USE AS SERVICE DISCONNECTING MEANS SHALL ADDITIONALLY CONFORM TO UL 869. PANELBOARDS SHALL BE CIRCUIT BREAKER EQUIPPED UNLESS INDICATED OTHERWISE. DESIGN SHALL BE SUCH THAT ANY INDIVIDUAL BREAKER CAN BE REMOVED WITHOUT DISTURBING ADJACENT UNITS OR WITHOUT LOOSENING OR REMOVING SUPPLEMENTAL INSULATION SUPPLIED AS A MEANS OF OBTAINING CLEARANCES AS REQUIRED BY UL. WHERE "SPACE ONLY" IS INDICATED, MAKE PROVISIONS FOR THE FUTURE INSTALLATION OF A BREAKER SIZED AS INDICATED. DIRECTORIES SHALL BE TYPED TO INDICATE LOAD SERVED BY EACH CIRCUIT AND MOUNTED IN A HOLDER BEHIND TRANSPARENT PROTECTIVE COVERING. DIRECTORY LISTING FOR EACH BREAKER SHALL LIST THE TYPE LOAD SERVED (LIGHTING, RECEPTACLES, ETC.) AND LOCATION OF LOAD (ROOM NAME, ROOM NUMBER, ETC.)

B. PANELBOARD BUSES: SUPPORT BUS BARS ON BASES INDEPENDENTLY OF THE CIRCUIT BREAKERS. MAIN BUSES AND BACK PANS SHALL BE DESIGNED SO THAT BREAKERS MAY BE CHANGED WITHOUT MACHINING, DRILLING, OR TAPPING. PROVIDE AN ISOLATED NEUTRAL BUS IN EACH PANEL FOR CONNECTION OF CIRCUIT NEUTRAL CONDUCTORS. PROVIDE A SEPARATE GROUND BUS MARKED WITH A GREEN STRIPE ALONG ITS FRONT AND BONDED TO THE STEEL CABINET FOR CONNECTING GROUNDING CONDUCTORS.

C. CIRCUIT BREAKERS: FED. SPEC. W–C–375 THERMAL MAGNETIC TYPE WITH INTERRUPTING CAPACITY AS INDICATED OR TO MATCH EXISTING. BREAKER TERMINALS SHALL BE UL LISTED AS SUITABLE FOR THE TYPE OF CONDUCTOR PROVIDED. PLUG–IN CIRCUIT BREAKERS SHALL BE PROVIDED ONLY WHERE INDICATED IN DRAWINGS.

1. MULTI–POLE BREAKERS: PROVIDE COMMON–TRIP TYPE WITH A SINGLE OPERATING HANDLE. BREAKER DESIGN SHALL BE SUCH THAT AN OVERLOAD IN ONE POLE AUTOMATICALLY CAUSES ALL POLES TO OPEN. MAINTAIN PHASE SEQUENCE THROUGHOUT EACH PANEL SO THAT ANY THREE ADJACENT BREAKER POLES ARE CONNECTED TO PHASES A, B, AND C, RESPECTIVELY.
2. CIRCUIT BREAKER WITH GROUND–FAULT CIRCUIT INTERRUPTER: UL 1053 AND NFPA 70. PROVIDE WITH "PUSH–TO–TEST" BUTTON, VISIBLE INDICATION OF TRIPPED CONDITION, AND ABILITY TO DETECT A CURRENT IMBALANCE OF APPROXIMATELY 5 MILLIAMPERES.
3. CIRCUIT BREAKER FOR ARC–FAULT CIRCUIT INTERRUPTER: UL 1699 AND NFPA 70. PROVIDE "PUSH–TO–TEST" BUTTON AND VISUAL INDICATION OF TRIPPED CONDITION.
4. BREAKERS USED TO SERVE REFRIGERATION AND AIR CONDITIONING COMPRESSORS SHALL BE TYPE "HACR."
5. CIRCUIT BREAKER USED TO SERVE FIRE ALARM COMPONENTS SHALL BE PROVIDED WITH RED, LOCKING HARDWARE AS WELL AS RED ENGRAVED NAMEPLATE MOUNTED IMMEDIATELY ADJACENT TO BREAKER.

D. CONSTRUCTION:

1. ALL PANELBOARDS SHALL HAVE HINGED, LOCKABLE FRONT COVERS. ALL PANELBOARD LOCKS INCLUDED IN THE PROJECT SHALL BE KEYED ALIKE AND EACH SHALL BE PROVIDED WITH TWO (2) KEYS.
2. FOR SURFACE–MOUNT FRONTS, MATCH BOX DIMENSIONS; FOR FLUSH–MOUNTED FRONTS, PROVIDE COVER WITH OVERLAP TRIM. TRIMS SHALL COVER ALL LIVE PARTS AND SHALL HAVE NO EXPOSED HARDWARE.

E. PANELBOARDS SHALL BE RATED FOR ENVIRONMENTAL CONDITIONS AT LOCATION WHERE INSTALLED:

1. INDOORS, DRY AND CLEAN CONDITIONS: NEMA 250, TYPE 1.
2. OUTDOORS, NEMA 250, TYPE 3R
3. KITCHEN OR WASH–DOWN AREAS: NEMA 250, TYPE 4X
4. OTHER WET OR DAMP INDOOR LOCATIONS: NEMA 250, TYPE 4
5. INDOOR LOCATIONS SUBJECT TO DUST, FALLING DIRT AND DRIPPING NONCORROSIVE LIQUIDS: NEMA 250, TYPE 5
6. PUMP STATIONS, LIFT STATIONS, VICINITY OF WASTEWATER, POOL EQUIPMENT OR SIMILAR CORROSIVE ENVIRONMENTS: NEMA 250, TYPE 4X, STAINLESS STEEL.

2.12 FUSES

A. PROVIDE A COMPLETE SET OF FUSES FOR EACH FUSIBLE DEVICE PROVIDED. TIME–CURRENT CHARACTERISTICS CURVES OF FUSES SERVING MOTORS OR CONNECTED IN SERIES WITH CIRCUIT BREAKERS OR OTHER CIRCUIT PROTECTIVE DEVICES SHALL BE COORDINATED FOR PROPER OPERATION; SUBMIT COORDINATION DATA FOR APPROVAL. FUSES SHALL HAVE A VOLTAGE RATING NOT LESS THAN THE CIRCUIT VOLTAGE.

B. CARTRIDGE FUSES, CURRENT–LIMITING TYPE (CLASS R): UL 198E, TIME–DELAY TYPE. ASSOCIATED FUSEHOLDERS SHALL BE CLASS R ONLY.

C. CARTRIDGE FUSES, CURRENT–LIMITING TYPE (CLASSES J AND L): UL 198C, CLASS J FOR 0 TO 600 AMPS AND CLASS L FOR 601 TO 6000 AMPS.

2.13 GROUNDING AND BONDING EQUIPMENT

A. UL 467.

Schneider Electric
1650 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 5498
www.scheider-electric.com

SEAL
025412
S. DICKSON O'BRIEN
3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT
FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
ELECTRICAL SPECIFICATIONS
PART 1

MARK	DATE	DESCRIPTION
		SUBMISSION / REVISION

DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

SHEET NUMBER
E201
SHT. 6 OF 7

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net

PART 3 – EXECUTION

3.1 RACEWAYS

A. PROVIDE RACEWAYS FOR ALL CONDUCTORS AND CABLES. SEE DRAWINGS FOR RACEWAY TYPES APPROVED FOR VARIOUS LOCATIONS AND APPLICATIONS IN THE PROJECT.

B. PROVIDE FLEXIBLE METAL CONDUIT FOR CONNECTION TO ROTATING OR VIBRATING EQUIPMENT. IN ALL POTENTIALLY WET LOCATIONS, PROVIDE WATERPROOF FLEXIBLE CONDUIT. IN NO CASE SHALL LENGTH OF FLEXIBLE CONDUIT EXCEED 3 FEET. SUPPORT IN ACCORDANCE WITH NEC AND AS APPROVED BY ENGINEER.

C. CONTRACTOR SHALL SIZE PULL AND JUNCTION BOXES. COMPLY WITH REQUIREMENTS FOR DIMENSIONS AND CONDUIT SPACINGS AS DEFINED IN THE NEC ARTICLE 314.

D. RACEWAYS SHALL BE CONTINUOUS BETWEEN OUTLETS AND ENCLOSURES. BOND RACEWAY SYSTEM AS DESCRIBED IN DRAWINGS AND GROUNDING SPECIFICATIONS AND MAKE ALL CONNECTIONS WRENCH TIGHT FOR ELECTRICAL CONTINUITY. CONNECT RACEWAYS AT BOXES AND ENCLOSURES USING LOCKNUTS AND BUSHINGS. PROVIDE INSULATING BUSHINGS WITH GROUNDING LUG ON ALL RACEWAYS ONE INCH AND LARGER.

E. INSTALL RACEWAYS GENERALLY AS FOLLOWS:

1. RUN CONCEALED RACEWAYS IN STRAIGHT LINES WITH LONG SWEEP BENDS AND OFFSETS.
2. WHERE RACEWAYS TURN UP OUT OF FLOOR, CURVED PORTION SHALL NOT BE VISIBLE.
3. RUN EXPOSED RACEWAYS PARALLEL AND PERPENDICULAR WITH BUILDING LINES. FOR EXPOSED RACEWAYS IN FINISHED AREAS, STRAP WITH TWO-HOLE FLAT STRAPS; DO NOT USE MINERALLAC STRAPS. MINERALLAC STRAPS MAY BE UTILIZED IN EQUIPMENT ROOMS OR UTILITY AREAS.
4. SUPPORT RACEWAYS WITHIN 3' OF EACH OUTLET BOX, FITTING, OR ENCLOSURE, AND AT 10' INTERVALS. USE MALLEABLE IRON OR STAMPED STEEL CLAMPS FOR BRANCH CIRCUIT RACEWAYS; USE PIPE HANGERS FOR FEEDER RACEWAYS. DO NOT HANG CONDUIT WITH WIRE, PERFORATED STRAP, OR NAILS.
5. CUT ALL JOINTS SQUARE, THREAD, REAM AND DRAW TIGHT. MAKE BENDS AND OFFSETS WITH STANDARD CONDUIT ELLS OR WITH AN APPROVED BENDER OR HICKEY.
6. NO MORE THAN THREE QUARTER-BENDS EQUIVALENT IN ANY RUN.
7. CAP RACEWAY ENDS TO PREVENT ENTRANCE OF DEBRIS DURING CONSTRUCTION. CAP WITH APPROVED PENNIES, PLASTIC CAPS OR COVERS; DO NOT TAPE.
8. COMPLETE RACEWAY INSTALLATION AND CLEAN THOROUGHLY BEFORE PULLING CONDUCTORS.
9. WHERE CONDUITS PASS THROUGH FIRE-RATED WALLS AND/OR FLOORS, PROVIDE A UL-LISTED THROUGH-PENETRATION ASSEMBLY WITH FIRE RATING EQUAL TO WALL OR FLOOR PENETRATED. MATERIALS SHALL BE BY 3M COMPANY OR EQUAL. EACH ASSEMBLY SHALL BE SPECIFIC TO THE PENETRATING DEVICE, E.G., SINGLE CONDUIT, MULTIPLE CONDUITS, BUSWAY, ETC. AND SHALL BE SPECIFIC TO THE WALL OR FLOOR CONSTRUCTION PENETRATED, E.G., CONCRETE, GYPSUM BOARD ON WALL STUDS, ETC. INSTALL ASSEMBLIES IN ACCORDANCE WITH MATERIAL MANUFACTURER'S INSTRUCTIONS AND UL BUILDING MATERIALS DIRECTORY, LATEST EDITION.
10. INSTALL EXPANSION FITTINGS WITH COPPER BONDING JUMPERS IN CONDUIT RUNS WHICH CROSS BUILDING EXPANSION JOINTS.
11. DO NOT ATTACH RACEWAY, BOXES OR CABLES DIRECTLY TO ROOF DECKING. PROVIDE MOUNTING FROM BUILDING STRUCTURE AND MAINTAIN A MINIMUM OF 1-1/2" SEPARATION FROM LOWEST SURFACE OF ROOF DECK.
12. FERROUS METAL RACEWAYS, CABLE TRAYS, CABLEBUS, AUXILIARY GUTTERS, CABLE ARMOR, BOXES, CABLE SHEATHING, CABINETS, METAL ELBOWS, COUPLINGS, NIPPLES, FITTINGS, SUPPORTS, AND SUPPORT HARDWARE SHALL BE SUITABLY PROTECTED AGAINST CORROSION INSIDE AND OUTSIDE (EXCEPT THREADS AT JOINTS) BY A COATING OF APPROVED CORROSION-RESISTANT MATERIAL (THOMAS & BETTS, KOPR-SHIELD, OR EQUAL). WHERE CORROSION PROTECTION IS NECESSARY AND THE CONDUIT IS THREADED IN THE FIELD, THE THREADS SHALL BE COATED WITH AN APPROVED ELECTRICALLY CONDUCTIVE, CORROSION-RESISTANT COMPOUND.

F. INSTALL PULL BOXES AS SHOWN IN DRAWINGS AND AS REQUIRED TO PULL CONDUCTORS WITHOUT DAMAGE TO INSULATION. PROVIDE PULL BOXES IN ACCESSIBLE LOCATIONS ONLY, AND SIZE IN ACCORDANCE WITH NEC.

G. ALL UNDERGROUND/IN-SLAB RACEWAYS SHALL TRANSITION TO GRS/IMC PRIOR TO PENETRATING SLAB. NO PVC RACEWAY ALLOWED ABOVE SLAB.

H. INSTALL RACEWAYS OF SIZES SHOWN IN DRAWINGS AND COMPLY WITH TABLE 1 OF NEC (LATEST EDITION). IN CASE OF CONFLICT, INSTALL LARGER SIZE.

I. COMMUNICATION CONDUCTORS/CABLES SHALL NOT BE ROUTED IN THE SAME CONDUIT OR RACEWAY CONTAINING LINE VOLTAGE (120V AND ABOVE) POWER CONDUCTORS.

J. PROVIDE IN EACH EMPTY RACEWAY A PULL CORD OR WIRE, IDENTIFIED WITH A CARDBOARD TAG AS TO LOCATION OF EQUIPMENT OR OUTLET FED BY CONDUIT.

3.2 OUTLET, SWITCH, AND JUNCTION BOXES, FITTINGS

A. PROVIDE OUTLET AND JUNCTION BOXES AS REQUIRED FOR POWER SYSTEMS AS SHOWN IN DRAWINGS.

B. BOXES SHALL BE HELD SECURELY IN PLACE BY BEING IMBEDDED IN MASONRY OR SHALL BE SECURED TO A FIXED STRUCTURAL UNIT SUCH AS A STUD OR JOIST.

3.3 CONDUCTORS

A. PROVIDE CONDUCTORS IN RACEWAYS AS SHOWN IN DRAWINGS FOR SERVICE, FEEDERS AND BRANCH CIRCUITS.

B. WIRE AND CABLE SHALL BE SUITABLY PROTECTED FROM WEATHER DURING STORAGE AND HANDLING AND SHALL BE IN GOOD CONDITION WHEN INSTALLED.

C. DO NOT PULL CONDUCTORS BEFORE COMPLETION OF MASONRY, CONCRETE AND OTHER TRADES WHICH GENERATE DUST AND DEBRIS. SEE RACEWAYS SECTION, ABOVE.

D. CONDUCTORS NO. 8 AND LARGER SHALL BE CONNECTED TO EQUIPMENT BY MEANS OF PRESSURE TYPE MECHANICAL LUGS. WHERE MULTIPLE CONDUCTORS ARE CONNECTED TO THE SAME TERMINAL EACH CONDUCTOR SHALL BE PROVIDED WITH AN INDIVIDUAL LUG.

E. SOLDERED SPLICES SHALL BE MADE MECHANICALLY SECURE BEFORE SOLDERING.

F. JOIN CONDUCTORS WITH APPROVED CONNECTORS, OR BY SOLDERING, BRAZING OR WELDING. TAPE ALL CONNECTIONS OR COVER WITH APPROVED PREFABRICATED INSULATING DEVICES TO PROVIDE INSULATION RESISTANCE AT THE CONNECTION EQUAL TO THAT OF THE WIRE. MAKE SPLICES IN BOXES OR FITTINGS ONLY.

G. ALL ELECTRICAL CONNECTIONS AND TERMINATIONS SHALL BE IN ACCORDANCE WITH NEC SECTION 110.14 REQUIREMENTS.

H. WHERE TIGHTENING TORQUE VALUES ARE INDICATED ON EQUIPMENT OR IN EQUIPMENT INSTALLATION INSTRUCTIONS, TORQUE CONNECTIONS TO ACHIEVE STATED VALUES UTILIZING A CALIBRATED TORQUE TOOL. WHERE EQUIPMENT MANUFACTURER PROVIDES AN ALTERNATIVE METHOD FOR ACHIEVING REQUIRE TORQUE VALUES, THIS METHOD MAY BE USED IN LIEU OF TORQUE TOOL.

I. WHERE CONDUCTORS ARE CONNECTED IN PARALLEL, THE PARALLEL CONDUCTOR SETS SHALL BE INSTALLED IN GROUPS CONSISTING OF NOT MORE THAN ONE CONDUCTOR PER PHASE OR NEUTRAL CONDUCTOR TO PREVENT CURRENT IMBALANCE DUE TO INDUCTIVE REACTANCE.

3.4 PANELBOARDS

A. WHERE SHOWN ON DRAWINGS AND INDICATED IN RISER DIAGRAM, PROVIDE PANELBOARDS OF THE TYPES AND SIZES INDICATED. PANELBOARDS SHALL BE INSTALLED WITH TOP OF CABINET 72" ABOVE FINISHED FLOOR.

B. COMPLY WITH NFPA-70, SECTION 408, FOR INSTALLATION REQUIREMENTS AND WITH OTHER APPLICABLE SECTIONS FOR CLEARANCES. LAY OUT ALL EQUIPMENT ROOMS IN ADVANCE OF ROUGHING AND NOTIFY ENGINEER IMMEDIATELY, IN WRITING, IF INTERFERENCES ARE ENCOUNTERED OR IF CODE REQUIREMENTS CANNOT BE MET WITH EQUIPMENT PROPOSED.

C. PROVIDE MULTI-POLE BREAKERS OF COMMON-TRIP TYPE TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS IN MULTIWIRE BRANCH CIRCUITS.

3.5 SAFETY SWITCHES

A. PROVIDE HEAVY DUTY, FUSIBLE SAFETY SWITCHES AS SHOWN ON DRAWINGS AND IN ACCORDANCE WITH NEC REQUIREMENTS. PROVIDE NAMEPLATES ON SWITCHES AS SPECIFIED IN SECTION 26 05 00. WORDING SHALL IDENTIFY THE LOAD WHICH SWITCH DISCONNECTS.

B. COORDINATE SWITCH LOCATIONS WITH ALL TRADES AND INSTALL SO THAT ADEQUATE WORKSPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR SAFE ACCESS. COMPLY WITH NEC ARTICLE 110 REQUIREMENTS.

C. FOR SWITCHES USED AS MOTOR DISCONNECTS ON LOAD SIDE OF VARIABLE FREQUENCY DRIVES, PROVIDE SIGNALING CABLE AS REQUIRED FROM VFD TO AUXILIARY CONTACTS IN SAFETY SWITCH. CONNECT COMPLETE.

3.6 SWITCHES AND RECEPTACLES

A. PROVIDE SWITCHES AND RECEPTACLES FOR POWER AND LIGHTING AS SHOWN IN DRAWINGS. WHERE INDICATED, VERIFY LOCATION OF RECEPTACLES WITH OWNER PRIOR TO ROUGHING.

B. GANG PLATES WHERE TWO OR MORE DEVICES OCCUR AT THE SAME LOCATION. VERIFY LOCATIONS IN RELATION TO DOOR SWINGS, AND PLACE DEVICES ON THE STRIKE SIDE.

C. INSTALL DEVICES AT LOCATIONS INDICATED IN DETAILS.

D. INSTALL OUTLETS AND DEVICES PLUMB, LEVEL AND WITH POSITIONING AT ROUGHING TO SUIT FINAL WALL COVERING. DEVICE PLATES SHALL CONTACT FINISHED WALLS ALL-AROUND ON ALL FOUR SIDES.

E. PROTECT DEVICES DURING PAINTING AND CLEAN-UP OF JOB. LEAVE DEVICES CLEAN AND FREE FROM PAINT, DIRT AND DEBRIS.

F. PRIOR TO FINAL COMPLETION, CHECK ALL RECEPTACLES FOR SHORTS, OPENS AND GROUNDS AND CORRECT ALL INCORRECT CONNECTIONS. CHECK ALL GFCI AND AFCI RECEPTACLES FOR PROPER FUNCTION. USE RECEPTACLE TESTER AS MANUFACTURED BY DANIEL WOODHEAD COMPANY, GENERAL ELECTRIC, LEVITON, OR EQUAL.

3.7 GROUNDING

A. PROVIDE GROUNDING SYSTEM TO COMPLY WITH NEC, AS SHOWN ON DRAWINGS AND AS SPECIFIED.

B. ALL GROUND SYSTEM COMPONENTS AND FITTINGS USED SHALL BE FREE FROM PAINT, GREASE, AND OTHER POORLY CONDUCTING MATERIAL, AND CONTACT SURFACES SHALL BE CLEANED THOROUGHLY TO ENSURE GOOD METAL-TO-METAL CONTACT.

C. INSTALL BONDING JUMPERS BETWEEN ALL PANELBOARDS AND FEEDER RACEWAYS CONNECTED THERETO; ACROSS PULL BOX AND RACEWAY EXPANSION JOINTS AND ACROSS WATER METERS LOCATED WITHIN BUILDINGS.

D. PROVIDE A GROUND WIRE IN ALL CIRCUITS SIZED PER NEC TABLE 250-122 AS APPLICABLE.

E. PROVIDE IN ALL RUNS OF FLEXIBLE CONDUIT A SEPARATE GROUNDING CONDUCTOR SIZED PER NEC TABLE 250-122.

END OF SECTION 26 20 00

SECTION 28 31 10 – FIRE ALARM SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. THE FOLLOWING APPLY TO THE WORK UNDER THIS SECTION:

1. SECTION 26 05 00, ELECTRICAL, GENERAL
2. SECTION 26 20 00, INTERIOR WIRING SYSTEMS

1.2 SCOPE

A. PROVIDE COMPLETE AND READY FOR OPERATION A FIRE ALARM SYSTEM EXTENSION AS SHOWN IN THE DRAWINGS AND AS SPECIFIED HEREIN. EQUIPMENT SHALL MATCH EXISTING AND SHALL INCLUDE ALL REQUIRED MODIFICATIONS TO CURRENT PROGRAMMING AS REQUIRED TO SUIT ANY REQUIRED DEMOLITION AND NEW WORK.

B. THE SYSTEM SHALL MEET THE REQUIREMENTS OF NFPA-72, NATIONAL FIRE ALARM CODE, NFPA-70, NATIONAL ELECTRICAL CODE, STATE FIRE MARSHAL'S OFFICE, INTERNATIONAL FIRE CODE, ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES (ICC / ANSI 117.1 – 2009).

C. FIRE ALARM SYSTEM CONTROL EQUIPMENT, ALARM INITIATING DEVICES, POWER SOURCE, AND OTHER COMPONENTS SHALL BE UNDERWRITERS' LABORATORIES LISTED FOR THE INSTALLED APPLICATION.

D. THE SYSTEM SHALL BE MICROPROCESSOR BASED, MULTIPLEX TYPE WITH ADDRESSABLE DEVICES. ALL MAJOR SYSTEM COMPONENTS (CONTROL PANEL, ANNUNCIATORS, POWER SUPPLIES, VOICE EVACUATION & NOTIFICATION, EXTENDER PANELS, MODULES AND THE LIKE) SHALL BE PRODUCED OR SUPPLIED BY THE SAME MANUFACTURER AS THE MAIN FIRE ALARM CONTROL PANEL AND DESIGNED TO BE AN INTEGRAL SYSTEM.

E. ALL ELECTRONICS WORK SHALL BE PROVIDED BY A FRANCHISED DISTRIBUTOR-REPRESENTATIVE OF THE SYSTEM EQUIPMENT MANUFACTURER, WHO SHALL MAINTAIN SPARE PARTS STOCK AND FACTORY-TRAINED PERSONNEL WITHIN TWO HOURS OF THE JOB SITE BY NORMAL GROUND TRANSPORTATION. SYSTEMS PURCHASED FROM A MARKET SOURCE AND INSTALLED BY THE ELECTRICAL CONTRACTOR WILL NOT BE ACCEPTED.

F. THE DISTRIBUTOR-REPRESENTATIVE SHALL HAVE A MINIMUM OF FIVE YEARS DOCUMENTED EXPERIENCE WITH THREE OR MORE INSTALLATIONS OF SYSTEMS OF COMPARABLE SIZE AND COMPLEXITY WITH REGARD TO COORDINATING, ENGINEERING, TESTING AND SUPERVISING. EACH OF THESE INSTALLATIONS SHALL HAVE BEEN IN SUCCESSFUL OPERATION FOR THREE OR MORE YEARS. THE INSTALLER TECHNICIANS SHALL BE INDIVIDUALLY CERTIFIED NICET LEVEL 2 AND BY THE MANUFACTURER OF THE EQUIPMENT AND TRAINED AND CERTIFIED ON THE SPECIFIC MODEL BEING INSTALLED. THE INSTALLER SHALL HAVE AT LEAST ONE TECHNICIAN ON STAFF CERTIFIED NICET LEVEL 3.

1.3 SUBMITTALS

A. GENERAL SUBMITTAL REQUIREMENTS:

1. THE INTENT OF THESE SPECIFICATIONS AND CORRESPONDING PLANS IS TO SERVE AS PRELIMINARY DOCUMENTS TO BE USED AS A BASIS FOR COMMUNICATING GENERAL INTENT AND REQUIREMENTS FOR THE FIRE ALARM SYSTEM AND NOT TO BE USED AS FINAL DESIGN OR INSTALLATION DOCUMENTATION.
2. SUBMITTALS/SHOP DRAWINGS SHALL BE PREPARED BY THE DISTRIBUTOR-REPRESENTATIVE BY PERSONS WITH THE FOLLOWING QUALIFICATIONS:
   a. TRAINED AND CERTIFIED BY MANUFACTURER IN FIRE-ALARM SYSTEM DESIGN.
   b. NICET-CERTIFIED, FIRE-ALARM TECHNICIAN; LEVEL III MINIMUM.
3. SUBMITTALS SHALL BE APPROVED BY AUTHORITIES HAVING JURISDICTION PRIOR TO SUBMITTING THEM TO ENGINEER.
4. THE CONTRACTOR SHALL RETAIN ON SITE A COPY OF THE SUBMITTAL PLANS AND WIRING DIAGRAMS AND SHALL INDICATE THEREON ANY MODIFICATIONS TO THE PLANS OR DIAGRAMS MADE DURING CONSTRUCTION. PRIOR TO ACCEPTANCE OF THE BUILDING BY THE OWNER, CONTRACTOR SHALL TRANSFER ALL MODIFICATIONS TO A FINAL, AS-BUILT DIAGRAM AND SHALL TURN OVER TO OWNER A REPRODUCIBLE DIAGRAM FOR RECORD.
5. INCLUDE A COPY OF ALL FINAL PLANS, SHOP DRAWINGS, MANUALS, PROGRAMS AND OTHER PERTINENT MATERIAL IN THE FIRE ALARM DOCUMENTS BOX.

B. PRODUCT DATA: PROVIDE FOR EACH TYPE OF PRODUCT, INCLUDING ALL FURNISHED OPTIONS AND ACCESSORIES.

1. INCLUDE OVERALL BILL OF MATERIALS.
2. INCLUDE CUTSHEET DATA FOR ALL COMPONENTS AND CABLING.
3. INCLUDE CONSTRUCTION DETAILS, MATERIAL DESCRIPTIONS, DIMENSIONS, PROFILES AND FINISHES.
4. INCLUDE RATED CAPACITIES, OPERATING CHARACTERISTICS AND ELECTRICAL CHARACTERISTICS.

C. CALCULATIONS:

1. BATTERY CAPACITY AND RUNTIME
2. VOLTAGE DROP
3. CIRCUIT SIZING

D. SHOP DRAWINGS:

1. COMPLY WITH RECOMMENDATIONS AND REQUIREMENTS IN THE "DOCUMENTATION" CHAPTER IN NFPA 72.
2. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK. PLANS SHALL BE COMPUTER GENERATED (HAND DRAWN WILL NOT BE ACCEPTED) ON A SCALABLE PLAN OF THE BUILDING.
3. INCLUDE DETAILS OF EQUIPMENT ASSEMBLIES. INDICATE DIMENSIONS, WEIGHTS, LOADS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATIONS. INDICATE CONDUCTOR SIZES, INDICATE TERMINATION LOCATIONS AND REQUIREMENTS, AND DISTINGUISH BETWEEN FACTORY AND FIELD WIRING.
4. DETAIL ASSEMBLY AND SUPPORT REQUIREMENTS.
5. INCLUDE VOLTAGE DROP CALCULATIONS FOR NOTIFICATION-APPLIANCE CIRCUITS.
6. INCLUDE BATTERY-SIZE CALCULATIONS.
7. INCLUDE INPUT/OUTPUT MATRIX.
8. INCLUDE STATEMENT FROM MANUFACTURER THAT ALL EQUIPMENT AND COMPONENTS HAVE BEEN TESTED AS A SYSTEM AND MEET ALL REQUIREMENTS IN THIS SPECIFICATION AND IN NFPA 72.
9. INCLUDE PERFORMANCE PARAMETERS AND INSTALLATION DETAILS FOR EACH DETECTOR.
10. VERIFY THAT EACH DUCT DETECTOR IS LISTED FOR COMPLETE RANGE OF AIR VELOCITY, TEMPERATURE, AND HUMIDITY POSSIBLE WHEN AIR-HANDLING SYSTEM IS OPERATING.
11. PROVIDE PROGRAM REPORT SHOWING THAT AIR-SAMPLING DETECTOR PIPE LAYOUT BALANCES PNEUMATICALLY WITHIN THE AIRFLOW RANGE OF THE AIR-SAMPLING DETECTOR.
12. INCLUDE PLANS, SECTIONS, AND ELEVATIONS OF HEATING, VENTILATING, AND AIR-CONDITIONING DUCTS, DRAWN TO SCALE; COORDINATE LOCATION OF DUCT SMOKE DETECTORS AND ACCESS TO THEM.
    a. SHOW CRITICAL DIMENSIONS THAT RELATE TO PLACEMENT AND SUPPORT OF SAMPLING TUBES, DETECTOR HOUSING, AND REMOTE STATUS AND ALARM INDICATORS.
    b. SHOW FIELD WIRING REQUIRED FOR HVAC UNIT SHUTDOWN ON ALARM. INCLUDE OVERRIDE BY FIREFIGHTERS' CONTROL OR SMOKE-EVACUATION SYSTEM WHERE APPLICABLE.
    c. LOCATE DETECTORS ACCORDING TO MANUFACTURER'S WRITTEN RECOMMENDATIONS.
    d. SHOW AIR-SAMPLING DETECTOR PIPE ROUTING.
13. INCLUDE FLOOR PLANS TO INDICATE FINAL DEVICE LOCATIONS SHOWING ADDRESS OF EACH ADDRESSABLE DEVICE. SHOW SIZE AND ROUTE OF CABLE AND CONDUITS AND POINT-TO-POINT WIRING DIAGRAMS.

E. SEISMIC:

1. SEISMIC QUALIFICATION CERTIFICATES: FOR FIRE-ALARM CONTROL UNIT, ACCESSORIES, AND COMPONENTS, FROM MANUFACTURER.
2. BASIS FOR CERTIFICATION: INDICATE WHETHER WITHSTAND CERTIFICATION IS BASED ON ACTUAL TEST OF ASSEMBLED COMPONENTS OR ON CALCULATION.
3. DIMENSIONED OUTLINE DRAWINGS OF EQUIPMENT UNIT: IDENTIFY CENTER OF GRAVITY AND LOCATE AND DESCRIBE MOUNTING AND ANCHORAGE PROVISIONS.
4. DETAILED DESCRIPTION OF EQUIPMENT ANCHORAGE DEVICES ON WHICH THE CERTIFICATION IS BASED AND THEIR INSTALLATION REQUIREMENTS.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. SMOKE AND FIRE/SMOKE DAMPERS: EXAMINE HVAC INSTALLATION AND PLANS AND PROVIDE SMOKE DETECTORS AS REQUIRED FOR DAMPER SYSTEM INSTALLED. ALLOW FOR DETECTORS WITHIN 5 FOOT OF EACH DAMPER UNLESS NOTED OTHERWISE IN MECHANICAL PLANS. CONNECT COMPLETE TO OPERATE DAMPERS AND TO SHUT DOWN AIR HANDLING UNITS WHERE REQUIRED.

B. DUCT SMOKE DETECTORS:

1. FURNISH AND CONNECT UL 268A ADDRESSABLE DUCT SMOKE DETECTORS COMPLETE, INCLUDING POWER INPUT AND FIRE ALARM CIRCUITS. CONTROL WIRING FOR FANS AND DAMPERS SHALL BE BY MECHANICAL CONTRACTOR.
2. DETECTORS SHALL SUIT SYSTEM FURNISHED. PROVIDE DETECTORS WITH ENCLOSED DETECTOR UNIT AND CONTACTS MOUNTED EXTERIOR TO DUCT AND WITH AIR INLET TUBE EXTENDING INTO DUCT. PROVIDE INLET TUBE LENGTHS AS DIRECTED BY MECHANICAL CONTRACTOR; TUBES SHALL BE A MINIMUM OF 75% OF DUCT WIDTH.
3. PROVIDE DETECTORS WITH AT LEAST TWO SETS OF SPDT AUXILIARY CONTACTS FOR CONNECTION OF FAN AND SMOKE DAMPER CONTROLS BY MECHANICAL CONTRACTOR.
4. TURN DETECTORS OVER TO MECHANICAL CONTRACTOR, WHO WILL INSTALL AND CONNECT CONTROL WIRING THROUGH AUXILIARY CONTACTS FOR FANS AND DAMPERS.
5. POWER INPUT FOR DETECTOR OPERATION SHALL BE PROVIDED THROUGH FIRE ALARM WIRING. CONNECT TO SOUND FIRE ALARM ON DETECTOR ACTIVATION AND FOR DEVICE ANNUNCIATION AS SPECIFIED ABOVE.
6. PROVIDE EACH DUCT SMOKE DETECTOR WITH A REMOTE ANNUNCIATOR/RESET STATION. STATION SHALL DISPLAY A LIGHTED PILOT LAMP WHEN DETECTOR IS IN ALARM AND SHALL INCORPORATE A SWITCH BY WHICH THE DETECTOR MAY BE REMOTELY RESET. INSTALL STATIONS IN ACCESSIBLE LOCATIONS AS DIRECTED BY OWNER.
7. EXAMINE HVAC PLANS AND PROVIDE DETECTORS AS REQUIRED BY APPLICABLE CODES: ONE DETECTOR (RETURN) FOR FAN UNITS PRODUCING 2,000 TO 15,000 CFM AND TWO DETECTORS (SUPPLY AND RETURN) FOR FAN UNITS ABOVE 15,000 CFM. ALL FAN UNITS SERVING AREAS UTILIZED FOR EGRESS, REGARDLESS OF CAPACITY, SHALL HAVE A RETURN DETECTOR INSTALLED. IN ADDITION, PROVIDE SUPPLY DETECTOR IF FAN UNIT EXCEEDS 15,000 CFM. REFER TO THE 2015 INTERNATIONAL MECHANICAL CODE (IMC), SECTION 606 – SMOKE DETECTION SYSTEMS CONTROL.

C. EMERGENCY POWER SUPPLY: SYSTEM SHALL BE PROVIDED WITH ADDITIONAL EMERGENCY POWER SUPPLY AS REQUIRED TO ENSURE SYSTEM OPERATION UNDER CONDITIONS OF NORMAL POWER OUTAGE. THE EMERGENCY POWER SUPPLY SHALL BE CAPABLE OF MAINTAINING THE SYSTEM IN A SUPERVISORY, STANDBY CONDITION FOR A PERIOD OF AT LEAST 24 HOURS, WITH SUFFICIENT POWER CAPABILITY AFTER THE 24-HOUR STANDBY PERIOD FOR 15 MINUTES OF ALARM CONDITION OPERATION.

D. PROVIDE A SMOKE DETECTOR AT EVERY NEW FIRE ALARM CONTROL UNIT, REMOTE PANEL AND EXTENDER PANELS IN COMPLIANCE WITH NFPA 72 SECTION 10.4.4.

2.2 WIRING

A. MONITOR AND SIGNALING DEVICES SHALL BE SUPERVISED BY MEANS FOR A CLASS "B" CIRCUIT. THIS INCLUDES CIRCUITS FROM THE FIRE ALARM CONTROL PANEL, REMOTE CONTROL MODULES AND REMOTE MONITORING MODULES.

B. ALL DIGITAL COMMUNICATIONS WIRING SHALL BE AS RECOMMENDED BY MANUFACTURER FOR EACH APPLICATION AND DISTANCE; WIRING SHALL BE A MINIMUM #18 SHIELDED AWG, FOIL WRAP SHIELD WITH INTEGRAL DRAIN WIRE.

C. POWER, SIGNAL AND OTHER CLASS "B" CIRCUIT WIRING SHALL BE SIZED AS RECOMMENDED BY MANUFACTURER FOR EACH APPLICATION AND DISTANCE; WIRING SHALL BE A MINIMUM #14 AWG.

D. PROVIDE END OF LINE (EOL) RESISTORS WHERE NECESSARY; OHMIC VALUES AS REQUIRED TO SUIT SYSTEM FURNISHED.

E. AT CONTRACTOR'S OPTION, T-TAPS (PARALLEL TAPS) ARE PERMITTED IF ALLOWED BY LOCAL CODES AND PERMITTED BY FIRE ALARM MANUFACTURER. QUANTITY OF T-TAPS IN EACH CIRCUIT SHALL NOT EXCEED THE NUMBER SPECIFIED BY FIRE ALARM MANUFACTURER TO SUIT SYSTEM FURNISHED.

F. ISOLATOR MODULES SHALL BE PROVIDED TO LIMIT THE NUMBER OF MODULES OR DETECTORS THAT MAY BE RENDERED INOPERATIVE BY A SHORT CIRCUIT FAULT ON SLC LOOPS. MODULES SHALL AUTOMATICALLY ISOLATE WIRE-TO-WIRE SHORT CIRCUITS ON AN SLC LOOP AND WHEN THE SHORT CIRCUIT CONDITION IS CORRECTED, THE ISOLATOR MODULE SHALL AUTOMATICALLY RECONNECT THE ISOLATED SECTION. PROVIDE ISOLATOR MODULES AS FOLLOWS:

1. AFTER EACH TWENTY-FIVE (25) DEVICES/CONTROL POINTS ON ANY ADDRESSABLE CIRCUIT.
2. FOR EACH CIRCUIT EXTENDING OUTSIDE THE BUILDING.
3. IN THE FACP, AT THE END OF EACH LOOP.
4. ON LOOPS CONTAINING FEWER THAN TWENTY-FIVE (25) DEVICES, PLACE AN ISOLATOR AT EACH END OF THE LOOP AND ONE IN THE ELECTRICAL CENTER OF THE LOOP.

2.3 SEISMIC REQUIREMENTS

A. FIRE ALARM CONTROL PANEL, NAC PANELS, AND RACEWAYS SHALL WITHSTAND THE EFFECTS OF EARTHQUAKE MOTIONS DETERMINED ACCORDING TO ASCE/SEI 7.

PART 3 – EXECUTION

3.1 SYSTEM OPERATION

A. THE SYSTEM SHALL BE ELECTRICALLY SUPERVISED, NON-PRESIGNAL TYPE WITH OPERATING SEQUENCE TO MATCH EXISTING.

3.2 INSTALLATION

A. ALL CONDUCTORS AND CABLES SHALL BE AS REQUIRED BY SYSTEM MANUFACTURER FOR FUNCTIONS SPECIFIED AND SHALL COMPLY WITH UL, NFPA, NATIONAL ELECTRICAL CODE AND INTERNATIONAL FIRE CODE IN RATING, TYPE, SURVIVABILITY AND INSTALLATION.

B. PROVIDE RACEWAYS FOR ALL CONDUCTORS AND CABLES. SEE DRAWINGS FOR RACEWAY TYPES APPROVED FOR VARIOUS LOCATIONS AND APPLICATIONS IN THE PROJECT. ALL METALLIC RACEWAYS SHALL BE RED, MINIMUM 3/4" IN SIZE. INSTALL CONCEALED IN ALL FINISHED SPACES.

C. PROVIDE RED LOCKING KIT FOR ALL CIRCUIT BREAKERS SERVING FIRE ALARM SYSTEM COMPONENTS. INSTALL RED ENGRAVED NAMEPLATE ADJACENT TO EACH BREAKER WITH WORDING TO INDICATE LOAD SERVED.

D. PROTECT ALL DETECTORS IN CONSTRUCTION AREAS FROM CONTAMINATION AND PHYSICAL DAMAGE WITH APPROPRIATE DUST COVERS AND PROTECTIVE DEVICES. DO NOT REMOVE COVERS UNTIL COMPLETION OF ANY DUST OR FUME PRODUCING WORK IS COMPLETE.

3.3 TESTING AND INSPECTIONS

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TEST AND INSPECT ALL COMPONENTS, ASSEMBLIES, CONNECTIONS, WIRING AND EQUIPMENT INSTALLATION.

B. PERFORM THE FOLLOWING TESTS AND INSPECTIONS:

1. VISUAL INSPECTION: CONDUCT VISUAL INSPECTION PRIOR TO TESTING. INSPECTION SHALL BE BASED ON SUBMITTALS, RECORD DRAWINGS AND SYSTEM DOCUMENTATION REQUIRED BY THE "COMPLETION DOCUMENTS, PREPARATION" TABLE IN THE "DOCUMENTATION" SECTION OF THE "FUNDAMENTALS" CHAPTER IN NFPA 72. COMPLY WITH THE "VISUAL INSPECTION FREQUENCIES" TABLE IN THE "INSPECTION" SECTION OF THE "INSPECTION, TESTING AND MAINTENANCE" CHAPTER IN NFPA 72; RETAIN THE "INITIAL/REACCEPTANCE" COLUMN AND LIST ONLY THE INSTALLED COMPONENTS.
2. SYSTEM TESTING: COMPLY WITH THE "TEST METHODS" TABLE IN THE "TESTING" SECTION OF THE "INSPECTION, TESTING AND MAINTENANCE" CHAPTER IN NFPA 72.
3. TEST AUDIBLE APPLIANCES FOR THE PUBLIC OPERATING MODE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
4. TEST VISIBLE APPLIANCES FOR THE PUBLIC OPERATING MODE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
5. OPEN INITIATING DEVICE CIRCUITS AND VERIFY THAT TROUBLE SIGNAL ACTUATES.
6. OPEN SIGNALING LINE CIRCUITS AND VERIFY THAT TROUBLE SIGNAL ACTUATES.
7. OPEN AND SHORT NOTIFICATION APPLIANCE CIRCUITS AND VERIFY THAT TROUBLE SIGNAL ACTUATES.
8. GROUND ALL CIRCUITS AND VERIFY RESPONSE OF TROUBLE SIGNALS.
9. INTRODUCE ON SYSTEM EACH OF THE ALARM CONDITIONS THE SYSTEM IS REQUIRED TO DETECT. VERIFY PROPER RECEIPT AND PROPER PROCESSING OF SIGNAL AT FIRE ALARM CONTROL PANEL AND CORRECT ACTIVATION OF CONTROL POINTS, DOOR HOLDERS AND THE LIKE.

C. PREPARE TEST AND INSPECTION REPORTS UPON SUCCESSFUL COMPLETION OF TESTING

3.4 CERTIFICATE OF OPERATION

A. AT THE TIME OF SUBSTANTIAL COMPLETION, BEFORE ENGINEER MAKES SUBSTANTIAL COMPLETION INSPECTION, THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER A CERTIFICATE OF OPERATION FOR THE FIRE ALARM SYSTEM. THE CERTIFICATE SHALL:

1. STATE THAT THE SYSTEM (ALL STATIONS) HAS BEEN COMPLETED, TESTED AND OPERATED SUCCESSFULLY.
2. INCLUDE ALL INFORMATION REQUIRED IN NFPA-72 ON FORMS IDENTICAL TO THOSE CONTAINED IN 2013 EDITION, 7.8.2.
3. INCLUDE WRITTEN CERTIFICATION THAT THE SYSTEM HAS PASSED INSPECTION BY AUTHORITY HAVING JURISDICTION.

3.5 SYSTEM TRAINING

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL ON ALL ADJUSTMENTS, OPERATIONS AND MAINTENANCE OF FIRE ALARM SYSTEM.

B. AT A MINIMUM, THE TRAINING SHALL COVER THE FOLLOWING TOPICS IN SUFFICIENT DETAIL:

1. PREVENTATIVE MAINTENANCE SERVICE TECHNIQUES AND SCHEDULES, INCLUDING HISTORICAL DATA TRENDING OF ALARM AND TROUBLE RECORDS.
2. OVERALL SYSTEM CONCEPTS, CAPABILITIES AND FUNCTIONS.
3. EXPLANATION OF ALL CONTROL FUNCTIONS, SYSTEM TROUBLESHOOTING, SILENCE, RESET AND SIMILAR FUNCTIONS.
4. REVIEW OF MANUALS, DRAWINGS AND ALL TECHNICAL DOCUMENTATION.
5. ANY PROGRAMMING OR PERFORMANCE PECULIARITIES THAT ARE INHERENT WITHIN THE SYSTEM.

END OF SECTION 28 31 10

Schneider Electric
Schneider Electric
1650 West Crosby Road
Carrollton, TX 75006 USA
Tel. +1 972 323 1111
Fax +1 972 323 5498
www.schneider-electric.com

SEAL 025412
S. DICKSON O'BRIEN
3/23/2022

SCHNEIDER ELECTRIC ENERGY SERVICES PROJECT
FOR
BRUNSWICK COUNTY SCHOOL DISTRICT
SOUTH BRUNSWICK MIDDLE SCHOOL
100 COUOGAR ROAD
SOUTHPORT, NC 28461

SHEET TITLE
ELECTRICAL SPECIFICATIONS
PART 2

MARK	DATE	DESCRIPTION

SUBMISSION / REVISION

DRAWN BY: CJA	CHECKED BY: SDO
DESIGNED BY: CJA	APPROVED BY: SDO
DATE: 03-23-22	PROJECT: PC21P0006

GWA: 21-3670
GWA inc. Electrical Engineers
168 Laurelhurst Avenue
Columbia, SC 29210
(803)252-6919
Fax (803)799-5494
gwa@gwainc.net
http://www.gwainc.net

SHEET NUMBER
E202