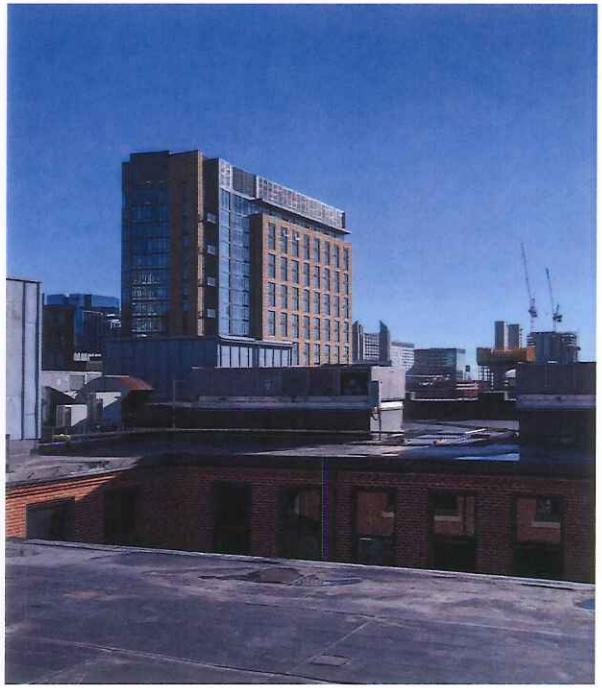
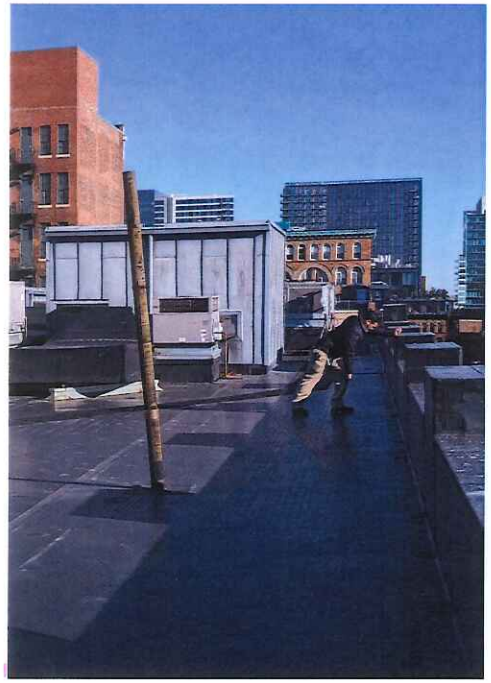
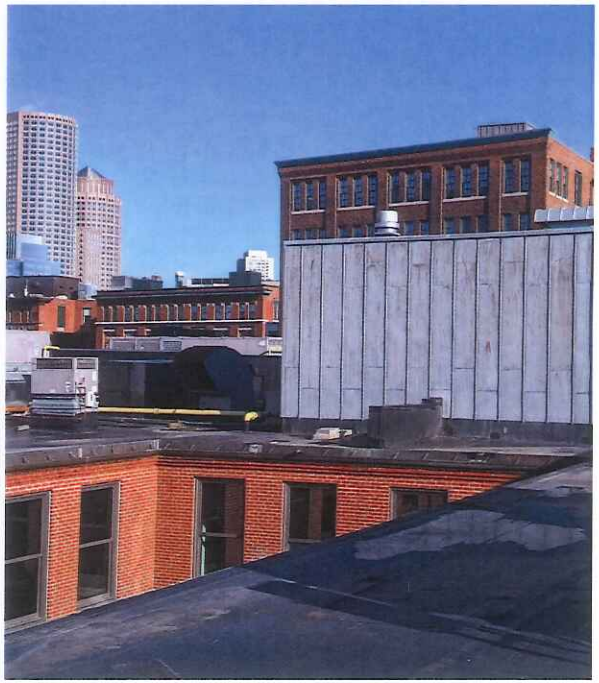
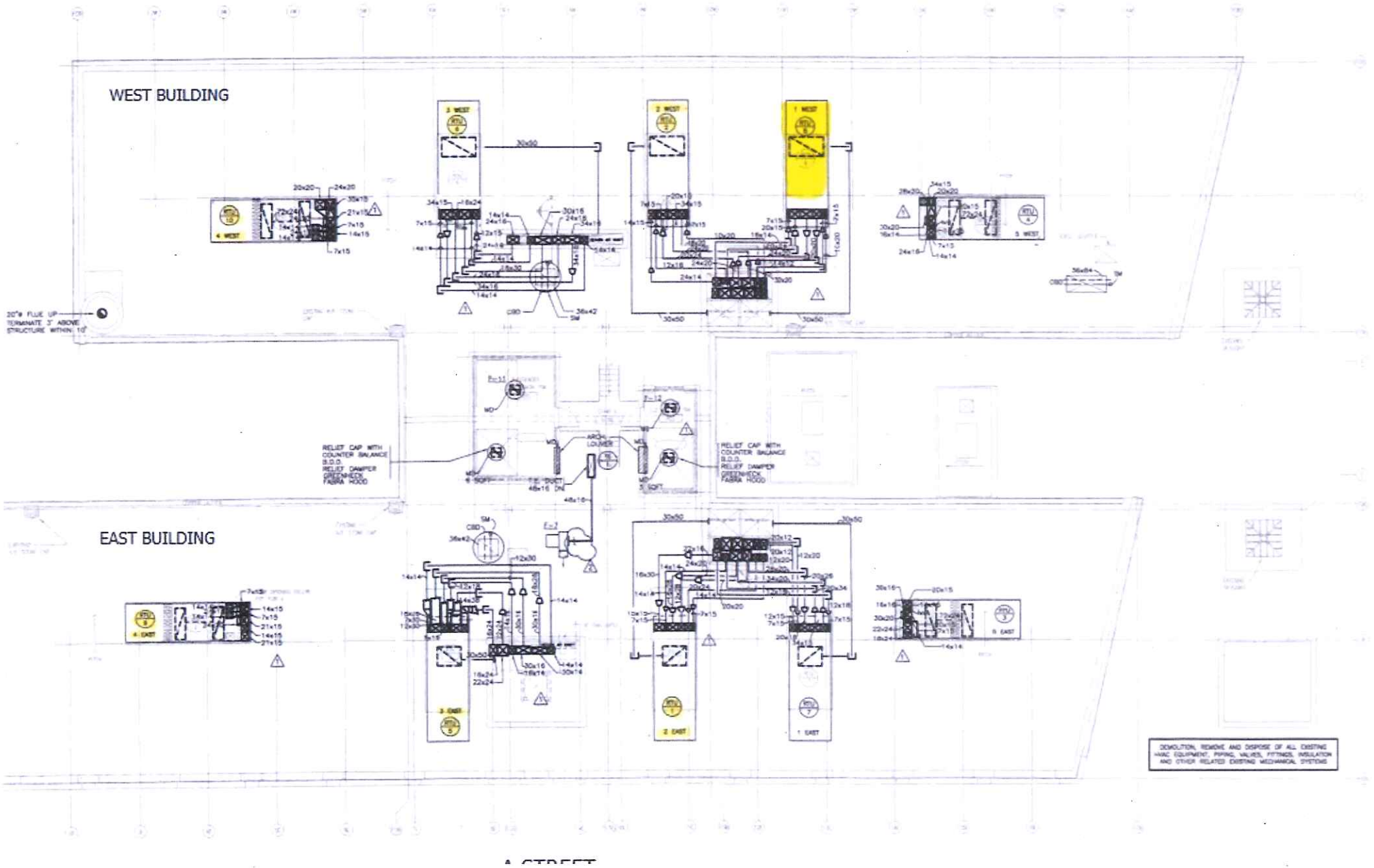


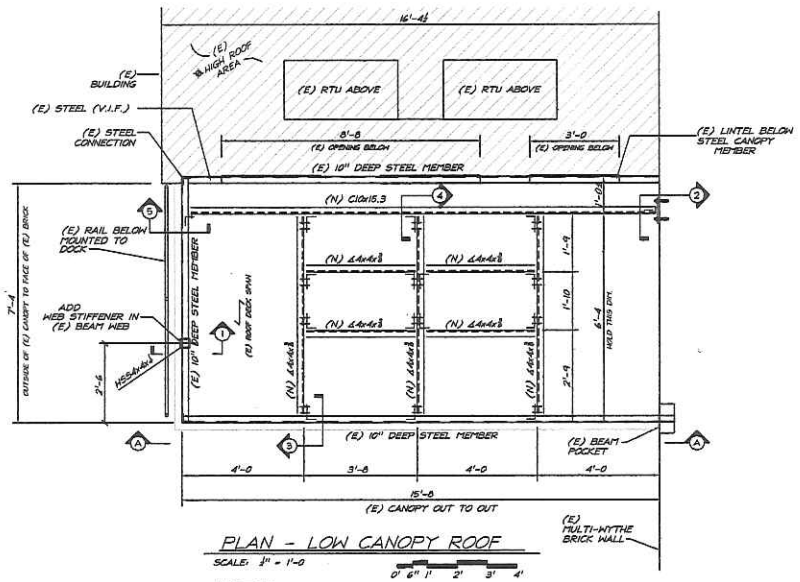




Roof Existing Conditions - Rooftop Units




Existing RTU and associated Duct to be Removed and the Roof infilled.
Necco St
Environments At Work
Office furniture store
300 A Street
Necco St
Red Hat, Inc
Tivo Office
Gazelle
Necco Ct
Integrated Interiors
A St
Necco Ct
Life is Good,
Clothing st

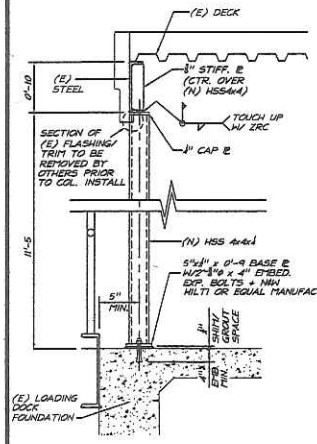


PLAN - LOW CANOPY ROOF

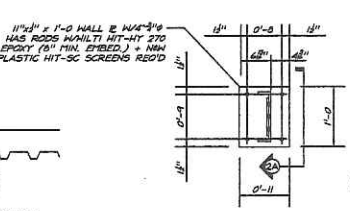
SCALE: ¼" = 1'-0

NOTES:

ALL NEW MATERIAL (N) TO BE GALVANIZED
ALL MATERIAL NOTED (E) IS EXISTING



SECTION 1



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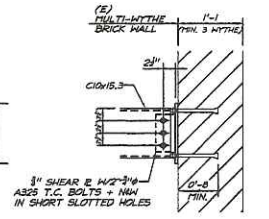

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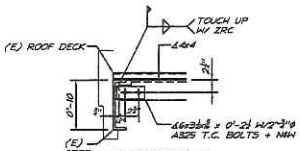

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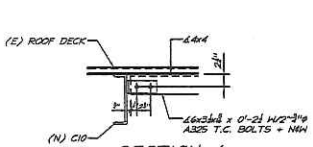

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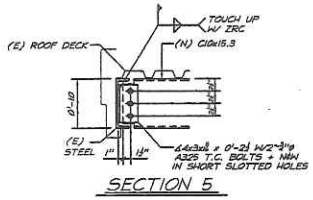
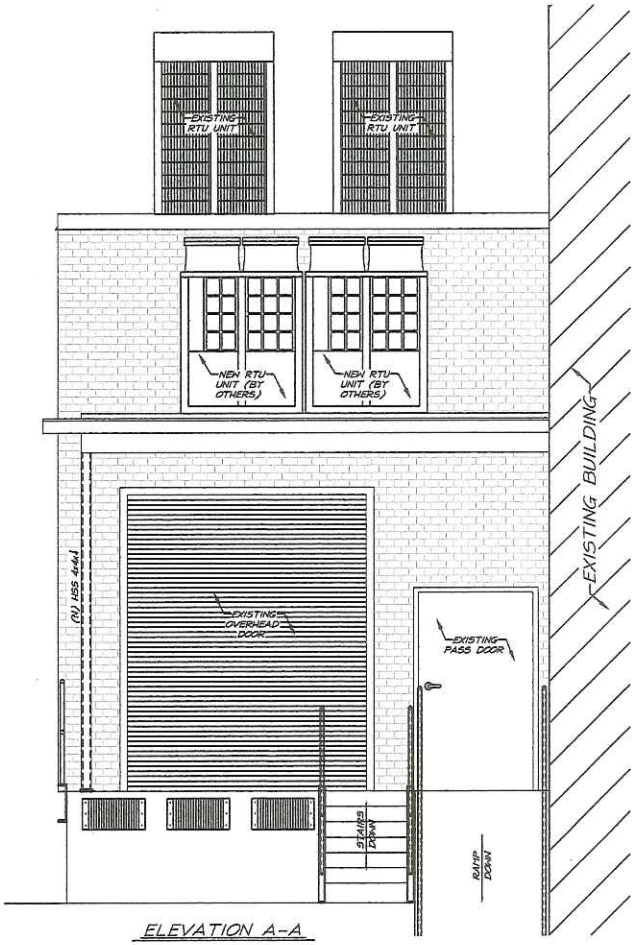


SECTION 5

NOTE; SECTIONS ARE NOT DRAWN TO SCALE



ELEVATION A-A

STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 AND TO THE "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL", PER THE LATEST EDITION OF THE AISC MANUAL.
2. SHOP AND FIELD CONNECTIONS SHALL BE BY HIGH STRENGTH A325 BOLTS OR WELDING (USE E70XX ELECTRODES). UNLESS OTHERWISE NOTED, ALL BOLTED CONNECTIONS SHALL BE DETAILED FOR MAXIMUM END REACTIONS OF SUPPORTED ELEMENT; ALL WELDS SHALL DEVELOP FULL STRENGTH OF MEMBERS TO BE WELDED.
3. THE FABRICATOR IS RESPONSIBLE FOR SUBMITTING TO THE ENGINEER FOR APPROVAL, DETAILS, AND SUPPORTING CALCULATIONS FOR ALL CONNECTIONS NOT OTHERWISE SHOWN USING MAXIMUM END REACTIONS AND MOMENTS REFERRED TO IN THESE NOTES.
4. WHERE BEAMS BEAR ON MASONRY OR CONCRETE, PROVIDE STEEL BEARING PLATES.
5. TEMPORARY ERECTION BRACING SHALL BE PROVIDED TO HOLD STRUCTURAL STEEL SECURELY IN POSITION AS DESCRIBED ON THE DRAWINGS. IT SHALL NOT BE REMOVED UNTIL PERMANENT BRACING HAS BEEN INSTALLED.
6. PROVIDE GROUT OF THICKNESS AS REQUIRED AND QUARTER OF AN INCH THICK STEEL LEVELING PLATES UNDER ALL COLUMN BASE PLATES. ANCHOR ALL COLUMNS TO PIERS, WALLS OR FOOTINGS WITH MINIMUM OF FOUR THREE QUARTER OF AN INCH DIAMETER ANCHOR BOLTS BY ONE FOOT THREE INCHES LONG WITH THREE INCHES LONG HOOK UNLESS OTHERWISE NOTED.
7. ALL (N) NEW STRUCTURAL STEEL TO BE GALVANIZED.

STEEL ERECTION

1. COMMENCEMENT OF STEEL ERECTION: A STEEL ERECTION CONTRACTOR SHALL NOT ERECT STEEL UNLESS IT HAS RECEIVED WRITTEN NOTIFICATION FROM THE GENERAL CONTRACTOR THAT THE CONCRETE IN THE FOOTINGS, PIERS, AND WALLS OR THE MORTAR IN THE MASONRY WALLS, PILASTERS AND FILLED MASONRY COLUMNS HAS ATTAINED, ON THE BASIS OF THE APPROPRIATE ASTM STANDARD TEST METHOD OF FIELD-CURED SAMPLES, EITHER 75% OF THE INTENDED MINIMUM COMPRESSIVE DESIGN STRENGTH OR SUFFICIENT STRENGTH TO SUPPORT THE LOADS IMPOSED DURING STEEL ERECTION.
2. ANY REPAIRS, REPLACEMENTS AND MODIFICATIONS TO THE ANCHOR BOLTS SHALL BE REPORTED TO THE ENGINEER.

DESIGN CRITERIA

DEAD LOAD =	10 PSF (CANOPY ROOF) 622# (EACH UNIT)
SNOW LOAD:	Pg = 40 PSF GROUND SNOW I = 1.0 IMPORTANCE FACTOR Ce = 1.0 EXPOSURE FACTOR Ct = 1.2 THERMAL FACTOR Pf = 33.60 PSF FLAT ROOF SNOW Pd = 46.28 PSF DRIFT @ HIGH END
ROOF LIVE LOAD =	20 PSF
WIND CRITERIA:	BOSTON MA. V = 128 MPH RISK CAT. = II EXPOSURE = B
SEISMIC CRITERIA:	S_S = 0.217 S_1 = 0.069

JAY H. BROWN STRUCTURAL No. 34031 REGISTERED PROFESSIONAL ENGINEER
7-20-2020

STRUCTURAL SYSTEMS, INC.
865 TURNPIKE STREET
NORTH ANDOVER, MA 01845-6139
PHONE 978.682.1000 FAX 978.682.1004
WWW.STRUCTURAL-SYSTEMS.COM

REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		
6		
7		

JOB: 300 A STREET SOUTH BOSTON, MA

FOR: ACCUTEMP ENGINEERING, INC.
100 MAPLE ST., BLDG. B
STONEHAM, MA 02180

DRAWN PRINTER | DATE 7-16-20 | DRAWING NO. S1
SCALE NOTED | DATE

ELECTRICAL LEGEND

- – RECEPTACLE, DUPLEX, 20A, 125V, COMMERCIAL/SPECIFICATION GRADE
- – RECEPTACLE, DUPLEX, 20A, 125V, COMMERCIAL/SPECIFICATION GRADE CONNECTED TO A DEDICATED CIRCUIT
- – RECEPTACLE, DOUBLE DUPLEX
- – RECEPTACLE, NEMA TYPE TBD
- – JUNCTION BOX
- – JUNCTION BOX W/BLANK PLATE
- – JUNCTION BOX, DIMENSIONS AS SHOWN
- – EMERGENCY POWER PANELBOARD, SURFACE MOUNTED
- – PANELBOARD, SURFACE MOUNTED
- – PANELBOARD, FLUSH MOUNTED
- 100AF/60AT – CIRCUIT BREAKER, 100A FRAME/60A TRIP
- 100AS – DISCONNECT SWITCH, 100A SWITCH
- 100AS/60AF – DISCONNECT SWITCH, FUSED, 100A SWITCH/60A FUSE
- 100AS – DISCONNECT SWITCH, 100A SWITCH
- 100AS/60AF – DISCONNECT SWITCH, FUSED, 100A SWITCH/60A FUSE
- $ – THERMAL MOTOR SWITCH
- CM – CHECK METER
- M – UTILITY METER
- (S) – MOTOR, FAN, ETC., NUMERAL INDICATES HORSE POWER
- (G) – GENERATOR
- – HVAC EQUIPMENT
- T – LINE VOLTAGE THERMOSTAT
- LC – SWITCH, FAN CONTROL, FURNISHED BY MC, WIRED BY EC
- S – SWITCH, SINGLE POLE, 20A, 120/277V, COMMERCIAL/SPECIFICATION GRADE
- S2 – SWITCH, DOUBLE POLE, SINGLE THROW, 20A, 120/277V, COMMERCIAL/SPECIFICATION GRADE
- S3 – SWITCH, THREE WAY, 20A, 120/277V, COMMERCIAL/SPECIFICATION GRADE
- S4 – SWITCH, FOUR WAY, 20A, 120/277V, COMMERCIAL/SPECIFICATION GRADE

SUBSCRIPTS & ABBREVIATIONS

AIC – AMPERES INTERRUPTING CAPACITY (RMS SYMMETRICAL)
AFF – ABOVE FINISHED FLOOR
AFC – ABOVE FINISHED CEILING
ACT – ABOVE COUNTER TOP
CC – CONTROLS CONTRACTOR
cd – INDICATES THE CANDELA RATING OF THE STROBE
CP – CONTROL PANEL
E – EXISTING TO REMAIN
EC – ELECTRICAL CONTRACTOR
EGC – EQUIPMENT GROUNDING CONDUCTOR
EDH – ELECTRIC DUCT HEATER
EMS – ENERGY MANAGEMENT SYSTEM
EMT – ELECTRICAL METALLIC TUBING
EP – EMERGENCY POWER
EPO – EMERGENCY POWER OFF
ER – EXISTING TO BE RELOCATED
EVC – ELEVATOR CONTRACTOR
EWH – ELECTRIC WATER HEATER
EX – EXISTING TO BE REMOVED
EX,N – EXISTING DEVICE TO BE REMOVED & REPLACED W/ NEW AS SHOWN
F – FUTURE
FACP – FIRE ALARM CONTROL PANEL
FATC – FIRE ALARM TERMINAL CABINET
FBO – FURNISHED BY OTHERS
FCC – FIRE COMMAND CENTER
FLA – FULL LOAD AMPERES
FMC – FLEXIBLE METAL CONDUIT
FPT – FAN POWERED TERMINAL
GC – GENERAL CONTRACTOR
GFI – GROUND FAULT INTERRUPTING
GEC – GROUNDING ELECTRODE CONDUCTOR
LSV – LIQUID SENSING VALVE
MC – MECHANICAL CONTRACTOR
MI – MINERAL INSULATED CABLE
MTD – MOUNTED
N – NEW DEVICE
NEC – NATIONAL ELECTRICAL CODE
NIC – NOT IN CONTRACT
NTS – NOT TO SCALE
NP – NORMAL POWER
OC – ON CENTER
OCPD – OVER CURRENT PROTECTIVE DEVICE
PC – PLUMBING CONTRACTOR
RE – RELOCATED
RGS – RIGID GALVANIZED STEEL
RMC – RIGID METAL CONDUIT
SC – SPRINKLER CONTRACTOR
SCA – SHORT CIRCUIT AMPERES
SR – SERIES COMBINATION RATED
TBD – TO BE DETERMINED
TD – TIME DELAY
TGB – TELECOMMUNICATIONS GROUND BUS
UNO – UNLESS NOTED OTHERWISE
VFD – VARIABLE FREQUENCY DRIVE
WP – WEATHER PROOF
XFMR – TRANSFORMER

ELECTRICAL SPECIFICATION

1. ALL WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF NFPA, NEC, NESC, AND WITH ALL APPLICABLE STATE AND LOCAL CODES.
2. ALL WORK PERFORMED BY THIS CONTRACTOR SHALL BE GUARANTEED TO BE FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE. ANY EQUIPMENT SHOWN TO BE DEFECTIVE WITHIN THIS PERIOD SHALL BE REPAIRED, REPLACED OR ADJUSTED FREE OF CHARGE.
3. CONTRACTOR SHALL VISIT THE SITE TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS PRIOR TO SIGNING THE CONTRACT. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES AND/OR CONFLICTS BETWEEN THESE DRAWINGS AND THE SITE CONDITIONS.
4. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL ELECTRICAL EQUIPMENT WITH ALL OTHER TRADES IN ORDER TO AVOID CONFLICTS IN THE FIELD. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES AND/OR CONFLICTS BETWEEN TRADES.
5. CONTRACTOR SHALL COORDINATE ANY PATCHING AND PAINTING REQUIRED WITH THE GC/ARCHITECT. ALL SCOPE AND COST ASSOCIATED WITH PATCHING AND PAINTING SHALL BE IDENTIFIED PRIOR TO CONSTRUCTION.
6. CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF ALL DEVICES.
7. CONTRACTOR SHALL SUBMIT A MANUFACTURERS SPECIFICATION SHEET AND ANY APPLICABLE SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO PURCHASING ANY EQUIPMENT.
8. ALL COMPONENTS FURNISHED AND/OR INSTALLED BY THIS CONTRACTOR SHALL BE UL LISTED.
9. ALL DEVICES SHALL MATCH BUILDING STYLES AND STANDARDS, UNO.
10. ALL WIRING SHALL BE ROUTED PERPENDICULAR TO COLUMN LINES.
11. ALL EXPOSED WIRING i.e. ELECTRIC ROOMS, SHALL BE INSTALLED IN EMT CONDUIT, UNO.
12. ALL CONDUIT AND CABLING PATHS SHOWN ARE DIAGRAMMATIC ONLY. EC SHALL FIELD VERIFY, COORDINATE AND DETERMINE EXACT ROUTING WITH EXISTING AND NEW BUILDING CONSTRUCTION CONDITIONS AND ALL OTHER TRADES.
13. ALL PENETRATIONS THROUGH FIRE RATED SPACES SHALL BE FIRE STOPPED IN ORDER TO MAINTAIN THE REQUIRED FIRE RATING OF THE SPACE. FIRE STOPPING MATERIALS SHALL BE UL LISTED FOR THE REQUIRED FIRE RATING.
14. EXPANSION FITTINGS SHALL BE INSTALLED ON ALL RACEWAYS PASSING THROUGH BUILDING EXPANSION JOINTS.
15. ALL WIRE WITHIN CONDUIT SHALL BE COPPER, #12 AWG MINIMUM, 600V THHN/THWN INSULATION, UNO. CONDUCTORS SHALL BE SOLID FOR #14 AWG AND SMALLER. STRANDED CONDUCTORS SHALL BE USED FOR ALL SIZES LARGER THAN #14 AWG.
16. ALL HOMERUNS AND BRANCH CIRCUIT WIRING SHALL BE 12-2 MC CABLE, UNO. WORKSTATIONS SHALL BE FED VIA SUPER-NEUTRAL CABLES.
17. ALL WIRE, LUGS, AND TERMINATIONS SHALL BE RATED FOR 75°C MINIMUM.
18. WHEN LOAD IS ADDED TO AN EXISTING BRANCH CIRCUIT, CONTRACTOR SHALL CONFIRM THAT THE CURRENT DRAW DOES NOT EXCEED THE CIRCUIT RATING.
19. ALL WIRING IN JUNCTION BOXES, TROUGHS, AND POINTS OF TERMINATION SHALL BE IDENTIFIED WITH PANELBOARD AND CIRCUIT NUMBER DESIGNATION.
20. CONTRACTOR SHALL CLEAN, VACUUM, AND TIGHTEN ALL CONNECTIONS IN ANY ELECTRICAL EQUIPMENT THAT IS TO BE REUSED. ALL KNOCK OUTS SHALL BE SEALED IN ALL ENCLOSURES AFFECTED BY THE CONSTRUCTION.
21. CONTRACTOR SHALL PROVIDE A TYPED CIRCUIT DIRECTORY FOR ALL PANELBOARDS AFFECTED BY THE CONSTRUCTION.
22. CONTRACTOR SHALL PROVIDE ENGRAVED NAMEPLATES FOR ALL PANELBOARDS, DISCONNECT SWITCHES, MOTOR STARTERS, AND ALL OTHER SIMILAR EQUIPMENT APPLICABLE TO THIS CONTRACT. NAMEPLATES SHALL BE BLACK PLASTIC WITH 1" HIGH ENGRAVED WHITE LETTERING OR P-TOUCH TYPE LABELING AND PERMANENTLY AFFIXED TO THE EQUIPMENT. NAMEPLATES SHALL CLEARLY IDENTIFY WHERE THE EQUIPMENT IS FED FROM AND WHAT THE EQUIPMENT IS SERVING INCLUDING VOLTAGE AND AMPERES. PEN, PENCIL OR MARKER WILL NOT BE ACCEPTED.
23. A COMPLETE SET OF RECORD DRAWINGS SHALL BE KEPT THROUGHOUT THE PROCESS OF CONSTRUCTION AND TURNED OVER TO THE PROPERTY MANAGEMENT AT THE PROJECT CLOSEOUT.
24. ALL ELECTRICAL EQUIPMENT AND OVERCURRENT DEVICES SHALL BE UL LISTED TO SAFELY INTERRUPT THE AVAILABLE FAULT CURRENT. IF A UL SERIES COMBINATION RATING IS USED TO SATISFY THIS REQUIREMENT, THE CONTRACTOR SHALL FURNISH THE ENGINEER WITH DOCUMENTATION INDICATING THE UL AIC RATING VERIFIED BY TEST. ALL APPLICABLE CODE REQUIREMENTS REGARDING SERIES RATED SYSTEMS MUST BE MET INCLUDING THE NECESSARY SIGNAGE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE THE ENGINEER WITH MANUFACTURER AND PART NUMBER FOR ALL EXISTING DEVICES IN A SERIES RATED SYSTEM. THE COST ASSOCIATED WITH REPLACING ANY EXISTING DEVICES IN ORDER TO ACHIEVE A GIVEN UL SERIES COMBINATION RATING SHALL BE INCLUDED IN THE ORIGINAL BID.
25. CONTRACTOR SHALL PROVIDE OUTLET AND JUNCTION BOXES SIZED IN ACCORDANCE WITH THE NEC.
26. OUTLET BOXES SHALL NOT BE INSTALLED BACK-TO-BACK.
27. PRIOR TO SUBMITTING A BID, THE CONTRACTOR SHALL OBTAIN FROM THE BUILDING MANAGEMENT COMPANY A COPY OF THE BUILDING STANDARDS, RULES & REGULATIONS FOR CONSTRUCTION OF TENANT WORK. ALL INFORMATION CONTAINED THEREIN APPLICABLE TO THE CONTRACTOR'S SCOPE OF WORK SHALL BE STRICTLY ADHERED TO AND INCLUDED IN HIS BID.
28. THESE DRAWINGS DO NOT SHOW POINT TO POINT WIRING. UNLESS SPECIFICALLY NOTED OTHERWISE, EC SHALL BE RESPONSIBLE FOR PROVIDING BRANCH CIRCUIT CONDUCTORS THAT WILL LIMIT VOLTAGE DROP COMPLIANT WITH THE NEC.
29. ALL MULTI-WIRE BRANCH CIRCUITS, INCLUDING SYSTEMS FURNITURE, SHALL BE PROVIDED WITH A MEANS THAT WILL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE POINT WHERE THE BRANCH CIRCUIT ORIGINATES. MULTI-WIRE BRANCH CIRCUITS MAY USE EITHER MULTI-POLE CIRCUIT BREAKERS OR MULTIPLE SINGLE-POLE CIRCUIT BREAKERS UTILIZING IDENTIFIED HANDLE TIES.
30. PRIOR TO ON/OFF CONTROL OR DIMMING OF ANY NEW FLUORESCENT LAMPS THAT ARE INSTALLED IN FIXTURES THAT ARE TO BE DIMMED, LAMPS MUST BE SEASONED BY OPERATING CONTINUOUSLY AT FULL INTENSITY FOR A MINIMUM OF 100 HOURS.
31. GFCI PROTECTION MAY NOT BE FULLY IDENTIFIED ON PLANS. IT SHALL BE THE RESPONSIBILITY OF THE EC TO PROVIDE NEC COMPLIANT GFCI PROTECTION WHERE SO REQUIRED. THIS SHALL INCLUDE DRINKING FOUNTAINS, VENDING MACHINES, BATHROOM RECEPTACLES, JANITORS CLOSET RECEPTACLES, ALL EXTERIOR RECEPTACLES AND ANY RECEPTACLE LOCATED WITHIN 6' OF A SINK IN A LUNCHROOM OR KITCHENETTE OR ANY OTHER AREA CONTAINING A SINK. GFCI RECEPTACLES SHALL BE SPECIFICATION GRADE LEVITON OR EQUAL. WHERE CONTRACTOR OPTIONS TO UTILIZE GFCI CIRCUIT BREAKERS IN LIEU OF RECEPTACLES THE BREAKER SHALL MATCH THE MANUFACTURER OF THE PANEL IN WHICH THE BRANCH CIRCUIT ORIGINATES.

SCHEDULE OF DRAWINGS

DRAWING	DESCRIPTION
E0.00	ELECTRICAL LEGEND AND SPECIFICATIONS
E2.01	ELECTRICAL 1ST FLOOR DEMOLITION PLAN
E3.01	ELECTRICAL 1ST FLOOR POWER PLAN
E3.02	ELECTRICAL ROOF PLAN
E7.00	ELECTRICAL ONE LINE DIAGRAM, DETAILS AND SCHEDULES

Commercial Construction Consulting, Inc.
313 Congress Street
Boston, MA 02210
617.330.9080
617.330.9383 fax
info@c3boston.com
Consulting Engineers/Construction Managers

ADDENDUMS

No.	Date	Description	By

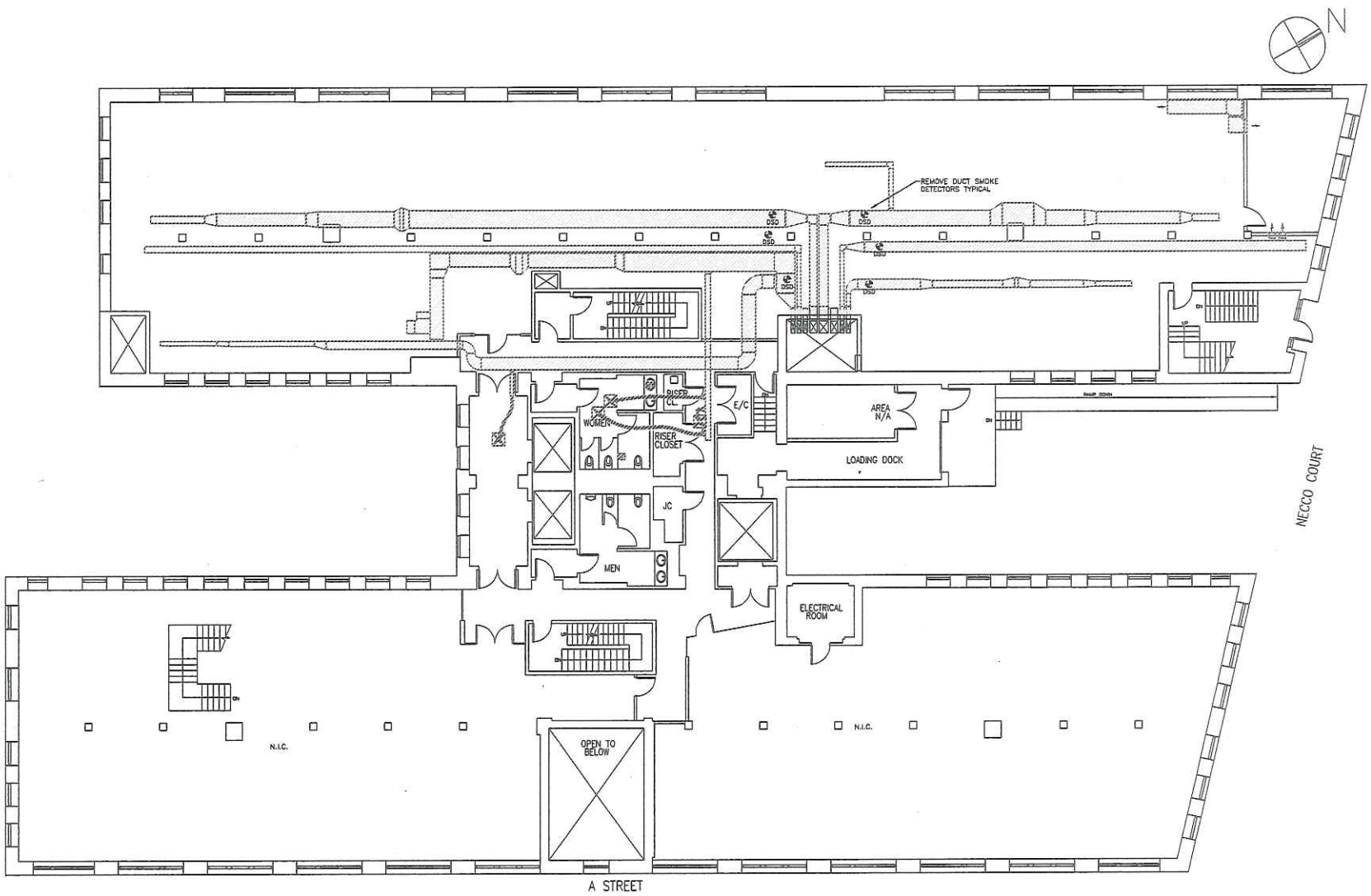
1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

ELECTRICAL LEGEND AND SPECIFICATIONS
Drawing Title

Project No.	Checked	Date
21772	SB	12/6/2019
Drawn: SB	Approved: BW	Scale: NONE

Seal

Drawing No.
E0.00



Commercial Construction Consulting, Inc.
313 Congress Street
Boston, MA 02210
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Consulting Engineers/Construction Managers

ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

ELECTRICAL
1ST FLOOR
DEMOLITION PLAN

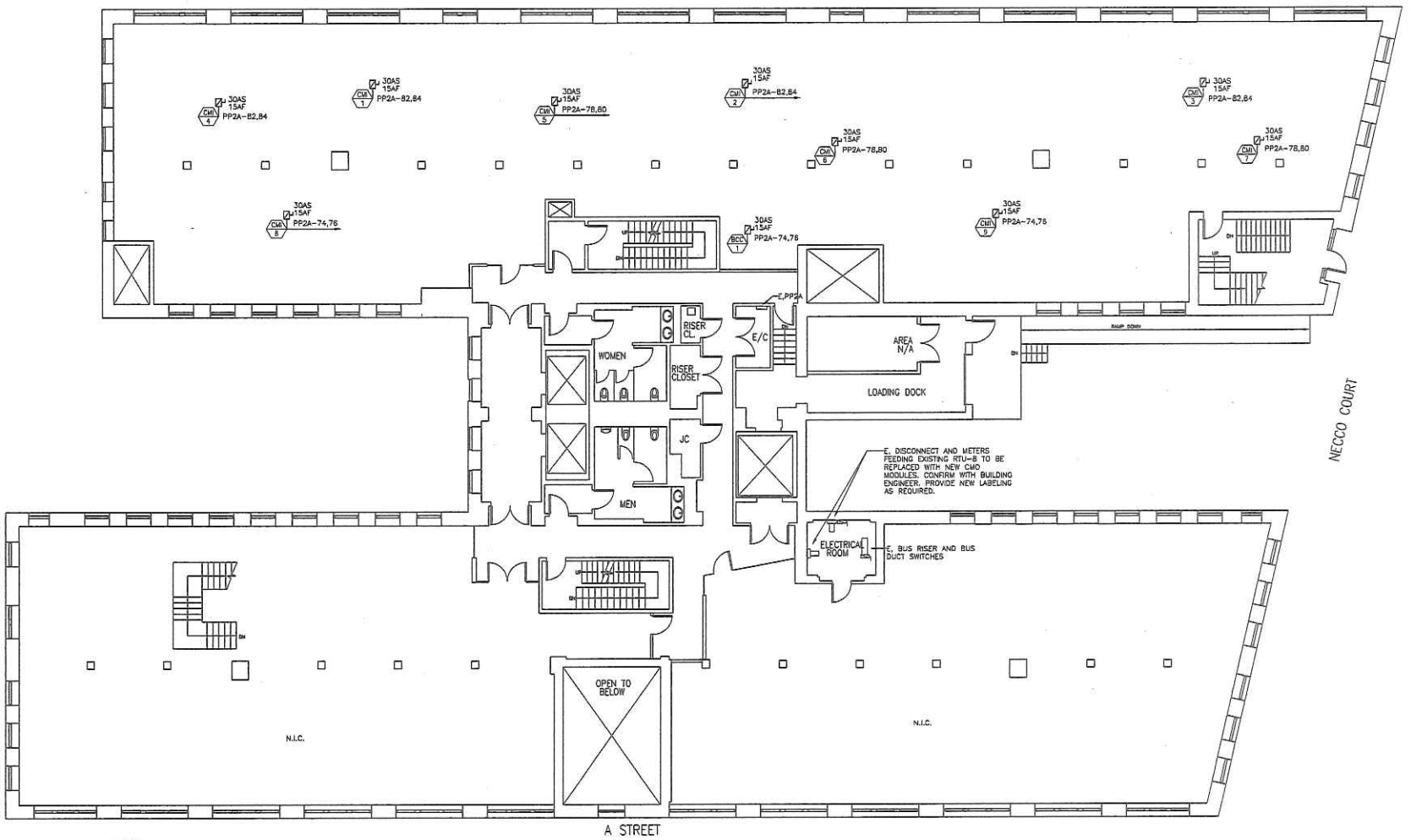
Drawing Title

Project No.	Checked	Date
21772	SB	12/6/2019
Drawn	Approved	Scale
SB	BW	1/8" = 1'-0"

Seal

Drawing No.

E2.01



NOTES:

1. ALL COMPONENTS ARE NEW, UNO.
2. PROVIDE NEW 2P, 20AMP BRANCH CIRCUIT BREAKERS IN PANEL PP2A TO FEED NEW FAN UNITS. CONFIRM AND COORDINATE WITH BUILDING ENGINEER PROVIDE NEW LABELING AND PANEL SCHEDULES AS REQUIRED.

Commercial Construction Consulting, Inc.
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Consulting Engineers/Construction Managers

ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

ELECTRICAL
1ST FLOOR POWER PLAN

Drawing Title

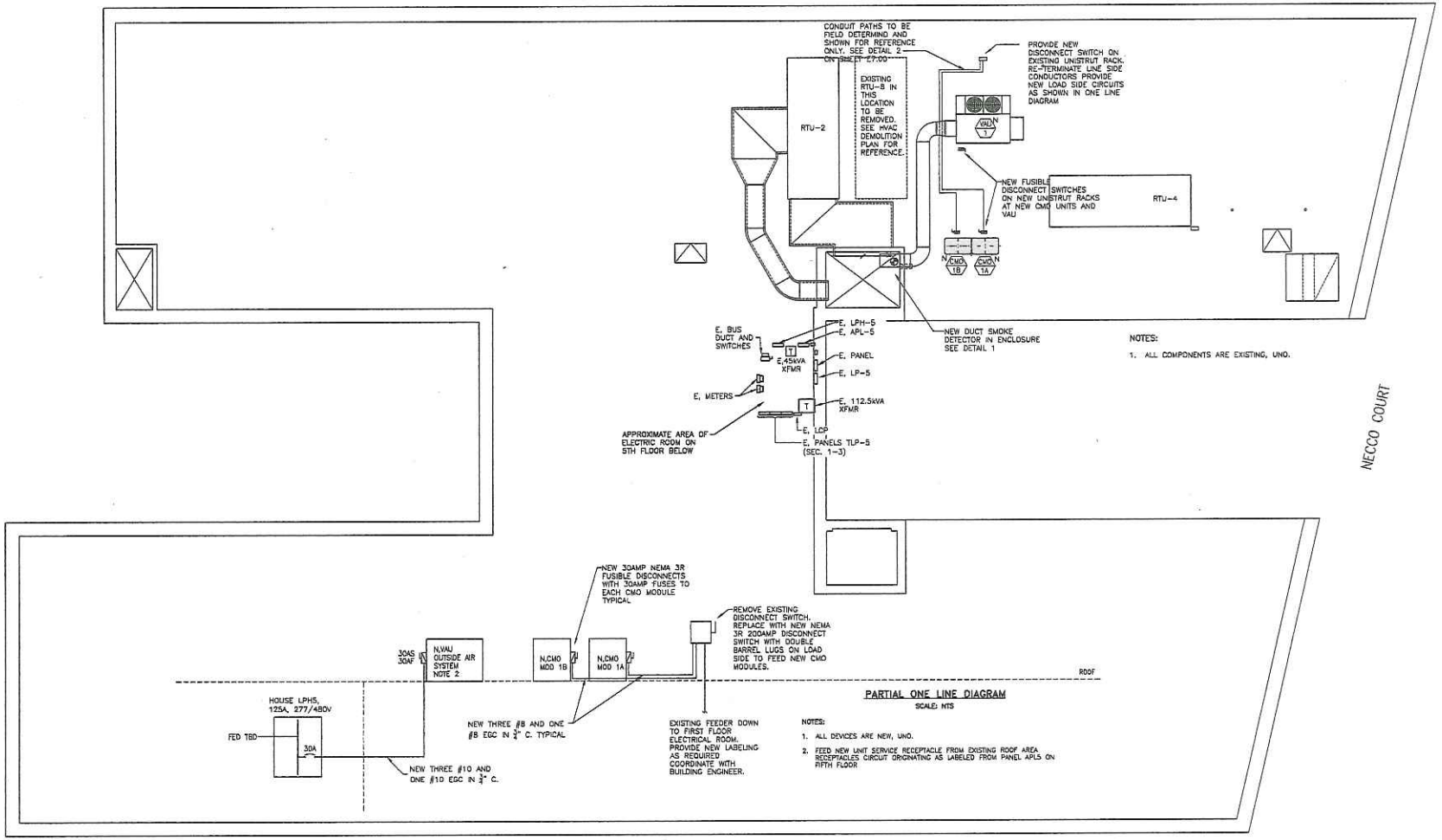
Project No.	Checked	Date
21772	SB	12/6/2019
Drawn	Approved	Scale
SB	BW	1/8" = 1'-0"

Seal

Drawing No.

E3.01

P:\JOBS\300 A Street Boston, MA_Base\Building\1st Floor VRF System\Electrical\E1.01 ELECTRICAL 1ST FLOOR POWER PLAN.dwg



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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

ELECTRICAL ROOF POWER PLAN

Drawing Title

Project No.	Checked	Date
21772	SB	12/6/2019
Drawn: SB	Approved: BW	Scale: 1/8" = 1'0"

Seal

Drawing No.

E3.02

VENTILATION AIR UNIT SCHEDULE

UNIT #	MANUFACTURER	MODEL #	SUPPLY FAN PERFORMANCE DATA					COOLING COIL– REMOTE AIR COOLED DX							HEATING DATA – INDIRECT GAS					ELECTRICAL DATA					CABINET SOUND POWER DATA								
			SUPPLY CFM	O.A. CFM	EXT. S.P.	V/PH/HZ	FAN HP	ROWS	FPI	CAPACITY (MBH) TOTAL	CAPACITY (MBH) SENS.	ENT. DB°	ENT. WB°	LVG DB°	LVG WB°	MODULATING (TURN/DOWN)	TYPE	MBH INPUT	MBH OUTPUT	E.A.T. °F	L.A.T. °F	MCA	FUSE SIZE	FLA	MOP	V/Ø/HZ		62.5	125	250	500	1000	2000	4000	8000
VAU-1	MITSUBISHI PREMISYS	MP-1-3L-120-1M	2400	2400	1.0"	460/3/60	1-1/2	4	12	134.8	89.3	91.0	73.0	57.2	56.5	13:1	NAT.GAS	250	200	0	83.2	23.5	30	16.8	30	460/3/60	DISCHARGE LW (dB)	71	71	81	77	74	71	73	65
																											INLET LW (dB)	–	–	–	–	–	–	–	–

CITY-MULTI SYSTEM UNIT SCHEDULE

INDOOR AIR CONDITIONING UNIT

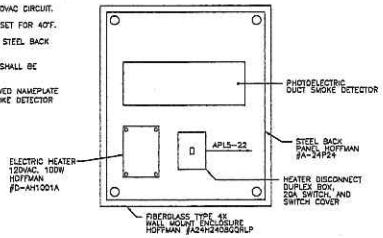
UNIT#	MANUFACTURER	MODEL#	V-PH (60Hz)	NOMINAL TONS	NOMINAL CFM	WATTS	AMPS
CMI-1	MITSUBISHI	PEFY-P48NMAU-E3	208/230-1	4.0	989-1412	340	3.41
CMI-2	MITSUBISHI	PEFY-P48NMAU-E3	208/230-1	4.0	989-1412	340	3.41
CMI-3	MITSUBISHI	PEFY-P48NMAU-E3	208/230-1	4.0	989-1412	340	3.41
CMI-4	MITSUBISHI	PEFY-P24NMAU-E3	208/230-1	2.0	618-883	170	2.73
CMI-5	MITSUBISHI	PEFY-P24NMAU-E3	208/230-1	2.0	618-883	170	2.73
CMI-6	MITSUBISHI	PEFY-P24NMAU-E3	208/230-1	2.0	618-883	170	2.73
CMI-7	MITSUBISHI	PEFY-P24NMAU-E3	208/230-1	2.0	618-883	170	2.73
CMI-8	MITSUBISHI	PEFY-P12NMAU-E3	208/230-1	1.0	265-371	90	1.20
CMI-9	MITSUBISHI	PEFY-P08NMAU-E3	208/230-1	0.75	212-300	60	1.05

AIR COOLED CONDENSING UNIT

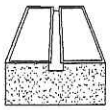
UNIT#	MANUFACTURER	MODEL#	V-PH (60Hz)	NOMINAL TONS	MCA	MFS	NET COOLING MBH	TOTAL HEATING MBH	REMARKS
CMO-1	MITSUBISHI	PURY-EP240YSNU-A	–	20.0	–	–	–	–	
	MITSUBISHI	PURY-EP120YNU-A	460/3	10.0	19	30	120.0	135.0	
	MITSUBISHI	PURY-EP120YNU-A	460/3	10.0	19	30	120.0	135.0	

UNIT#	MODEL#	WATTS	AMPS
BCDU-1	CMB-P1012NU-JA1	255	1.82

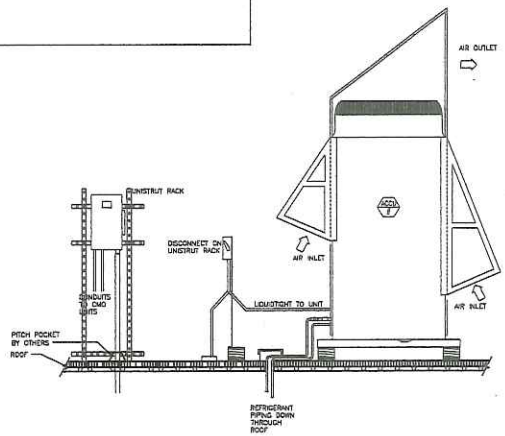
NOTES:
1) HEATER SHALL BE WIRED TO 120VAC CIRCUIT.
2) HEATER THERMOSTAT SHALL BE SET FOR 40°F.
3) HEATER SHALL BE MOUNTED TO STEEL BACK PANEL.
4) ALL ENCLOSURE PENETRATIONS SHALL BE PROPERLY SEALED
5) ENCLOSURE SHALL HAVE ENGRAVED NAMEPLATE MARKED "FIRE ALARM DUCT SMOKE DETECTOR MUA-1 SUPPLY" IN RED



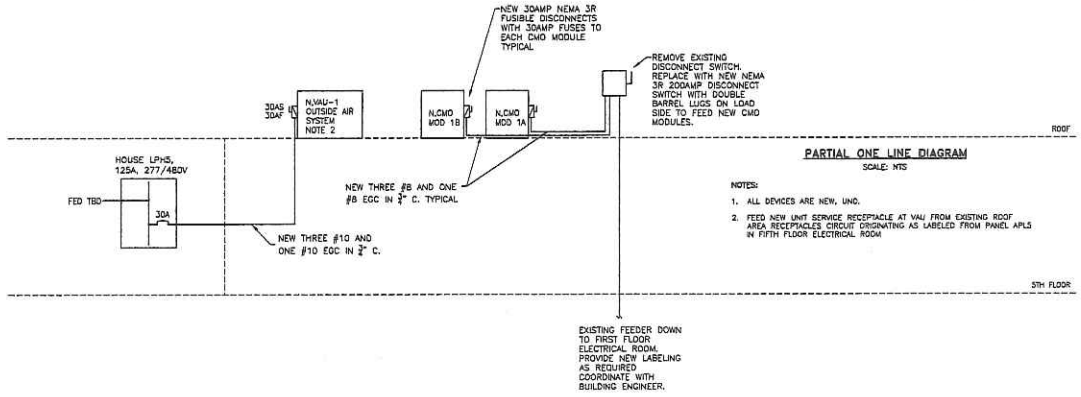
1 **HEATED ENCLOSURE FOR MUA DUCT SMOKE DETECTOR UNIT**
SCALE: NTS



2 **TYPICAL CONDUIT ROOF SUPPORT SLEEPER**
SCALE: NTS



3 **TYPICALROOF MOUNTED UNISTRUT RACK FEEDS TO ROOF UNITS**
SCALE: NTS



PARTIAL ONE LINE DIAGRAM
SCALE: NTS

NOTES:
1. ALL DEVICES ARE NEW, UNO.
2. FEED NEW UNIT SERVICE RECEPTACLE AT VAU FROM EXISTING ROOF AREA RECEPTACLES CIRCUIT ORIGINATING AS LABELED FROM PANEL AP15 IN FIFTH FLOOR ELECTRICAL ROOM

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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

ELECTRICAL ONE LINE DIAGRAM, DETAILS AND SCHEDULES
Drawing Title

Project No. 21772	Checked SB	Date 12/6/2019
Drawn SB	Approved BW	Scale 1/8" = 1'0"

Seal

Drawing No.
E7.00

HVAC ABBREVIATION LIST

A/C	AIR CONDITIONING	KW	KILOWATT
ACT	ACOUSTICAL CEILING TILE	LAT	LEAVING AIR TEMPERATURE
AD	ACCESS DOOR	LBS	POUNDS
AFF	ABOVE FINISHED FLOOR	LBS/HR	POUNDS PER HOUR
AFUE	ANNUAL FUEL UTILIZATION EFF	LF	LINEAR FEET
AMB	AMBIENT	LVG	LEAVING
AP	ACCESS PANEL	LWT	LEAVING WATER TEMPERATURE
AVG	AVERAGE	MAX	MAXIMUM
BFC	BELOW FINISHED CEILING	MBH	THOUSAND BTUs HOUR
BFP	BACKFLOW PREVENTER	MC	MECHANICAL CONTRACTOR
BDD	BACKDRAFT DAMPER	MCA	MINIMUM CIRCUIT AMPACITY
BHP	BRAKE HORSEPOWER	MIN	MINIMUM
BJ	BELOW JOISTS	MOCP	MAX OVERCURRENT PROTECTION
BOP	BOTTOM OF PIPE	NA	NOT APPLICABLE
BOS	BOTTOM OF STEEL	NC	NORMALLY CLOSED
BTU	BRITISH THERMAL UNIT	NIC	NOT IN CONTRACT
CA	COMBUSTION AIR	NO	NORMALLY OPEN
CAP	CAPACITY	NOM	NOMINAL
CAV	CONSTANT AIR VOLUME	NTS	NOT TO SCALE
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
CLG	CEILING	OAL	OUTSIDE AIR LOUVER
CO2	CARBON DIOXIDE	PC	PLUMBING CONTRACTOR
COP	COEFFICIENT OF PERFORMANCE	PD	PRESSURE DROP/DIFFERENCE
CP	CONDENSATE PUMP	PH	PHASE
CRD	CLG RADIATION DAMPER	POC	POINT OF CONNECTION
DB	DRY BULB TEMPERATURE	PPM	PARTS PER MILLION
DDC	DIRECT DIGITAL CONTROLS	PRV	PRESSURE REDUCING VALVE
DN	DOWN	PSI	POUNDS PER SQUARE INCH
DSD	DUCT SMOKE DETECTOR	PSIG	PSI GAUGE
DX	DIRECT EXPANSION	PVC	POLYVINYL CHLORIDE
EA	EXHAUST AIR	RA	RETURN AIR
EAT	ENTERING AIR TEMPERATURE	RE	RELOCATED EXISTING
EC	ELECTRICAL CONTRACTOR		UNIT/DEVICE
ED	EXISTING UNIT/DEVICE TO BE DEMOLISHED	RH	RELATIVE HUMIDITY
		RM	ROOM
EER	ENERGY EFFICIENCY RATING	RPM	REVOLUTIONS PER MINUTE
EFF	EFFICIENCY	SA	SUPPLY AIR
ENT	ENTERING	SEER	SEASONAL ENERGY EFF RATING
ER	EXISTING UNIT/DEVICE TO BE RELOCATED	SENS	SENSIBLE
		SHR	SENSIBLE HEAT RATIO
ESP	EXTERNAL STATIC PRESSURE	SP	STATIC PRESSURE
ETR	EXISTING TO REMAIN	SPEC	SPECIFICATION
EWT	ENTERING WATER TEMPERATURE	SQ FT	SQUARE FEET
EXT	EXTERNAL	SS	STAINLESS STEEL
FC	FLEXIBLE CONNECTION	STD	STANDARD
FLA	FULL LOAD AMPS	SUCT	SUCTION
FPM	FEET PER MINUTE	TSTAT	THERMOSTAT
GA	GAUGE	TEMP	TEMPERATURE
GC	GENERAL CONTRACTOR	TSP	TOTAL STATIC PRESSURE
GPH	GALLONS PER HOUR	TYP	TYPICAL
GPM	GALLONS PER MINUTE	UNO	UNLESS NOTED OTHERWISE
GWB	GYPSUM WALL BOARD	U/C	1" UNDERCUT ON DOOR
HD	HEAD	VAR	VARIABLE
HEPA	HIGH EFF PARTICULATE FILTER	VAV	VARIABLE AIR VOLUME
HP	HORSEPOWER	VD	VOLUME DAMPER
HR	HOUR	VEL	VELOCITY
HTG	HEATING	VFD	VARIABLE FREQUENCY DRIVE
HWR	HOT WATER RETURN	VSC	VARIABLE SPEED CONTROLLER
HWS	HOT WATER SUPPLY	VOL	VOLUME
HZ	HERTZ (FREQUENCY)	W	WATT
IBJ	IN BETWEEN JOISTS	WB	WET BULB TEMPERATURE
IN	INCH	ZN	ZONE
IN WC	INCHES, WATER COLUMN	ΔP	CHANGE IN PRESSURE
IN WC	INCHES, WATER GAUGE	ΔT	CHANGE IN TEMPERATURE
		°F	DEGREES FARHENHEIT

NOTE: SOME OR ALL ABBREVIATIONS MAY NOT BE USED ON THIS PROJECT

GENERAL HVAC TAGS AND SYMBOLS

ACCU #	AIR COOLED CONDENSING UNIT		SECTION DESIGNATION SHEET NUMBER
ACU #	AIR CONDITIONING UNIT		DETAIL DESIGNATION SHEET NUMBER
AHU #	AIR HANDLING UNIT		SUPPLY OR RETURN AIR RISER DESIGNATION
BCC #	BRANCH CIRCUIT CONTROLLER		POINT OF CONNECTION TO EXISTING SYSTEM
CMI #	CITY-MULTI INDOOR UNIT		DEMOLITION OF EXISTING SYSTEM TO POINT INDICATED
CMO #	CITY-MULTI OUTDOOR UNIT	AVS	AIR VOLUME TRAVERSE STATION
CP #	CONDENSATE PUMP	VD	MANUAL VOLUME DAMPER
EAF —	ELECTRONIC AIR FILTER	FD	SELF-CLOSING FIRE DAMPER W/ACCESS DOOR
EBB #	ELECTRIC BASEBOARD	ACD	AUTOMATIC CONTROL DAMPER W/ACCESS DOOR
ERU #	ENERGY RECOVERY VENTILATION	SD	AUTOMATIC SMOKE DAMPER W/ACCESS DOOR
EF #	EXHAUST FAN (GENERAL DUTY)	FSD	COMBINATION FIRE/SMOKE DAMPER W/ACCESS DOOR
FTR #	FINNED TUBE RADIATION	MD	MOTORIZED DAMPER
GEF #	GARAGE EXHAUST FAN	UC 1/2"	UNDERCUT DOOR
HP #	HEAT PUMP UNIT	LVDR L.S SF	LOUVERED DOOR
KEF #	KITCHEN EXHAUST FAN		RETURN OR EXHAUST AIR FLOW
MUA #	MAKE-UP AIR UNIT		SUPPLY AIR FLOW
RTU #	ROOF-TOP UNIT	T	THERMOSTAT
TPD #	THERMALLY POWERED DIFFUSER	S	TEMPERATURE SENSOR
TEF #	TOILET EXHAUST FAN	F	FAN SWITCH
VAU #	VENTILATION AIR UNIT	P	STATIC PRESSURE SENSOR
VAV #	VARIABLE AIR VOLUME TERMINAL	CO	CARBON MONOXIDE SENSOR
		CO2	CARBON DI-OXIDE SENSOR
		DSD	DUCT SMOKE DETECTOR
		#	REVISION REFERENCE

SOME OR ALL TAGS AND/OR SYMBOLS MAY NOT BE USED ON THIS PROJECT

DUCTWORK LEGEND

ROUND SUPPLY DUCT UP		ROUND RETURN OR EXHAUST DUCT UP	
SUPPLY DUCT UP		RETURN/EXHAUST DUCT UP	
ROUND SUPPLY DUCT DOWN		ROUND RETURN OR EXHAUST DUCT DN	
SUPPLY DUCT DOWN		RETURN/EXHAUST DUCT DOWN	
STANDARD RADIUS ELBOW (R = W) SUPPLY/RETURN EXHAUST	R	HORIZONTAL OFFSET SUPPLY/RETURN /EXHAUST	
CEILING DUCT MTD DIFF/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER	VD	TAKE-OFF TO DIFF/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER	VD HARD ELBOW
RISE OR DROP SUPPLY/RETURN/ EXHAUST	RISE/DROP	ACOUSTICALLY LINED DUCT	
90° TAKE-OFF W/BRANCH TAKE-OFF VOLUME DAMPER (VD IN LOW PRESSURE SYSTEMS ONLY)	VD VD	SIDEWALL DUCT MTD REGISTER/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER	
CEILING DUCT MTD DIFF/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER	VD	BULLHEAD CONVERGE RETURN/EXHAUST W/BRANCH TAKE-OFF VOLUME DAMPER	
OPEN END DUCT W/VD & 1/2"x1/2" WMS	VD	FLEXIBLE DUCT	

SCOPE OF WORK

SCOPE OF WORK SHALL INCLUDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TRANSPORTATION, HOISTING AND RIGGING, ETC. TO PERFORM THE WORK AS INDICATED ON THE DRAWINGS AND HEREIN SPECIFIED FOR A COMPLETE AND TOTAL INSTALLATION.

SCOPE OF WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:

1. INSTALLATION OF (1) NEW ROOF-MOUNTED VENTILATION AIR UNIT (VAU-1) AND ASSOCIATED DUCTWORK, DUCT LINING, DUCTWORK ACCESSORIES, GAS PIPING, VALVES AND CONTROLS TO SERVE FIRST FLOOR OFFICE SPACE.
2. INSTALLATION OF MITSUBISHI CITY-MULTI VARIABLE REFRIGERANT FLOW SYSTEMS, WHICH INCLUDES OUTDOOR AS WELL AS INDOOR UNITS, AND ALL ASSOCIATED ACCESSORIES, PIPING, PIPING INSULATION, VALVES AND CONTROLS, AS SHOWN FIRST FLOOR AND ROOF PLANS.
3. DEMOLITION OF THE EXISTING CARRIER MULTI-ZONE ROOFTOP UNIT (RTU-8), AND ALL ITS ASSOCIATED APPURTENANCES AND DUCTWORK, AS SHOWN ON PLANS.
4. INSTALLATION OF MITSUBISHI DIAMOND CONTROLS PACKAGE TO INTEGRATE THE OPERATION OF ALL HVAC RELATED EQUIPMENT. GC/MC SHALL PROVIDE ADD ALTERNATE PRICING FOR TYING THE DIAMOND CONTROL PACKAGE INTO THE BUILDING'S AUTOMATION SYSTEM (BAS).
5. THE DIAMOND CONTROL PACKAGE SHALL SET THE START/STOP AND OCCUPANCY SCHEDULE FOR ALL THE NEW EQUIPMENT SHOWN ON PLANS, IE. VAU-1, CMI'S AND CMO'S.
6. GC/MC SHALL BE RESPONSIBLE FOR SUB-CONTRACTING A STRUCTURAL ENGINEER FOR ANY AND ALL WORK WHERE IT IS REQUIRED.

SCHEDULE OF DRAWINGS

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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

MECHANICAL LEGEND AND SCOPE OF WORK

Drawing Title

Project No. 21772	Checked MNF	Date 12/6/2019	
Drawn BSK	Approved MNF	Scale NONE	

Seal

Drawing No.

M0.00

PART 1 - GENERAL

A. GENERAL CONDITIONS:

1. THE CONTRACTOR SHALL PERFORM THE WORK AND PROVIDE NEW MATERIAL AND EQUIPMENT AS SHOWN ON DRAWINGS AND AS SPECIFIED IN THIS SECTION OF THE SPECIFICATIONS. PROVIDE ALL COMPONENTS AND MATERIALS, WHETHER SPECIFICALLY SHOWN OR NOT, THAT ARE NECESSARY TO MAKE THE SYSTEMS COMPLETE AND FULLY OPERATIONAL AS INTENDED IN THE CONSTRUCTION DOCUMENTS.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL WORK INCLUDED UNDER THIS SECTION UNTIL THE COMPLETION AND FINAL ACCEPTANCE OF THIS PROJECT. PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE FROM ALL CAUSES. ALL MATERIALS AND EQUIPMENT DAMAGED OR STOLEN SHALL BE REPAIRED OR REPLACED WITH EQUAL MATERIAL OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. PROTECT ALL EQUIPMENT, OUTLETS AND OPENINGS, AND ROOF PENETRATIONS. PROTECT WORK AND MATERIALS OF OTHER TRADES FROM DAMAGE THAT MIGHT BE CAUSED BY WORK OR WORKMEN UNDER THIS SECTION. DAMAGED MATERIALS ARE TO BE REMOVED FROM THE SITE; NO SITE STORAGE OF DAMAGED MATERIALS WILL BE ALLOWED. ANY DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT CAUSED BY THIS CONTRACTOR DURING INSTALLATION SHALL BE REPAIRED AND/OR REPLACED AT THIS CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE OWNER.

3. WHERE DRAWINGS OR SPECIFICATIONS DO NOT COINCIDE WITH MANUFACTURERS' RECOMMENDATIONS, ARE UNCLEAR AS TO INTENT AND/OR REQUIRED MATERIAL QUALITY, ADVISE THE DESIGN TEAM (VIA G.C.) IN WRITING BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REWORK NECESSARY TO RESOLVE THESE DISCREPANCIES.

4. THE CONTRACTOR SHALL CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS THAT MAY IMPACT THE WORK OF THIS SECTION BEFORE SUBMITTING BID. NO EXTRA PAYMENT SHALL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY THE SITE CONDITIONS THAT ARE VISIBLE OR EASILY DISCERNED BY THE CONTRACTOR.

5. COORDINATE WITH ALL OTHER TRADES RELATIVE TO LOCATION OF ALL APPARATUS AND EQUIPMENT TO BE INSTALLED AND SELECT LOCATIONS SO AS NOT TO CONFLICT WITH OR HINDER THE PROGRESS OF THE WORK OF OTHER SECTIONS. WORK INSTALLED THAT CREATES INTERFERENCE OR RESTRICTS ACCESS REQUIRED BY CODE OR TO CONDUCT MAINTENANCE AND/OR ADJUSTMENTS SHALL BE MODIFIED AT NO ADDITIONAL COST TO THE OWNER.

6. INCLUDE ALL STRUCTURAL STEEL SUPPORTS, HANGER BRACKETS, ETC., REQUIRED FOR THE WORK IN THIS SECTION. HANGERS SHALL BE STEEL ANGLE IRON, CHANNEL OR STEEL ROD USED WITH APPROVED CLAMPS, INSERTS, ETC. ALL HANGERS SHALL BE GALVANIZED OR PAINTED WITH TWO COATS OF RUST PREVENTING PAINT BEFORE INSTALLATION. SUPPORTS INSTALLED IN EXTERIOR LOCATIONS SHALL BE GALVANIZED STEEL OR STAINLESS STEEL WITH STAINLESS STEEL HARDWARE.

7. IF THE GENERAL CONTRACTOR IS NOT RESPONSIBLE FOR THE CUTTING AND PATCHING REQUIRED IN THIS SECTION THEN THE CONTRACTOR SHALL INCLUDE ALL CORING, CUTTING, PATCHING AND FIREPROOFING NECESSARY FOR THE WORK OF THIS SECTION. STRUCTURAL ELEMENTS SHALL NOT BE CUT. FILL AND PATCH ALL OPENINGS OR HOLES LEFT IN THE EXISTING STRUCTURES BY THE REMOVAL OF EXISTING EQUIPMENT. PATCH, SEAL AND MAKE AIR AND WATER TIGHT ALL EXISTING OPENINGS IN DUCTWORK AND PIPING NOT USED FOR THE NEW WORK. THIS CONTRACTOR SHALL PROVIDE FOR APPROVAL THE SPECIFIC UL LISTED ASSEMBLY BEING USED FOR EACH TYPE OF THROUGH PENETRATION (OR DISTURBANCE OF ANY FIRE OR SMOKE RATED PARTITION/ASSEMBLY) TO THE INSPECTOR HAVING JURISDICTION AND TO THE BUILDING OWNER FOR RECORD.

8. THE CONTRACTOR SHALL PROVIDE, SET-UP AND MAINTAIN THE HOISTING, CRANES, SCAFFOLDS, STAGING AND PLANKING AS REQUIRED FOR THE WORK FOR THIS SECTION.

9. THE CONTRACTOR SHALL COMPLY WITH ALL OF THE SAFETY REQUIREMENTS OF THE OWNER AND OSHA THROUGHOUT THE COURSE OF THE PROJECT.

10. THE CONTRACTOR SHALL PROVIDE A CERTIFICATE OF COMPLETION STATING THAT THE INSTALLATION IS IN COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS AND ALL APPLICABLE CODES. ALL SUBMITTALS, AS-BUILTS, O&M MANUALS, COMPLETED PUNCH LIST ITEMS AND REPORTS ARE TO BE PROVIDED PRIOR TO REQUEST FOR COMPLETION CERTIFICATES. THE CONTRACTOR SHALL VERIFY THAT ALL SYSTEMS AND EQUIPMENT ARE WORKING PER THE CONTRACT DRAWINGS.

11. THE MECHANICAL SUB-CONTRACTOR SHALL RETAIN THE SERVICES OF A QUALIFIED STRUCTURAL ENGINEER TO DESIGN, SPECIFY AND APPROVE ALL SEISMIC SYSTEMS AS REQUIRED WITHIN THE CURRENT EDITION OF THE MASSACHUSETTS STATE BUILDING CODE.

B. CODES:

1. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF ALL APPLICABLE FEDERAL/STATE/LOCAL CODES, ORDINANCES, AND/OR AUTHORITIES HAVING JURISDICTION. PERTINENT CODES FOR COMPLIANCE SHALL INCLUDE, BUT NOT BE LIMITED TO: INTERNATIONAL BUILDING CODE, INTERNATIONAL MECHANICAL CODE, INTERNATIONAL ENERGY CONSERVATION CODE, NATIONAL ELECTRICAL CODE, STATE GAS CODE, SMACNA, NFPA, ANSI/ASHRAE, ASME, UL, NEMA, OSHA, ARCHITECTURAL ACCESS BOARD, ETC.

2. PROJECT DRAWINGS AND SPECIFICATIONS ILLUSTRATE THE SCOPE REQUIRED FOR THIS PROJECT, WHICH MAY EXCEED MINIMUM CODE, LAW AND STANDARDS CRITERIA.

3. ALL REQUIRED PERMITS AND CERTIFICATES OF INSPECTION SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.

4. PERTINENT CERTIFICATES SHALL BE DELIVERED TO THE OWNERS REPRESENTATIVE BEFORE FINAL ACCEPTANCE.

C. INSPECTION OF SITE:

1. PRIOR TO SUBMITTING A BID, THE MECHANICAL CONTRACTOR SHALL OBTAIN ANY BUILDING STANDARDS, RULES AND REGULATIONS FOR CONSTRUCTION OF RELATED WORK FROM THE LANDLORD/PROPERTY MANAGER. ANY INFORMATION CONTAINED THEREIN APPLICABLE TO THE MECHANICAL CONTRACTOR'S SCOPE OF WORK SHALL BE STRICTLY ADHERED TO AND INCLUDED IN THEIR BID.

2. THE CONTRACTOR SHALL VISIT THE PREMISES OF THE PROPOSED WORK AND SHALL CAREFULLY EXAMINE THE EXISTING CONDITIONS AND LIMITATIONS THEREOF. VERIFICATION SHALL BE MADE AS TO THE ACTUAL LOCATIONS WHERE NEW DUCT AND PIPE RUNS WILL TIE INTO EXISTING SYSTEMS AND TO AVOID STRUCTURAL/ARCHITECTURAL MEMBERS. THE DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL DUCTWORK AND EQUIPMENT. THE DRAWINGS INDICATE REQUIRED SIZE AND POINTS OF TERMINATION AND SUGGEST ROUTES OF DUCTS AND PIPES. HOWEVER, IT IS NOT THE INTENTION OF THE DRAWINGS TO SHOW ALL NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL/ARCHITECTURAL CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO INSTALL ALL PROPOSED WORK IN SUCH A MANNER THAT IT WILL CONFORM TO THE STRUCTURE, ARCHITECTURE AND OTHER EXISTING SYSTEMS. AVOID OBSTRUCTION, PRESERVE HEADROOM AND KEEP OPENING AND PASSAGEWAYS CLEAR WITHOUT FURTHER INSTRUCTIONS OR COST.

3. NO EXTRA PAYMENT SHALL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY SITE CONDITIONS THAT ARE VISIBLE OR EASILY DISCERNED BY THE CONTRACTOR.

D. SHOP DRAWINGS AND SAMPLE SUBMITTALS:

1. SUBMIT "SHOP DRAWINGS" AND "SAMPLES" FOR APPROVAL. SHOP DRAWINGS SUBMITTAL SHALL INCLUDE DIMENSIONS, THICKNESS, PROFILES, TYPE OF MATERIAL, METHOD OF FASTENING, RELATION TO ADJACENT WORK AND ALL OTHER NECESSARY DETAILS TO FULLY DESCRIBE THE ITEM SUBMITTED. SHEET METAL SHOP DRAWINGS SHALL BE DRAWN TO 3/8" SCALE. ALL SHOP DRAWINGS AND CUTS WILL BE REVIEWED FOR ALL DESIGN APPEARANCE ONLY. THE CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ERRORS ON THEIR DRAWINGS. IF THE CONTRACTOR PROPOSES TO SUBSTITUTE WORK THEY MUST ADHERE TO THE INTENT THAT MATERIALS TO BE SUBSTITUTED MUST BE OF GREATER QUALITY AND THAT THE ENGINEER APPROVES THE SUBSTITUTIONS. CHANGES IN MECHANICAL EQUIPMENT, DUCTWORK OR ELECTRICAL EQUIPMENT TO SUIT THE SUBSTITUTION SHALL BE MADE WITH NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL SUBMIT THREE (3) COPIES EACH OF SHOP DRAWINGS FOR ALL EQUIPMENT AND MATERIAL INDICATED ON THE DRAWING. SHOP DRAWINGS SHALL BE SUBMITTED WITH COMPLETE BROCHURES GIVING NAMES OF MANUFACTURERS AND CATALOG FIGURE NUMBERS, TRADE NAMES, TECHNICAL DATE, PERFORMANCE DATA, AND REQUESTED INFORMATION OF EACH ITEM TO BE FURNISHED. SUBMITTAL DATA SHALL BE REFERRED TO THE SECTION AND PARAGRAPH NUMBERS OF THE SPECIFICATIONS AND TO FIXTURE AND EQUIPMENT NUMBERS LISTED OR SHOWN ON THE DRAWINGS.

E. SUBMITTALS

1. MANUFACTURERS' NAMES AND MODEL NUMBERS SHOWN ON THE DRAWINGS ARE FOR DESCRIPTIVE PURPOSES AND ARE INTENDED TO SHOW A LEVEL OF PERFORMANCE AS WELL AS QUALITY OF MATERIALS. SUBSTITUTIONS MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

2. THE CONTRACTOR SHALL PROVIDE SUBMITTALS THAT SPECIFY SPECIFIED ITEMS, EQUIPMENT AND THE MANUFACTURERS' PRODUCT DATA. DEVIATIONS TO SPECIFIED ITEMS SHALL BE AT THE SOLE RISK OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR ALL ASSOCIATED CHANGES TO THIS AND OTHER TRADES. REVIEW OF THE SHOP DRAWINGS BY THE ENGINEER SHALL NOT ABSOLVE THE CONTRACTOR FROM MEETING THE FULL DESIGN INTENT OF THE ASSOCIATED SYSTEMS. THE CONTRACTOR SHALL HAVE PREVIOUSLY REVIEWED AND APPROVED THE SUBMITTALS BEFORE SUBMITTING.

3. SHOP DRAWINGS INCLUDE EQUIPMENT SUBMITTALS, FABRICATION AND INSTALLATION DRAWINGS, SETTING DIAGRAMS, SCHEDULES, PATTERNS, TEMPLATES AND SIMILAR DRAWINGS. INCLUDE THE FOLLOWING INFORMATION:

   a. DIMENSIONS.
   b. IDENTIFICATION OF PRODUCTS AND MATERIALS INCLUDED.
   c. COMPLIANCE WITH SPECIFIED STANDARDS AND PERFORMANCE DATA AS INDICATED.
   d. NOTATION OF COORDINATION REQUIREMENTS.
   e. NOTATION OF DIMENSIONS ESTABLISHED BY FIELD MEASUREMENT.

4. DO NOT USE SHOP DRAWINGS WITHOUT AN APPROPRIATE FINAL STAMP INDICATING ACTION TAKEN IN CONNECTION WITH CONSTRUCTION.

5. DO NOT ORDER ANY MATERIALS OR EQUIPMENT PRIOR TO RECEIVING FINAL APPROVED SHOP DRAWINGS.

6. SUBMITTALS THAT SHALL BE FORWARDED TO THE ENGINEER FOR APPROVAL SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING SYSTEMS:

   a. CONTROLS: THERMOSTATS AND SEQUENCE
   b. DUCT: DUCT, FITTINGS, ACCESSORIES, ETC...
   c. PIPING: FITTINGS, INSULATION, ETC...
   d. EQUIPMENT: VAU-1, CMI'S, CMO'S, BCC-1

7. SHOP DRAWINGS:

   a. FURNISH ALL MATERIALS AND EQUIPMENT LISTED UNDER SCOPE OF WORK INCLUDING ELECTRIC AND CONTROL DIAGRAMS.

F. OPERATING INSTRUCTIONS:

1. OPERATING INSTRUCTIONS AND RECOMMENDED MAINTENANCE PROCEDURES FOR THE HVAC SYSTEMS SHALL BE DELIVERED TO THE OWNER BEFORE FINAL COMPLETION OF WORK. AT THE COMPLETION OF THE JOB, THE CONTRACTOR SHALL DELIVER TO THE DESIGNER A COMPLETE SET OF DRAWINGS AS TO EXACT LOCATION AND SIZES OF ALL EQUIPMENT AND DUCTWORK INSTALLED.

G. OPERATING AND MAINTENANCE MANUALS:

1. SUBMIT OPERATING AND MAINTENANCE MANUALS PRIOR TO THE COMPLETION OF THE PROJECT. PROVIDE ON-SITE DEMONSTRATION OF ALL SYSTEMS TO OWNER AFTER SYSTEMS ARE FULLY OPERATIONAL. O&M MANUALS SHALL INCLUDE ALL COMPONENTS AS WELL AS SYSTEM DESCRIPTIONS OF ALL SYSTEMS WITH FLOW DIAGRAMS, WIRING DIAGRAMS, WRITTEN WARRANTEES, RECOMMENDED SPARE PARTS AND ROUTINE MAINTENANCE REQUIREMENTS WITH RECOMMENDED INTERVALS FOR ALL MOVING EQUIPMENT AND CONTROLS.

H. AS-BUILT/RECORD DRAWINGS:

1. THE HVAC CONTRACTOR SHALL PROVIDE AT THEIR COST A SET OF "AS-BUILT" DRAWINGS. ALL CHANGES/MODIFICATIONS SHALL BE CORRECTED AND CLEARLY DRAWN (ELECTRONICALLY) ON THE "AS-BUILT DRAWINGS". IF NO CHANGES WERE MADE IN THE INSTALLATION, THE DRAWINGS SHALL BE STAMPED "AS BUILT DRAWINGS", WITH THE DATE AND THE CONTRACTOR'S SIGNATURE. TWO PRINTS AND PDF's ON CD (OR ELECTRONICALLY) SHALL BE DELIVERED TO THE OWNER.

I. CLEANING:

1. UPON COMPLETION OF WORK AND PERIODICALLY DURING CONSTRUCTION, THE CONTRACTOR SHALL REMOVE ALL RUBBISH AND EXCESS MATERIAL ACCUMULATED AS A RESULT OF HIS OPERATION; ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE THOROUGHLY CLEAN OF DUST AND DEBRIS BEFORE FINAL ACCEPTANCE BY THE OWNER.

J. ACCESS:

1. LEAVE WORK READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. PROVIDE ACCESS DOORS IN DUCTWORK, CEILINGS, SOFFIT OR WALL AS REQUIRED.

K. CUTTING AND PATCHING:

1. ALL CUTTING THROUGH THE WALLS REQUIRED FOR, OR IN CONNECTION WITH THE HVAC SYSTEMS SHALL BE BY THIS CONTRACTOR. PATCHING SHALL BE BY THE GENERAL CONTRACTOR.

L. SUPERVISION:

1. MAINTAIN A FIELD REPRESENTATIVE, ON THE PREMISES AT ALL TIMES DURING THE COURSE OF THE CONSTRUCTION WORK.

M. VIBRATION CONTROL:

1. FREEDOM FROM VIBRATION AND NOISE IS ESSENTIAL. TAKE PARTICULAR CARE IN INSTALLING VIBRATION ISOLATION MOUNTS AND HANGERS IN ACCORDANCE WITH VIBRATION MANUFACTURERS REQUIREMENTS SO THAT VIBRATION FROM OPERATING EQUIPMENT IS NOT TRANSMITTED TO THE STRUCTURE OR OTHER WORK. REFER TO VIBRATION ISOLATION SECTION BELOW FOR FURTHER DETAIL.

N. SMOKE DETECTORS:

1. PROVIDE SMOKE DETECTOR ON THE SUPPLY SIDE OF VAU-1. DUCT SMOKE DETECTORS SHALL COMPLY WITH UL 268A. UPON ACTIVATION, SMOKE DETECTOR(S) SHALL SHUT DOWN ASSOCIATED FAN(S). ALL FIRE ALARM WIRING AND PROGRAMMING OF SMOKE DETECTORS SHALL BE BY FIRE ALARM INSTALLER.

O. SEISMIC RESTRAINTS:

1. ALL EQUIPMENT, DUCTWORK AND PIPING SHALL BE INSTALLED AND CERTIFIED TO REMAIN IN PLACE WHEN SUBJECT TO A GRAVITATIONAL ACCELERATION OF 0.5 INCHES. ALL WORK SHALL BE PREPARED AND APPROVED BY A REGISTERED STRUCTURAL ENGINEER TO COMPLY WITH THE 9TH EDITION OF THE MASSACHUSETTS STATE BUILDING CODE. APPLICABLE SYSTEMS TO INCLUDE BUT NOT LIMITED TO:

   a. ALL DUCTWORK WITH A CROSS SECTIONAL AREA OF SIX (6) SQUARE FEET OR GREATER.
   b. ALL ROOF MOUNTED EQUIPMENT.
   c. ALL PIPING 2-1/2 INCHES AND LARGER.
   d. ALL PIPING 1-1/4 INCHES AND LARGER WITHIN A BOILER ROOM.
   e. ALL GAS PIPING 1 INCH AND LARGER.

• GUARANTEES/WARRANTY:

1. ALL WORK DONE AND EQUIPMENT FURNISHED UNDER THE HVAC CONTRACT SHALL BE GUARANTEED FREE FROM MECHANICAL OR ELECTRICAL DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE OF THE WORK. THE GUARANTEE SHALL BE IN WRITING.

PART 2 - PRODUCTS

A. GENERAL

1. COOLING COILS SHALL BE FURNISHED WITH SECONDARY EMERGENCY CONDENSATE DRAIN PAN. THIS SECONDARY DRAIN PAN SHALL BE EQUIPPED WITH LEAK DETECTOR SAFETY SWITCH TO LOCK OUT THE COMPRESSOR(S) OPERATION UPON DETECTION OF CLOGGED DRAIN LINES. IN LIEU OF SECONDARY DRAIN PANS, GC/MC SHALL INSTALL A WATER-LEVEL MONITORING DEVICE INSIDE THE PRIMARY DRAIN PAN. THIS DEVICE SHALL SHUT OFF THE EQUIPMENT SERVED IN THE EVENT THAT THE PRIMARY DRAIN BECOMES RESTRICTED. DEVICES INSTALLED IN THE DRAIN LINE SHALL NOT BE PERMITTED.

2. MC SHALL BE RESPONSIBLE FOR PREPARATION, START-UP, AND PROPER OPERATION OF ALL HVAC EQUIPMENT. THIS INCLUDES ALL NEW AND EXISTING EQUIPMENT WITHIN SCOPE OF WORK.

B. DUCTWORK

1. ALL HEATING, VENTILATION, AND AIR CONDITIONING DUCTWORK, FITTINGS, HANGERS, SUPPORTS, FLEXIBLE CONNECTIONS, EQUIPMENT SUSPENSION, ETC... SHALL BE FURNISHED AND INSTALLED PER THE LATEST EDITIONS OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE" AND SMACNA "SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS".

2. PRESSURE CLASS FOR ALL OUTSIDE AIR, EXHAUST AIR AND SUPPLY AIR DUCTWORK UPSTREAM OF THE AIR TERMINALS SHALL BE 3" W.G..

3. ALL NEW DUCTWORK AND/OR SUPPLY AIR PLENUM SYSTEMS SHALL BE LEAK TESTED IN ACCORDANCE WITH SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL. THE LEAKAGE CLASSIFICATION SHALL BE A MAXIMUM OF 4.0, REGARDLESS OF SYSTEM OPERATING PRESSURE.

4. DUCTWORK ASSOCIATED WITH VENTILATION AIR, SHALL BE INTERNALLY LINED, AND HAVE A MINIMUM R-VALUE OF 6.

5. ALL DUCT, ACCESSORIES, FITTINGS, AND FASTENERS SHALL BE GALVANIZED STEEL. EXPOSED ROUND DUCTWORK SHALL BE SPIRAL SEAMED GALVANIZED STEEL DUCT. GAUGES, THICKNESS, BRACING, REQUIREMENTS, ETC., OF DUCTWORK SHALL BE IN ACCORDANCE WITH THE LATEST SMACNA HVAC DUCT CONSTRUCTION STANDARD LISTED IN ITEM #1.

6. ALL BRANCH TAKEOFFS FROM MAIN LOW PRESSURE SUPPLY DUCTS SHALL BE VIA A 45° SHOE OR BELLMOUTH TYPE FITTING, AND SHALL BE PROVIDED WITH A VOLUME DAMPER.

7. DUCT DIMENSIONS INDICATED ON HVAC PLANS ARE CLEAR INSIDE DIMENSIONS, AND MUST BE INCREASED FOR DUCT LINING WHERE APPLICABLE.

9. DUCTWORK EXPOSED TO OUTDOOR AMBIENT TEMPERATURES

   a. SUPPLY/RETURN AIR DUCTWORK
   a.1. EXTERIOR DUCTWORK FROM AQC OR APPROVED EQUAL IS TO BE A DOUBLE LAYERED DUCT SYSTEM USING THE PAL PHENOLIC DUCT PANELS PRE-FABRICATED AND ASSEMBLED INTO INTER-LOCKING SECTIONS, OTHERWISE KNOWN AS Q DUCT SUPPLIED BY AQC INDUSTRIES. THE Q DUCT SHALL HAVE A MINIMUM INSTALLED R-VALUE OF 12.0.
   a.2. PANELS USED IN THE FABRICATION OF THE Q DUCT DUCTWORK SYSTEM SHALL BE PAL PHENOLIC DUCT RIGID PHENOLIC INSULATION PANELS WITH A THERMAL CONDUCTIVITY OF 0.1977 BTU-IN/HRXFT^2 °F AND A MINIMUM COMPRESSIVE STRENGTH OF 29 PSI, AS MANUFACTURED BY PAL INTERNATIONAL.

11. PROVIDE DYNAMIC FIRE DAMPERS THROUGHOUT AIR SYSTEMS FOR ALL DUCTS PENETRATING FIRE RATED WALLS AND AS REQUIRED BY APPLICABLE CODES, STANDARDS, AND AUTHORITIES. PROVIDE ACCESS DOOR FOR EACH FIRE DAMPER OF SUFFICIENT SIZE TO REPAIR INTERNAL LINK. FIRE DAMPERS SHALL BE AS MANUFACTURED BY GREENHECK, BUCKLEY OR RUSKIN. DAMPER BLADES SHALL BE OUT OF AIR STREAM.

12. PROVIDE A FLEXIBLE COLLAR CONNECTION AT THE INLET AND OUTLET CONNECTION OF EACH AIR HANDLING UNIT CONNECTED TO DUCTWORK.

C. DUCTWORK INSULATION & LINER

1. CONCEALED OR PLENUM INSTALLED DUCTWORK

   a. ALL SUPPLY AND RETURN AIR DUCTS AND PLENUMS SHALL BE INSULATED WITH A MINIMUM OF R-6 (FT^2-°F-HR/BTU) INSULATION. THIS CAN BE A COMBINATION OF EXTERNAL AND INTERNAL INSULATION TO MEET THIS REQUIRED VALUE.

   a.1. EXTERNAL DUCT INSULATION SHALL BE CERTAIN-TEED, KNAUF, OWENS CORNING OR EQUAL. ALL NEW SUPPLY AND VENTILATION AIR DUCTWORK AND PLENUMS SHALL BE INSULATED WITH FIBROUS GLASS AND FOIL-KRAFT FLAME RESISTANT VAPOR BARRIER (FSK) COVER.

   a.2. INTERNAL DUCT INSULATION SHALL BE EQUAL TO MODEL "LINACOUSTIC RC" AS MANUFACTURED BY JOHNS MANVILLE. THE THICKNESS OF THE INSULATION SHALL NOT REDUCE THE SIZE OF THE DUCT AS INDICATED ON PLANS.

2. EXPOSED DUCTWORK WITHIN CONDITIONED SPACES

   a. ALL SUPPLY DUCTS INSTALLED WITHIN CONDITIONED SPACES SHALL BE INTERNALLY LINED WITH 1" THICK ACOUSTICAL INSULATION EQUAL TO MODEL "LINACOUSTIC RC" AS MANUFACTURED BY JOHNS MANVILLE. THE THICKNESS OF THE INSULATION SHALL NOT REDUCE THE SIZE OF THE DUCT AS INDICATED ON PLANS. ALL EXPOSED DUCTWORK SHALL BE PAINTED. COLOR AS INDICATED PER ARCHITECT.

D. HVAC PIPING SYSTEMS

3. ALL PIPING AND INSTALLATIONS SHALL CONFORM TO THE APPLICABLE STANDARDS INDICATED IN THE TABLE BELOW:

MATERIAL	STANDARD
ABS PLASTIC	ASTME D1527; ASTM F2806
BRASS PIPE	ASTM B43
BRASS TUBING	ASTM B135
COPPER OR COPPER ALLOY PIPE	ASTM B42; ASTM B302
COPPER/COPPER ALLOY TUBING (TYPE K, L, M)	ASTM B75; ASTM B88; ASTM B251
CVPVC PLASTIC PIPE	ASTM D2846; ASTM F441; ASTM F442
PEX-AL-PEX PRESSURE PIPE	ASTM F11281
PEX TUBING	ASTM F876; ASTM F877
DUCTILE IRON PIPE	AWWA C151/A21.51; AWWA C115/A21.15
LEAD PIPE	FS WW-P-325B
PB PLASTIC PIPE	ASTM D3309
PE-AL-PE PRESSURE PIPE	ASTM F1282
PVC PLASTIC PIPE	ASTM D1785; ASTM D2241
PE-RT	ASTM F2633
STEEL PIPE	ASTM B53; ASTM A106
STEEL TUBING	ASTM BA254

4. ALL PIPE FITTINGS AND INSTALLATIONS SHALL BE APPROVED FOR INSTALLATION WITH THE PIPING MATERIALS TO BE INSTALLED AND SHALL CONFORM TO THE APPLICABLE STANDARDS INDICATED IN THE TABLE BELOW:

MATERIAL	STANDARD
BRASS	ASTM F1974
BRONZE	ASTM B16.24
COPPER & COPPER ALLOYS	ASTM B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B1.29
DUCTILE AND GRAY IRON	ANSI/AWWA C110/A21.10
DUCTILE IRON	ANSI C153/A21.53
GRAY IRON	ASTM A126
MALLEABLE IRON	ASTM B16.3
PLASTIC	ASTM D2466; ASME D2467; ASME D2468; ASME D438; ASME F439; ASME F877; ASTM F2389
STEEL	ASTM B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASME A420; ASME B1.29

5. PIPE MATERIAL

   a. REFRIGERANT PIPING SHALL BE TYPE ACR DRAWN COPPER TUBING WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS. INSTALL REFRIGERANT PIPING IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS AND ASHRAE STANDARD 15.

   b. CONDENSATE DRAIN, AND COOLING TOWER DRAIN/OVERFLOW PIPING SHALL BE TYPE L COPPER TUBING WITH 95-5 TIN-ANTIMONY SOLDER JOINTS, PITCHED AT 1/4" PER FOOT.

4. PIPING VALVES

A. ALL ISOLATION AND CONTROL VALVES (BOTH MANUAL AND AUTOMATIC) WITHIN COPPER PIPING SYSTEMS 2-1/2" AND LESS SHALL BE TWO-PIECE, FULL PORT, BRONZE BALL VALVES WITH STAINLESS TRIM AS FOLLOWS:

- CWP RATING:	150 PSIG
- BODY DESIGN:	TWO-PIECE
- BODY MATERIAL:	BRONZE
- ENDS:	THREADED, GROUVED OR SWEAT
- SEATS:	PTFE OR TFE
- STEM:	STAINLESS STEEL
- BALL:	STAINLESS STEEL, VENTED
- PORT:	FULL

B. ALL ISOLATION AND CONTROL VALVES (BOTH MANUAL AND AUTOMATIC) WITHIN STEEL PIPING SYSTEMS 3" AND LARGER SHALL BE GROOVED END OR WELDED BUTTERFLY VALVES AS FOLLOWS:

- CWP RATING:	150 PSIG
- BODY MATERIAL:	ASTM A 536 COATED DUCTILE IRON
- ENDS:	GROOVED OR WELDED
- STEM:	TWO-PIECE STAINLESS STEEL
- DISC:	COATED, DUCTILE IRON, OFFSET
- SEAL:	EPDM
- SEATS:	EPDM OR PPS COATED SURFACE

NOTE: BODY DESIGN SHALL BE LUG TYPE, SUITABLE FOR BI-DIRECTIONAL DEAD-END SERVICE AT RATED PRESSURE WITHOUT USE OF DOWNSTREAM FLANGE.

C. ACTUATORS FOR AUTOMATIC CONTROL VALVES SHALL BE PROVIDED BY THE ATC CONTRACTOR AND SHALL BE COMPATIBLE AND INTEGRATED WITH THE EXISTING BUILDING CONTROL SYSTEM.

5. PIPING INSTALLATIONS

   a. INSTALL UNIONS OR FLANGES IN PIPES ADJACENT TO EACH VALVE, CONTROL DEVICE AND AT FINAL CONNECTIONS TO EACH PIECE OF EQUIPMENT.

   b. PROVIDE PIPE STANDS, SUPPORTS, HANGERS, AND OTHER SUPPORTING APPLIANCES AS NECESSARY TO SUPPORT WORK REQUIRED BY CONTRACT DOCUMENTS. SPACING OF HANGERS SHALL BE INSTRUCTED IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES. SIZE OF HANGERS SHALL INCLUDE THE PIPE INSULATION WITH SHIELD. WHERE HANGERS ARE USED OUTDOORS, THEY SHALL BE STAINLESS STEEL OR PVC COATED GALVANIZED STEEL.

   c. INSTALL DIELECTRIC UNIONS TO JOIN DISSIMILAR METALS.

   d. THE EXPANSION OF SUPPLY AND RETURN PIPES SHALL BE PROVIDED FOR BY CHANGES IN THE DIRECTION OF THE RUN OF PIPE, BY EXPANSION LOOPS, OR BY EXPANSION JOINTS AS REQUIRED.

   e. INSTALL AND ANCHOR PIPING TO ENSURE PROPER EXPANSION AND CONTRACTION.

   f. PIPE HANGERS AND SUPPORTS SHALL MEET THE REQUIREMENTS OF MSS SP-69 AND SP-89 DEVELOPED BY THE MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVES AND FITTINGS INDUSTRY INC.

   g. PROVIDE AUTOMATIC AIR VENTS AT ALL HIGH POINTS AND DRAIN VALVES AT ALL LOW POINTS. ALL PIPING SHALL BE PITCHED TO ALLOW THE SYSTEM TO BE COMPLETELY DRAINED.

   h. CONTACT THE LOCAL UTILITY COMPANIES FOR NECESSARY COORDINATION OF SERVICE REQUIREMENTS AND PAY FOR ALL RELATED CHARGES FOR ALL SERVICE INSTALLATIONS.

6. PRESSURE TESTING

   a. ALL PIPING SYSTEMS INSTALLED UNDER THIS CONTRACT SHALL BE PRESSURE TESTED WITH CLEAN WATER TO INSURE TIGHTNESS. DURATION OF HYDROSTATIC TESTING SHALL BE NOT LESS THAN SIX HOURS AND PRESSURE MUST BE MAINTAINED FOR THE DURATION OF THE TEST. CARE MUST BE TAKEN TO EXPEL ALL ENTRAPPED AIR AND HAVE THE PIPING COMPLETELY FULL OF WATER. PRESSURE TESTING SHALL BE PERFORMED AS FOLLOWS:

   a.1. HVAC HYDRONIC PIPING SHALL BE TESTED TO 1½ TIMES THE SYSTEM'S WORKING PRESSURE. TEST PRESSURE SHALL NOT EXCEED MAXIMUM PRESSURE FOR ANY VESSEL, PUMP, VALVE, ETC... UNDER TEST.

   a.2. REFRIGERANT PIPING, HIGHSIDE AND LOWSIDE, SHALL BE TESTED TO 200 PSIG OR THE SETTING OF THE PRESSURE RELIEF DEVICE PROTECTING EITHER HIGHSIDE OR LOWSIDE. TESTING SHALL BE DONE WITH DRY NITROGEN.

7. PIPING INSULATION

   a. INSULATION SHALL BE APPLIED ON CLEAN, DRY SURFACES, AFTER INSPECTION AND RELEASE FOR INSULATION APPLICATION.

   b. INSULATION OF COLD SURFACES WHERE VAPOR BARRIER JACKETS ARE USED SHALL BE APPLIED WITH A CONTINUOUS UNBROKEN VAPOR SEAL. HANGERS SUPPORTS, ANCHORS, ETC. THAT ARE SECURED DIRECTLY TO COLD SURFACES SHALL BE ADEQUATELY INSULATED AND VAPOR SEALED TO PREVENT CONDENSATION.

   c. ALL EXTERIOR PIPING SHALL BE INSULATED WITH FIBERGLASS AND PVC COVER WITH CHEMICALLY WELDED SEAMS.

   d. ALL INTERIOR PIPING SHALL BE INSULATED WITH FIBERGLASS WITH ASJ COVERING. ALL SEAMS SHALL BE TAPED. STAPLES WILL NOT BE ACCEPTED. PVC COVERING SHALL BE USED IN ALL EXPOSED AREAS INCLUDING MECHANICAL ROOMS, STORAGE ROOMS, ETC.

   e. CONDENSATE DRAIN PIPING:

   e.1. CONDENSATE DRAIN PIPING SHALL HAVE A MINIMUM PIPE INSULATION THICKNESS OF 1.0 INCH AND CONDUCTIVITY (K) RANGE BETWEEN 0.21 - 0.27 BTU/IN/H-SF-°F.

   f. REFRIGERANT PIPING:

   f.1. ALL REFRIGERANT PIPING TO BE INSULATED WITH FLEXIBLE ELASTOMERIC TYPE INSULATION ASTM C 534, TYPE I. COAT WITH WATER BASED LATEX ENAMEL COATING RECOMMENDED BY MANUFACTURER. PIPING SHALL HAVE A MINIMUM PIPE INSULATION THICKNESS OF 1.0 INCH AND CONDUCTIVITY (K) RANGE BETWEEN 0.21 - 0.27 BTU/IN/H-SF-°F.

8. SYSTEM IDENTIFICATION

   a. GENERAL

   a.1. ALL EQUIPMENT AND PIPING SHALL BE MARKED FOR IDENTIFICATION AND DIRECTION OF FLOW.

   a.2. MARKING SHALL BE DONE USING PAINTED STENCILING APPLIED TO CLEAN SMOOTH

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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON
MA

Project

MECHANICAL
GENERAL NOTES 1

Drawing Title

Project No. 21772	Checked BSK	Date 12/6/2019
Drawn ZDA	Approved MNF	Scale NONE

Drawing No.

M0.01

Seal

F:\JOBS\300 A Street Boston, MA_BaseBuilding\1st Floor VRF System\Mechanical\M0.01 MECHANICAL GENERAL NOTES 1.dwg

SURFACES OR SETON MARKERS (SETMARK).

a.3. LETTERING SHALL NOT BE LESS THAN 3" IN HEIGHT, WITH SHARPLY CONTRASTED BACKGROUND FOR EASE OF IDENTIFICATION. COLOR SHALL BE IN ACCORDANCE WITH ANSI STANDARD

b. EQUIPMENT

b.1. MARKINGS SHALL BE PROMINENTLY PAINTED ON EACH NORMALLY VISIBLE SIDE OF EQUIPMENT. EQUIPMENT INTENDED FOR INSTALLATION IN FINISHED AREAS SHALL HAVE MARKINGS LOCATED BEHIND NORMALLY USED ACCESS PANELS MOUNTED SO AS TO BE READILY FOUND.

b.2. EQUIPMENT IDENTIFICATION DESIGNATIONS SHALL BE TAKEN FROM EQUIPMENT SCHEDULE.

c. PIPING

c.1. MARKINGS SHALL BE PROMINENTLY PAINTED ON ALL PIPING EXPOSED TO VIEW (INCLUDING ABOVE CEILINGS, IN MECHANICAL SHAFTS, AT ENTRIES TO SHAFTS AND AT ALL VALVING). MARKING SPACING SHALL BE EVERY 20' AND AT ALL CHANGES IN DIRECTION.

c.2. PIPING MARKINGS SHALL INDICATE DIRECTION OF FLOW WITH PIPING DESIGNATION TAKEN FROM ENGINEER'S PIPING LEGEND.

c.3. BEFORE APPLYING IDENTIFICATION, COMPLETE TESTING, INSULATION AND FINISH PAINTING.

E. MOTORS AND STARTERS:

1. PROVIDE PREMIUM EFFICIENCY MOTORS. STARTERS AND/OR VFD'S SHALL BE PROVIDED BY DIVISION 16 UNLESS PART OF PACKAGED EQUIPMENT. PROVIDE CONTROL AND OTHER RELATED WIRING INCLUDING INTERLOCKS.

F. VIBRATION ISOLATION:

1. PROVIDE VIBRATION ISOLATION FOR EACH PIECE OF ROTATING OR PISTON DRIVEN HVAC EQUIPMENT SHOWN ON THE DRAWINGS. ISOLATION MAY BE INTERNAL OR EXTERNAL TO THE EQUIPMENT AND SHALL PROVIDE AT LEAST 90% ISOLATION EFFICIENCY. INSTALLATION PRACTICES SHALL BE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE VIBRATION ISOLATION MANUFACTURER.

2. EQUIPMENT

a. OUTDOOR, ROOF LOCATED EQUIPMENT SHALL BE MOUNTED ON FLASHABLE, ISOLATED UNIT SUPPORT RAILS. SPRING ISOLATORS SHALL BE SELECTED TO ACHIEVE AT MINIMUM OF 1.5" OF STATIC DEFLECTION UNDER LOAD. PROVIDE CALCULATIONS FOR WIND LOAD AND SEISMIC RESTRAINTS FOR METHOD OF SECURING UNITS TO RAILS AND RAILS TO STRUCTURE.

b. DUCT WORK SHALL BE ISOLATED FROM ALL FAN ASSISTED HVAC EQUIPMENT BY MEANS OF FLEXIBLE CONNECTION.

c. CEILING MOUNTED HVAC EQUIPMENT SHALL BE HUNG FROM SPRING ISOLATORS SELECTED TO ACHIEVE AT LEAST A 1.5" STATIC DEFLECTION UNDER LOAD.

3. PIPING:

a. THE FIRST (3) SUPPORT HANGERS UPSTREAM OF EQUIPMENT AND/OR DOWNSTREAM FROM PIPE RISERS SHALL BE PROVIDED WITH SPRING ISOLATORS. ISOLATORS SHALL BE SELECTED TO ACHIEVE A 0.75" STATIC DEFLECTION UNDER LOAD.

b. ALL PIPING 4" IN DIAMETER AND LARGER SHALL BE ISOLATED FROM THE BUILDING STRUCTURE BY MEANS OF VIBRATION ISOLATORS, RESILIENT LATERAL SUPPORTS, AND RESILIENT PENETRATION SLEEVES/SEALS.

c. ALL PIPING LOCATED IN MECHANICAL ROOMS OR WITHIN THE FIRST 50 FEET OF TOTAL PIPE LENGTH, WHICHEVER IS GREATER) CONNECTED TO VIBRATION ISOLATED EQUIPMENT SHALL BE ISOLATED FROM THE BUILDING STRUCTURE BY MEANS OF VIBRATION ISOLATORS, RESILIENT LATERAL SUPPORTS, AND RESILIENT PENETRATION SLEEVES/SEALS

H. CONDENSATE DRAIN PUMPS:

1. PROVIDE, WHERE INDICATED ON DRAWINGS, CONDENSATE PUMPS WITH TANK AND LEVEL CONTROL BY LITTLE GIANT, ZOELLER, OR B&G. PROVIDE EACH PUMP WITH A CHECK VALVE. WHERE LOCATED WITHIN A PLENUM, PUMP SHALL UL LISTING FOR PLENUM USE (PLENUM RATED).

I. HYDRONIC SPECIALTIES:

1. PROVIDE 125 PSI RATED (ASME) AIR SEPARATORS AND DIAPHRAGM EXPANSION TANKS AS SHOWN ON DRAWINGS. PROVIDE WITH AUTOMATIC AIR VENT AND DRAIN VALVES. SPECIALTIES SHALL BE AS MANUFACTURED BY SPRIOVENT, AMTROL OR BELL AND GOSSETT.

PART 3 - EXECUTION

J. DEMOLITION:

1. THE EXISTING FACILITY WILL CONTINUE TO OPERATE DURING ALL PHASES OF THE DEMOLITION WORK AND SUBSEQUENT CONSTRUCTION. NO INTERRUPTION OF THE SYSTEMS WILL BE PERMITTED WITHOUT PRIOR APPROVAL OF THE OWNER'S REPRESENTATIVE. SUBMIT PROPOSED METHODS AND SEQUENCE OF OPERATIONS FOR THE SELECTIVE DEMOLITION WORK TO THE OWNER'S REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO THE START OF THE WORK. ANY DEMOLITION SHALL BE COORDINATED WITH OWNER, AND CM/GC. PERFORM ALL DEMOLITION WHILE ENSURING MINIMUM INTERFERENCE WITH ADJACENT OCCUPIED AREAS.

K. TESTING, ADJUSTING AND BALANCING (TAB)

1. THE MECHANICAL CONTRACTOR SHALL PROVIDE THE SERVICES OF AN INDEPENDENT TESTING, ADJUSTING, AND BALANCING (TAB) COMPANY TO PERFORM TAB SERVICES FOR THE HEATING, VENTILATING AND AIR CONDITIONING (HVAC) SYSTEMS. THE TAB COMPANY AND THE COMPANY'S TECHNICIANS PERFORMING ON-SITE TAB SERVICES SHALL BE CERTIFIED BY ONE OR MORE OF THE FOLLOWING TAB AGENCIES:

a. THE TESTING, ADJUSTING AND BALANCING BUREAU (TABB)
b. NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)
c. ASSOCIATED AIR BALANCE COUNCIL (AABC).

2. THE TAB COMPANY AND TECHNICIANS PERFORMING THE SERVICES SHALL SPECIALIZE IN THE TESTING, ADJUSTING AND BALANCING OF HEATING VENTILATING AND AIR CONDITIONING (HVAC) SYSTEMS AND HAVE A MINIMUM OF FIVE YEARS EXPERIENCE PERFORMING TAB SERVICES.

3. THE TAB COMPANY SHALL HAVE SUCCESSFULLY COMPLETED A MINIMUM OF FIVE PROJECTS THAT ARE SIMILAR IN SIZE AND SCOPE.

4. TAB SERVICES SHALL INCLUDE, BUT NOT BE LIMITED TO.

a. MEASURING AND BALANCING AIR AND/OR HYDRONIC DISTRIBUTION SYSTEMS
b. ADJUSTING THE TOTAL AIR AND/OR HYDRONIC SYSTEMS TO PROVIDE DESIGN QUANTITIES
c. ELECTRICAL MEASUREMENT OF AIR AND/OR HYDRONIC EQUIPMENT
d. ESTABLISHING QUANTITATIVE PERFORMANCE OF ALL HVACR EQUIPMENT
e. ASSISTING AUTOMATIC TEMPERATURE CONTROLS (ATC) CONTRACTOR WITH VERIFICATION OF THE AUTOMATIC TEMPERATURE CONTROLS
f. WHEN BALANCING FAN POWERED TERMINALS WITHIN A VAV SYSTEM, THE BALANCER SHALL INDICATE THE BALANCED RESULTS AT BOTH FULL COOLING AND MINIMUM COOLING MODES.
g. AIR QUANTITIES SHALL BE WITHIN 10 % OF LISTED QUANTITIES ON DRAWINGS.

5. THE TAB COMPANY SHALL PERFORM ALL TESTING, ADJUSTING AND BALANCING PROCEDURES ON ALL HVAC SYSTEMS IN ACCORDANCE WITH THE DETAILED PROCEDURES OUTLINED IN THE LATEST EDITIONS OF THE FOLLOWING ACCEPTED PUBLISHED STANDARDS AS A MINIMUM REQUIREMENT;

a. NEBB: "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS"

b. AABC: "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE" AND "TEST AND BALANCE PROCEDURES"

c. SMACNA: "HVAC SYSTEMS TESTING, ADJUSTING, BALANCING"

6. TAB REPORT: SUBMIT (3) COPIES OF THE COMPLETE TESTING, ADJUSTING AND BALANCING REPORT, INCLUDING ANY DRAWINGS INDICATING AIR OUTLETS, THERMOSTATS/SENSORS/CONTROLS LOCATIONS, AND EQUIPMENT IDENTIFIED TO CORRESPOND WITH DATA SHEETS.

7. REPORTS SHALL BE ON TABB/SMACNA, NEBB, OR AABC, FORMS THAT INDICATE INFORMATION ADDRESSING EACH OF THE TESTING METHODS, MEASUREMENTS, AND ADJUSTMENTS.

8. OPERATIONAL DEFICIENCIES AND RECOMMENDATIONS FOR CORRECTING UNSATISFACTORY PERFORMANCES OF HVAC SYSTEMS WHEN THEY CANNOT BE SUCCESSFULLY BALANCED SHALL BE RECORDED IN THE TESTING, ADJUSTING AND BALANCING REPORT AND GIVEN TO THE MECHANICAL ENGINEER BY THE MECHANICAL CONTRACTOR FOR HIS REVIEW.

9. PERIMETER SLOT DIFFUSERS SHALL HAVE BLADES AIMED TOWARDS WINDOW.

10. INTERIOR DIFFUSERS/GRILLES SHALL BE ADJUSTED AS TO NOT BLOW DIRECTLY ON OCCUPANTS.

11. **PRIOR TO THE ISSUANCE OF THE MECHANICAL FINAL AFFIDAVIT CONTRACTOR SHALL SUBMIT A FINAL T.A.B. REPORT INDICATING ALL RECORDED AIR AND HYDRONIC FLOW RATES ARE WITHIN 10% OF THE LISTED DESIGN VALUES.**

C. ELECTRICAL

1. ALL POWER AND CONTROL WIRING SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR'S ELECTRICAL SUB CONTRACTOR UNDER THE MC'S CONTRACT. THE ELECTRICAL SUB CONTRACTOR SHALL INSTALL ALL CONTROL TRANSFORMERS, STARTERS, AND DISCONNECT SWITCHES.

2. WHERE THE MECHANICAL CONTROLS REQUIRE OTHER THAN 120 VOLTS, THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL REQUIRED CONTROL POWER TRANSFORMERS. (PROVIDED BY MECHANICAL CONTRACTOR)

D. EQUIPMENT IDENTIFICATION

1. ALL EQUIPMENT, PIPING, VALVES, WARNING TAGS AND DUCTWORK PROVIDED UNDER THIS SECTION OF THE SPECIFICATION SHALL BE MARKED FOR EASE OF IDENTIFICATION. STENCILS AND LABELS USED FOR IDENTIFYING SIZE, SYMBOL TYPE, DIRECTION OF FLOW, FLUID/GAS IDENTIFICATION, EQUIPMENT LABELING, ETC. SHALL BE PROVIDED AND INSTALLED AS OUTLINED IN ANSI/NEMA AND ASME A13.1 STANDARDS.

E. DUCTWORK CLEANING:

1. **DUCTWORK EXAMINATION, PREPARATION, CLEANING AND CLEANING VERIFICATION SHALL STRICTLY ADHERE TO NADCA ACR 2006 STANDARDS AND PROCEDURES.**
2. **AIR-SIDE SYSTEMS SHALL BE THOROUGHLY CLEANED SO THAT NO DIRT OR DUST SHALL REMAIN WITHIN/ON DUCTWORK, AIR HANDLERS, FAN COILS, DIFFUSERS, REGISTERS, OR GRILLES.**
3. **THIS SECTION PERTAINS TO ALL EXISTING SUPPLY AND EXHAUST DUCTWORK TO REMAIN INCLUDING ALL EXISTING AIR HANDLERS, FAN COILS, GRILLES, DIFFUSERS, ETC.**
4. **AFTER COMPLETION OF PROJECT, REMOVE ALL CONSTRUCTION DEBRIS, TEMPORARY FACILITIES AND EQUIPMENT FROM WORK AREA. CLEAN WORK AREA TO PERMIT OCCUPANCY.**

F. EQUIPMENT INSTALLATION:

1. INSTALL ALL EQUIPMENT ACCORDING TO THE MANUFACTURER'S REQUIREMENTS, SHOP DRAWINGS, DETAILS AS SHOWN ON THE DRAWINGS, AND AS SPECIFIED HEREIN. INSTALL ALL WORK SO THAT PARTS REQUIRING INSPECTION, REPLACEMENT, MAINTENANCE AND REPAIR SHALL BE READILY ACCESSIBLE. SMALL DEVIATIONS FROM THE DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT ANY SUBSTANTIAL CHANGE SHALL NOT BE MADE WITHOUT PRIOR WRITTEN OWNER AND ENGINEER APPROVAL.

G. FIRESTOPPING:

1. INSTALL FIRESTOPPING ASSEMBLY AT ALL FIRE RATED WALLS AND FLOORS AS SPECIFIED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

PART 4 - CONTROLS

A. AUTOMATIC CONTROLS

1. **GENERAL DESCRIPTION**

a. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES, AND PERFORM ALL OPERATIONS REQUIRED FOR COMPLETE INSTALLATION OF ALL AUTOMATIC CONTROLS AND RELATED WORK AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. CONTROL SYSTEM SHALL BE AN AUTOMATIC PROGRAMMABLE CONTROL SYSTEM.

b. MC SHALL PROVIDE CONTROLS, CONTROL WIRING AND CONTROL POWER NECESSARY FOR THE OPERATION OF THE MECHANICAL SYSTEMS. THIS SHALL INCLUDE BUT NOT BE LIMITED TO THERMOSTATS, SENSORS, INTERLOCKS, EQUIPMENT CONTROLLERS, ETC.. WHERE SUCH WIRING IS EXPOSED, FURNISH AND INSTALL WIRING IN A RACEWAY OR CONDUIT. MC SHALL MATCH ELECTRICAL SYSTEM RACEWAYS OR CONDUITS FOR MATERIAL AND TYPE.

c. MC SHALL LOCATE WALL MOUNTED THERMOSTATS, TEMPERATURE SENSORS, HUMIDISTATS, AND HUMIDITY SENSORS AT 48" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. COORDINATE LOCATIONS WITH THE ARCHITECTURAL DRAWINGS, OTHER EQUIPMENT, FURNITURE, AND DOOR SWINGS. PERIMETER MOUNTED THERMOSTATS AND SENSORS SHALL BE MOUNTED ON AN INSULATED BASE.

d. AUTOMATIC CONTROLS SHALL INCLUDE ALL MATERIALS, APPARATUS, EQUIPMENT, ETC. THAT WILL BE REQUIRED TO PERFORM THE FUNCTIONS INTENDED. THE EQUIPMENT, IN GENERAL, SHALL CONSIST OF, BUT NOT BE LIMITED TO: THERMOSTATS, DAMPERS, DAMPER MOTOR, OUTDOOR CONTROLLERS; DUCT THERMOSTAT, RELAYS; SWITCHES, MANUAL SWITCHES, PRESSURE GAUGES; THERMOMETERS; CONTROL SYSTEM; AND ALL OTHER INCIDENTAL EQUIPMENT REQUIRED TO PROVIDE A REMOTE TEMPERATURE SENSING AND CONTROL FROM A CENTRAL LOCATION.

e. ELECTRICAL FIELD CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE HVAC AND AUTOMATIC CONTROL DRAWINGS.

f. PROVIDE ALL ELECTRICAL WIRING IN CONNECTION WITH THE CONTROL SYSTEM AND INTERLOCKING ELECTRIC WIRING.

g. PROVIDE COMPLETE DIRECT DIGITAL SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS BY BUILDING CONTROL MANUFACTURER. CONTROL SYSTEM SHALL BE CAPABLE OF PERFORMING ALL SEQUENCES OF OPERATION TO CONFORM WITH BUILDING STANDARDS. EXISTING SYSTEM SHALL BE FIELD VERIFIED BY THE CONTRACTOR. INDIVIDUAL CONTROL COMPONENTS MAY NOT BE SHOWN ON CONTRACT DOCUMENTS, BUT ATC CONTRACTOR SHALL SUPPLY ALL COMPONENTS AND WIRING NECESSARY FOR A COMPLETE FOR A COMPLETE OPERABLE SYSTEM. ATC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SYSTEM COMPONENTS, WHETHER THE ELECTRICAL AND OTHER WORK IS SUB-CONTRACTED OR NOT. ALL CONTROL VALVES SHALL BE ELECTRICALLY ACTUATED.

h. ALL CONTROL WIRING SHALL COMPLY WITH THE REQUIREMENTS OF THE ELECTRICAL SECTION OF THESE CONTRACT DOCUMENTS.

i. WIRING BETWEEN FIRE ALARM SYSTEM AND TEMPERATURE CONTROL SYSTEM, EXCEPT FOR DUCT MOUNTED SMOKE DETECTORS, SHALL BE BY ATC CONTRACTOR.

j. DDC/BUILDING AUTOMATION SYSTEM INTERFACE, UNLESS PNEUMATIC ARE SPECIFIED.

k. PROVIDE TO OWNER FULL OPERATING AND MAINTENANCE INSTRUCTIONS FOR NEW AND/OR ALTERATION OF DDC SYSTEMS.

l. DDC/BUILDING AUTOMATION SYSTEM INTERFACE: PROVIDE ALL NECESSARY COMPONENTS AND WIRING FOR INTERLOCK TO EXISTING DDC/BUILDING AUTOMATION SYSTEM. ALL COMPONENTS MUST BE COMPATIBLE WITH EXISTING OUTPUT DEVICES. PROVIDE TO OWNER FULL OPERATING AND MAINTENANCE INSTRUCTIONS FOR USE AND/OR ALTERATION OF DDC SYSTEMS.

2. **SMOKE CONTROL**

a. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ANY AND ALL EXISTING BASE BUILDING SMOKE CONTROL SEQUENCES OF OPERATION WITH THE BUILDING MANAGEMENT. COORDINATE WITH THE ATC CONTRACTOR AS REQUIRED TO INCLUDE INTERLOCK'S SEQUENCING, ETC. OF ALL NEW AND EXISTING HVAC EQUIPMENT AS REQUIRED TO MAINTAIN THE CURRENT SMOKE CONTROL SEQUENCE OF OPERATION.

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ADDENDUMS			
No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON
MA

Project

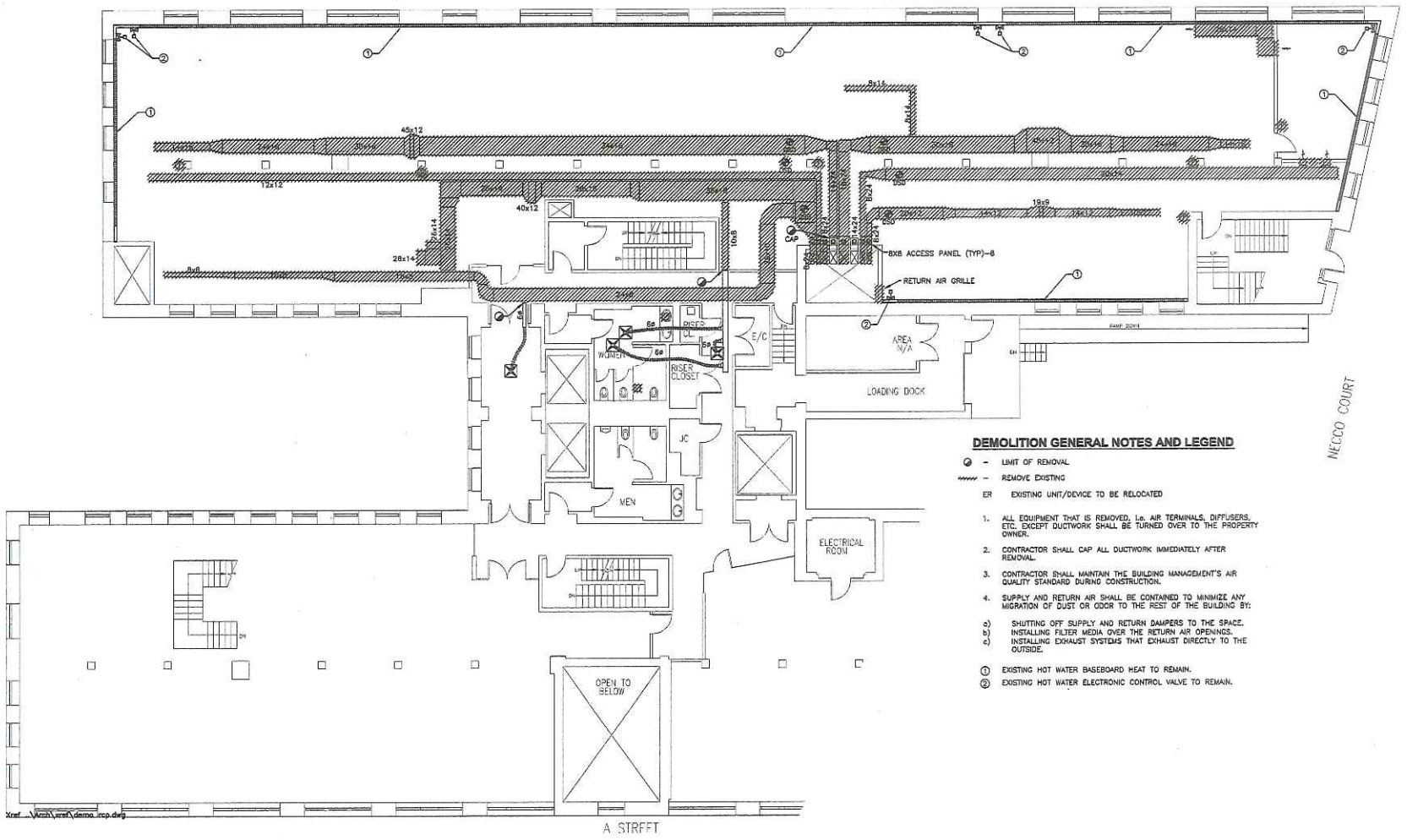
MECHANICAL
GENERAL NOTES 2

Drawing Title

Project No.	Checked	Date
21772	BSK	12/6/2019
Drawn ZDA	Approved MNF	Scale NONE

Drawing No.
M0.02

Seal



DEMOLITION GENERAL NOTES AND LEGEND

- LIMIT OF REMOVAL
- REMOVE EXISTING
- ER EXISTING UNIT/DEVICE TO BE RELOCATED

1. ALL EQUIPMENT THAT IS REMOVED, i.e. AIR TERMINALS, DIFFUSERS, ETC. EXCEPT DUCTWORK SHALL BE TURNED OVER TO THE PROPERTY OWNER.
2. CONTRACTOR SHALL CAP ALL DUCTWORK IMMEDIATELY AFTER REMOVAL.
3. CONTRACTOR SHALL MAINTAIN THE BUILDING MANAGEMENT'S AIR QUALITY STANDARD DURING CONSTRUCTION.
4. SUPPLY AND RETURN AIR SHALL BE CONTAINED TO MINIMIZE ANY MIGRATION OF DUST OR ODOR TO THE REST OF THE BUILDING BY:

a) SHUTTING OFF SUPPLY AND RETURN DAMPERS TO THE SPACE.
b) INSTALLING FILTER MEDIA OVER THE RETURN AIR OPENINGS.
c) INSTALLING EXHAUST SYSTEMS THAT EXHAUST DIRECTLY TO THE OUTSIDE.

① EXISTING HOT WATER BASEBOARD HEAT TO REMAIN.
② EXISTING HOT WATER ELECTRONIC CONTROL VALVE TO REMAIN.

① HVAC 1ST FLOOR DEMOLITION PLAN
1/8" = 1'-0"

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ADDENDUMS

No.	Date	Description	By

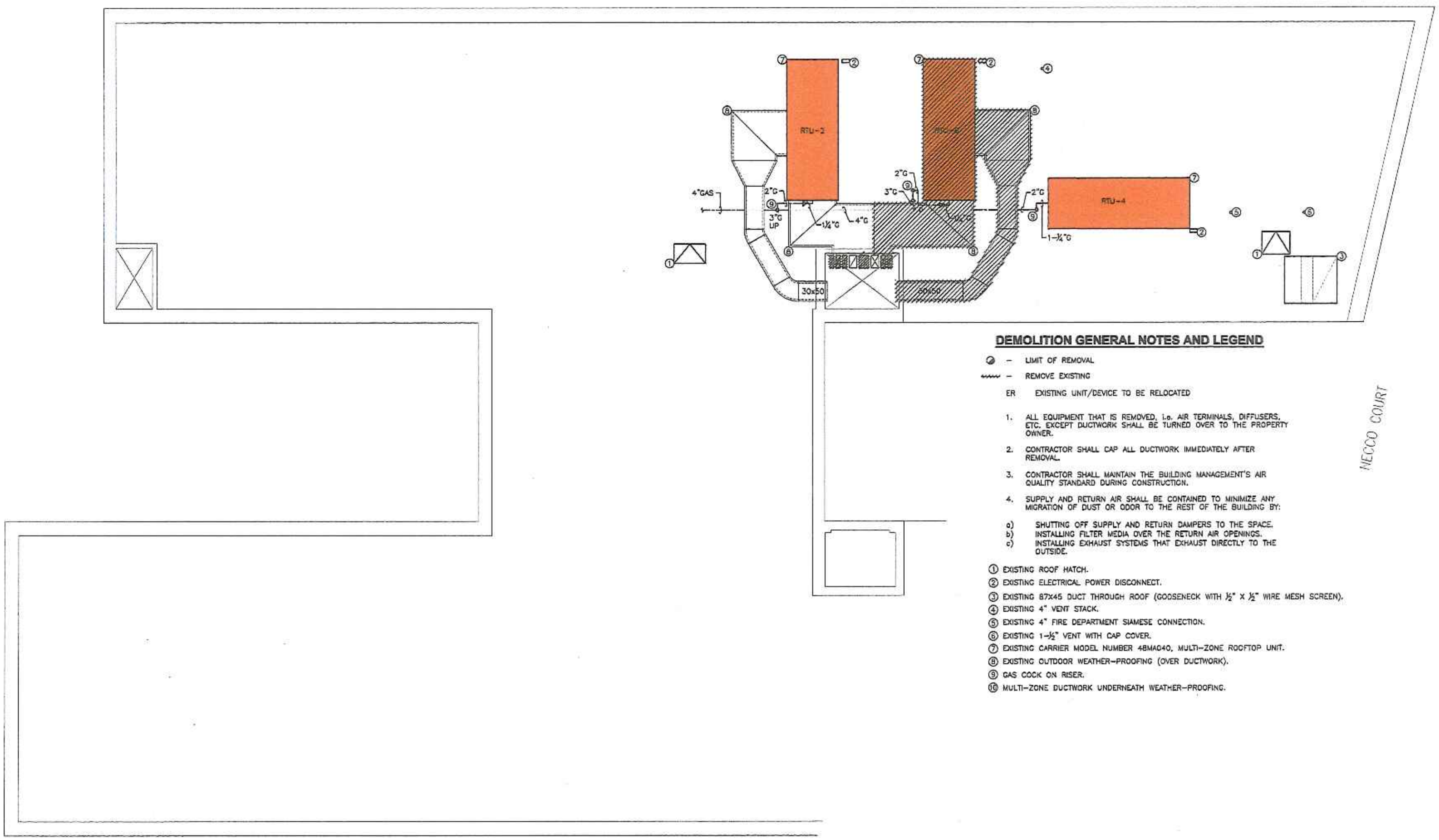
1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

MECHANICAL
1ST FLOOR
DEMOLITION PLAN
Drawing Title

Project No. 21772	Checked BSK	Date 12/6/2019
Drawn ZDA	Approved MNF	Scale 1/8" = 1' 0"

Seal

Drawing No.
M2.01



① HVAC PARTIAL ROOF PLAN
1/8" = 1'-0"

DEMOLITION GENERAL NOTES AND LEGEND

- — LIMIT OF REMOVAL
- ~~~ — REMOVE EXISTING
- ER EXISTING UNIT/DEVICE TO BE RELOCATED

1. ALL EQUIPMENT THAT IS REMOVED, i.e. AIR TERMINALS, DIFFUSERS, ETC. EXCEPT DUCTWORK SHALL BE TURNED OVER TO THE PROPERTY OWNER.
2. CONTRACTOR SHALL CAP ALL DUCTWORK IMMEDIATELY AFTER REMOVAL.
3. CONTRACTOR SHALL MAINTAIN THE BUILDING MANAGEMENT'S AIR QUALITY STANDARD DURING CONSTRUCTION.
4. SUPPLY AND RETURN AIR SHALL BE CONTAINED TO MINIMIZE ANY MIGRATION OF DUST OR ODOR TO THE REST OF THE BUILDING BY:
   a) SHUTTING OFF SUPPLY AND RETURN DAMPERS TO THE SPACE.
   b) INSTALLING FILTER MEDIA OVER THE RETURN AIR OPENINGS.
   c) INSTALLING EXHAUST SYSTEMS THAT EXHAUST DIRECTLY TO THE OUTSIDE.

① EXISTING ROOF HATCH.
② EXISTING ELECTRICAL POWER DISCONNECT.
③ EXISTING 87X45 DUCT THROUGH ROOF (GOOSENECK WITH ½" X ½" WIRE MESH SCREEN).
④ EXISTING 4" VENT STACK.
⑤ EXISTING 4" FIRE DEPARTMENT SIAMESE CONNECTION.
⑥ EXISTING 1-½" VENT WITH CAP COVER.
⑦ EXISTING CARRIER MODEL NUMBER 48MA040, MULTI-ZONE ROOFTOP UNIT.
⑧ EXISTING OUTDOOR WEATHER-PROOFING (OVER DUCTWORK).
⑨ GAS COCK ON RISER.
⑩ MULTI-ZONE DUCTWORK UNDERNEATH WEATHER-PROOFING.

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No.	Date	Description	By

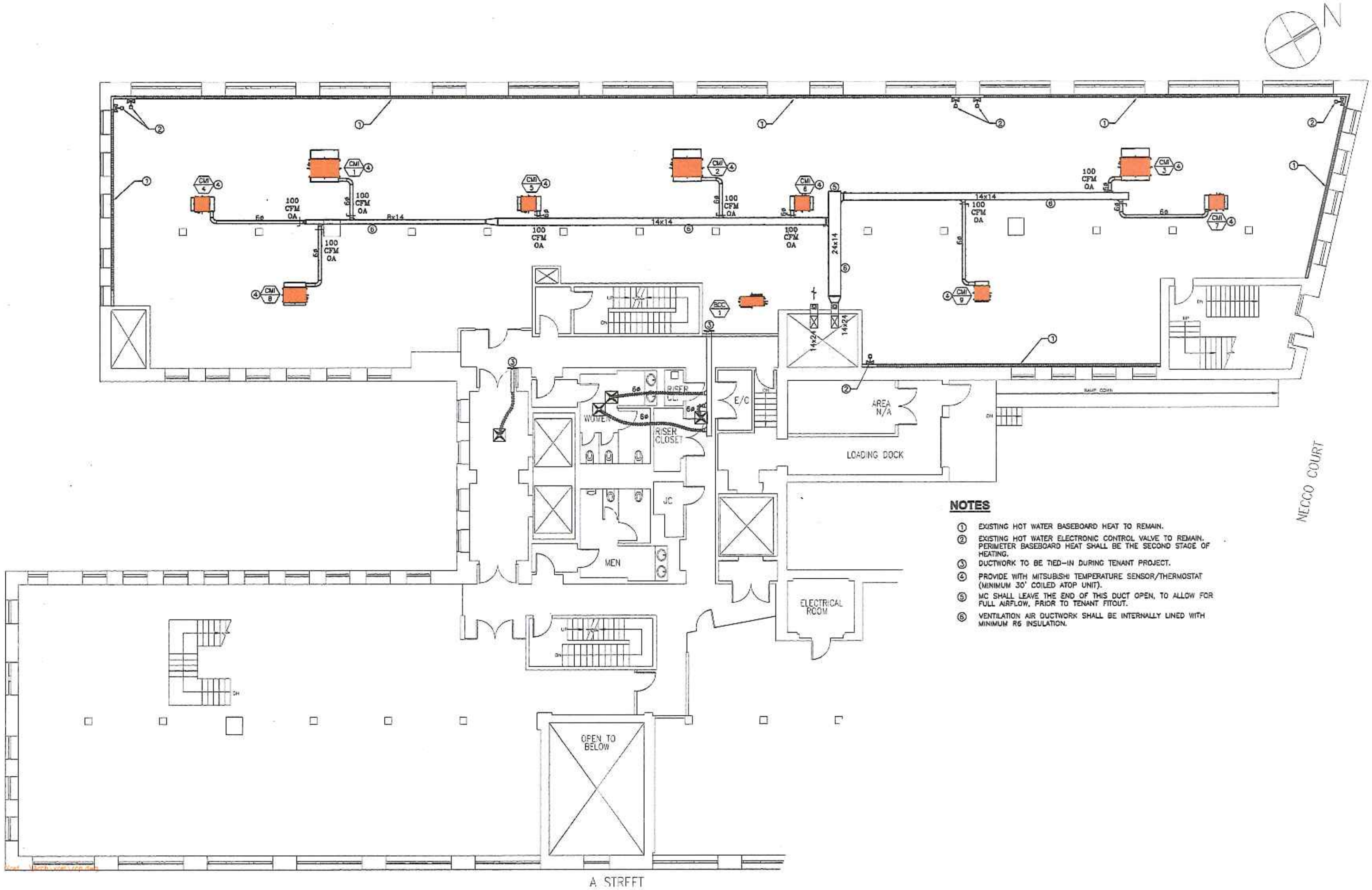
1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

MECHANICAL ROOF DEMOLITION PLAN
Drawing Title

Project No. 21772	Checked BSK	Date 12/6/2019
Drawn ZDA	Approved MNF	Scale 1/8" = 1' 0"

Seal

Drawing No.
M2.06



NOTES

1. EXISTING HOT WATER BASEBOARD HEAT TO REMAIN.
2. EXISTING HOT WATER ELECTRONIC CONTROL VALVE TO REMAIN. PERIMETER BASEBOARD HEAT SHALL BE THE SECOND STAGE OF HEATING.
3. DUCTWORK TO BE TIED-IN DURING TENANT PROJECT.
4. PROVIDE WITH MITSUBISHI TEMPERATURE SENSOR/THERMOSTAT (MINIMUM 30' COILED ATOP UNIT).
5. MC SHALL LEAVE THE END OF THIS DUCT OPEN, TO ALLOW FOR FULL AIRFLOW, PRIOR TO TENANT FITOUT.
6. VENTILATION AIR DUCTWORK SHALL BE INTERNALLY LINED WITH MINIMUM R6 INSULATION.

(1) HVAC 1ST FLOOR PLAN
1/8" = 1'-0"

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No.	Date	Description	By

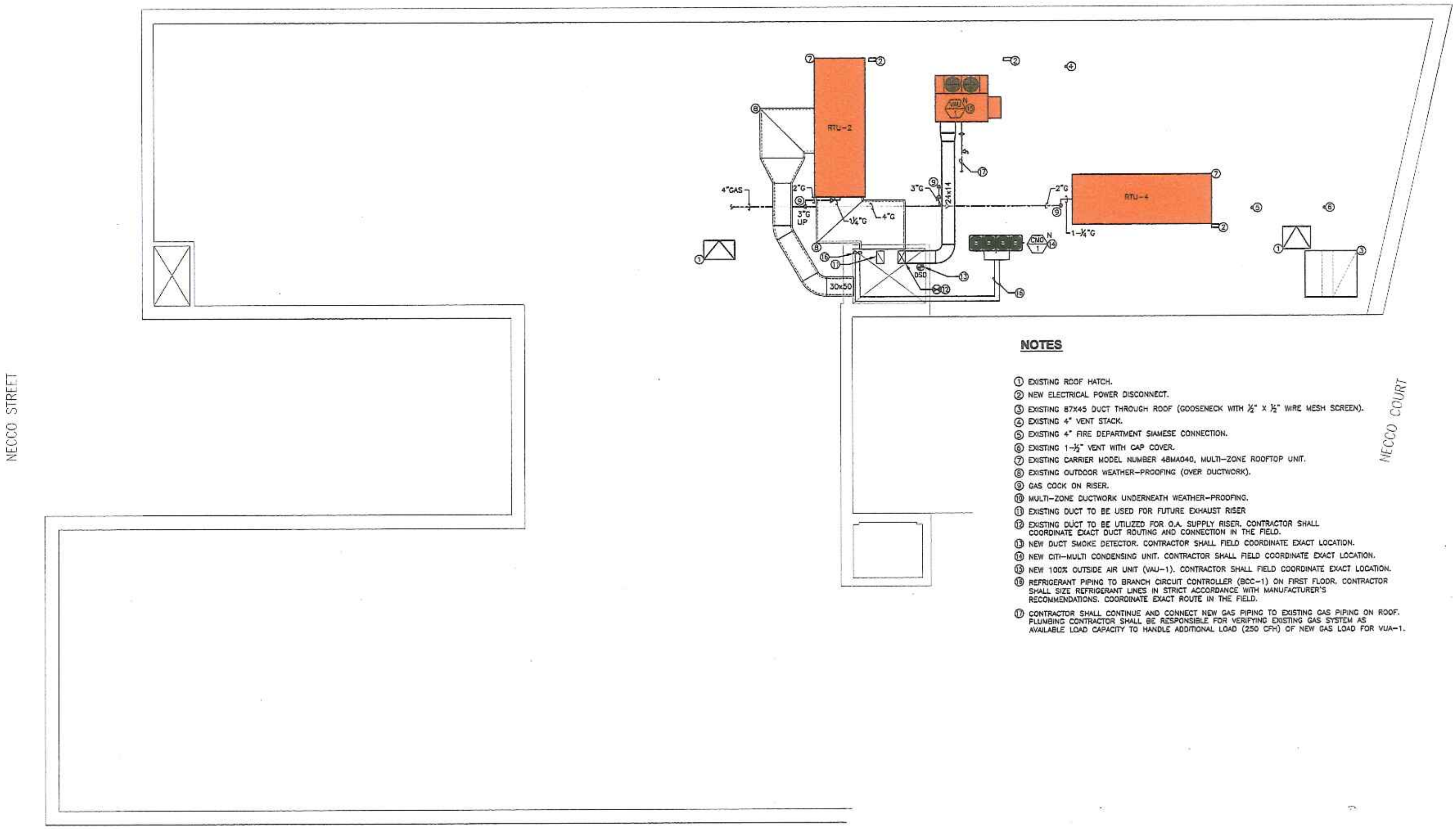
Project: 1ST FLOOR VRF SYSTEM 300 A STREET, BOSTON MA

Drawing Title: MECHANICAL 1ST FLOOR PLAN

Project No. 21772	Checked BSK	Date 12/6/2019
Drawn BSK	Approved MNF	Scale 1/8" = 1'0"

Seal: KENNETH R. WAGNER MECHANICAL

Drawing No. M3.01



NOTES

① EXISTING ROOF HATCH.
② NEW ELECTRICAL POWER DISCONNECT.
③ EXISTING 87X45 DUCT THROUGH ROOF (GOOSENECK WITH ½" X ½" WIRE MESH SCREEN).
④ EXISTING 4" VENT STACK.
⑤ EXISTING 4" FIRE DEPARTMENT SIAMESE CONNECTION.
⑥ EXISTING 1-½" VENT WITH CAP COVER.
⑦ EXISTING CARRIER MODEL NUMBER 48MA040, MULTI-ZONE ROOFTOP UNIT.
⑧ EXISTING OUTDOOR WEATHER-PROOFING (OVER DUCTWORK).
⑨ GAS COCK ON RISER.
⑩ MULTI-ZONE DUCTWORK UNDERNEATH WEATHER-PROOFING.
⑪ EXISTING DUCT TO BE USED FOR FUTURE EXHAUST RISER
⑫ EXISTING DUCT TO BE UTILIZED FOR O.A. SUPPLY RISER. CONTRACTOR SHALL COORDINATE EXACT DUCT ROUTING AND CONNECTION IN THE FIELD.
⑬ NEW DUCT SMOKE DETECTOR. CONTRACTOR SHALL FIELD COORDINATE EXACT LOCATION.
⑭ NEW CITI-MULTI CONDENSING UNIT. CONTRACTOR SHALL FIELD COORDINATE EXACT LOCATION.
⑮ NEW 100% OUTSIDE AIR UNIT (VAU-1). CONTRACTOR SHALL FIELD COORDINATE EXACT LOCATION.
⑯ REFRIGERANT PIPING TO BRANCH CIRCUIT CONTROLLER (BCC-1) ON FIRST FLOOR. CONTRACTOR SHALL SIZE REFRIGERANT LINES IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. COORDINATE EXACT ROUTE IN THE FIELD.
⑰ CONTRACTOR SHALL CONTINUE AND CONNECT NEW GAS PIPING TO EXISTING GAS PIPING ON ROOF. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXISTING GAS SYSTEM AS AVAILABLE LOAD CAPACITY TO HANDLE ADDITIONAL LOAD (250 CFH) OF NEW GAS LOAD FOR VUA-1.

① HVAC PARTIAL ROOF PLAN
1/8" = 1'-0"

F:\JOBS\300 A Street Boston, MA_BaseBuilding\1st Floor VRF System\Mechanical\M3.06 MECHANICAL ROOF PLAN.dwg

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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON
MA

Project

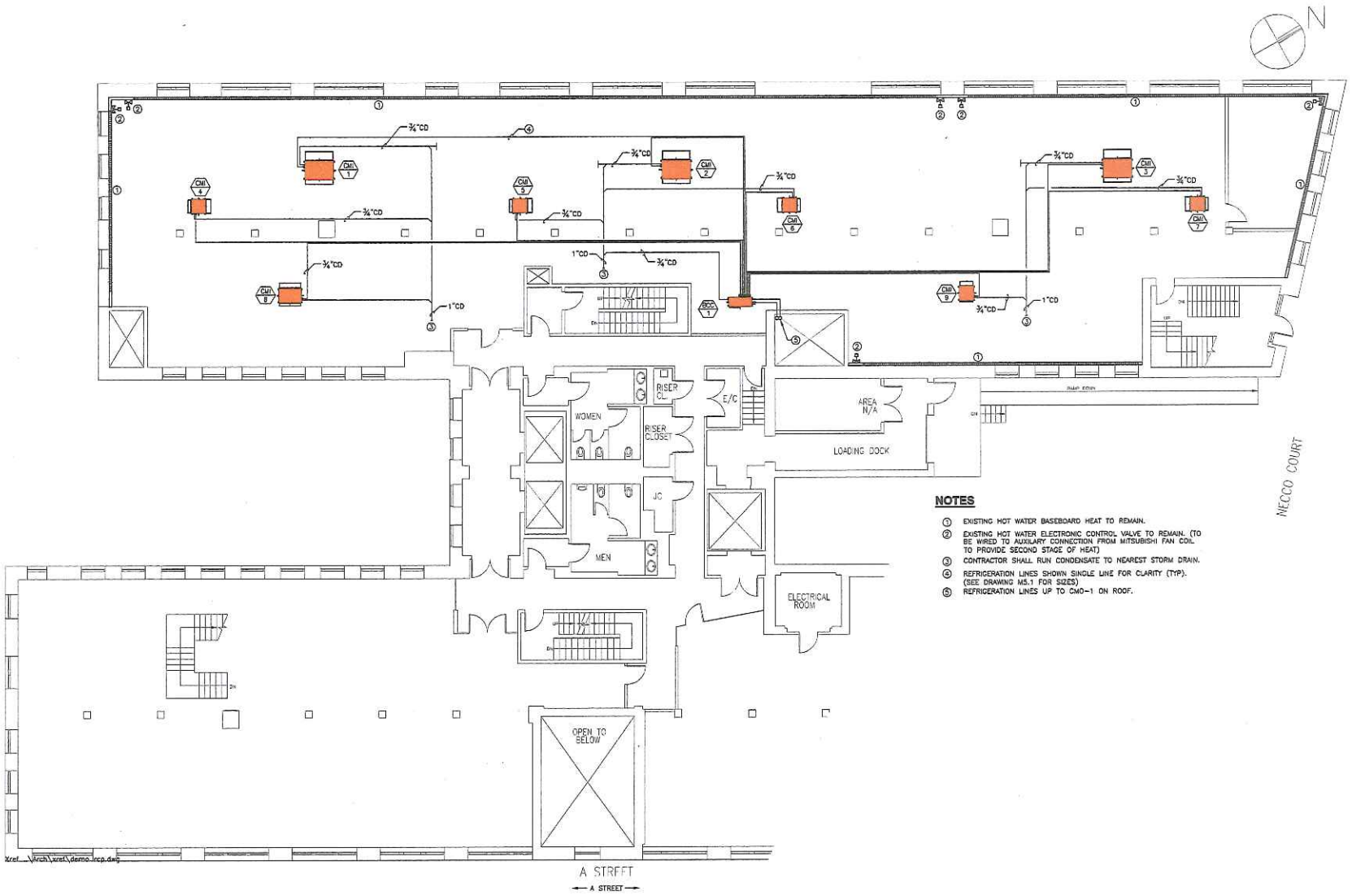
MECHANICAL
ROOF PLAN

Drawing Title

Project No. 21772	Checked BSK	Date 12/6/2019
Drawn ZDA	Approved MNF	Scale 1/8" = 1'0"

Seal: COMMONWEALTH OF MASSACHUSETTS — KENNETH R. WAGNER — MECHANICAL — No. 40160 — REGISTERED PROFESSIONAL ENGINEER

Drawing No.
M3.06



NOTES

1. EXISTING HOT WATER BASEBOARD HEAT TO REMAIN.
2. EXISTING HOT WATER ELECTRONIC CONTROL VALVE TO REMAIN. (TO BE WIRED TO AUXILIARY CONNECTION FROM MITSUBISHI FAN COIL TO PROVIDE SECOND STAGE OF HEAT)
3. CONTRACTOR SHALL RUN CONDENSATE TO NEAREST STORM DRAIN.
4. REFRIGERATION LINES SHOWN SINGLE LINE FOR CLARITY (TYP). (SEE DRAWING M5.1 FOR SIZES)
5. REFRIGERATION LINES UP TO CMO-1 ON ROOF.

① HVAC 1ST FLOOR DEMOLITION PLAN
1/8" = 1'-0"

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No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

MECHANICAL
1ST FLOOR PIPING PLAN

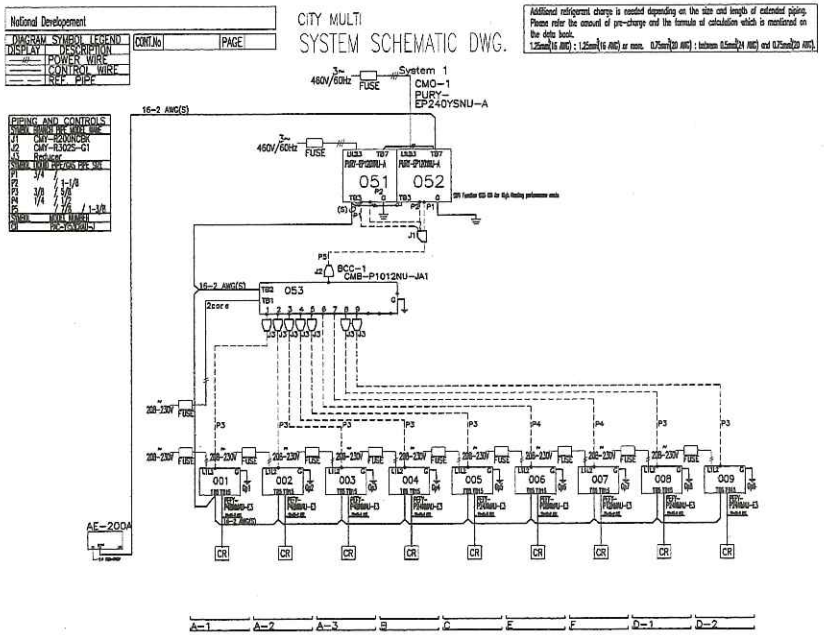
Drawing Title

Project No. 21772	Checked MNF	Date 12/6/2019
Drawn BSK	Approved MNF	Scale 1/8" = 1' 0"

Seal

Drawing No.

M4.01



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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

MECHANICAL
CITY-MULTI PIPING
SCHEMATIC

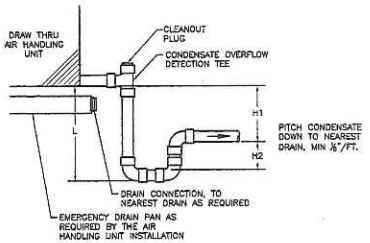
Drawing Title

Project No.	Checked	Date
21772	MNF	12/6/2018
Drawn	Approved	Scale
BSK	MNF	NONE

Seal

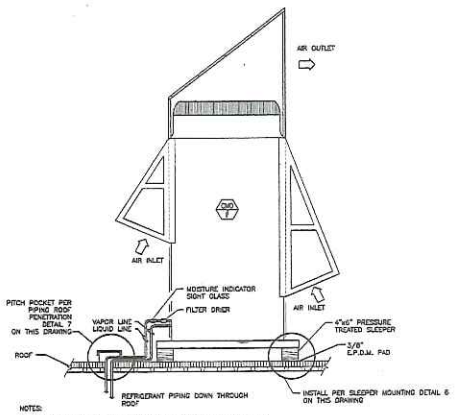
Drawing No.

M5.01



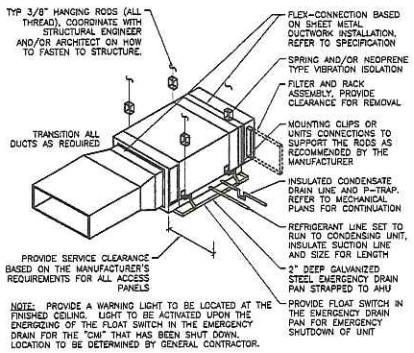
H1 = MAX NEGATIVE STATIC PRESSURE PLUS 1"
H2 = H1/2
L = H1 + H2 + PIPE DIAMETER + INSULATION THICKNESS

5 M7.00 **CONDENSATE DRAIN DETAIL** NOT TO SCALE



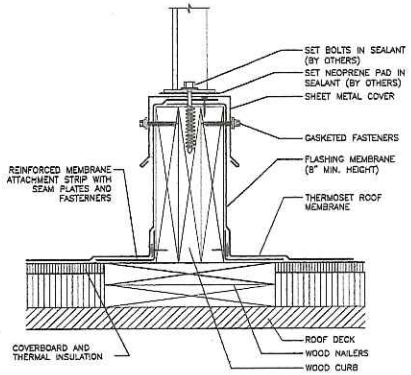
NOTES:
1. CONDENSING UNIT SHALL BE MECHANICALLY ATTACHED TO SLEEPERS.
2. REFRIGERANT PIPING SHALL BE PIPED IN STRICT ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTRUCTIONS, FOR LONG LINES, IF APPLICABLE.
3. INSTALL UNIT SO THAT WIND WILL NOT DIRECTLY LASH AGAINST OPENINGS OF INLET AND OUTLET DUCTS.
4. WHEN THE UNIT IS USED IN A COLD REGION AND THE HEATING OPERATION IS CONTINUOUSLY PERFORMED FOR A LONG TIME WHEN THE OUTSIDE TEMPERATURE IS BELOW FREEZING, INSTALL A HEATER TO THE BASE OR TAKE OTHER APPROPRIATE MEASURES TO PREVENT WATER FROM FREEZING IN THE BASE.

4 M7.00 **ROOF MOUNTED CITY-MULTI OUTDOOR UNIT** NOT TO SCALE



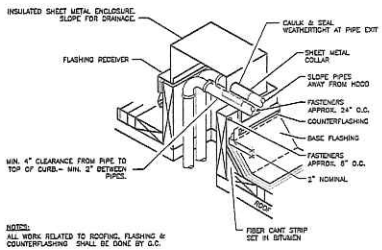
NOTE: PROVIDE A WARNING LIGHT TO BE LOCATED AT THE FINISHED CEILING. LIGHT TO BE ACTIVATED UPON THE ENERGIZING OF THE FLOAT SWITCH IN THE EMERGENCY DRAIN FOR THE "CMI" THAT HAS BEEN SHUT DOWN. LOCATION TO BE DETERMINED BY GENERAL CONTRACTOR.

3 M7.00 **HORIZONTAL UNIT MOUNTING DETAIL (CMI)** NOT TO SCALE



WIDTH OF EQUIPMENT	HEIGHT OF LEGS
UP TO 24"	24"
24" TO 48"	36"
48" AND WIDER	48"

2 M7.00 **EQUIPMENT SUPPORT CURB** NOT TO SCALE



NOTES:
ALL WORK RELATED TO ROOFING, FLASHING & COUNTERFLASHING SHALL BE DONE BY G.C.

1 M7.00 **PIPING ROOF PENETRATION DETAIL** NOT TO SCALE

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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

MECHANICAL DETAILS

Drawing Title

Project No. 21772	Checked MNF	Date 12/6/2019
Drawn BSK	Approved MNF	Scale NONE

Seal

Drawing No.

M7.00

VENTILATION AIR UNIT SCHEDULE

UNIT #	MANUFACTURER	MODEL #	SUPPLY FAN PERFORMANCE DATA: SUPPLY CFM	O.A. CFM	EXT. S.P.	V/PH/HZ	FAN HP	COOLING COIL– REMOTE AIR COOLED DX: ROWS	FPI	CAPACITY (MBH) TOTAL	CAPACITY (MBH) SENS.	ENT. DB°	ENT. WB°	LVG DB°	LVG WB°	HEATING DATA – INDIRECT GAS: MODULATING (TURN/DOWN)	TYPE	MBH INPUT	MBH OUTPUT	E.A.T. °F	L.A.T. °F	ELECTRICAL DATA: MCA	FUSE SIZE	FLA	MOP	V/ø/HZ
VAU–1	MITSUBISHI PREMISYS	MP–1–3L–120–1M	2400	2400	1.0"	480/3/60	1–1/2	4	12	134.6	89.3	91.0	73.0	57.2	56.5	13:1	NAT.GAS	250	200	0	83.2	23.5	30	18.8	30	480/3/60

CABINET SOUND POWER DATA	62.5	125	250	500	1000	2000	4000	8000
DISCHARGE LW (dB)	71	71	81	77	74	71	73	65
INLET LW (dB)	–	–	–	–	–	–	–	–

PROVIDE UNIT WITH THE FOLLOWING OPTIONS:
1. WEATHERHOOD: DOWNTURNED HOOD
2. 100% OUTDOOR AIR UNIT WITH LOW LEAKAGE TWO POSITION MOTORIZED DAMPER
3. 120 V FACTORY WIRED CONVENIENCE OUTLET
4. PREMIUM EFFICIENT SUPPLY FAN MOTOR
5. SUPPLY FILTERS – 2" MERV8 AND MERV13, 8–20x20x2
6. DIRTY FILTER SWITCH WITH OUTPUT TO BCS
7. FACTORY MOUNTED UNIT DISCONNECT
8. DDC CONTROLLER WITH BCS INTEGRATION
9. SUPPLY FAN VFD
10. AIRFLOW MONITORING – OUTDOOR
11. HAIL GUARDS

CITY MULTI SEQUENCE OF OPERATIONS

c. SPLIT SYSTEMS (CMI–#, CMO–#)

i. GENERAL

1. SPLIT SYSTEMS CONSIST OF AN AIR COOLED CONDENSING UNIT, A FAN, A DX HEATING/COOLING COIL, SECONDARY DRAIN PAN LEAK DETECTION, DISTRIBUTION DUCTWORK/DIFFUSERS, REFRIGERANT/CONDENSATE PIPING, CONTROLS, AND CONTROL WIRING
2. UNITS SHALL BE CONTROLLED VIA STAND–ALONE LOCAL REMOTE CONTROLLERS MODEL PAC–YT53CRAU WITH AE–200A CENTRAL CONTROLLER FOR GLOBAL ADJUSTMENTS.

ii. OCCUPIED MODE

1. INDOOR UNIT FAN SHALL ENERGIZE AND RUN CONTINUOUSLY WITH AIR COOLED CONDENSING UNIT AND/OR BC CONTROLLER FUNCTIONING AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SET POINTS OF 75° F IN THE COOLING MODE, AND 70° F IN THE HEATING MODE. THE SECOND STAGE OF HEATING SHALL BE THE EXISTING PERIMETER HOT WATER BASEBOARD.

iii. UNOCCUPIED MODE

1. INDOOR UNIT FAN SHALL BE OFF, ONLY ENERGIZING IN CONJUNCTION WITH THE AIR COOLED CONDENSING UNIT AND/OR BC CONTROLLER AS REQUIRED TO MAINTAIN NIGHT SETBACK TEMPERATURE SET POINTS OF 85° F IN THE COOLING MODE, AND 60° F IN THE HEATING MODE.

iv. ALARMS/MONITORS

1. IF CONDENSATE IS DETECTED IN THE INDOOR UNIT SECONDARY DRAIN PAN, THE ASSOCIATED F.C.U. SHALL BE SHUT DOWN AND AN ALARM SHALL BE SENT TO THE FACILITY EXISTING CONTROL SYSTEM FRONT END.

d. VENTILATION AIR UNIT (VAU–1)

i. GENERAL

1. VAU–1 SHALL CONSIST OF PACKAGED ROOF–MOUNTED UNIT, WITH 24" ROOF CURB, A SUPPLY FAN, DX COOLING, GAS HEAT, HOT GAS BYPASS, DISTRIBUTION DUCTWORK, CONTROLS, AND CONTROL WIRING, ETC...AS SPECIFIED WITHIN PLANS.

j. OCCUPIED/UNOCCUPIED MODES SHALL COINCIDE WITH OCCUPANCY SCHEDULE AS DETERMINED AT THE CENTRAL CONTROLLER

k. OCCUPIED MODE

1. OUTDOOR AIR INTAKE LOW LEAKAGE MOTORIZED DAMPER SHALL OPEN. UPON CONFIRMATION DAMPER HAVE OPENED VIA END SWITCH, THE UNIT SUPPLY FAN SHALL ENERGIZE VENTILATING THE SPACE.

iii. UNOCCUPIED MODE

1. OUTDOOR AIR INTAKE LOW LEAKAGE MOTORIZED DAMPER SHALL SHUT AND UNIT FAN SHALL BE "OFF"

VI. ALARMS/MONITORS

1. IF UNIT IS CALLED TO RUN AND FAN(S) CURRENT TRANSFORMER DOES NOT INDICATED AMPERAGE DRAW, THE UNIT SHALL BE SHUTDOWN AN AND AN ALARM SHALL BE SENT TO THE FACILITY CONTROLS SYSTEM FRONT END.
2. UPON DETECTION OF SMOKE, VIA OUTDOOR AIR OR RETURN AIR DUCT SMOKE DETECTOR, THE UNIT SHALL BE SHUT DOWN AND, IF APPLICABLE, THE LOW LEAKAGE MOTORIZED DAMPERS SHALL CLOSE.

CITY-MULTI SYSTEM UNIT SCHEDULE

INDOOR AIR CONDITIONING UNIT (CMI #)

UNIT#	MANUFACTURER	MODEL#	V–PH (60Hz)	NOMINAL TONS	NOMINAL CFM	WATTS	AMPS
CMI–1	MITSUBISHI	PEFY–P48NMAU–E3	208/230–1	4.0	989–1412	340	3.41
CMI–2	MITSUBISHI	PEFY–P48NMAU–E3	208/230–1	4.0	989–1412	340	3.41
CMI–3	MITSUBISHI	PEFY–P48NMAU–E3	208/230–1	4.0	989–1412	340	3.41
CMI–4	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–5	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–6	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–7	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–8	MITSUBISHI	PEFY–P12NMAU–E3	208/230–1	1.0	265–371	90	1.20
CMI–9	MITSUBISHI	PEFY–P08NMAU–E3	208/230–1	0.75	212–300	60	1.05

AIR COOLED CONDENSING UNIT (CMO #)

UNIT#	MANUFACTURER	MODEL#	V–PH (60Hz)	NOMINAL TONS	MCA	MFS	NET COOLING MBH	TOTAL HEATING MBH	REMARKS
CMO–1	MITSUBISHI	PURY–EP240YSNU–A	–	20.0	–	–	–	–	(1)(2)(3)(4)(5)(6)
	MITSUBISHI	PURY–EP120YNU–A	480/3	10.0	19	30	120.0	135.0	
	MITSUBISHI	PURY–EP120YNU–A	480/3	10.0	19	30	120.0	135.0	

UNIT#	MODEL#	WATTS	AMPS
BCCU–1	CMB–P1012NU–JA1	255	1.82

GENERAL NOTES:
1. CITY–MULTI SYSTEM & CONTROLS SHALL BE INSTALLED BY A FACTORY APPROVED MITSUBISHI CONTRACTOR IN STRICT ACCORDANCE PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDATIONS.
2. CONTRACTOR SHALL PROVIDE DISCONNECT SWITCH.
3. PROVIDE FBM SERIES FILTER BOXES ON CMI UNITS.

KEY NOTES:

(1) PROVIDE LOCAL REMOTE CONTROLLER PAC–YT53CRAU. REFER TO FLOOR PLAN FOR LOCATIONS AND QUANTITIES.

(2) PROVIDE SYSTEM WITH CENTRALIZED SYSTEM AE–200A WITH LICENSE FOR REMOTE MONITORING. ALL FAN COIL (CMI), AIR COOLED CONDENSING UNITS (CMO) TO CENTRALIZED SYSTEM.

(3) PROVIDE BALL VALVES ON ALL REFRIGERANT PIPING AT BC CONTROLLER TO ALLOW SYSTEM MAINTENANCE AND UNIT CHANGES WITHOUT SYSTEM SHUT DOWN.

(4) PROVIDE LOW AMBIENT CONTROLS.

(5) LOCATION OF AIR COOLED CONDENSING UNITS TO BE COORDINATED WITH G.C., ARCHITECT, AND BUILDING MANAGEMENT.

(6) PROVIDE BC CONTROLLER (BCC–1) WITH SECONDARY DRAIN PAN WITH LEAK DETECTION.

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ADDENDUMS

No.	Date	Description	By

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

MECHANICAL SCHEDULES

Drawing Title

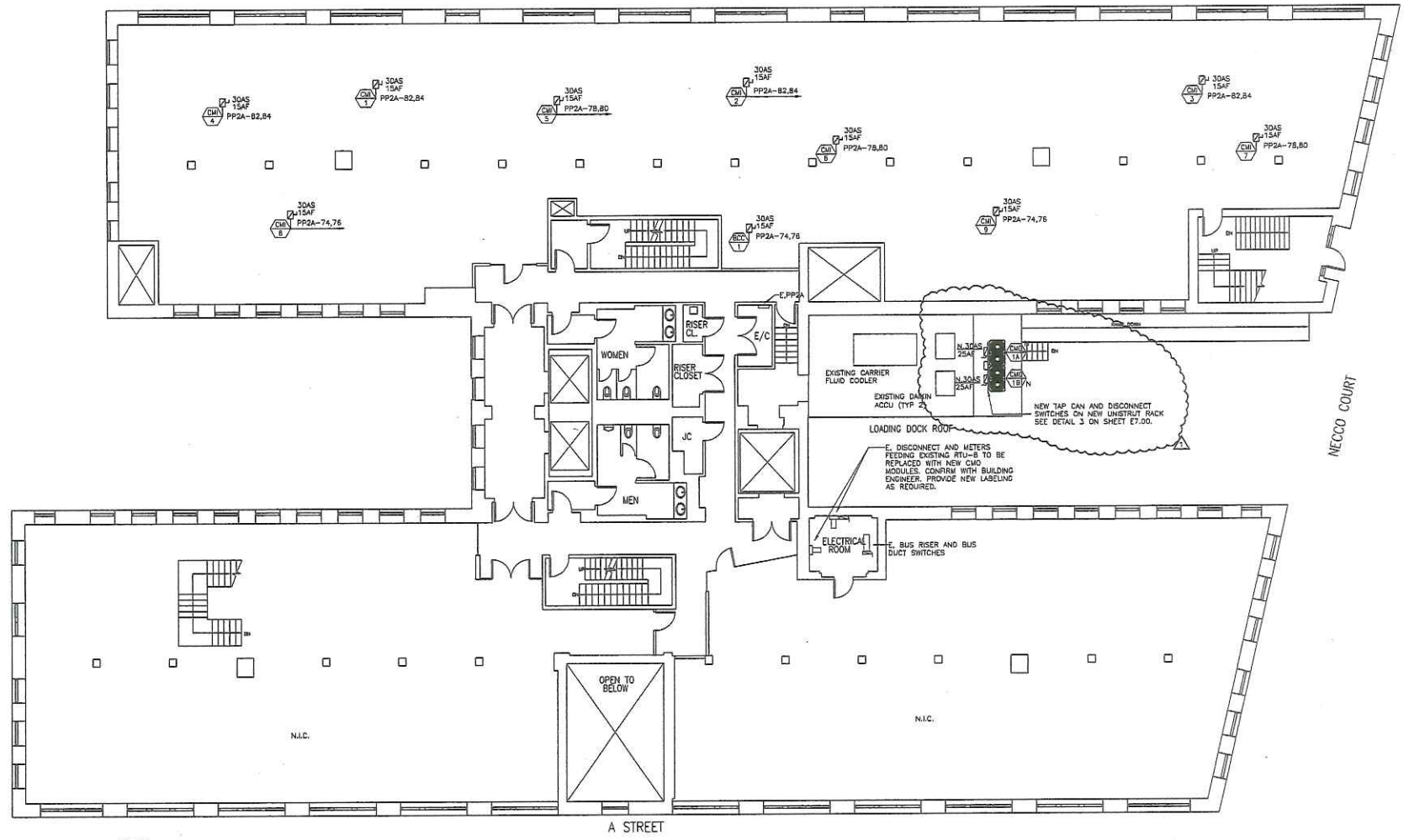
Project No. 21772	Checked MNF	Date 12/6/2019
Drawn BSK	Approved MNF	Scale NONE

Seal

Drawing No.

M8.00

F:\JOBS\300 A Street Boston, MA_BaseBuilding\1st Floor VRF System\Mechanical\M8.00 MECHANICAL SCHEDULES.dwg



NOTES:

1. ALL COMPONENTS ARE NEW, UNO.
2. PROVIDE NEW 2P, 20AMP BRANCH CIRCUIT BREAKERS IN PANEL PP2A TO FEED NEW FAN UNITS. CONFIRM AND COORDINATE WITH BUILDING ENGINEER PROVIDE NEW LABELING AND PANEL SCHEDULES AS REQUIRED.

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ADDENDUMS

No.	Date	Description	By
1	9/8/20	CMO-1 Landlord Relocation	

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

ELECTRICAL
1ST FLOOR POWER PLAN

Drawing Title

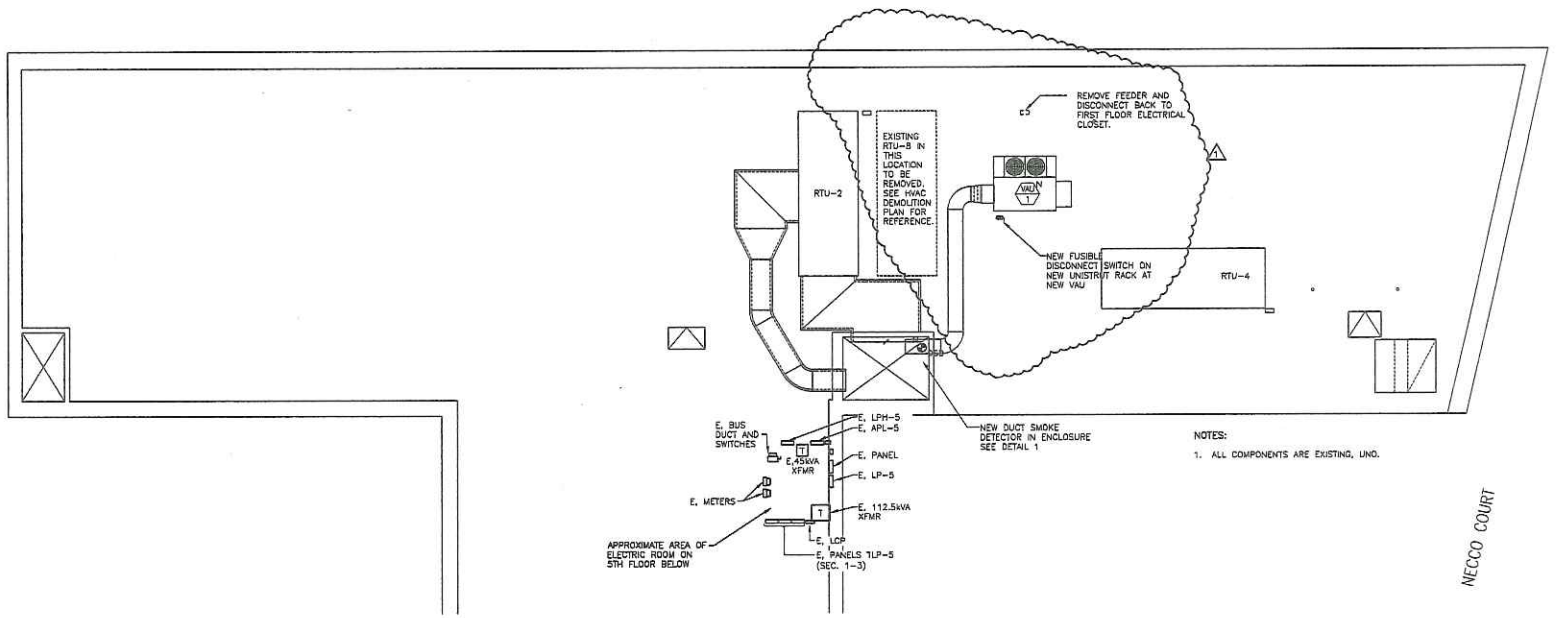
Project No. 21772	Checked SB	Date 12/6/2019
Drawn SB	Approved BW	Scale 1/8" = 1'-0"

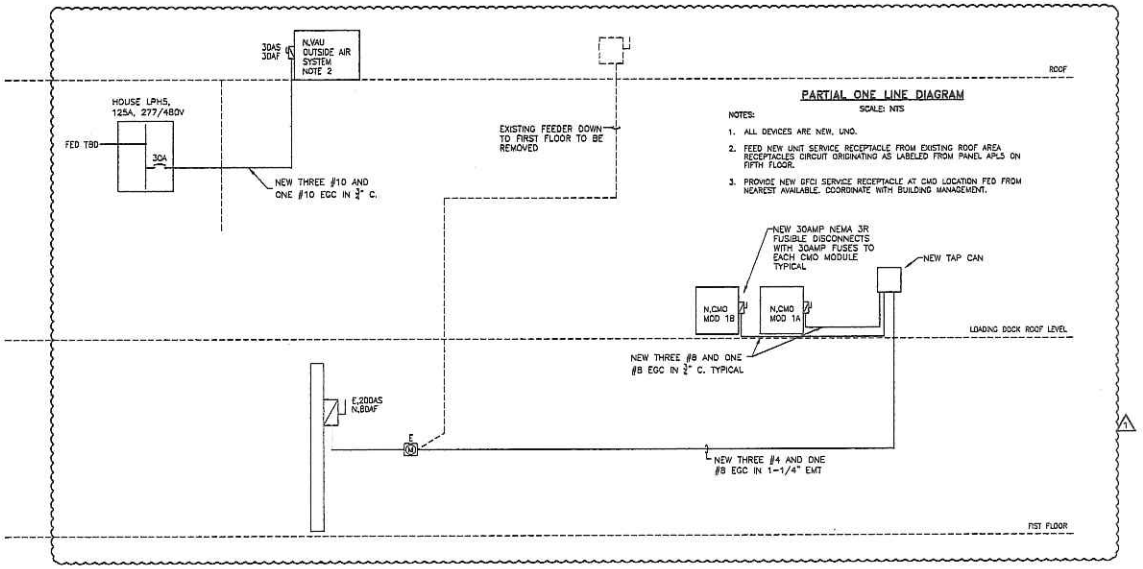
Drawing No.

E3.01

Seal

F:\JOBS\300 A Street Boston, MA_Base Building\1st Floor VRF System\Schools\E3.01 ELECTRICAL 1ST FLOOR POWER PLAN.dwg





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ADDENDUMS

No.	Date	Description	By
1	9/8/20	CMO-1 Landlord Relocation	

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

ELECTRICAL ROOF POWER PLAN
Drawing Title

Project No. 21772	Checked SB	Date 12/6/2019
Drawn SB	Approved BW	Scale 1/8" = 1' 0"

Seal

Drawing No. E3.02

VENTILATION AIR UNIT SCHEDULE

UNIT #	MANUFACTURER	MODEL #	SUPPLY FAN PERFORMANCE DATA					COOLING COIL– REMOTE AIR COOLED DX							HEATING DATA – INDIRECT GAS					ELECTRICAL DATA					CABINET SOUND POWER DATA							
			SUPPLY CFM	O.A. CFM	EXT. S.P.	V/PH/HZ	FAN HP	ROWS	FPI	CAPACITY (MBH) TOTAL	CAPACITY (MBH) SENS.	ENT. DB°	ENT. WB°	LVG DB°	LVG WB°	MODULATING (TURN/DOWN)	TYPE	MBH INPUT	MBH OUTPUT	E.A.T. °F	L.A.T. °F	MCA	FUSE SIZE	FLA	MOP	V/ø/HZ		62.5	125	250	500	1000	2000	4000	8000
VAU–1	MITSUBISHI PREMISYS	MP–1–3L–120–1M	2400	2400	1.0"	480/3/60	1–1/2	4	12	134.6	89.3	91.0	73.0	57.2	56.5	13:1	NAT.GAS	250	200	0	83.2	23.5	30	18.8	30	480/3/60	DISCHARGE LW (dB)	71	71	81	77	74	71	73	65
																											INLET LW (dB)	–	–	–	–	–	–	–	–

CITY-MULTI SYSTEM UNIT SCHEDULE

INDOOR AIR CONDITIONING UNIT

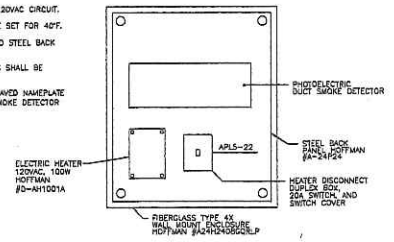
UNIT#	MANUFACTURER	MODEL#	V–PH (60Hz)	NOMINAL TONS	NOMINAL CFM	WATTS	AMPS
CMI–1	MITSUBISHI	PEFY–P48NMAU–E3	208/230–1	4.0	989–1412	340	3.41
CMI–2	MITSUBISHI	PEFY–P48NMAU–E3	208/230–1	4.0	989–1412	340	3.41
CMI–3	MITSUBISHI	PEFY–P48NMAU–E3	208/230–1	4.0	989–1412	340	3.41
CMI–4	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–5	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–6	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–7	MITSUBISHI	PEFY–P24NMAU–E3	208/230–1	2.0	618–883	170	2.73
CMI–8	MITSUBISHI	PEFY–P12NMAU–E3	208/230–1	1.0	265–371	90	1.20
CMI–9	MITSUBISHI	PEFY–P08NMAU–E3	208/230–1	0.75	212–300	60	1.05

AIR COOLED CONDENSING UNIT

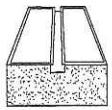
UNIT#	MANUFACTURER	MODEL#	V–PH (60Hz)	NOMINAL TONS	MCA	MFS	NET COOLING MBH	TOTAL HEATING MBH	REMARKS
CMO–1	MITSUBISHI	PURY–EP240YSNU–A	–	20.0	–	–	–	–	
	MITSUBISHI	PURY–EP120YNU–A	480/3	10.0	19	30	120.0	135.0	
	MITSUBISHI	PURY–EP120YNU–A	480/3	10.0	19	30	120.0	135.0	

UNIT#	MODEL#	WATTS	AMPS
BCCU–1	CMB–P101NU–JA1	255	1.82

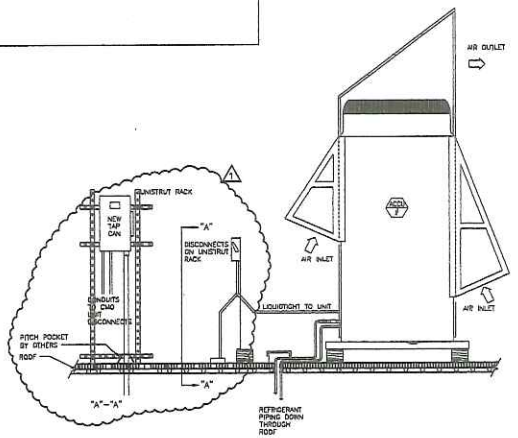
NOTES:
1) HEATER SHALL BE WIRED TO 120VAC CIRCUIT.
2) HEATER THERMOSTAT SHALL BE SET FOR 40°F.
3) HEATER SHALL BE MOUNTED TO STEEL BACK PANEL.
4) ALL ENCLOSURE PENETRATIONS SHALL BE PROPERLY SEALED
5) ENCLOSURE SHALL HAVE ENGRAVED NAMEPLATE MARKED "FIRE ALARM DUCT SMOKE DETECTOR MUA–1 SUPPLY" IN RED



1 **HEATED ENCLOSURE FOR MUA DUCT SMOKE DETECTOR UNIT**
SCALE: NTS



2 **TYPICAL CONDUIT ROOF SUPPORT SLEEPER**
SCALE: NTS



3 **TYPICALROOF MOUNTED UNISTRUT RACK FEEDS TO ROOF UNITS**
SCALE: NTS

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ADDENDUMS

No.	Date	Description	By
1	9/8/20	CMO-1 Landlord Relocation	

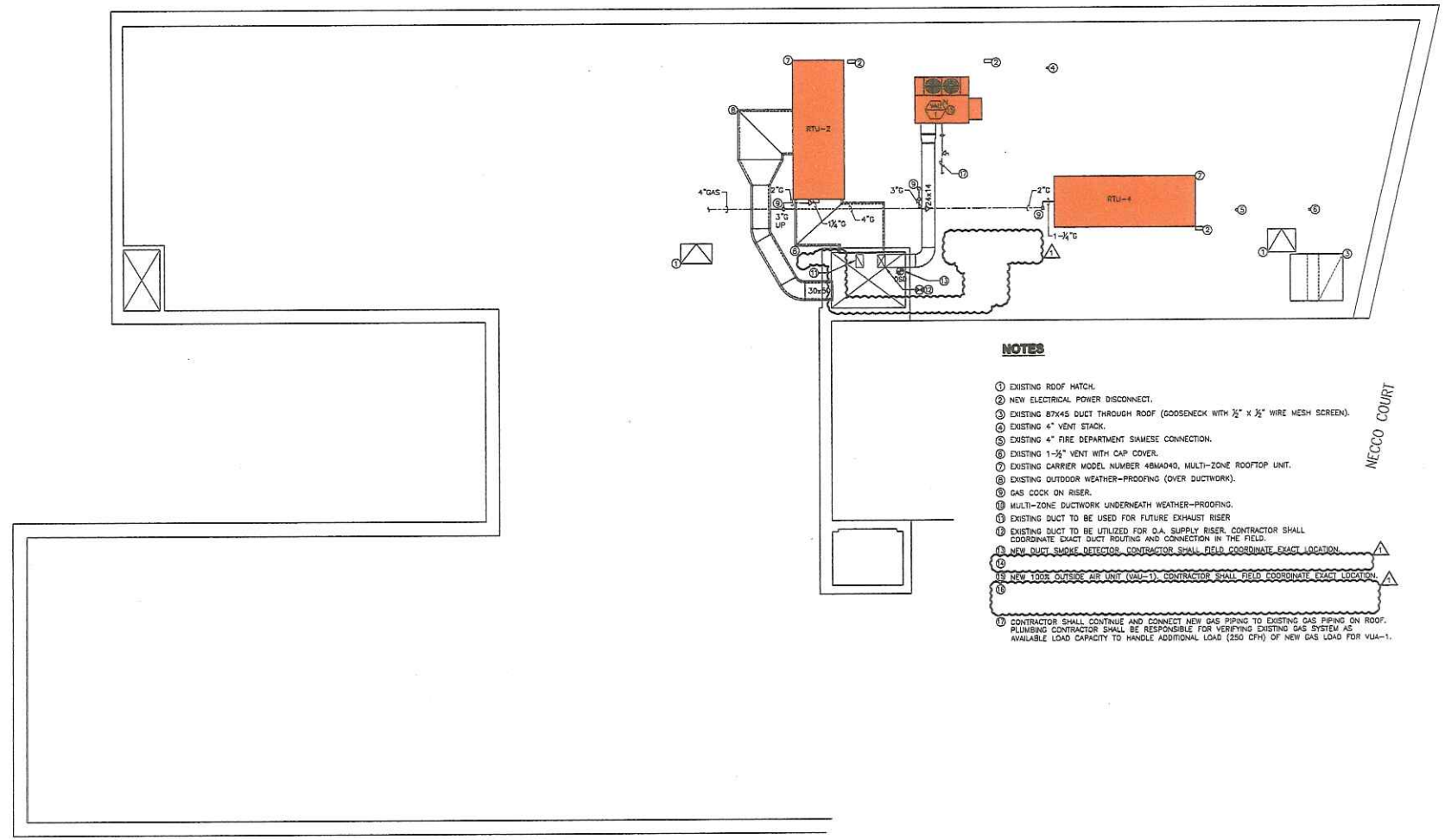
1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

ELECTRICAL
ONE LINE DIAGRAM, DETAILS AND SCHEDULES
Drawing Title

Project No. 21772	Checked SB	Date 12/6/2019
Drawn SB	Approved BW	Scale 1/8" = 1'-0"

Drawing No. E7.00

Seal



NOTES

1. EXISTING ROOF HATCH.
2. NEW ELECTRICAL POWER DISCONNECT.
3. EXISTING 87X45 DUCT THROUGH ROOF (GOOSENECK WITH ½" X ½" WIRE MESH SCREEN).
4. EXISTING 4" VENT STACK.
5. EXISTING 4" FIRE DEPARTMENT SIAMESE CONNECTION.
6. EXISTING 1-½" VENT WITH CAP COVER.
7. EXISTING CARRIER MODEL NUMBER 48MA040, MULTI-ZONE ROOFTOP UNIT.
8. EXISTING OUTDOOR WEATHER-PROOFING (OVER DUCTWORK).
9. GAS COCK ON RISER.
10. MULTI-ZONE DUCTWORK UNDERNEATH WEATHER-PROOFING.
11. EXISTING DUCT TO BE USED FOR FUTURE EXHAUST RISER
12. EXISTING DUCT TO BE UTILIZED FOR O.A. SUPPLY RISER. CONTRACTOR SHALL COORDINATE EXACT DUCT ROUTING AND CONNECTION IN THE FIELD.
13. NEW DUCT SMOKE DETECTOR. CONTRACTOR SHALL FIELD COORDINATE EXACT LOCATION. △1
14.
15. NEW 100% OUTSIDE AIR UNIT (VAU-1). CONTRACTOR SHALL FIELD COORDINATE EXACT LOCATION. △1
16.
17. CONTRACTOR SHALL CONTINUE AND CONNECT NEW GAS PIPING TO EXISTING GAS PIPING ON ROOF. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXISTING GAS SYSTEM AS AVAILABLE LOAD CAPACITY TO HANDLE ADDITIONAL LOAD (250 CFH) OF NEW GAS LOAD FOR VUA-1.

① HVAC PARTIAL ROOF PLAN
1/8" = 1'-0"

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ADDENDUMS

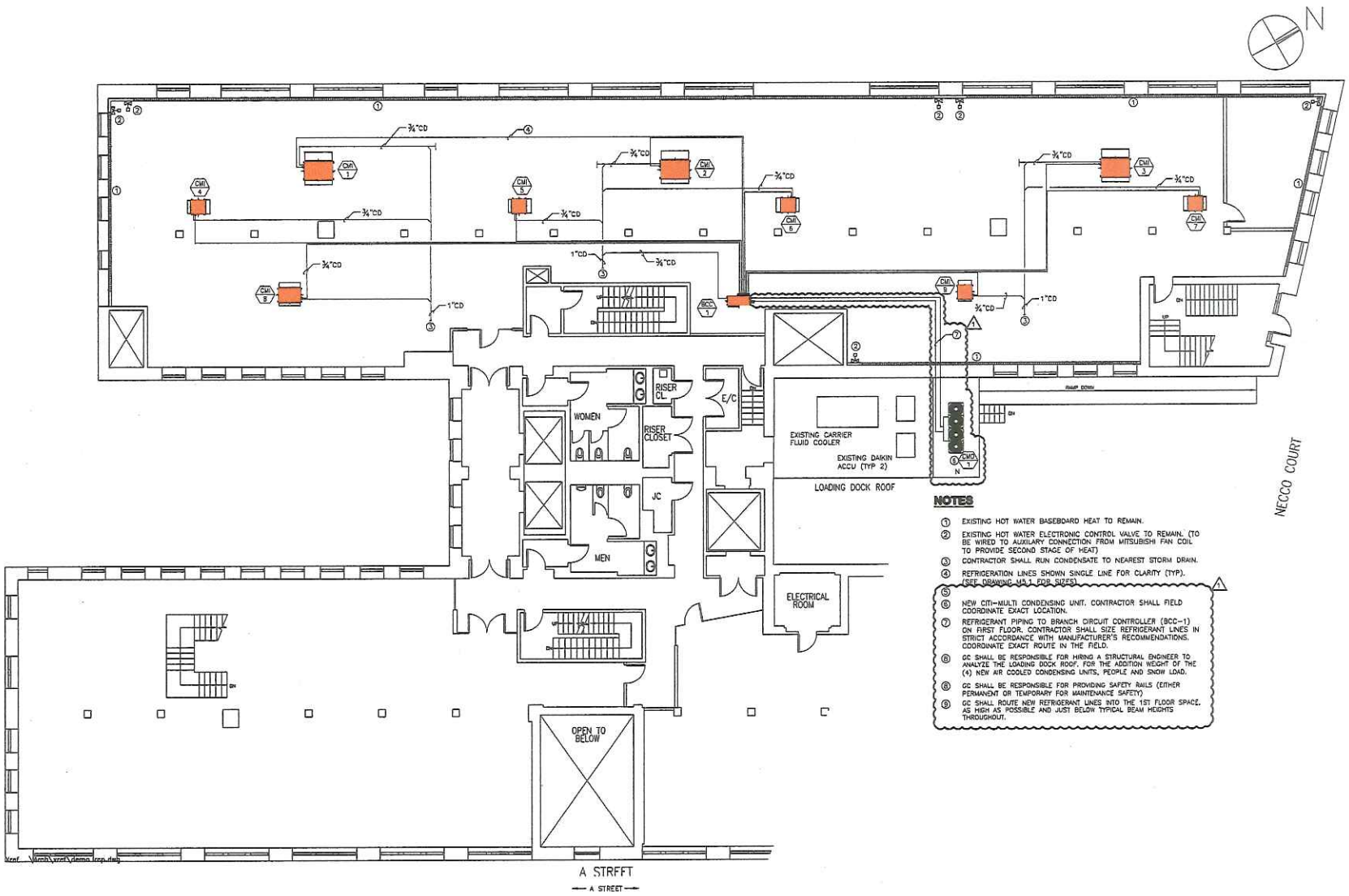
No.	Date	Description	By
△1	9/8/20	CMO-1 Landlord Relocation	

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

MECHANICAL ROOF PLAN
Drawing Title

Project No. 21772	Checked BSK	Date 12/6/2019
Drawn ZDA	Approved MNF	Scale 1/8" = 1'-0"

Drawing No.
M3.06
Seal



NOTES

1. EXISTING HOT WATER BASEBOARD HEAT TO REMAIN.
2. EXISTING HOT WATER ELECTRONIC CONTROL VALVE TO REMAIN. (TO BE WIRED TO AUXILARY CONNECTION FROM MITSUBISHI FAN COIL TO PROVIDE SECOND STAGE OF HEAT)
3. CONTRACTOR SHALL RUN CONDENSATE TO NEAREST STORM DRAIN.
4. REFRIGERATION LINES SHOWN SINGLE LINE FOR CLARITY (TYP). (SEE DRAWING M3.1 FOR SIZES)
5.
6. NEW CITI-MULTI CONDENSING UNIT. CONTRACTOR SHALL FIELD COORDINATE EXACT LOCATION.
7. REFRIGERANT PIPING TO BRANCH CIRCUIT CONTROLLER (BCC-1) ON FIRST FLOOR. CONTRACTOR SHALL SIZE REFRIGERANT LINES IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. COORDINATE EXACT ROUTE IN THE FIELD.
8. GC SHALL BE RESPONSIBLE FOR HIRING A STRUCTURAL ENGINEER TO ANALYZE THE LOADING DOCK ROOF, FOR THE ADDITION WEIGHT OF THE (4) NEW AIR COOLED CONDENSING UNITS, PEOPLE AND SNOW LOAD.
9. GC SHALL BE RESPONSIBLE FOR PROVIDING SAFETY RAILS (EITHER PERMANENT OR TEMPORARY FOR MAINTENANCE SAFETY)
10. GC SHALL ROUTE NEW REFRIGERANT LINES INTO THE 1ST FLOOR SPACE, AS HIGH AS POSSIBLE AND JUST BELOW TYPICAL BEAM HEIGHTS THROUGHOUT.

1 HVAC 1ST FLOOR DEMOLITION PLAN
1/8" = 1'-0"

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ADDENDUMS

No.	Date	Description	By
1	8/8/20	CMO-1 Landlord Relocation	

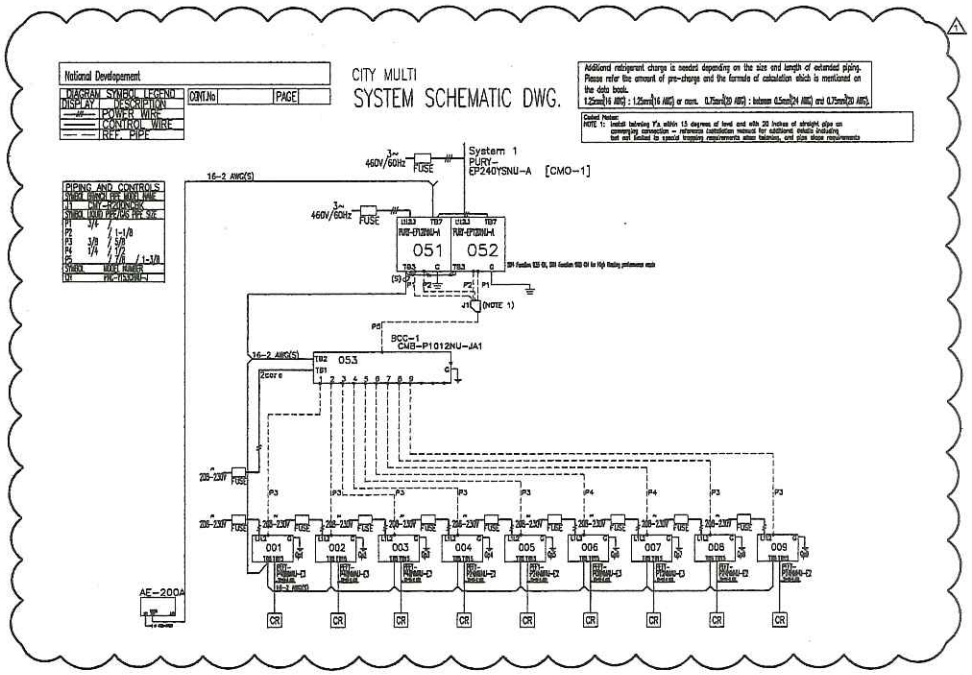
1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

MECHANICAL
1ST FLOOR PIPING PLAN
Drawing Title

Project No.	Checked	Date
21772	MNF	12/6/2019
Drawn: BSK	Approved: MNF	Scale: 1/8" = 1'-0"

Drawing No.
M4.01
Seal

F:\JOBS\300 A Street Boston, MA_Base\Revit\1st Floor VRF System\Mechanical\M4.01 MECHANICAL 1ST FLOOR PIPING PLAN.dwg



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ADDENDUMS

No.	Date	Description	By
1	9/8/20	CMO-1 Landlord Relocation	

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA

Project

MECHANICAL
CITY-MULTI PIPING SCHEMATIC

Drawing Title

Project No.	Checked	Date
21772	MNF	12/6/2019
Drawn: BSK	Approved: MNF	Scale: NONE

Drawing No.

M5.01

Seal

VENTILATION AIR UNIT SCHEDULE

UNIT #	MANUFACTURER	MODEL #	SUPPLY FAN PERFORMANCE DATA					COOLING COIL- REMOTE AIR COOLED DX							HEATING DATA – INDIRECT GAS						ELECTRICAL DATA					CABINET SOUND POWER DATA								
			SUPPLY CFM	O.A. CFM	EXT. S.P.	V/PH/HZ	FAN HP	ROWS	FPI	CAPACITY (MBH) TOTAL	CAPACITY (MBH) SENS.	ENT. DB°	ENT. WB°	LVG DB°	LVG WB°	MODULATING (TURN/DOWN)	TYPE	MBH INPUT	MBH OUTPUT	E.A.T. °F	L.A.T. °F	MCA	FUSE SIZE	FLA	MOP	V/ø/HZ		62.5	125	250	500	1000	2000	4000	8000
VAU-1	MITSUBISHI PREMISYS	MP-1-3L-120-1M	2400	2400	1.0"	480/3/60	1-1/2	4	12	134.6	89.3	91.0	73.0	57.2	56.5	13:1	NAT.GAS	250	200	0	83.2	23.5	30	18.8	30	480/3/60	DISCHARGE LW (dB)	71	71	81	77	74	71	73	65
																											INLET LW (dB)	–	–	–	–	–	–	–	–

PROVIDE UNIT WITH THE FOLLOWING OPTIONS:
1. WEATHERHOOD: DOWNTURNED HOOD
2. 100% OUTDOOR AIR UNIT WITH LOW LEAKAGE TWO POSITION MOTORIZED DAMPER
3. 120 V FACTORY WIRED CONVENIENCE OUTLET
4. PREMIUM EFFICIENT SUPPLY FAN MOTOR
5. SUPPLY FILTERS – 2" MERV8 AND MERV13, 8-20x20x2
6. DIRTY FILTER SWITCH WITH OUTPUT TO BCS
7. FACTORY MOUNTED UNIT DISCONNECT
8. DDC CONTROLLER WITH BCS INTEGRATION
9. SUPPLY FAN VFD
10. AIRFLOW MONITORING – OUTDOOR
11. HAIL GUARDS

CITY MULTI SEQUENCE OF OPERATIONS

c. SPLIT SYSTEMS (CMI-#, CMO-#)

i. GENERAL

1. SPLIT SYSTEMS CONSIST OF AN AIR COOLED CONDENSING UNIT, A FAN, A DX HEATING/COOLING COIL, SECONDARY DRAIN PAN LEAK DETECTION, DISTRIBUTION DUCTWORK/DIFFUSERS, REFRIGERANT/CONDENSATE PIPING, CONTROLS, AND CONTROL WIRING
2. UNITS SHALL BE CONTROLLED VIA STAND-ALONE LOCAL REMOTE CONTROLLERS MODEL PAC-YT53CRAU WITH AE-200A CENTRAL CONTROLLER FOR GLOBAL ADJUSTMENTS.

ii. OCCUPIED MODE

1. INDOOR UNIT FAN SHALL ENERGIZE AND RUN CONTINUOUSLY WITH AIR COOLED CONDENSING UNIT AND/OR BC CONTROLLER FUNCTIONING AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SET POINTS OF 75° F IN THE COOLING MODE, AND 70° F IN THE HEATING MODE. THE SECOND STAGE OF HEATING SHALL BE THE EXISTING PERIMETER HOT WATER BASEBOARD.

iii. UNOCCUPIED MODE

1. INDOOR UNIT FAN SHALL BE OFF, ONLY ENERGIZING IN CONJUNCTION WITH THE AIR COOLED CONDENSING UNIT AND/OR BC CONTROLLER AS REQUIRED TO MAINTAIN NIGHT SETBACK TEMPERATURE SET POINTS OF 85° F IN THE COOLING MODE, AND 60° F IN THE HEATING MODE.

iv. ALARMS/MONITORS

1. IF CONDENSATE IS DETECTED IN THE INDOOR UNIT SECONDARY DRAIN PAN, THE ASSOCIATED F.C.U. SHALL BE SHUT DOWN AND AN ALARM SHALL BE SENT TO THE FACILITY EXISTING CONTROL SYSTEM FRONT END.

d. VENTILATION AIR UNIT (VAU-1)

i. GENERAL

1. VAU-1 SHALL CONSIST OF PACKAGED ROOF-MOUNTED UNIT, WITH 24" ROOF CURB, A SUPPLY FAN, DX COOLING, GAS HEAT, HOT GAS BYPASS, DISTRIBUTION DUCTWORK, CONTROLS, AND CONTROL WIRING, ETC...AS SPECIFIED WITHIN PLANS.

ii. OCCUPIED/UNOCCUPIED MODES SHALL COINCIDE WITH OCCUPANCY SCHEDULE AS DETERMINED AT THE CENTRAL CONTROLLER

iii. OCCUPIED MODE

1. OUTDOOR AIR INTAKE LOW LEAKAGE MOTORIZED DAMPER SHALL OPEN. UPON CONFIRMATION DAMPER HAVE OPENED VIA END SWITCH, THE UNIT SUPPLY FAN SHALL ENERGIZE VENTILATING THE SPACE.

iii. UNOCCUPIED MODE

1. OUTDOOR AIR INTAKE LOW LEAKAGE MOTORIZED DAMPER SHALL SHUT AND UNIT FAN SHALL BE "OFF"

vi. ALARMS/MONITORS

1. IF UNIT IS CALLED TO RUN AND FAN(S) CURRENT TRANSFORMER DOES NOT INDICATED AMPERAGE DRAW, THE UNIT SHALL BE SHUTDOWN AN AND AN ALARM SHALL BE SENT TO THE FACILITY CONTROLS SYSTEM FRONT END.
2. UPON DETECTION OF SMOKE, VIA DUTDOOR AIR OR RETURN AIR DUCT SMOKE DETECTOR, THE UNIT SHALL BE SHUT DOWN AND, IF APPLICABLE, THE LOW LEAKAGE MOTORIZED DAMPERS SHALL CLOSE.

CITY-MULTI SYSTEM UNIT SCHEDULE

INDOOR AIR CONDITIONING UNIT

UNIT#	MANUFACTURER	MODEL#	V-PH (60HZ)	NOMINAL TONS	NOMINAL CFM	WATTS	AMPS
CMI-1	MITSUBISHI	PEFY-P48NMAU-E3	208/230-1	4.0	989-1412	340	3.41
CMI-2	MITSUBISHI	PEFY-P48NMAU-E3	208/230-1	4.0	989-1412	340	3.41
CMI-3	MITSUBISHI	PEFY-P48NMAU-E3	208/230-1	4.0	989-1412	340	3.41
CMI-4	MITSUBISHI	PEFY-P24NMHU-E3	208/230-1	2.0	618-883	170	2.73
CMI-5	MITSUBISHI	PEFY-P24NMHU-E3	208/230-1	2.0	618-883	170	2.73
CMI-6	MITSUBISHI	PEFY-P24NMAHU-E3	208/230-1	2.0	618-883	170	2.73
CMI-7	MITSUBISHI	PEFY-P24NMAHU-E3	208/230-1	2.0	618-883	170	2.73
CMI-8	MITSUBISHI	PEFY-P12NMAU-E3	208/230-1	1.0	265-371	90	1.20
CMI-9	MITSUBISHI	PEFY-P08NMAU-E3	208/230-1	0.75	212-300	60	1.05

AIR COOLED CONDENSING UNIT

UNIT#	MANUFACTURER	MODEL#	V-PH (60HZ)	NOMINAL TONS	MCA	MFS	NET COOLING MBH	TOTAL HEATING MBH	REMARKS
CMO-1	MITSUBISHI	PURY-EP240YSNU-A	–	20.0	–	–	–	–	1 2 3 4 5 6
	MITSUBISHI	PURY-EP120YNU-A	480/3	10.0	19	30	120.0	135.0	
	MITSUBISHI	PURY-EP120YNU-A	480/3	10.0	19	30	120.0	135.0	

UNIT#	MODEL#	WATTS	AMPS
BCU-1	CMB-P1012NU-JA1	255	1.82

GENERAL NOTES:
1. CITY-MULTI SYSTEM & CONTROLS SHALL BE INSTALLED BY A FACTORY APPROVED MITSUBISHI CONTRACTOR IN STRICT ACCORDANCE PER MANUFACTURER'S INSTRUCTIONS & RECOMMENDATIONS.
2. CONTRACTOR SHALL PROVIDE DISCONNECT SWITCH.
3. PROVIDE FBM SERIES FILTER BOXES ON CMI UNITS.

KEY NOTES:

1. PROVIDE LOCAL REMOTE CONTROLLER PAC-YT53CRAU. REFER TO FLOOR PLAN FOR LOCATIONS AND QUANTITIES.
2. PROVIDE SYSTEM WITH CENTRALIZED SYSTEM AE-200A WITH LICENSE FOR REMOTE MONITORING. ALL FAN COIL (CMI), AIR COOLED CONDENSING UNITS (CMO) TO CENTRALIZED SYSTEM.
3. PROVIDE BALL VALVES ON ALL REFRIGERANT PIPING AT BC CONTROLLER TO ALLOW SYSTEM MAINTENANCE AND UNIT CHANGES WITHOUT SYSTEM SHUT DOWN.
4. PROVIDE LOW AMBIENT CONTROLS.
5. LOCATION OF AIR COOLED CONDENSING UNITS TO BE COORDINATED WITH G.C., ARCHITECT, AND BUILDING MANAGEMENT.
6. PROVIDE BC CONTROLLER (BCC-1) WITH SECONDARY DRAIN PAN WITH LEAK DETECTION.

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ADDENDUMS

No.	Date	Description	By
1	9/8/20	CMO-1 Landlord Relocation	

1ST FLOOR VRF SYSTEM
300 A STREET, BOSTON MA
Project

MECHANICAL SCHEDULES
Drawing Title

Project No.	Checked	Date
21772	MNF	12/6/2019
Drawn: BSK	Approved: MNF	Scale: NONE

Drawing No.
M8.00

Seal

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