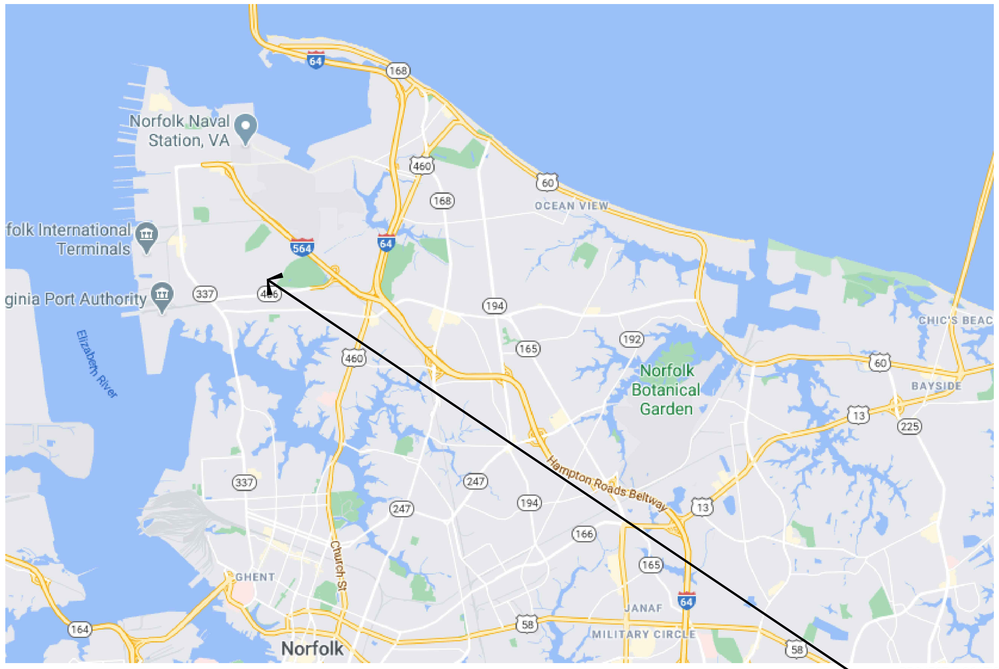
NATO ACT MAKEUP AIR HANDLING UNIT REPLACEMENT

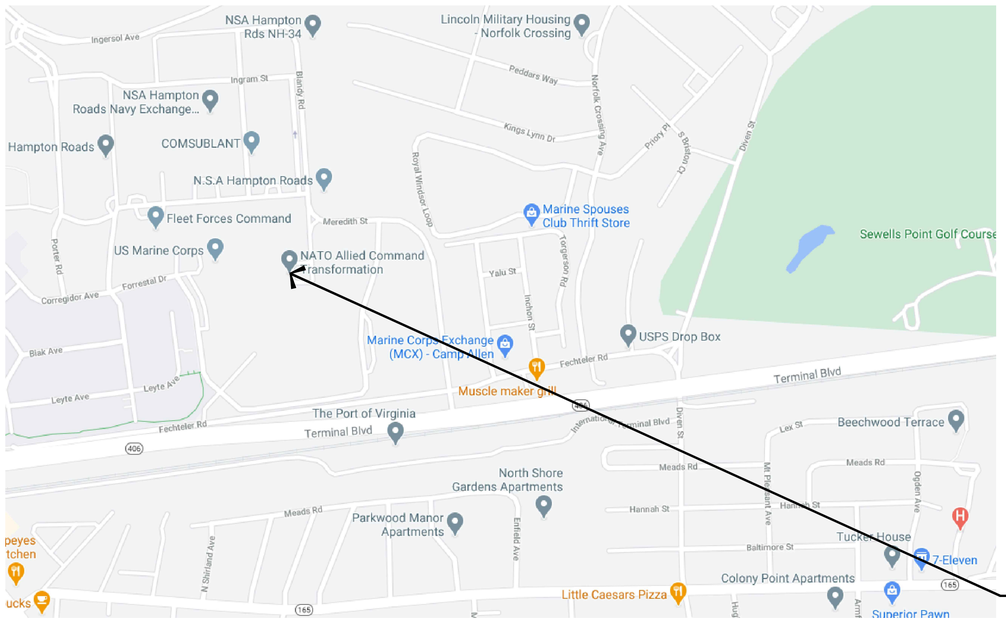
NORFOLK NAVAL STATION
NORFOLK, VIRGINIA
EPROJECTS WO#: -------



NORTH

VICINITY MAP

NOT TO SCALE



NORTH

LOCATION MAP

NOT TO SCALE

PROJECT SUMMARY

THE PROJECT IS LOCATED AT THE NATO ALLIED COMMAND TRANSFORMATION BUILDING ON NAVAL STATION NORFOLK IN NORFOLK, VIRGINIA. THE SCOPE OF WORK INCLUDES THE REMOVAL AND REPLACEMENT OF FIVE MAKE-UP AIR HANDLING UNITS LOCATED ON THE ROOF. THE NEW MAKE-UP AIR HANDLING UNITS WILL UTILIZE WATER COOLED DX FOR COOLING AND RECONNECT TO EXISTING CONDENSER WATER PIPING. NATURAL GAS WILL BE USED FOR HEATING AND WILL REQUIRE NEW GAS PIPING TO BE ROUTED TO THE INDIVIDUAL UNITS FROM THE UTILITY SERVICE ENTRANCE. TO GET NATURAL GAS PIPING TO THE ROOF OF THE FIVE STORY BUILDING, A NEW PIPE CHASE WILL HAVE TO BE BUILT IN A CORNER OFFICE ON FLOORS ONE THROUGH FIVE. EXISTING ELECTRICAL POWER CONNECTIONS WILL BE REUSED TO THE GREATEST EXTENT PRACTICAL.

INDEX OF DRAWINGS

CONTACTS

GENERAL CONTRACTOR

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APPR			
DATE			
DESCRIPTION			
SYM			

NAVFAC

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A/E INFO

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ACTIVITY: XXXXX

SATISFACTORY TO DATE: MM/DD/YY

DES	DRW	CHK
MAW	SMF	DFB

PM/DM --

BRANCH MANAGER

CHIEF ENG/ARCH --

FIRE PROTECTION --

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND - <<AGENCY>>
NORFOLK, VIRGINIA
NORFOLK NAVAL STATION
NORFOLK, VIRGINIA
NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT
TITLE SHEET

SCALE:

EPROJECT NO.: ##########

CONSTR. CONTR. NO. ########-##-#-####

NAVFAC DRAWING NO. ----

SHEET 1 OF 14

G-001

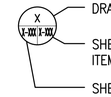
DRAWFORM REVISION: 25 AUGUST 2020

ABBREVIATIONS

AB	ANCHOR BOLT	HYD	HYDRANT
AD	AREA DRAIN	ID	INSIDE DIAMETER
ADJ	ADJACENT , ADJUSTABLE	INCL	INCLUDE
AFF	ABOVE FINISHED FLOOR	INSUL	INSULATION
AFG	ABOVE FINISHED GRADE	INT	INTERIOR, INTERMEDIATE
AP	ACCESS PANEL		INTERSECTION
BD	BOARD	INV	INVERT
BEL	BELOW	IP	INLET PROTECTION
BET	BETWEEN	JT	JOINT
BFG	BELOW FINISHED GRADE	KIT	KITCHEN
BIT	BITUMINOUS	KO	KNOCKOUT
BLDG	BUILDING	L	LENGTH
BLKG	BLOCKING	LAV	LAVATORY
BOT	BOTTOM	LL	LIVE LOAD
BRG	BEARING	LLV	LONG LEG VERTICAL
BS	BOTH SIDES	LT	LIGHT
BSMT	BASEMENT	MAS	MASONRY
BUR	BUILT-UP ROOFING	MAX	MAXIMUM
BW	BOTH WAYS	MCJ	MASONRY CONTROL JOINT
CAB	CABINET	MECH	MECHANICAL
CER	CERAMIC	MET	METAL
CF	CUBIC FOOT	MFR	MANUFACTURER
CFCI	CONTRACTOR-FURNISHED	MDF	MEDIUM-DENSITY FIBERBOARD
	CONTRACTOR-INSTALLED	MDO	MEDIUM-DENSITY OVERLAY
CG	CORNER GUARD	MH	MANHOLE
CJ	CEILING JOIST, CONTROL JOINT	MIN	MINIMUM
CLG	CEILING	MO	MASONRY OPENING
CLR	CLEAR(ANCE)	MT	MOUNT
CMU	CONCRETE MASONRY UNIT	MTL	MATERIAL
CO	CLEANOUT	(N)	NEW
COL	COLUMN	NIC	NOT IN CONTRACT
CONC	CONCRETE	NLB	NON LOAD BEARING
CONT	CONTINUOUS, CONTINUE	NTS	NOT TO SCALE
CPT	CARPET	OC	ON CENTER
CRS	COURSE(S)	OD	OUTSIDE DIAMETER
CSMT	CASEMENT		OVERFLOW ROOF DRAIN
CT	CERAMIC TILE	OFCI	OWNER-FURNISHED
CY	CUBIC YARD		CONTRACTOR-INSTALLED
DEMO	DEMOLISH, DEMOLITION	OFOI	OWNER-FURNISHED
DF	DRINKING FOUNTAIN		OWNER-INSTALLED
DH	DOUBLE HUNG	OH	OVERHEAD
DI	DROP INLET	OPP	OPPOSITE (HAND)
DIA	DIAMETER	OSB	ORIENTED STRAND BOARD
DIAG	DIAGONAL	PEJ	PERIMETER EXPANSION JOINT
DIM	DIMENSION	PL	PROPERTY LINE
DIP	DUCTILE IRON PIPE	P.LAM	PLASTIC LAMINATE
DL	DEAD LOAD	PLF	POUNDS PER LINEAR FOOT
DS	DOWNSPOUT	PSF	POUNDS PER SQUARE FOOT
DWG	DRAWING	PSI	POUNDS PER SQUARE INCH
DWR	DRAWER	PT	POINT
(E)	EXISTING	PVC	POLYVINYL CHLORIDE
EJ	EXPANSION JOINT	R	RISER
EL	ELEVATION	RA	RETURN AIR
ELEC	ELECTRIC(AL)	RCP	REINFORCED CONCRETE PIPE
ELEV	ELEVATOR OR ELEVATION	RD	ROOF DRAIN, ROAD
EPB	ELECTRICAL PANEL BOARD	REQ'D	REQUIRED
EQ	EQUAL	RM	ROOM
EQPT	EQUIPMENT	RO	ROUGH OPENING
EWC	ELECTRIC WATER COOLER	ROW	RIGHT OF WAY
EXP	EXPOSED	RWL	RAINWATER LEADER
EXT	EXTERIOR	S/S	STAINLESS STEEL
FA	FIRE ALARM	SAN	SANITARY SEWER
FBO	FURNISHED BY OTHERS	SC	SOLID CORE
FD	FLOOR DRAIN	SD	STORM DRAIN
FE	FIRE EXTINGUISHER	SF	SQUARE FOOT
FEC	FIRE EXTINGUISHER CABINET	SH	SHELF, SHELVING
FHC	FIRE HOSE CABINET	SHT	SHEET
FHMS	FLAT-HEAD MACHINE SCREW	SIM	SIMILAR
FHWS	FLAT-HEAD WOOD SCREW	SMS	SHEET METAL SCREW
FIN	FINISH(ED)	SQ	SQUARE
FJ	FLOOR JOIST, FINGER- JOINT	SCC	STAMPED CONCRETE
FLR	FLOOR	STD	STANDARD
FNDN	FOUNDATION	STL	STEEL
FOC	FACE OF CONCRETE	STR	STRUCTURAL
FOF	FACE OF FINISH	T	TREAD
FOM	FACE OF MASONRY	TC	TOP OF CURVE
FOS	FACE OF STUD	TOF	TOP OF FOOTING
FRT	FIRE-RETARDANT TREATED	TOW	TOP OF WALL
FS	FLOOR SINK	TYP	TYPICAL
FTG	FOOTING	U	URINAL
GA	GAUGE	UON	UNLESS OTHERWISE NOTED
GALV	GALVANIZED	VB	VAPOR BARRIER
GC	GENERAL CONTRACTOR	VDOT	VIRGINIA DEPARTMENT
GL	GLASS, GLAZING		OF TRANSPORTATION
GR	GRADE	VERT	VERTICAL
GSF	GROSS SQUARE FEET	W	WIDE, WIDTH
GWB	GYPSUM WALL BOARD	W/	WITH
GYP	GYPSUM	W/O	WITHOUT
H	HEIGHT	WC	WATER CLOSET
HB	HOSE BIBB	WD	WOOD
HC	HANDICAPPED, HOLLOW CORE	WH	WATER HEATER
HDR	HEADER	WL	WATER LINE
HM	HOLLOW METAL	WM	WATER METER
HOR	HORIZONTAL	WO	WHERE OCCURS
HP	HIGH POINT	WWF	WELDED WIRE FABRIC

SYMBOLS LEGEND

ORIGINATING DETAIL MARKS

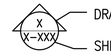


DRAWING OR DETAIL NUMBER

SHEET NUMBER WHERE REFERENCED ITEM IS DRAWN

SHEET NUMBER WHERE REFERENCED ITEM IS CUT

ELEVATION MARK



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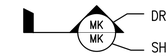
SHEET NUMBER WHERE REFERENCED ITEM IS DRAWN

SECTION MARK



DRAWING NUMBER

SHEET NUMBER WHERE REFERENCED ITEM IS DRAWN

NAME
000

ROOM NAME AND NUMBER

128

DOOR MARK, SEE SHEET A-XXX FOR DOOR AND FRAME SCHEDULE

1

KEYED NOTE

A

WALL TYPE

DIRECTION OF VIEW

INTERIOR ELEVATION MARK

MATERIALS

EARTH
CMU
CONCRETE
GROUT
GYPSUM BOARD
BRICK
WOOD IN ROUGH (CONTINUOUS)
WOOD IN ROUGH (BLOCKING)
WOOD FINISH
PLYWOOD
INSULATION
RIGID INSULATION

C CHANNEL
℄ CENTERLINE
d PENNY
L ANGLE
PL PLATE
ø ROUND, DIAMETER

APPR'
DATE
DESCRIPTION
SYM

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ACTIVITY

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PM/DM --

BRANCH MANAGER

CHIEF ENG/ARCH --

FIRE PROTECTION --

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL STATION
NORFOLK NAVAL STATION

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND - <<AGENCY>>
NORFOLK, VIRGINIA

NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS

SCALE:

EPROJECT NO.: ##########

CONSTR. CONTR. NO.
########-##-#-#####

NAVFAC DRAWING NO.

SHEET 2 OF 14

G-002

DRAWFORM REVISION: 25 AUGUST 2020

MECHANICAL LEGEND

- ITEMS TO DEMOLISH (DASHED, BOLD)
- EXISTING ITEMS (SOLID, LIGHT)
- G — NATURAL GAS PIPING
- G (BURIED) — NATURAL GAS PIPING BELOW GRADE
- (1) — NEW WORK PLAN NOTE
- (1) — DEMOLITION PLAN NOTE
- TAG — EQUIPMENT TAG
- AIRFLOW
- DUCT TURNING UP
- DUCT TURNING DOWN
- 20x10 — RECTANGULAR DUCT DESIGNATION (IN. WIDE X IN. DEPTH)
- RADIUS DUCT ELBOW
- MITERED DUCT ELBOW
- (M) — MOTORIZED DAMPER
- MANUAL VOLUME DAMPER
- PIPE DOWN
- PIPE UP
- POINT OF CONNECTION
- POINT OF DISCONNECTION

MECHANICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AHRI	AIR CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
BTM	BOTTOM
CFM	CUBIC FEET PER MINUTE
CO	CLEANOUT
D	CONDENSATE DRAIN PIPING
(D)	DEMOLITION ITEM TO BE REMOVED
DB	DRY BULB
dB(A)	A' WEIGHTED DECIBELS
DIA	DIAMETER
DN	DOWN
(E)	EXISTING ITEM TO REMAIN
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EWB	ENTERING WET BULB
EF	EXHAUST FAN
ESP	EXTERNAL STATIC PRESSURE
FPM	FEET PER MINUTE
HP	HEAT PUMP / HORSEPOWER
HR	HOUR(S)
HZ	HERTZ
IN.	INCHES
IN.WC	INCHES WATER COLUMN
IU	INDOOR UNIT
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LDB	LEAVING DRY BULB
LWB	LEAVING WET BULB
MAX	MAXIMUM
MBH	1000 BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MERV	MINIMUM EFFICIENCY RATING VALUE
MIN	MINIMUM
MOP	MAXIMUM OVERCURRENT PROTECTION
(N)	NEW ITEM TO BE PROVIDED
NC	NOISE CRITERIA
N/A	NOT APPLICABLE
OAT	OUTDOOR AIR TEMPERATURE
PAK	POST AWARD KICKOFF
PD	PRESSURE DROP
PH	PHASE
QTY	QUANTITY
SA	SUPPLY AIR
T	TEMPERATURE
TAB	TESTING, ADJUSTING, AND BALANCING
TYP	TYPICAL
UFGS	UNIFIED FACILITIES GUIDE SPECIFICATIONS
UL	UNDERWRITERS LABORATORIES
VTR	VENT THROUGH ROOF
W	WATTS
WB	WET BULB
WC	WALL CAP / WATER COLUMN
WG	WATER GAUGE
ø	DIAMETER / PHASE
°F	DEGREES FAHRENHEIT

MECHANICAL GENERAL NOTES

1. DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE PROJECT MANUAL.
2. ALL WORK TO BE IN ACCORDANCE WITH THE UFC-1-200-01 AND ALL STATE AND LOCAL CODES.
3. CONTRACTOR IS ENCOURAGED TO VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH THE PROJECT AND EXISTING CONDITIONS.
4. DRAWINGS HAVE BEEN GENERATED BASED ON ORIGINAL CONSTRUCTION DOCUMENTS AND WHAT IS VISIBLE ON THE SITE. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND DO NOT SHOW ALL TRANSITIONS, OFFSETS, OR FITTINGS. CONTRACTOR SHALL PROVIDE ALL MATERIAL TO PROVIDE FOR A COMPLETE AND FUNCTIONAL SYSTEM.
5. COORDINATE LOCATION OF ALL GAS PIPING WITH STEAM PIPING AND OTHER ROOF MOUNTED EQUIPMENT AND ACCESSORIES INSTALLED BY OTHER TRADES SO AS TO PRESENT A NEAT AND ATTRACTIVE INSTALLATION THROUGHOUT.
6. ARRANGE PIPING AND DUCTWORK ABOVE CEILING IN EXPOSED AREAS AS REQUIRED TO CLEAR STRUCTURE, CONDUIT, LIGHTS, SPRINKLER SYSTEM, ETC., ALLOWING SPACE FOR HANGERS, SUPPORTS, INSULATION, ETC.
7. INSTALL ALL EQUIPMENT SO THAT CODE REQUIRED AND MANUFACTURER RECOMMENDED CLEARANCES ARE PROVIDED. UNLESS OTHERWISE DIRECTED, EQUIPMENT SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
8. PROVIDE MATERIAL AND LABOR TO PERFORM START-UP OF EACH RESPECTIVE ITEM OF EQUIPMENT AND SYSTEM PRIOR TO THE BEGINNING OF TEST, ADJUST, AND BALANCING PROCEDURES.
9. COMPLY STRICTLY WITH MANUFACTURER'S RECOMMENDED PROCEDURES IN STARTING OF MECHANICAL SYSTEMS.
10. ALL CONTROLS SHALL BE COMPATIBLE WITH THE EXISTING BUILDING CONTROLS SYSTEM (THERMOTROL-AUTOMATED LOGIC).

DESIGN CONDITIONS

LOCATION	DRY BULB °F	WET BULB °F	RELATIVE HUMIDITY
SUMMER – EXTERIOR	91.0	78.1	–
SUMMER – INTERIOR	75.0	–	50%
WINTER – EXTERIOR	21.9	–	–
WINTER – INTERIOR	70.0	–	–

REFERENCE CODES AND STANDARDS

1. 2018 INTERNATIONAL BIULDING CODE
2. 2018 INTERNATIONAL MECHANICAL CODE
3. 2018 INTERNATIONAL FUEL GAS CODE
4. UFC-1-200-01
5. UFC-3-401-01
6. UFC-3-410-02
7. UFC-3-430-05

APPR'D | DATE | DESCRIPTION | SYM

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DES: MAW | DRW: SMF | CHK: DFB

PM/DM: –

BRANCH MANAGER

CHIEF ENG/ARCH: –

FIRE PROTECTION: –

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND - <<AGENCY>>
NAVAL STATION
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NORFOLK, VIRGINIA
NORFOLK NAVAL STATION
NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

MECHANICAL LEGEND, ABBREVIATIONS, NOTES, & SCHEDULES

SCALE:

EPROJECT NO.: #########

CONSTR. CONTR. NO.: #######-##-#-#####

NAVFAC DRAWING NO.: ----

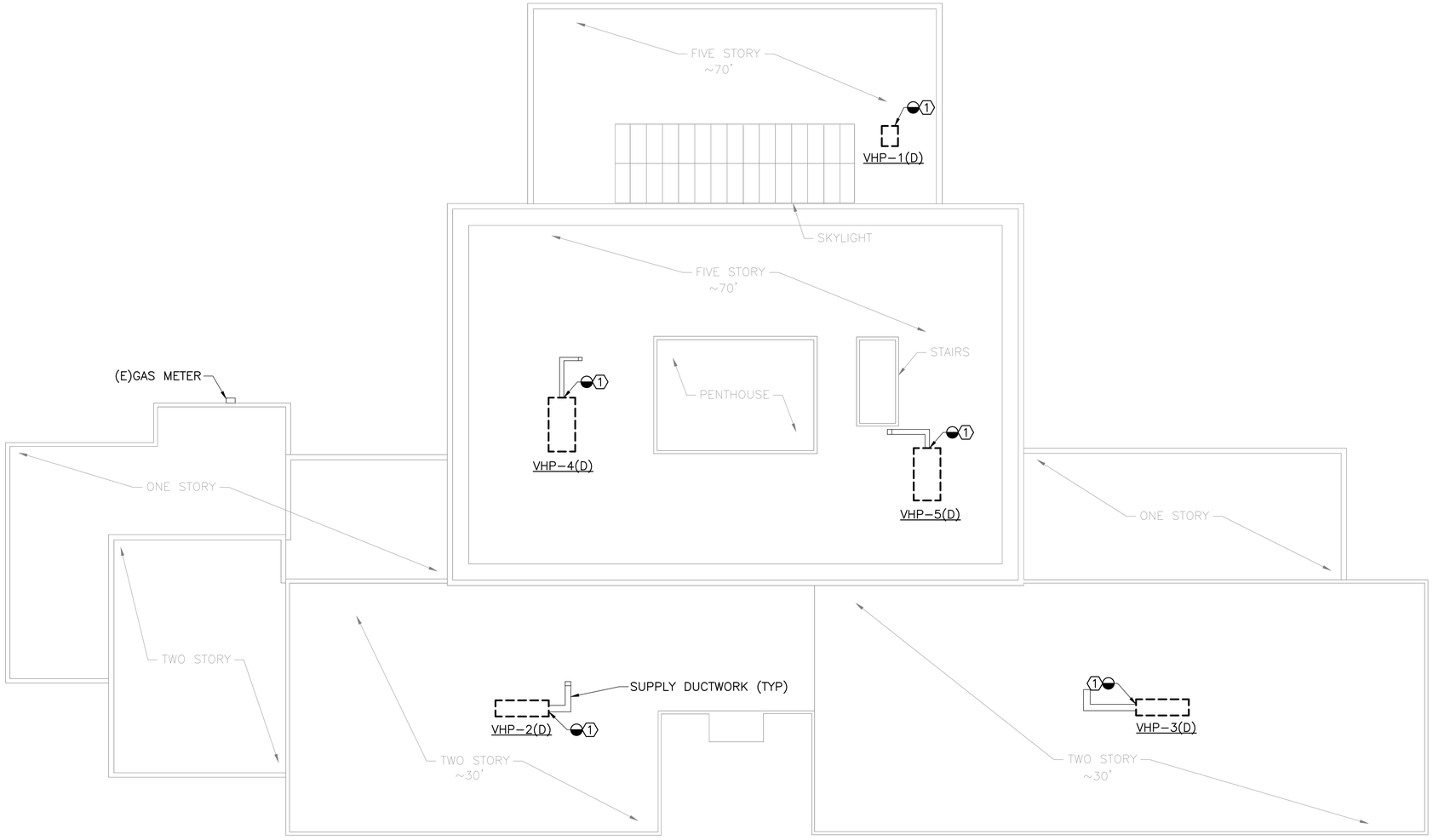
SHEET 3 OF 14

M-001

DRAWFORM REVISION: 25 AUGUST 2020

DEMOLITION KEYED NOTES

1. DEMOLISH EXISTING ROOFTOP UNIT. TEMPORARILY CAP ASSOCIATED SUPPLY DUCTWORK AND CONDENSER WATER PIPING FOR RE-CONNECTION TO NEW EQUIPMENT. ROOF CURBS ARE EXISTING TO REMAIN.



ROOF PLAN - DEMOLITION

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

PROJECT NORTH

GRAPHIC SCALE

0 8 16 24 32 40 48

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

APPR | DATE | DESCRIPTION | SYM

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NAVAL STATION
NORFOLK NAVAL STATION

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NORFOLK, VIRGINIA

NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

MECHANICAL DEMOLITION PLAN

SCALE:

EPROJECT NO.: #########

CONSTR. CONTR. NO.
#######-##-#-####

NAVFAC DRAWING NO.

SHEET 4 OF 14

MD101

DRAWFORM REVISION: 25 AUGUST 2020

NEW WORK KEYED NOTES

1. PROVIDE ROOFTOP EQUIPMENT AS SCHEDULED WITH SUPPLY DUCTWORK TRANSITIONS AS NECESSARY TO CONNECT TO EXISTING DUCT SYSTEM. RECONNECT TO EXISTING CONDENSER WATER SUPPLY AND RETURN PIPING AND PROVIDE NEW BALANCING VALVE KIT. PROVIDE NATURAL GAS PRESSURE REGULATOR AT EQUIPMENT CONNECTION.
2. PROVIDE EQUIPMENT CURB ADAPTERS AS REQUIRED TO SUPPORT NEW UNITS IN ON EXISTING ROOF CURBS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. CONNECT NEW NATURAL GAS PIPE CONNECTIONS TO EXISTING PIPE HEADER AT UTILITY ENTRANCE. SEE GAS RISER DIAGRAM.
4. EXTEND EXISTING FABRICATED ACCESS STAIR AS NECESSARY TO INSTALL NEW GAS PIPING.
5. EXTEND EXISTING PIPE RACK SUPPORTS TO SUPPORT GAS PIPING. PROVIDE ROOF PIPING SUPPORT BLOCKS WHERE USE OF EXISTING PIPE RACK IN NOT PRACTICAL.
6. ROUTE 1"ø G FROM CRAWLSPACE UP TO 5TH FLOOR CEILING WITHIN NEW 2-HOUR RATED CHASE. FIRESTOP ALL FLOOR PENETRATIONS.
7. ROUTE 1"ø G IN CRAWLSPACE TO RISER FLOOR PENETRATION. SLEEVE AND SEAL EXTERIOR WALL PENETRATION WATER TIGHT.
8. TRANSITION UNDERGROUND GAS PIPING TO MINIMUM 18" ABOVE FINISHED GRADE. SEE ANODELESS RISER DETAIL ON SHEET M-502.
9. ROUTE 1"ø G ABOVE CEILING TO ROOF PENETRATION LOCATION INDICATED. PROVIDE PIPING ROOF CURB. SEE DETAIL.
10. PROVIDE ALUMINUM DOWNSPOUT TO COVER GAS PIPING UP THE BUILDING EXTERIOR WALL. MATCH EXISTING BUILDING FINISHES.

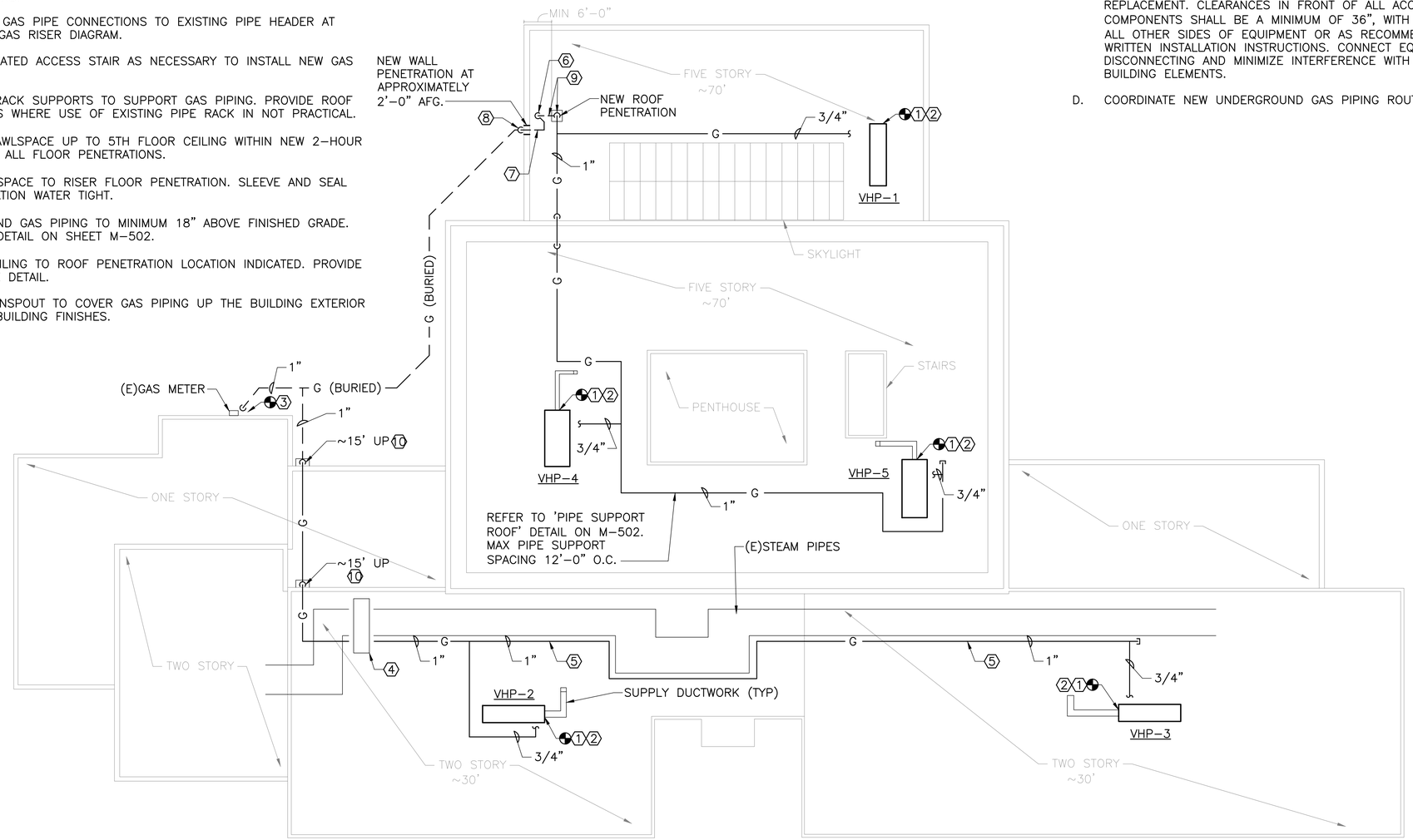
NEW WORK GENERAL NOTES

A. CUT, DRILL, AND SLEEVE OPENINGS WHERE REQUIRED, IN EXISTING CONSTRUCTION FOR INSTALLATION OF NEW EQUIPMENT. DO NOT PENETRATE OR DAMAGE STRUCTURAL FEATURES OF THE BUILDING. FLASH EXTERIOR OPENINGS WATER TIGHT.

B. PROVIDE ALL EQUIPMENT WITH MANUFACTURER'S RECOMMENDED SUPPORTS, NOISE AND VIBRATION ISOLATION. ALLOW FOR OFFSETS AS REQUIRED. LOCATIONS OF ITEMS SHOWN ON THESE DRAWINGS ARE APPROXIMATE.

C. LOCATE ALL EQUIPMENT TO FACILITATE TYPICAL SERVICING, MAINTENANCE, AND REPLACEMENT. CLEARANCES IN FRONT OF ALL ACCESS PANELS OR SERVICEABLE COMPONENTS SHALL BE A MINIMUM OF 36", WITH AT LEAST 24" CLEAR AROUND ALL OTHER SIDES OF EQUIPMENT OR AS RECOMMENDED BY THE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. CONNECT EQUIPMENT FOR EASE OF DISCONNECTING AND MINIMIZE INTERFERENCE WITH OTHER INSTALLATIONS AND BUILDING ELEMENTS.

D. COORDINATE NEW UNDERGROUND GAS PIPING ROUTING WITH EXISTING UTILITIES.



ROOF PLAN - NEW WORK

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

PROJECT NORTH

GRAPHIC SCALE
0 8 16 24 32 40 48
SCALE: 1/16" = 1'-0"

APPR	
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NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT
NORFOLK, VIRGINIA

MECHANICAL NEW WORK PLAN

SCALE:

EPROJECT NO.: #########

CONSTR. CONTR. NO. #######-##-#-#####

NAVFAC DRAWING NO. ----

SHEET 5 OF 14

M-101

DRAWFORM REVISION: 25 AUGUST 2020

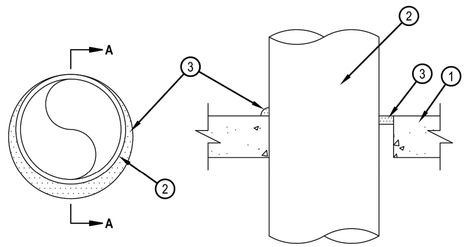
CAJ 1291

CLASSIFIED C UL US

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115

System No. C-AJ-1291

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 Hr
	FTH Rating — 0 Hr



SECTION A-A

1. Floor or Wall Assembly — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 30-7/8 in. (784 mm). See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through-Penetrant — One metallic pipe or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe or conduit and periphery of opening shall be min 0 in. to max 7/8 in. (22 mm). Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or conduits may be used:
   A. Steel Pipe — Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
   C. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. Conduit — Nom 6 in. (152 mm) diam (or smaller) steel conduit.
   F. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT).
3. Fill, Void or Cavity Material* — Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At the point contact location between pipe and concrete, a min 1/4 in. (6 mm) diam bead of fill material shall be applied at the concrete/pipe interface on the top surface of floor and on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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January 07, 2015

FIRESTOP FLOOR PENETRATION DETAIL

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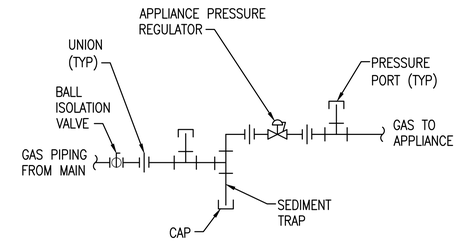

GAS REGULATOR DETAIL

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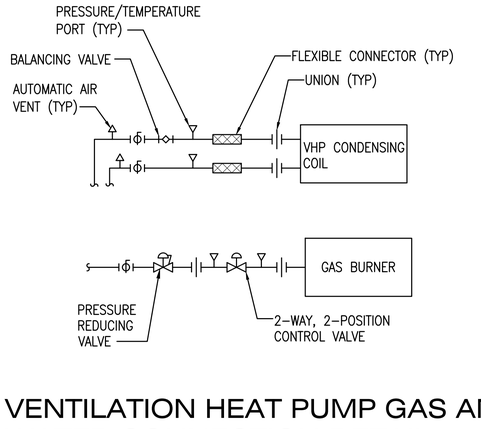
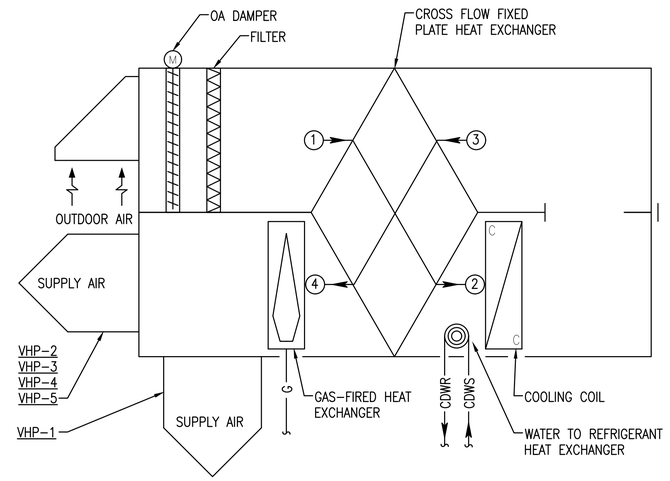


VENTILATION HEAT PUMP GAS AND WATER CONNECTION DETAIL

NOT TO SCALE



DEDICATED OUTDOOR AIR UNIT DIAGRAM

NOT TO SCALE

TYP OF VHP-1 THROUGH VHP-5

BEAM CLAMP ATTACHMENT

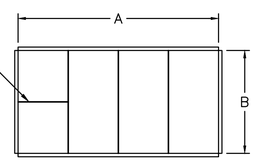
NOT TO SCALE

CLEVIS HANGER DETAIL

NOT TO SCALE

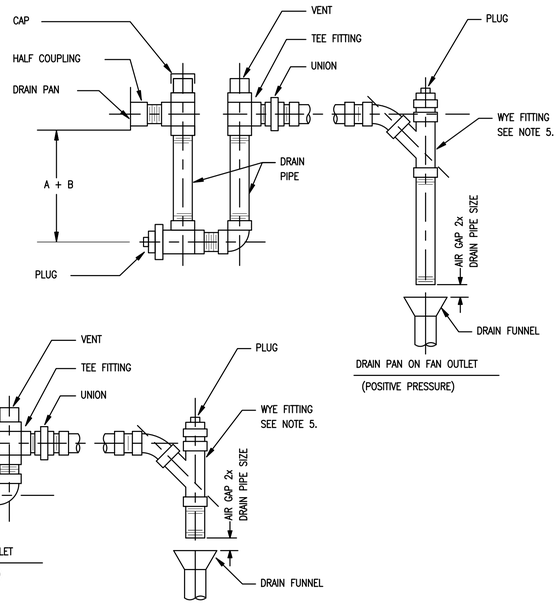
TAG	A (IN)	B (IN)
VHP-1	156	45
VHP-2	156	46.5
VHP-3	156	46.5
VHP-4	166	71
VHP-5	166	71

PROVIDE INTERMEDIATE CURB SUPPORT PER MANUFACTURER'S RECOMMENDATIONS. ALL LOADS SHALL TRANSFER TO THE EXISTING ROOF CURB.



RTU AND CURB DIMENSIONAL DETAIL

NOT TO SCALE



AHU CONDENSATE DRAIN DETAIL

NOT TO SCALE

TYP OF VHP-1 THROUGH VHP-5

NOTES:

1. DRAIN PIPE TO BE SAME SIZE AS UNIT OUTLET, BUT NO LESS THAN 1-1/4" PIPE SIZE.
2. "A" = SYSTEM STATIC PRESSURE IN INCHES AT DRAIN POINT.
3. "B" = 1/2 SYSTEM STATIC PRESSURE IN INCHES AT DRAIN POINT.
4. TRAP TO BE INSTALLED PARALLEL TO AIR HANDLING UNIT BASE.
5. ALL CONDENSATE FITTINGS TO BE DWV (DRAIN WASTE VENT) FITTINGS.
6. INSTALL CLEAN OUT AT EVERY CHANGE IN DIRECTION, MAX. 20'-0" BETWEEN CLEANOUTS.

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ACTIVITY: XXXXX

SATISFACTORY TO | DATE: MM/DD/YY

DES: MAW | DRW: SMF | CHK: DFB

PM/DM: -

BRANCH MANAGER:

CHIEF ENG/ARCH: -

FIRE PROTECTION: -

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NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL STATION
NORFOLK NAVAL STATION

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND - <<AGENCY>>
NORFOLK, VIRGINIA

NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

MECHANICAL DETAILS

SCALE:

EPROJECT NO.: #########

CONSTR. CONTR. NO.: ########-##-#-#####

NAVFAC DRAWING NO.: ----

SHEET 6 OF 14

M-501

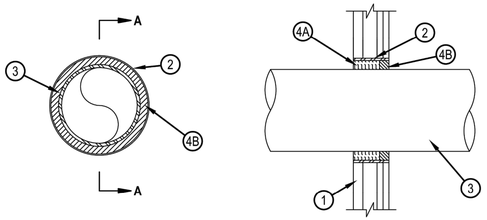
DRAWFORM REVISION: 25 AUGUST 2020

System No. W-L-1205

WL 1205

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Items 1 and 4)	F Ratings — 1 and 2 Hr (See Items 1 and 4)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Ratings — 1 and 2 Hr (See Items 1 and 4)
	FTH Rating — 0 Hr



SECTION A-A

1. Wall Assembly — The 1 or 2 Hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — "C-T" shaped studs 1-5/8 in. (41 mm) wide by 2-1/2 in. (64 mm) deep, fabricated from 25 MSG galv steel, spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — One layer of nom 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner and one or two layers of 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide gypsum board with square or tapered edges. The gypsum board types, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 10-1/2 in. (267 mm).

1A. Wall Assembly — As an alternate to the above wall assembly, the 1 or 2 Hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC.
   B. Gypsum Board* — Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 10-1/2 in. (267 mm).

   The hourly F, FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

2. Metallic Sleeve — Max 10-1/2 in. (267 mm) diam cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) thick galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. Sleeve may also be formed of No. 8 steel wire mesh having a min 1 in. (25 mm) lap along the longitudinal seam.

Hilti Firestop Systems

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Page: 1 of 2

System No. W-L-1205

WL 1205

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3. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. An annular space of min 1/4 in. (6 mm) to max 1-5/8 in. (41 mm) is required within firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe — Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 4 in. (203 mm) diam (or smaller) steel electrical metallic tubing (EMT) or 6 in. diam steel conduit.
   D. Copper Tubing — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   F. Flexible Steel Conduit+ — Nom 2 in. (51 mm) diam (or smaller) flexible steel conduit.

   See Flexible Metal Conduit (DXUZ) category in the Electrical Construction Equipment Directory for names of manufacturers.

4. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 2-1/8 in. (54 mm) or 2-3/4 in. (70 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening on the room side of the wall as permanent form for 1 and 2 hr fire rated walls, respectively. Packing material to be recessed from the room side of wall as required to accommodate the required thickness of fill material. In alternate wall assembly, packing material to be flush with either side of the wall and recessed from the other side of the wall to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material — Sealant* — Min 1 in. (25 mm) thickness of fill material applied within sleeve, flush with surface of wall.

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

+Bearing the UL Listing Mark

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Page: 2 of 2

FIRESTOP WALL PENETRATION DETAIL

NOT TO SCALE

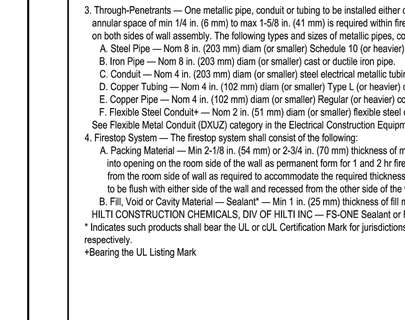
SUBMITTAL NOTE:

CONTRACTOR SHALL SUBMIT PRODUCT DATA FOR STUDS, SHAFTLINER AND GYPSUM WALL BOARD AS WELL AS ALL PRODUCTS REQUIRED FOR A COMPLETE UL RATED ASSEMBLY.

ASSEMBLED SHAFT WALL MUST COMPLY WITH UL DESIGN NO U415

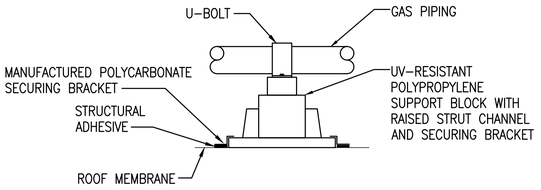
1 2 HR RATED PIPE CHASE WALL

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



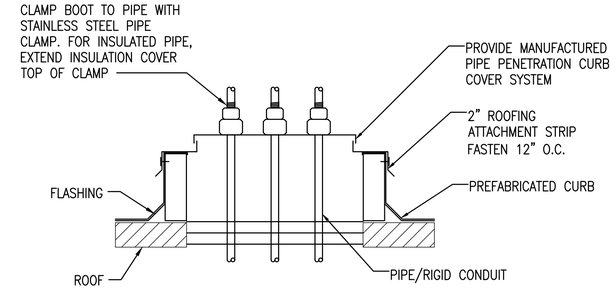
2 PART PLAN AT PIPE CHASE

SCALE: 1/8 =1'-0"



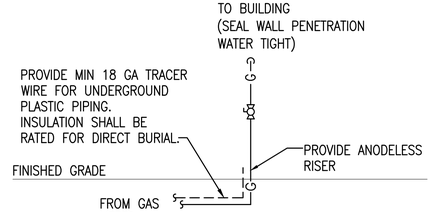
PIPE SUPPORT ROOF (SINGLE PIPE)

NOT TO SCALE



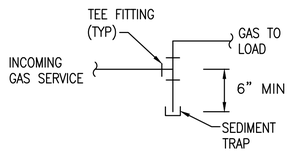
ROOF PIPE PENETRATION DETAIL

NOT TO SCALE



ANODELESS RISER DETAIL

NOT TO SCALE



GAS DIRT LEG DETAIL

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SYM			

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DES	MAW	DRW	SMF	CHK	DFB

PM/DM	-
BRANCH MANAGER	
CHIEF ENG/ARCH	-
FIRE PROTECTION	-

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NORFOLK, VIRGINIA
NAVAL STATION
NORFOLK NAVAL STATION
NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

MECHANICAL DETAILS

SCALE:

EPROJECT NO.: #########

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NAVFAC DRAWING NO. ----

SHEET 7 OF 14

M-502

DRAWFORM REVISION: 25 AUGUST 2020

DEDICATED OUTDOOR UNIT SCHEDULE (WATER COOLED DX COOLING & GAS HEAT)

TAG	NOMINAL CAPACITY (TONS)	PRE-FILTERS	SUPPLY FAN DATA				FIXED PLATE – SENSIBLE				DX COOLING CAPACITY											GAS HEATING CAPACITY – NATURAL GAS					ELECTRICAL					APPROX. WEIGHT	BASIS OF DESIGN		NOTES
			SUPPLY AIR	E.S.P.	MOTOR		EAT		LAT		EAT		LAT		SENSIBLE	TOTAL	FLUID	FLOW RATE	EWT	LWT	MAX WPD	COMPRESSOR	EAT	LAT	INPUT	OUTPUT	TURNDOWN RATIO	V	PH	FLA	MCA	MOP		MFR.	MODEL	
			CFM	IN WC.	HP	BHP	DB °F	WB °F	DB °F	WB °F	DB °F	WB °F	DB °F	WB °F	MBH	MBH		GPM	°F	°F	FT H20	QTY.	DB °F	DB °F	MBH	MBH							LBS			
VHP–1	12.5	2"–MERV 10	2585	0.4	7.7	2.35	91.0	78.1	75.8	63.2	74.4	73.0	56.0	56.0	53	150	WATER	31.1	85.0	95.0	20.0	1	21.9	70.0	171.0	137.0	10:1	460	3	28	32	45	3300	ANNEX AIR	ERP–E	1,3,4,5,6
VHP–2	6.9	2"–MERV 10	1410	0.4	3.9	1.34	91.0	78.1	75.8	63.1	74.3	73.0	56.0	56.0	29	82	WATER	31.2	85.0	95.0	20.1	1	21.9	70.0	94.0	75.0	10:1	460	3	25	29	45	3300	ANNEX AIR	ERP–E	2,3,4,5,6
VHP–3	6.9	2"–MERV 10	1410	0.4	3.9	1.34	91.0	78.1	75.8	63.1	74.3	73.0	56.0	56.0	29	82	WATER	31.2	85.0	95.0	20.1	1	21.9	70.0	94.0	75.0	10:1	460	3	25	29	45	3300	ANNEX AIR	ERP–E	2,3,4,5,6
VHP–4	16.6	2"–MERV 10	3435	0.4	4.4	3.16	91.0	78.1	75.7	63.1	74.4	73.0	56.0	56.0	70	199	WATER	35.6	85.0	95.0	20.1	1	21.9	70.0	228.0	182.0	10:1	460	3	37	43	60	3700	ANNEX AIR	ERP–E	2,3,4,5,6
VHP–5	20.1	2"–MERV 10	4155	0.4	4.4	3.88	91.0	78.1	75.7	63.1	74.4	73.0	56.0	56.0	85	241	WATER	51.9	85.0	95.0	20.1	2	21.9	70.0	275.0	220.0	10:1	460	3	49	53	70	4300	ANNEX AIR	ERP–E	2,3,4,5,6

NOTES:
1. PROVIDE UNIT WITH BOTTOM SUPPLY AIR OPENING
2. PROVIDE UNIT WITH END SUPPLY AIR OPENING.
3. PROVIDE UNIT WITH 2" DOUBLE WALL CASING, (MINIMUM R–13).
4. PROVIDE MANUFACTURER'S ROOF CURB ADAPTER IF NECESSARY TO ATTACH NEW UNIT TO EXISTING ROOF CURB.
5. PROVIDE UNIT WITH NEMA 3R FOR NON–FUSED DISCONNECT SWITCH.
6. PROVIDE UNIT WITH 120V LIGHTING AND 120V, 20A, GROUND FAULT CIRCUIT INTERRUPTER TYPE DUPLEX RECEPTACLE. PROVIDE FUSE TERMINAL BLOCK, 3 KW TRANSFORMER, AND WIRING. LIGHTING AND RECEPTACLE SHALL BE CONNECTED AHEAD OF 460V LOAD DISCONNECTING MEANS. SEE WIRING DIAGRAM BELOW.

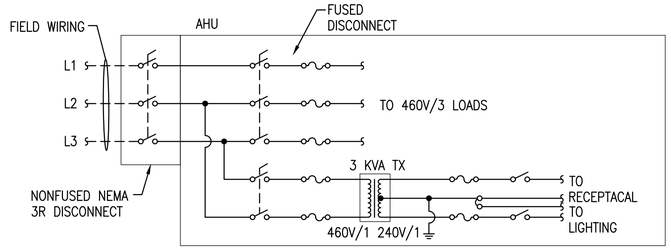
GAS REGULATOR SCHEDULE

TAG	SERVICE TO	FUEL	DESIGN FUEL RATE (CFH)**	INLET GAS PRESSURE (PSIG)	OUTLET GAS PRESSURE (IN. WG)	CONNECTION SIZE (NPS x NPS)	MANUFACTURER*	MODEL*
GR–1	VENTILATION HEAT PUMP #1	NATURAL GAS	171	2	7 – 14	3/4" x 3/4"	MAXITROL	325–5
GR–2	VENTILATION HEAT PUMP #2	NATURAL GAS	94	2	7 – 14	3/4" x 3/4"	MAXITROL	325–5
GR–3	VENTILATION HEAT PUMP #3	NATURAL GAS	94	2	7 – 14	3/4" x 3/4"	MAXITROL	325–5
GR–4	VENTILATION HEAT PUMP #4	NATURAL GAS	228	2	7 – 14	3/4" x 3/4"	MAXITROL	325–5
GR–5	VENTILATION HEAT PUMP #5	NATURAL GAS	275	2	7 – 14	3/4" x 3/4"	MAXITROL	325–5

* BASIS OF DESIGN EQUIPMENT
** BASED ON NATURAL GAS HEATING VALUE OF 1000 BTU PER CUBIC FOOT

PIPING AND PIPING INSULATION SCHEDULE

SYSTEM	NOMINAL OPERATING TEMPERATURE (°F)	NOMINAL OPERATING PRESSURE (PSIG)	LOCATION	PIPE SIZES	PIPING MATERIAL	JOINT TYPE	PIPE INSULATION	REMARKS
NATURAL GAS	–	1/2 TO 5	ALL	2–1/2" AND SMALLER	SCHEDULE 40 CARBON	THREADED	NONE	
CONDENSATE	–	–	OUTDOOR	3/4"	COPPER DWV	SOLDERED	NONE	



VHP LIGHTING AND RECEPTACLE WIRING DIAGRAM

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TYP OF VHP–1 THRU VHP–5

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MAW	SF	DFB

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BRANCH MANAGER
CHIEF ENG/ARCH –
FIRE PROTECTION –

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NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVAL STATION
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NORFOLK, VIRGINIA
NORFOLK, VIRGINIA
NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT
MECHANICAL SCHEDULES

SCALE:
EPROJECT NO.: ##########
CONSTR. CONTR. NO.: #######-##-#-#####
NAVFAC DRAWING NO.: ----
SHEET 8 OF 14

M-601

DRAWFORM REVISION: 25 AUGUST 2020

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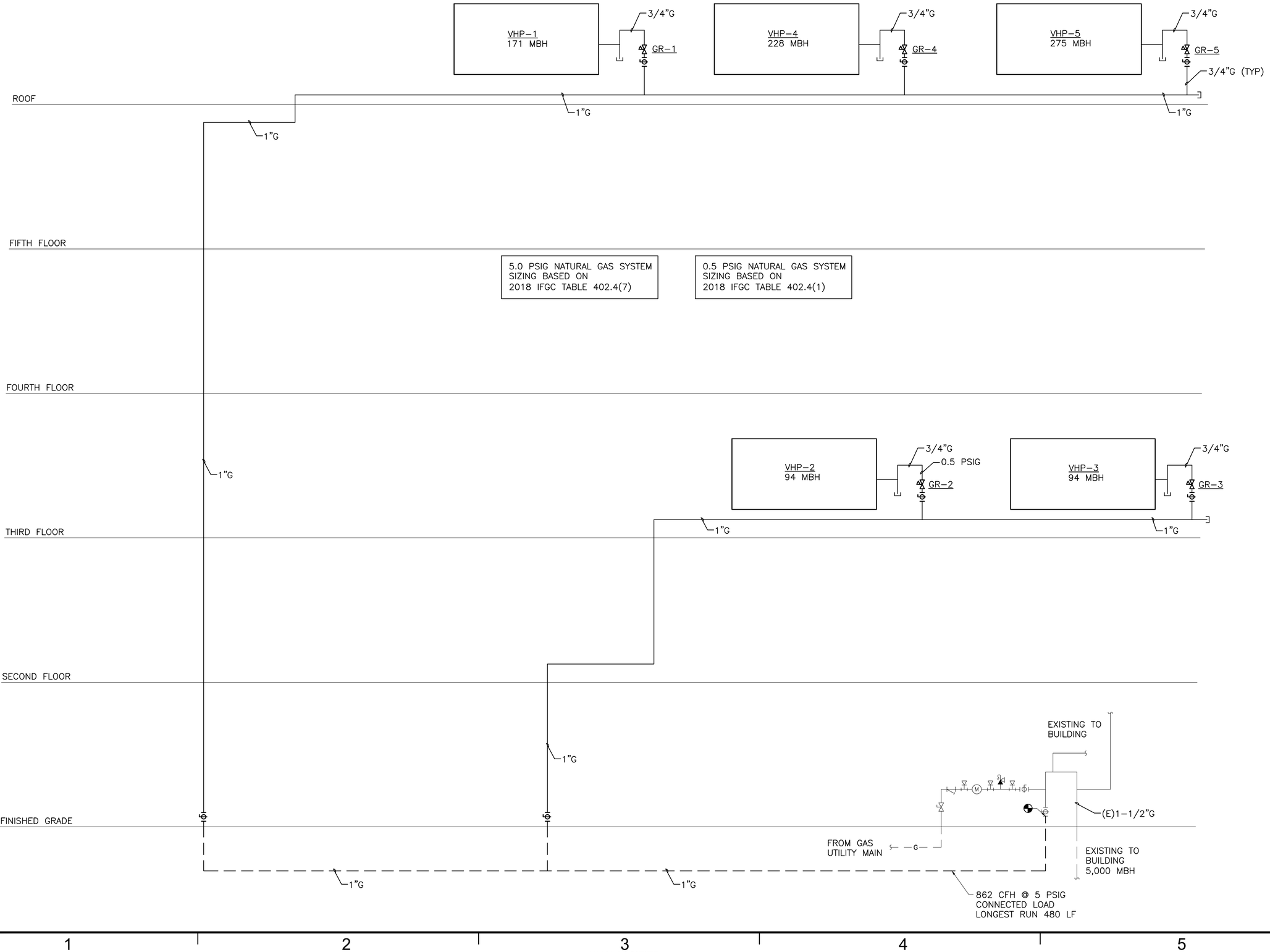

APPR	DATE	DESCRIPTION	SYM

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ACTIVITY

XXXXX

SATISFACTORY TO DATE MM/DD/YY

DES	MAW	DRW	SMF	CHK	DFB

PM/DM

BRANCH MANAGER

CHIEF ENG/ARCH

FIRE PROTECTION

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NORFOLK, VIRGINIA

NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

GAS RISER DIAGRAM

SCALE:

EPROJECT NO.: ##########

CONSTR. CONTR. NO.
#######-##-#-#####

NAVFAC DRAWING NO.

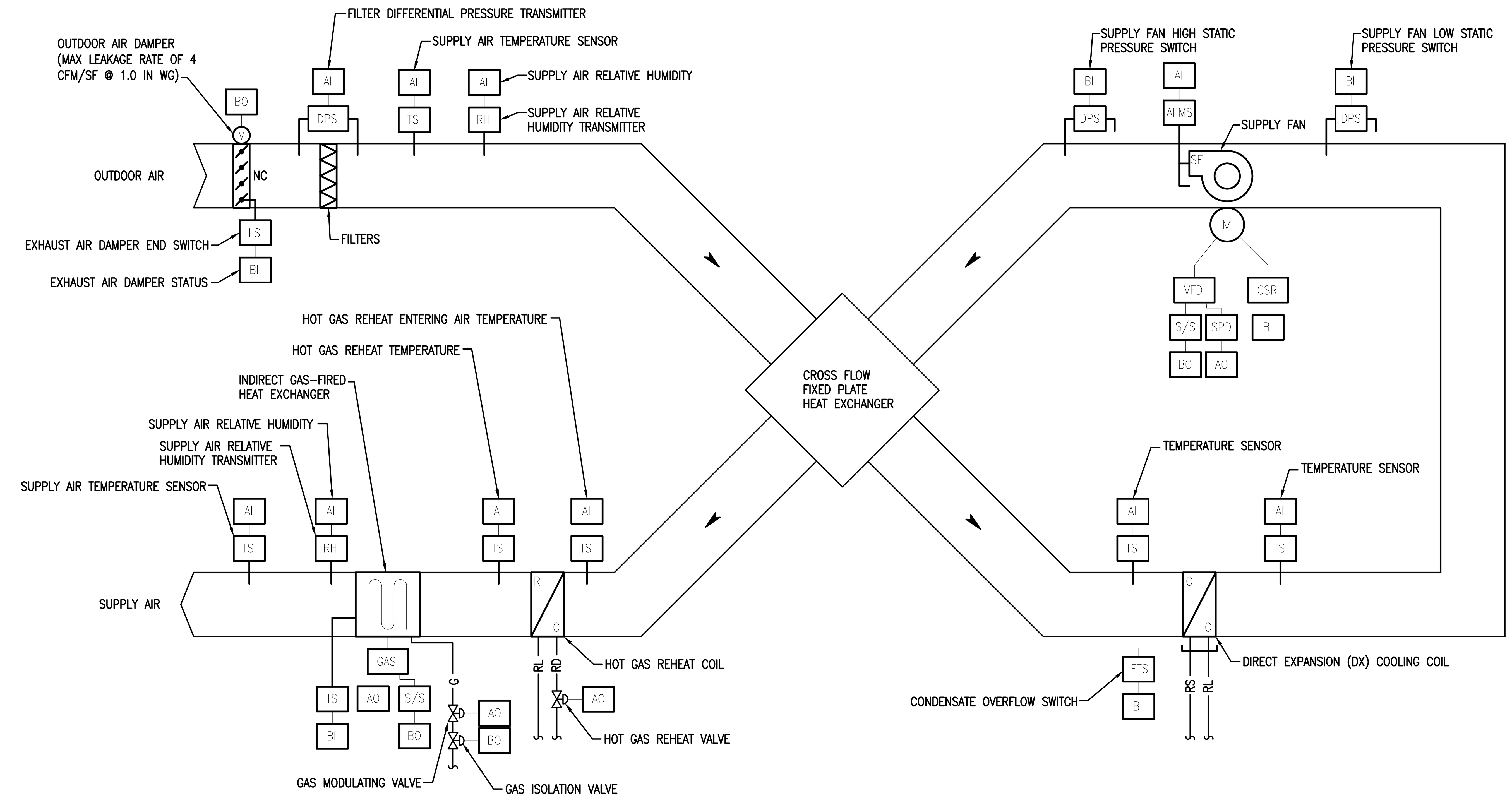
SHEET 9 OF 14

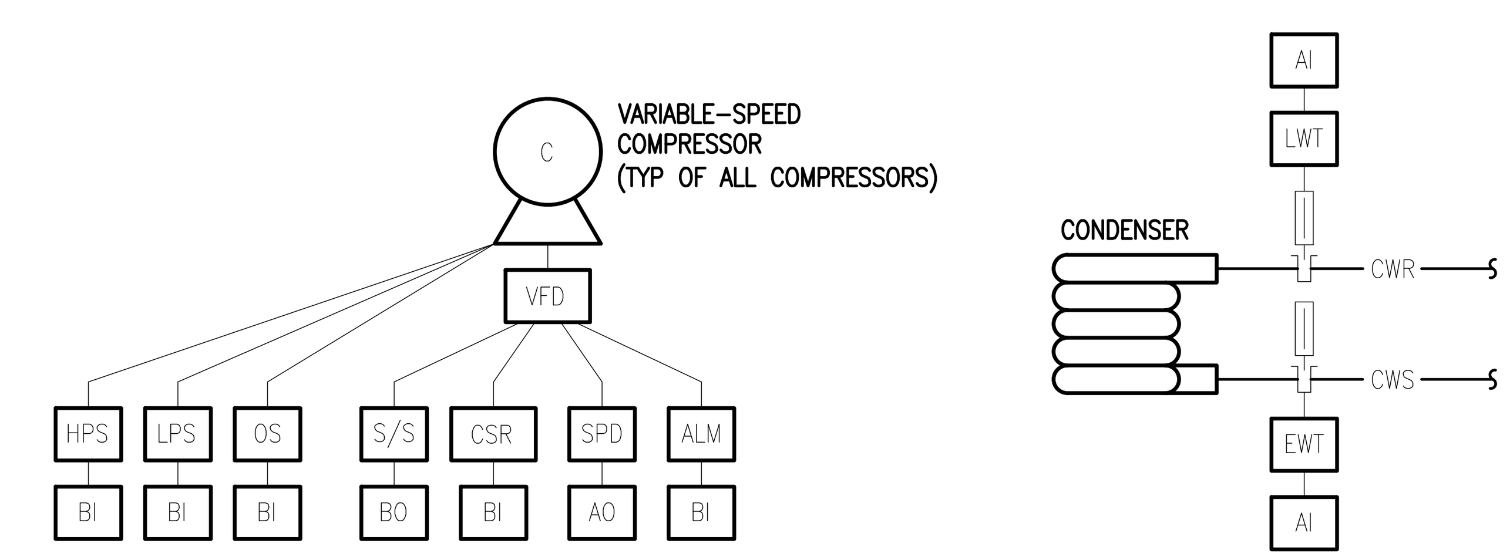
M-701

DRAWFORM REVISION: 25 AUGUST 2020

VHP SEQUENCE OF OPERATION

1. GENERAL
   - 1.1. EACH VHP IS TO OPERATE WHENEVER THE BUILDING IS OCCUPIED.
   - 1.2. EACH VHP SHALL BE PROVIDED A FIELD OR FACTORY INSTALLED EQUIPMENT LEVEL CONTROLLER THAT INTEGRATES SEAMLESSLY INTO THE EXISTING BUILDING AUTOMATION SYSTEM (AUTOMATED LOGIC – THERMOTROL).
   - 1.3. VHPS ARE DEDICATED OUTDOOR AIR UNITS COMPRISED OF WATER SOURCE HEAT PUMPS WITH DIGITAL SCROLL COMPRESSORS, DX COOLING COILS, HOT GAS REHEAT COILS, INDIRECT GAS–FIRED HEATERS, AND FIXED PLATE HEAT EXCHANGERS.
   - 1.4. SUPPLY FANS SHALL BE PROVIDED WITH FACTORY MOUNTED VFDS.
2. OPERATIONAL STATUS
   - 2.1. THE BAS SHALL INDICATE THE CURRENT OPERATING STATUS OF THE UNIT (ENABLED/DISABLED), AND OPERATING MODE THE UNIT IS CURRENTLY OPERATING IN (DEHUMIDIFICATION–COOLING/HEATING/FAN ONLY).
   - 2.2. THE BAS SHALL INDICATE THE STATUS OF THE HAND–OFF–AUTO SWITCH.
   - 2.3. A UNIT MOUNTED SELECTOR SWITCH SHALL BE PROVIDED TO MANUALLY SELECT THE OPERATING MODE (DEHUMIDIFICATION–COOLING / HEATING / FAN ONLY) WHEN THE UNIT HAND–OFF–AUTO SWITCH IS SET TO HAND MODE.
3. UNOCCUPIED MODE
   - 3.1. IF THE UNIT IS INDEXED FOR UNOCCUPIED MODE, THE SUPPLY FAN AND COMPRESSORS SHALL STOP AND ITS ASSOCIATED DAMPERS SHALL CLOSE.
4. OCCUPIED MODE
   - 4.1. STARTUP
     - 4.1.1 IF THE UNIT IS INDEXED FOR OCCUPIED MODE, THE OUTDOOR AIR DAMPER SHALL OPEN AND THE SUPPLY FAN SHALL START AT IT'S MINIMUM SPEED. AFTER A TIME DELAY OF 30 SECONDS (ADJ), THE OPERATING MODE OF THE UNIT SHALL BE DETERMINED AND THE FAN SHALL MODULATE TO MAINTAIN THE SCHEDULED AIRFLOW.
   - 4.2. FAN SPEED CONTROL:
     - 4.2.1 AFTER RELEASED FROM STARTUP, THE SYSTEM SHALL MONITOR THE SUPPLY FAN AIRFLOW MEASURING STATION AND THE FAN SHALL MODULATE IT'S SPEED AS NECESSARY TO MAINTAIN THE SCHEDULED DESIGN AIRFLOW.
   - 4.3. OPERATING MODE
     - 4.3.1. THE OPERATING MODE (DEHUMIDIFICATION–COOLING/HEATING/FAN ONLY) SHALL BE DETERMINED BY COMPARING THE OUTDOOR AIR DRY BULB AND RELATIVE HUMIDITY AND CALCULATING THE OUTDOOR AIR DEWPOINT.
     - 4.3.2. DEHUMIDIFICATION/COOLING MODE:
       - 4.3.2.1. IF THE OUTDOOR AIR DEWPOINT IS 56°F (ADJ) OR GREATER OR THE OUTDOOR AIR TEMPERATURE IS GREATER THAN 75°F (ADJ), THE UNIT SHALL BE INDEXED FOR DEHUMIDIFICATION/COOLING MODE.
       - 4.3.2.2. THE COMPRESSOR(S) SHALL MODULATE AS NECESSARY TO MAINTAIN A COOLING COIL LEAVING AIR TEMPERATURE OF 55°F (ADJ).
       - 4.3.2.3. THE HOT–GAS REHEAT COIL SHALL MODULATE AS NECESSARY TO MAINTAIN A SUPPLY AIR LEAVING AIR TEMPERATURE OF 72°F (ADJ).
       - 4.3.2.4. IN THE EVENT THAT THE HOT–GAS REHEAT COIL IS LOCKED OUT OR OTHERWISE PREVENTED FROM OPERATING, THE INDIRECT GAS–FIRED HEATER SHALL ENABLE AND MODULATE IT'S CAPACITY TO MAINTAIN THE SUPPLY AIR LEAVING AIR TEMPERATURE SETPOINT OF 72°F (ADJ).
     - 4.3.3. HEATING MODE:
       - 4.3.3.1. IF THE OUTDOOR AIR DEWPOINT IS LESS THAN 56°F AND OUTDOOR AIR TEMPERATURE IS LESS THAN 68°F (ADJ), THE UNIT SHALL BE INDEXED FOR HEATING MODE.
       - 4.3.3.2. DURING HEATING MODE, THE DX COOLING SYSTEM SHALL BE LOCKED OUT.
       - 4.3.3.3. THE INDIRECT GAS–FIRED HEATER SHALL ENABLE AND MODULATE IT'S CAPACITY TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT OF 70°F (ADJ).
       - 4.3.3.4. IF THE INDIRECT GAS–FIRED HEATER IS OPERATING AT IT'S MINIMUM CAPACITY, THE UNIT SUPPLY AIR TEMPERATURE SHALL BE ALLOWED TO DRIFT UPTO 75°F.
     - 4.3.4. FAN ONLY MODE:
       - 4.3.4.1. IF THE OUTDOOR AIR DEWPOINT IS LESS THAN 56°F (ADJ) AND THE OUTDOOR AIR DRYBULB TEMPERATURE IS BETWEEN 68°F (ADJ) AND 75°F (ADJ), THE UNIT SHALL BE INDEXED FOR FAN ONLY MODE.
       - 4.3.4.2. THE FAN SHALL OPERATE IN OCCUPIED MODE (SEE ABOVE).
       - 4.3.4.3. COOLING AND HEATING SYSTEMS OF THE UNIT SHALL BE LOCKED OUT.
5. SAFETIES
   - 5.1. ATFP SWITCH – IF ANY ATFP SWITCH IN THE FACILITY IS ACTIVATED, THE UNIT SHALL SHUTDOWN AND THE NATURAL GAS ISOLATION VALVE SHALL CLOSE.
   - 5.2. UNDERVOLTAGE – IF UNIT VOLTAGE IS 10% (ADJ) LOWER THAN NOMINAL, AN ALARM SHALL BE GENERATED AND THE UNIT SHALL SHUT DOWN.
   - 5.3. OVERVOLTAGE – IF UNIT VOLTAGE IS 10% (ADJ) HIGHER THAN NOMINAL, AN ALARM SHALL BE GENERATED AND THE UNIT SHALL SHUT DOWN.
   - 5.4. PHASE LOSS – IF ANY PHASE IS LOST, AN ALARM SHALL BE GENERATED AND THE UNIT SHALL SHUT DOWN.
   - 5.5. COMPRESSOR HIGH PRESSURE SWITCH – ON DETECTION OF HIGH REFRIGERANT PRESSURE (SETPOINT ADJ AND PER MANUFACTURER RECOMMENDATIONS), AN ALARM SHALL BE GENERATED AND THE COMPRESSOR(S) SHALL BE DISABLED.
   - 5.6. COMPRESSOR LOW PRESSURE SWITCH – ON DETECTION OF LOW REFRIGERANT PRESSURE (SETPOINT ADJ AND PER MANUFACTURER RECOMMENDATIONS), AN ALARM SHALL BE GENERATED AND THE COMPRESSOR(S) SHALL BE DISABLED.
   - 5.7. COMPRESSOR LOW OIL SWITCH – ON DETECTION OF LOW OIL, AN ALARM SHALL BE GENERATED AND THE COMPRESSOR(S) SHALL BE DISABLED.
   - 5.8. SUPPLY FAN HIGH PRESSURE SWITCH – ON DETECTION OF HIGH AIR PRESSURE (SETPOINT ADJ AND FIELD DETERMINED), AN ALARM SHALL BE GENERATED AND THE SUPPLY FAN SHALL BE DISABLED.
   - 5.9. SUPPLY FAN LOW PRESSURE SWITCH – ON DETECTION OF HIGH AIR PRESSURE (SETPOINT ADJ AND FIELD DETERMINED), AN ALARM SHALL BE GENERATED AND THE SUPPLY FAN SHALL BE DISABLED.
   - 5.10. SUPPLY AIR TEMPERATURE HIGH LIMIT (SOFTWARE) – ON DETECTION OF UNIT SUPPLY AIR TEMPERATURE 10°F OR MORE (ADJ) ABOVE THE SUPPLY AIR TEMPERATURE SETPOINT, AND ALARM SHALL BE GENERATED.
   - 5.11. SUPPLY AIR TEMPERATURE LOW LIMIT (SOFTWARE) – ON DETECTION OF UNIT SUPPLY AIR TEMPERATURE 5°F OR MORE (ADJ) BELOW THE SUPPLY AIR TEMPERATURE SETPOINT, AND ALARM SHALL BE GENERATED. IF THE SUPPLY AIR TEMPERATURE IS 60°F OR LESS (ADJ), THE UNIT SHALL SHUTDOWN.
   - 5.12. VFD ALARM – ON A CRITICAL FAULT FROM THE SUPPLY FAN OR COMPRESSOR VFDS, A DESCRIPTIVE, PLAIN ENGLISH ALARM SHALL BE GENERATED AND THE UNIT SHALL SHUTDOWN.
   - 5.13. ANTI–SHORT CYCLE TIMER – EACH FAN AND COMPRESSOR SHALL BE PROVIDED A HARDWIRED OR SOFTWARE PROGRAMMED SHORT CYCLE TIMER TO PREVENT SHORT CYCLING OF EQUIPMENT. TIME DELAY SHALL BE INDEPENENTLY ADJUSTABLE FOR EACH DEVICE AND BE SET PER THE MANUFACTURER'S RECOMMENDATIONS.





UNIT LEVEL

BO	UNIT ENABLE (OCCUPIED/UNOCCUPIED)	BI	HAND MODE – HEATING
BI	DEHUMIDIFICATION/HEATING/FAN ONLY MODE	BI	HAND MODE – FAN ONLY
BI	AUTO MODE STATUS	BI	UNIT UNDER VOLTAGE
BI	OFF MODE STATUS	BI	UNIT OVER VOLTAGE
BI	HAND MODE STATUS	BI	UNIT PHASE LOSS
BI	HAND MODE – DEHUMIDIFICATION/COOLING	BI	PHASE MONITORING RELAY
BI	VOLTAGE MONITORING RELAY		

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NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND - <<AGENCY>>
NORFOLK, VIRGINIA
NAVAL STATION
NORFOLK NAVAL STATION
NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

MECHANICAL CONTROLS

SCALE:

EPROJECT NO.: #########

CONSTR. CONTR. NO. ######-##-#-####

NAVFAC DRAWING NO. ----

SHEET 10 OF 14

M-801

DRAWFORM REVISION: 25 AUGUST 2020

FILE NAME: Q:\2210290 – Warwick Mechanical NATO ACT Makeup AHU Replacement_Mechanical\2210290_M-801.dwg LAYOUT NAME: 2210290_M-801 PLOTTED: Tuesday, April 06, 2021 – 12:31pm USER: stevenf

VHP DDC CONTROL SYSTEM OBJECT LIST

#	POINT NAME	HARDWARE POINTS				SOFTWARE POINTS				TREND	SHOW ON GRAPHIC	NOTES
		AI	AO	BI	BO	AV	BV	MSV	SCHED			
1	UNIT ENABLE (OCCUPIED/UNOCCUPIED)				X				X	COV	X	DISABLE ON ACTIVATION OF ATFP SWITCH
2	DEHUMIDIFICATION/HEATING/FAN ONLY MODE							X		COV	X	BAS OPERATOR TO BE ABLE TO MANUALLY SELECT MODE
3	AUTO MODE STATUS			X						COV	X	HOA SWITCH STATUS
4	OFF MODE STATUS			X						COV	X	HOA SWITCH STATUS
5	HAND MODE STATUS			X						COV	X	HOA SWITCH STATUS
6	HAND MODE – DEHUMIDIFICATION/COOLING			X						COV	X	
7	HAND MODE – HEATING			X						COV	X	
8	HAND MODE – FAN ONLY			X						COV	X	
9	UNIT UNDER VOLTAGE			X						COV	X	SHUTDOWN UNIT ON UNDER VOLTAGE
10	UNIT OVER VOLTAGE			X						COV	X	SHUTDOWN UNIT ON OVER VOLTAGE
11	UNIT PHASE LOSS			X						COV	X	SHUTDOWN UNIT ON PHASE LOSS
12	COMPRESSOR ENABLE (FOR EACH COMPRESSOR)				X					COV	X	
13	COMPRESSOR STATUS (FOR EACH COMPRESSOR)			X						COV	X	
14	COMPRESSOR SPEED (FOR EACH COMPRESSOR)		X							15 MIN	X	
15	COMPRESSOR ACCUMULATED RUNTIME (HRS FOR EACH COMPRESSOR)					X				1 HR	X	MAINTENANCE ALARM BASED ON MANUFACTURER'S RECOMMENDATION
16	COMPRESSOR VFD ALARM			X				X		COV	X	DISPLAY ALARM IN PLAIN ENGLISH
17	COMPRESSOR HIGH PRESSURE SWITCH (FOR EACH COMPRESSOR)			X						COV	X	INTERLOCK WITH COMPRESSOR
18	COMPRESSOR LOW PRESSURE SWITCH (FOR EACH COMPRESSOR)			X						COV	X	INTERLOCK WITH COMPRESSOR
19	COMPRESSOR LOW OIL SWITCH (FOR EACH COMPRESSOR)			X						COV	X	INTERLOCK WITH COMPRESSOR
20	CONDENSER ENTERING WATER TEMPERATURE	X								15 MIN	X	
21	CONDENSER LEAVING WATER TEMPERATURE	X								15 MIN	X	
22	OUTDOOR AIR DAMPER				X					COV	X	
23	OUTDOOR AIR DAMPER END SWITCH			X						COV	X	
24	OUTDOOR AIR FILTER DP TRANSMITTER	X								15 MIN	X	MAINTENANCE ALARM BASED ON MANUFACTURER'S RECOMMENDATION
25	OUTDOOR AIR TEMPERATURE	X								15 MIN	X	
26	OUTDOOR AIR RELATIVE HUMIDITY	X								15 MIN	X	
27	OUTDOOR AIR DEWPOINT					X				15 MIN	X	CALCULATED FROM TEMP AND HUMIDITY
28	COOLING COIL ENTERING AIR TEMPERATURE	X								15 MIN	X	
29	COOLING COIL LEAVING AIR TEMPERATURE	X								15 MIN	X	
30	CONDENSATE PAN OVERFLOW			X						COV	X	
31	SUPPLY AIRFLOW	X								15 MIN	X	
32	SUPPLY FAN LOW STATIC PRESSURE SWITCH			X						COV	X	ALARM AND SHUTDOWN UNIT ON OVERFLOW
33	SUPPLY FAN HIGH STATIC PRESSURE SWITCH			X						COV	X	INTERLOCK WITH SF OPERATION
34	SUPPLY FAN ENABLE				X					COV	X	INTERLOCK WITH SF OPERATION
35	SUPPLY FAN STATUS			X						COV	X	
36	SUPPLY FAN SPEED		X							15 MIN	X	
37	SUPPLY FAN ALARM							X		COV	X	DISPLAY ALARM IN PLAIN ENGLISH
38	SUPPLY FAN ACCUMULATED RUNTIME (HRS)					X				1 HR	X	MAINTENANCE ALARM BASED ON MANUFACTURER'S RECOMMENDATION
39	HOT GAS REHEAT ENTERING AIR TEMPERATURE	X								15 MIN	X	
40	HOT GAS REHEAT MODULATION		X							15 MIN	X	
41	HOT GAS REHEAT DEMAND					X				15 MIN	X	
42	HOT GAS REHEAT LEAVING AIR TEMPERATURE	X								15 MIN	X	
43	INDIRECT GAS FIRED HEATER ENABLE (START/STOP)				X					COV	X	
44	INDIRECT GAS FIRED HEATER AIRFLOW SWITCH			X						COV	X	
45	INDIRECT GAS FIRED HEATER GAS ISOLATION VALVE				X					COV	X	NC VALVE TO CLOSE ON ACTIVATION OF ATFP SWITCH
46	INDIRECT GAS FIRED HEATER MODULATION		X							15 MIN	X	
47	UNIT SUPPLY AIR TEMPERATURE	X								15 MIN	X	
48	UNIT SUPPLY AIR RELATIVE HUMIDITY	X								15 MIN	X	
49	SUPPLY AIR TEMPERATURE HIGH LIMIT					X				15 MIN	X	ALARM IF 15°F ABOVE SETPOINT (ADJ)
50	SUPPLY AIR TEMPERATURE LOW LIMIT					X				15 MIN	X	SHUTDOWN UNIT IF 10°F BELOW SETPOINT (ADJ)

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CHIEF ENG/ARCH –

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NAVAL STATION
NORFOLK NAVAL STATION

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND - <<AGENCY>>
NORFOLK, VIRGINIA

NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

MECHANICAL CONTROLS

SCALE:

EPROJECT NO.: ##########

CONSTR. CONTR. NO.
#######-##-#-####

NAVFAC DRAWING NO.

SHEET 11 OF 14

M-802

DRAWFORM REVISION: 25 AUGUST 2020

GENERAL ELECTRICAL NOTES

1. THE WORK INCLUDES PROVIDING A COMPLETE AND OPERABLE ELECTRICAL SYSTEM AS WELL AS MODIFICATION TO THE EXISTING ELECTRICAL SYSTEMS IN ACCORDANCE WITH THESE SPECIFICATIONS AND ASSOCIATED DRAWINGS.
2. ALL MATERIAL MUST BE NEW, UNLESS OTHERWISE NOTED, AND PROVIDED BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
3. LIGHTER LINE WEIGHTS INDICATE EXISTING TO REMAIN AS AT PRESENT. BOLD LINE WEIGHTS INDICATE NEW WORK. DASHED LINE WEIGHTS INDICATE EXISTING TO BE REMOVED, UON.
4. COORDINATE ALL ELECTRICAL WORK WITH OTHER TRADES IN FIELD PRIOR TO BEGINNING ANY ROUGH–IN WORK. COORDINATE ALL ELECTRICAL WORK, WITH MECHANICAL, ARCHITECTURAL, AND CIVIL DRAWINGS PRIOR TO ROUGH IN.
5. SHARED NEUTRAL CONDUCTORS ARE NOT ALLOWED.
6. CONTRACTOR MAY REUSE EXISTING BOXES, CONDUIT, AND WIRE WHERE POSSIBLE. CONTRACTOR SHALL PROVIDE ADDITIONAL BOXES, FITTINGS, CONDUIT, AND WIRE AS NECESSARY.
7. AT THE END OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE CURRENT TYPE WRITTEN CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH CIRCUITS MODIFIED DURING THE COURSE OF WORK.
8. ELECTRICAL EQUIPMENT AND CIRCUITS SHALL BE MARKED AND LABELED FOR IDENTIFICATION PURPOSES IN ACCORDANCE WITH THE NEC. JUNCTION AND PULL BOXES MAY BE LABELED USING A BLACK INDELIBLE MARKER. ALL SWITCH COVERS AND OUTLET BOX COVERS SHALL BE LABELED WITH BLACK INDELIBLE MARKER. LABELS SHALL INDICATE PANEL DESIGNATION AND BREAKER NUMBER. PLACE LABEL ON THE BACK OF THE COVER PLATE.
9. EXISTING CONDUIT RUNS AND BOXES CONCEALED IN WALLS WHICH ARE TO REMAIN, MAY BE ABANDONED IN PLACE OR REUSED. PROVIDE BLANK METAL COVER PLATES WHERE APPLICABLE. IF WIRING PASSES THROUGH CONDUIT OR BOX, REMOVE WIRING.
10. MAINTAIN CONTINUITY OF EXISTING CIRCUITS OF EQUIPMENT TO REMAIN. MAINTAIN EXISTING CIRCUITS OF EQUIPMENT ENERGIZED. RESTORE CIRCUITS WIRING AND POWER WHICH ARE TO REMAIN BUT WERE DISTURBED DURING DEMOLITION BACK TO ORIGINAL CONDITION.

LEGEND NOTES

1. LIGHTER LINE WEIGHTS INDICATE EXISTING TO REMAIN AS AT PRESENT. BOLD LINE WEIGHTS INDICATE NEW WORK. DASHED LINE WEIGHTS INDICATE EXISTING TO BE REMOVED, UON.

SYMBOL	DESCRIPTION
(E)	EQUIPMENT CONNECTION AS NOTED
3P 60/40	DISCONNECT SWITCH. 240V IN NEMA 1 ENCLOSURE UON 3P = NO. OF POLES, 60 = SWITCH RATING, 40 = FUSE RATING (NF INDICATES NON FUSIBLE)
OR	BRANCH CIRCUIT OR FEEDER WIRING IN CONDUIT, NO TICK MARKS INDICATE 2 #12 CONDUCTORS & 1 #12 GND. IN 1/2" CONDUIT UON. TICK MARKS, WHEN SHOWN, INDICATE NUMBER OF #12 CONDUCTORS IF OTHER THAN THREE; (1) INDICATES GROUND. CONDUIT LARGER THAN 1/2" & WIRE LARGER THAN #12 SHALL BE AS INDICATED.
A–1,3,5	HOMERUNS TO PANEL. PANEL & CIRCUIT DESIGNATIONS AS INDICATED.
3	WORK KEYNOTE

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
EC	EMPTY CONDUIT
EQUIP	EQUIPMENT
EXIST	EXISTING
GFI	GROUND FAULT CIRCUIT INTERRUPTOR
MLO	MAIN LUG ONLY
MCB	MAIN CIRCUIT BREAKER
NTS	NOT TO SCALE
PNL	PANEL
XFMR	TRANSFORMER
UON	UNLESS OTHERWISE NOTED
WP	WEATHER PROOF

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NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

ELECTRICAL LEGEND AND NOTES

SCALE:

EPROJECT NO.: #########

CONSTR. CONTR. NO. ########-##-#-####

NAVFAC DRAWING NO. ----

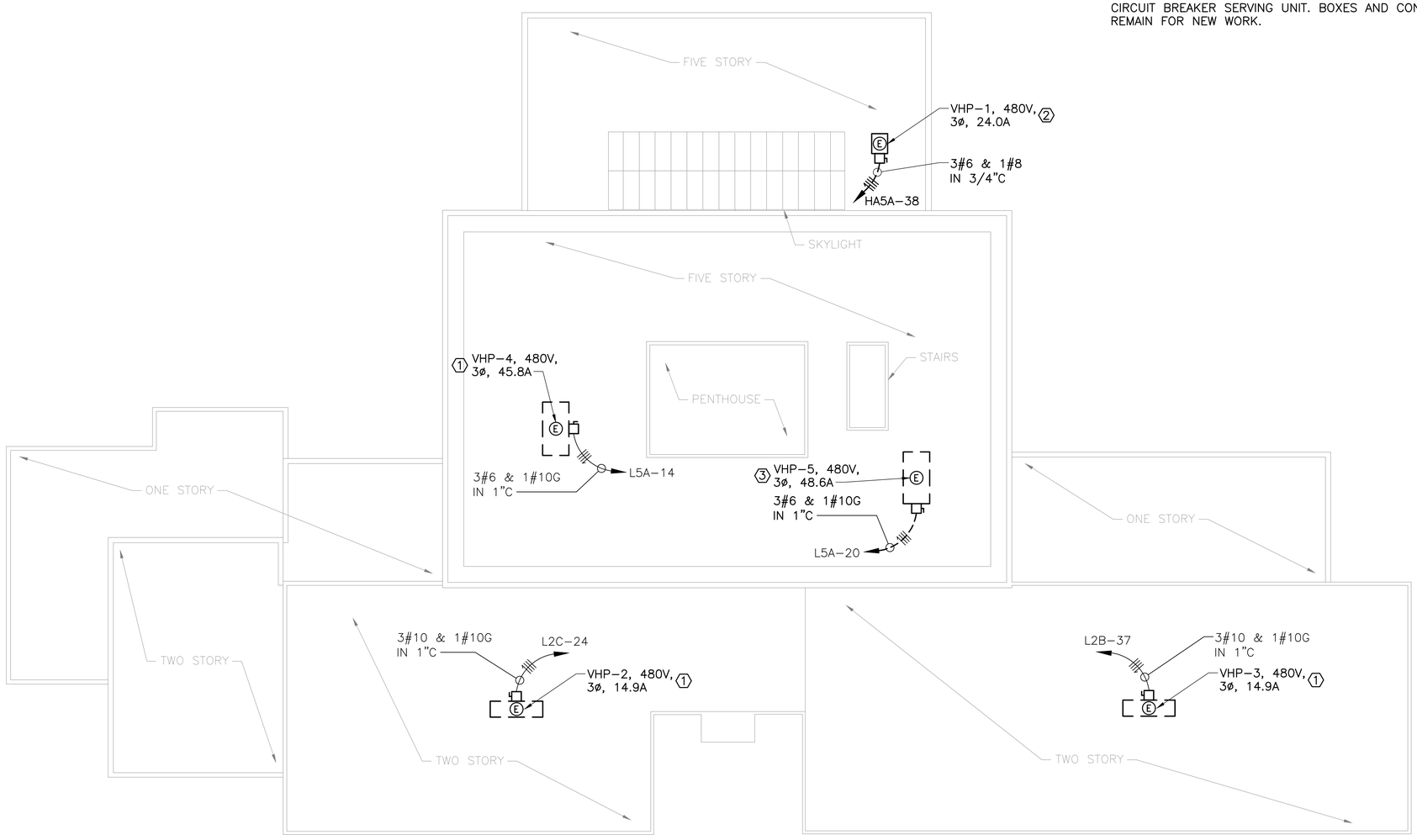
SHEET 12 OF 14

E-001

DRAWFORM REVISION: 25 AUGUST 2020

DEMOLITION KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING MAKE–UP AIR UNIT WITH DISCONNECTING MEANS. WIRE AND CONDUIT BACK TO EXISTING PANEL TO REMAIN FOR RECONNECTION TO NEW EQUIPMENT.
2. DISCONNECT AND REMOVE EXISTING MAKE–UP AIR UNIT WITH DISCONNECTING MEANS AND WIRE BACK TO EXISTING PANEL. BOXES AND CONDUIT BACK TO EXISTING PANEL TO REMAIN FOR NEW WORK.
3. DISCONNECT AND REMOVE EXISTING MAKE–UP AIR UNIT WITH DISCONNECTING MEANS AND WIRE BACK TO EXISTING PANELBOARD. DISCONNECT AND REMOVE 60A, 3–POLE CIRCUIT BREAKER SERVING UNIT. BOXES AND CONDUIT BACK TO EXISTING PANEL TO REMAIN FOR NEW WORK.



PROJECT NORTH

ROOF PLAN - DEMOLITION

SCALE: 1/16" = 1'–0"

GRAPHIC SCALE

0 8 16 24 32 40 48

SCALE: 1/16" = 1'–0"

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NAVAL STATION NORFOLK NAVAL STATION
NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

ELECTRICAL DEMOLITION PLAN

SCALE:

EPROJECT NO.: #########

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NAVFAC DRAWING NO. ----

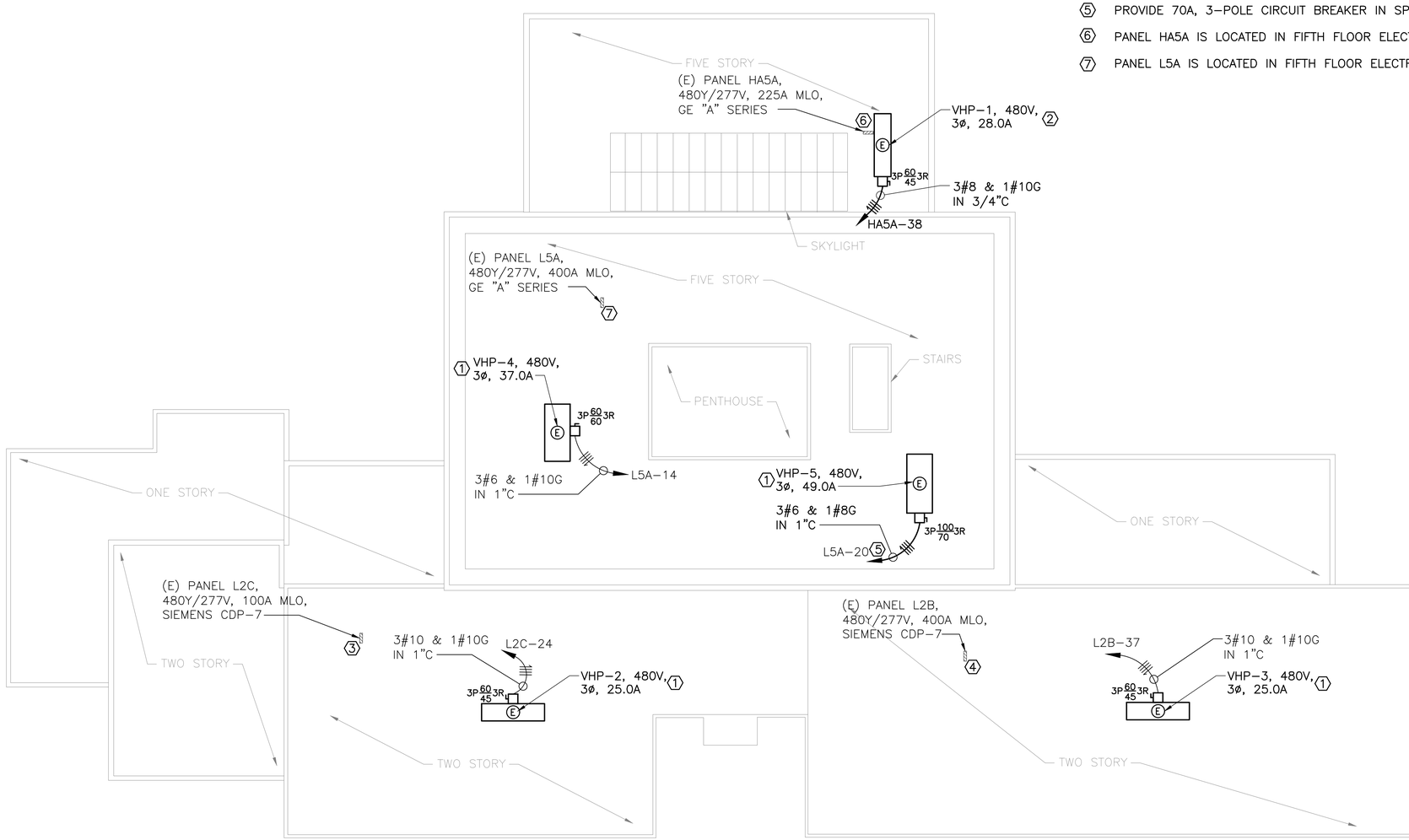
SHEET 13 OF 14

ED101

DRAWFORM REVISION: 25 AUGUST 2020

NEW WORK KEYED NOTES

1. CONNECT NEW MAKE–UP AIR UNIT TO EXISTING CIRCUIT CONDUCTORS. PROVIDE NEW FUSIBLE DISCONNECT SWITCH.
2. PROVIDE NEW CONDUCTORS FROM EXISTING PANEL TO NEW MAKE–UP AIR UNIT. PROVIDE NEW FUSIBLE DISCONNECT SWITCH.
3. PANEL L2C IS LOCATED IN HALLWAY ON SECOND FLOOR ADJACENT TO ROOM 260C.
4. PANEL L2B IS LOCATED IN SECOND FLOOR ELECTRICAL ROOM 242.
5. PROVIDE 70A, 3–POLE CIRCUIT BREAKER IN SPACE (L5A–20) TO SERVE VHP–5.
6. PANEL HA5A IS LOCATED IN FIFTH FLOOR ELECTRICAL ROOM 529.
7. PANEL L5A IS LOCATED IN FIFTH FLOOR ELECTRICAL ROOM 542.



PROJECT NORTH

ROOF PLAN - NEW WORK

SCALE: 1/16" = 1'–0"

GRAPHIC SCALE

0 8 16 24 32 40 48

SCALE: 1/16" = 1'–0"

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NORFOLK, VIRGINIA

NATO ACT
MAKEUP AIR HANDLING UNIT REPLACEMENT

ELECTRICAL NEW WORK

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SHEET 14 OF 14

E-101

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