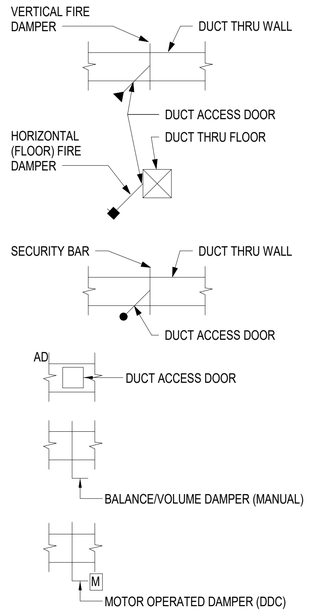
MECHANICAL LEGEND

T	THERMOSTAT
A 150	AIR TERMINAL TAG WITH AIR FLOW (CFM)
$	EMERGENCY HVAC SYSTEM SHUTOFF SWITCH
XXX	SPACE CO2 SENSOR / DDC POINT TAG
12"x10"	RECTANGULAR DUCT DIMENSIONS (INCHES)
12"Ø	ROUND DUCT DIMENSION
	FLEXIBLE ROUND DUCT (5'-0" MAX LENGTH)
	DOWNWARD DIRECTION OF SLOPED PIPING
	SUPPLY DUCT, SUPPLY DUCT DOWN/UP
	RETURN DUCT, RETURN DUCT DOWN/UP

AD	ACCESS DOOR (AD), ACCESS PANEL (AP)
	VOLUME DAMPER
	EXHAUST AIR (NEG.) DUCT SECTION
	CEILING CASSETTE
	CEILING CASSETTE DUCTED
	DUCTED FAN COIL UNIT
	VENT THRU FLOOR/ ROOF
	RISE IN DUCT (POINT IS HIGH)



DESIGN CONDITIONS

	SUMMER				WINTER			
	INDOOR		OUTDOOR		INDOOR		OUTDOOR	
	DB (°F)	RH	DB (°F)	WB (°F)	DB (°F)	DEWPOINT	DB (°F)	WB (°F)
MECHINCAL/ VEHICLE BAY	85		91	78	55		27	
OFFICE AREA	78	50	91	78	68		27	

DETAIL/SECTION TITLE	DETAIL CALLOUT SYMBOL	SECTION CUT SYMBOL
SECTION, DETAIL OR ELEVATION IDENTIFICATION MARK SECTION, DETAIL OR ELEVATION TITLE XX / X-XXX PLATE NUMBER WHERE SECTION, DETAIL OR ELEVATION IS TAKEN	DETAIL NUMBER PLATE NUMBER WHERE DETAIL IS DRAWN XX / X-XXX	SECTION LETTER PLATE NUMBER WHERE SECTION IS DRAWN VIEW SECTION XX / X-XXX

MECHANICAL PIPING LEGEND

D	CONDENSATE DRAIN PIPING
RL/S	REFRIGERANT LIQUID/SUCTION PIPING

MECHANICAL ABBREVIATIONS

A/C	AIR CONDITIONING
AC	ABOVE CEILING
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	ACOUSTIC LINING (DUCTWORK)
AP	ACCESS PANEL
AS	AIR SEPARATOR
ATFP	ANTI-TERRORISM FORCE PROTECTION
BAS	BUILDING AUTOMATIC SYSTEM (DDC)
BDD	BACKDRAFT DAMPER (DUCTWORK)
BHP	BRAKE HORSEPOWER
BI	BINARY INPUT
BO	BINARY OUTPUT
BOD	BOTTOM OF DUCT
BR	BASEBOARD RADIATOR
BSB	BRANCH SELECTOR BOX (VRF)
BTUH	BRITISH THERMAL UNITS PER HOUR
BV	BINARY VALUE
C	COMMON
CC	CEILING CASSETTE / COOLING COIL
CD	CEILING DIFFUSER
CER	CEILING EXHAUST REGISTER
CFM	CUBIC FEET PER MINUTE
CFT	CHEMICAL FEED TANK
CH	CHILLER
CHP	CHILLER PUMP
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CLG	CEILING
CND	CONDENSER
COP	COEFFICIENT OF PERFORMANCE
COV	CHANGE OF VALUE
CRAHU	COMPUTER ROOM HANDLING UNIT
CRG	CEILING RETURN GRILLE
CSD	CEILING SUPPLY DIFFUSER
CT	COOLING TOWER
CTG	CEILING TRANSER GRILLE
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
Cv	LOSS COEFFICIENT
CW	CHILLED WATER
DB	DRY BULB
DCW	DOMESTIC COLD WATER (POTABLE)
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DIA	DIAMETER
DOAS	DEDICATED OUTSIDE AIR UNIT
DS	DOWN IN SHAFT
DW	DOUBLEWALL (DUCTWORK)
DWGS	DRAWINGS
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRIONICALLY COMMUTATED (MOTOR) / ELECTRIC HEAT COIL
EER	ENERGY EFFICENCY RATIO
EF	EXHAUST FAN
EFF	EFFECTIVENESS / EFFICIENCY
EH	ELECTRIC HEAT
ERV	ENERGY RECOVERY VENTILATOR
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWH	ELECTRIC WATER HEATER
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FT	FEET
FT WG	FEET WATER GAUGE
G	NATURAL GAS
GH	GRAVITY HOOD
GP	GLYCOL PUMP

MECHANICAL ABBREVIATIONS

GPM	GALLONS PER MINUTE
GRH	GRAVITY ROOF HOOD
H	HUMIDIFIER (ELECTRIC)
HC	HEAT COIL (DX)
HGRC	HOT GAS REHEAT COIL (DX)
HGRH	HOT GAS REHEAT
HHWS	HOT HEATING WATER SYSTEM
HP	HEAT PUMP, HORSEPOWER
HR	HOUR / HEAT RECOVERY
HT	HEIGHT
HW	HOT WATER
HWP	HOT WATER PUMP
HX	HEAT EXCHANGER
IAW	IN ACCORDANCE WITH
IBS	IN BEAM SPACE
IC	IN CEILING
IDU	INDOOR UNIT (VRF)
IN.	INCH
IWG	INCHES WATER GAUGE
KW	KILOWATT
LBS	POUNDS
LPS	LOW PRESSURE STEAM
LV	LOUVER
LWT	LEAVING WATER TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	1,000 BTUH
MCA	MAXIMUM CIRCUIT AMPS
MD	MOTOR OPERATED DAMPER
MIN	MINIMUM
NC	NORMALLY CLOSED, NOISE CRITERIA
NO	NUMBER, NORMALLY OPEN
NP	NOT PROVIDED
OA	OUTSIDE AIR
OAU	OUTSIDE AIR UNIT
OCC	OCCUPANCY
ODU	OUTDOOR UNIT (VRF)
OF	ON FLOOR
OG	ON GRADE
OH	OPPOSITE HAND
OR	ON ROOF
OW	ON WALL
PA	PRIMARY AIR (VAV TERMINAL)
PH	PHASE
PRV	POWER ROOF VENTILATOR
PSIG	POUNDS PER SQUARE INCH GAUGE
PTAC	PACKAGED TERMINAL AIR CONDITIONING UNIT
PTHP	PACKAGED TERMINAL HEAT PUMP
PTP	PRESSURE/TEMPERATURE TEST PORT
QTY	QUANTITY
RA	RETURN AIR
RC-X	REHEAT COIL - NUMBER
RD	ROOF DRAIN
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SD	STORM DRAIN
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF-X	SUPPLY FAN - NUMBER
SIM	SIMILAR
SP	STATIC PRESSURE
SQ	SQUARE
SQFT	SQUARE FEET
TC	THRU CEILING
TF	THRU FLOOR
TR	THRU ROOF
TYP.	TYPICAL
UH	UNIT HEATER
UOI	UNLESS OTHERWISE INDICATED
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
VRF	VARIABLE REFRIGERANT FLOW
VWV	VARIABLE WATER VOLUME
W	WIDTH
WB	WET BULB
WC	WATER COLUMN (PRESSURE)
WH	WALL HOOD
WL	WALL LOUVER

MECHANICAL ABBREVIATIONS

WPD	WATER PRESSURE DROP
°	DEGREES
Ø	DIAMETER
Φ	OVAL

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS ARE USED

GENERAL MECHANICAL NOTES

1. THESE GENERAL MECHANICAL NOTES APPLY TO ALL MECHANICAL DRAWINGS IN THIS SET. SHEET SPECIFIC NOTES ARE INDICATED ON EACH SHEET UNDER GENERAL SHEET NOTES.
2. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED, AND AS REQUIRED BY CODE.
3. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, APPLICABLE CODES, AND REGULATIONS.
4. EXISTING DUCT AND PIPING SIZES INDICATED ARE APPROXIMATE. FIELD VERIFY ALL EXISTING CONDITIONS.
5. PATCH ALL HOLES FROM REMOVAL OF PIPING, DUCTWORK, OR EQUIPMENT TO MATCH ADJACENT CONSTRUCTION.
6. CONCEAL ALL DUCTWORK AND PIPING ABOVE SUSPENDED CEILINGS AND IN WALLS, UNLESS OTHERWISE NOTED.
7. PROVIDE VIBRATION ISOLATORS FOR ALL MECHANICAL EQUIPMENT AND PIPING TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
8. PROVIDE ACCESS PANELS IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVE FIRE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT THAT REQUIRES ROUTINE MAINTENANCE. ACCESS PANELS SHALL BE SIZED AS REQUIRED TO ALLOW WORKING CLEARANCE FOR DUCT ACCESS DOORS.
9. ALL 90 DEGREE RECTANGULAR MITERED DUCT ELBOWS IN SUPPLY AND RETURN DUCTWORK SHALL HAVE TURNING VANES. PROVIDE AN ACCESS DOOR UPSTREAM OF ELBOW FOR TURNING VANE INSPECTION AND CLEANING.
10. PROVIDE PIPE SLEEVES FOR ALL PIPING PENETRATIONS THRU WALLS AND FLOORS. EACH PIPE SHALL BE SEPARATELY SLEEVED. PROVIDE CONTINUOUS SEALANT JOINT AROUND PIPE SLEEVE, BOTH SIDES OF WALL, WATERTIGHT.
11. PROVIDE P-TRAPS IN CONDENSATE DRAIN PIPING AT EACH AC UNIT UNLESS THE RTU IS EQUIPPED WITH AN INTERNAL TRAP.
12. CONDENSATE DRAIN PIPING CLEANOUTS SHALL BE INSTALLED AT EACH CHANGE IN DIRECTION GREATER THAN 45 DEGREES. WHERE MORE THAN ONE CHANGE OF DIRECTION OCCURS IN A RUN OF PIPING, ONLY ONE CLEANOUT SHALL BE REQUIRED FOR EACH 40 FEET OF DEVELOPED LENGTH. COMBINATION WYE AND 1/8 BENDS SHALL BE USED IN LIEU OF TEES. UNLESS OTHERWISE INDICATED ALL CONDENSATE LINES SHALL SLOPE DOWNWARD AND BE GRAVITY FED.
13. MOUNT THERMOSTATS 48 INCHES MEASURED TO THE TOP OF THERMOSTAT ABOVE THE FINISHED FLOOR AND RECESSED, FLUSH WITH WALL SURFACE, WHERE POSSIBLE UNLESS OTHERWISE NOTED. SEE ELECTRICAL DRAWINGS FOR COORDINATION WITH LIGHT SWITCHES.
14. MECHANICAL EQUIPMENT, WHICH IS PROVIDED WITH MANUFACTURER'S INSTALLED CONTROLS, SHALL BE STARTED UP BY THE MANUFACTURER'S REPRESENTATIVE IN CONJUNCTION WITH THE CONTROLS CONTRACTOR (NOT MECHANICAL CONTRACTOR). TRAINING AND MANUALS FOR THE MANUFACTURER'S INSTALLED CONTROLS SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER'S REPRESENTATIVE. CONTROLS CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH MANUFACTURER'S REPRESENTATIVE FOR THE COMMUNICATION OF THE DDC SYSTEM TO THE MANUFACTURER'S INSTALLED CONTROLS.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES	DJG	DRW	DJG	CHK	MJH

PM/OM GFS/LEJ

BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA

MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

MECHANICAL LEGEND, ABBREVIATIONS AND NOTES

SCALE: AS NOTED

EPROJECT NO.: 1672404

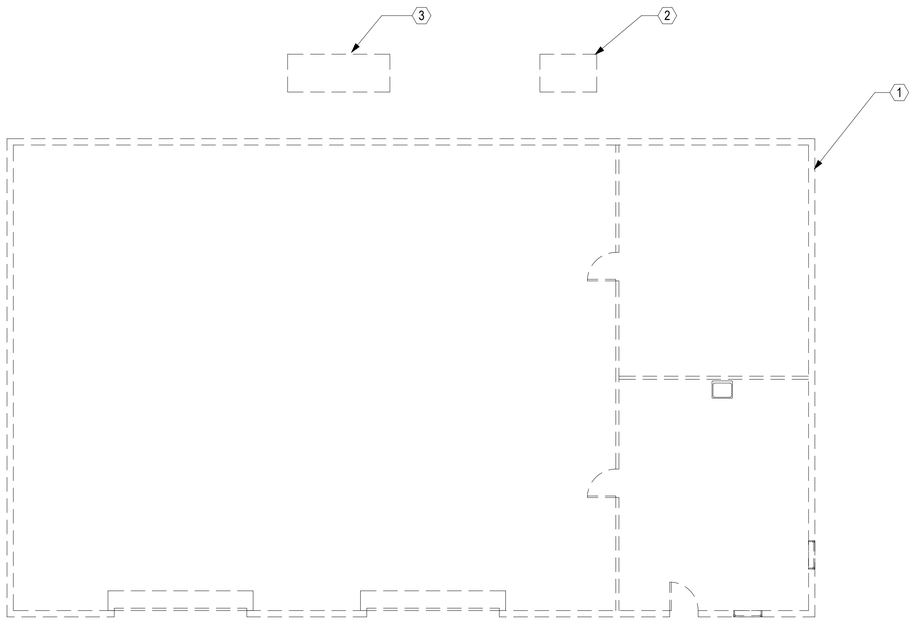
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12842314

SHEET 87 OF 119

M-001

DRAWFORM REVISION: 7 FEBRUARY 2019



BUILDING AS3534

PLAN NORTH

FIRST FLOOR DEMOLITION PLAN - MECHANICAL

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

GENERAL NOTES

1. THE WORK INCLUDES THE COMPLETE DEMOLITION AND REMOVAL OF THE ENTIRE EXISTING STRUCTURE AS SHOWN OF THE DRAWINGS INCLUDING BUT NOT LIMITED TO, FOUNDATION, MASONRY WALLS, STRUCTURE, DOORS AND FRAMES, LOUVERS, ROOFING SYSTEM, GUTTERS, AND DOWNSPOUTS, FINISHES, BUILT-INS, PLUMBING FIXTURES AND PIPING, MECHANICAL EQUIPMENT AND DUCT-WORK, LIGHTING FIXTURES, ELECTRICAL WIRING AND CONDUIT, WALKS AND CURBS, AND MISCELLANEOUS ITEMS.
2. COORDINATE REMOVAL AND CAPPING OF EXISTING UTILITIES INCLUDING, BUT NOT LIMITED TO, WATER LINES, SANITARY SEWER LINES, ELECTRICAL LINES, CONDUITS AND EQUIPMENT, FIRE PROTECTION LINE AND EQUIPMENT.
3. REFER TO HAZMAT REPORT FOR ADDITIONAL INFORMATION FOR HAZMAT IDENTIFICATION, REMOVAL AND DISPOSAL. SEE SHEET HM101.
4. THE TERMS "REMOVE" AND "DEMOLISH" SHALL MEAN THAT COMPLETE ITEM INDICATED SHALL BE ENTIRELY DISMANTLED AND REMOVED FROM THE SITE AND GOVERNMENT PROPERTY. THE TERMS ARE USED INTERCHANGEABLY. ALL REMOVED OR DEMOLISHED ITEMS SHALL BECOME PROPERTY OF THE CONTRACTOR AND MUST BE LEGALLY DISPOSED OF OFF SITE AND GOVERNMENT PROPERTY.
5. PRIOR TO CONTRACT AWARD, THE GOVERNMENT WILL REMOVE ALL FURNITURE AND EQUIPMENT. ANY REMAINING ITEMS WILL BE INCLUDED IN THE DEMOLITION.

(X) KEYNOTES

1 DISCONNECT AND DEMOLISH ALL MECHANICAL EQUIPMENT AND APPURTANANCES SERVING EXISTING BUILDING.

2 DISCONNECT AND DEMOLISH EXISTING AIR CONDITIONING PACKAGE UNIT AND ALL ASSOCIATED DUCT WORK AND APPURTENANCES.

3 DISCONNECT AND DEMOLISH EXISTING PROPANE TANK AND ALL ASSOCIATED PIPING. CONTRACTOR TO FIELD VERIFY LOCATION OF TANK AND EQUIPMENT.

GRAPHIC SCALE(S)

1/8" = 1' - 0" 0 5' 10' 15' 30'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

A/E INFO

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FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES	DJG	DRW	DJG	CHK	MJH

PM/DM	GFS/LEJ
BRANCH MANAGER	SCW
CHIEF ENG/ARCH	EA
FIRE PROTECTION	DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA

MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

FIRST FLOOR DEMOLITION PLAN - MECHANICAL

SCALE: AS NOTED

EPROJECT NO.: 1672404

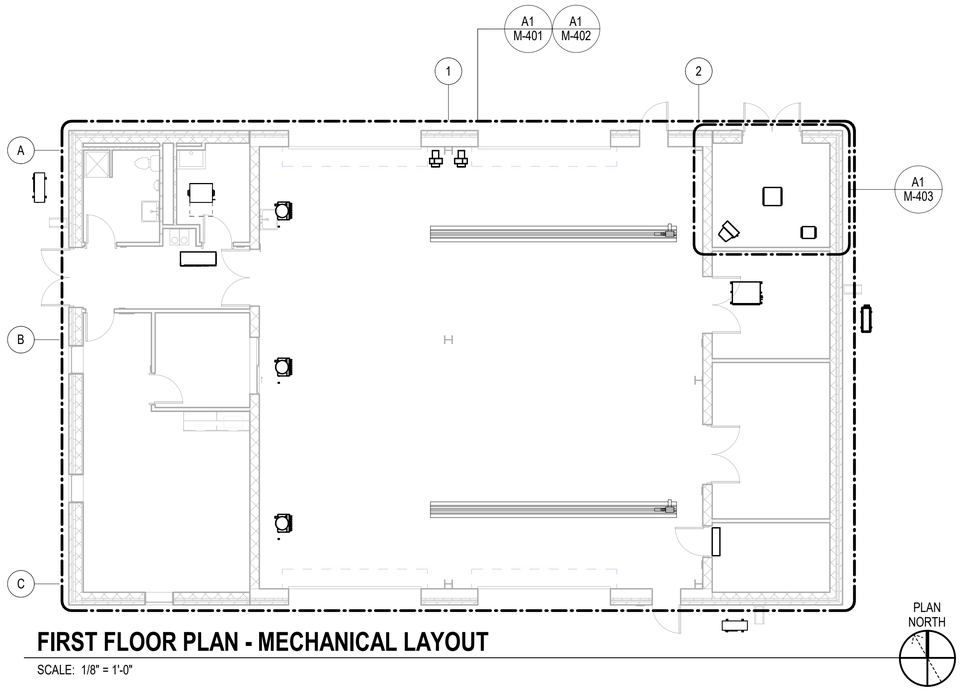
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842315

SHEET 88 OF 119

MD101

DRAWFORM REVISION: 7 FEBRUARY 2019



FIRST FLOOR PLAN - MECHANICAL LAYOUT

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

PLAN NORTH

SYM	DESCRIPTION	DATE	APPR

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES	DJG	DRW	DJG	CHK	MJH

PM/DM GFS/LEJ

BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA
MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

FIRST FLOOR PLAN - MECHANICAL LAYOUT

SCALE: AS NOTED

EPROJECT NO.: 1672404

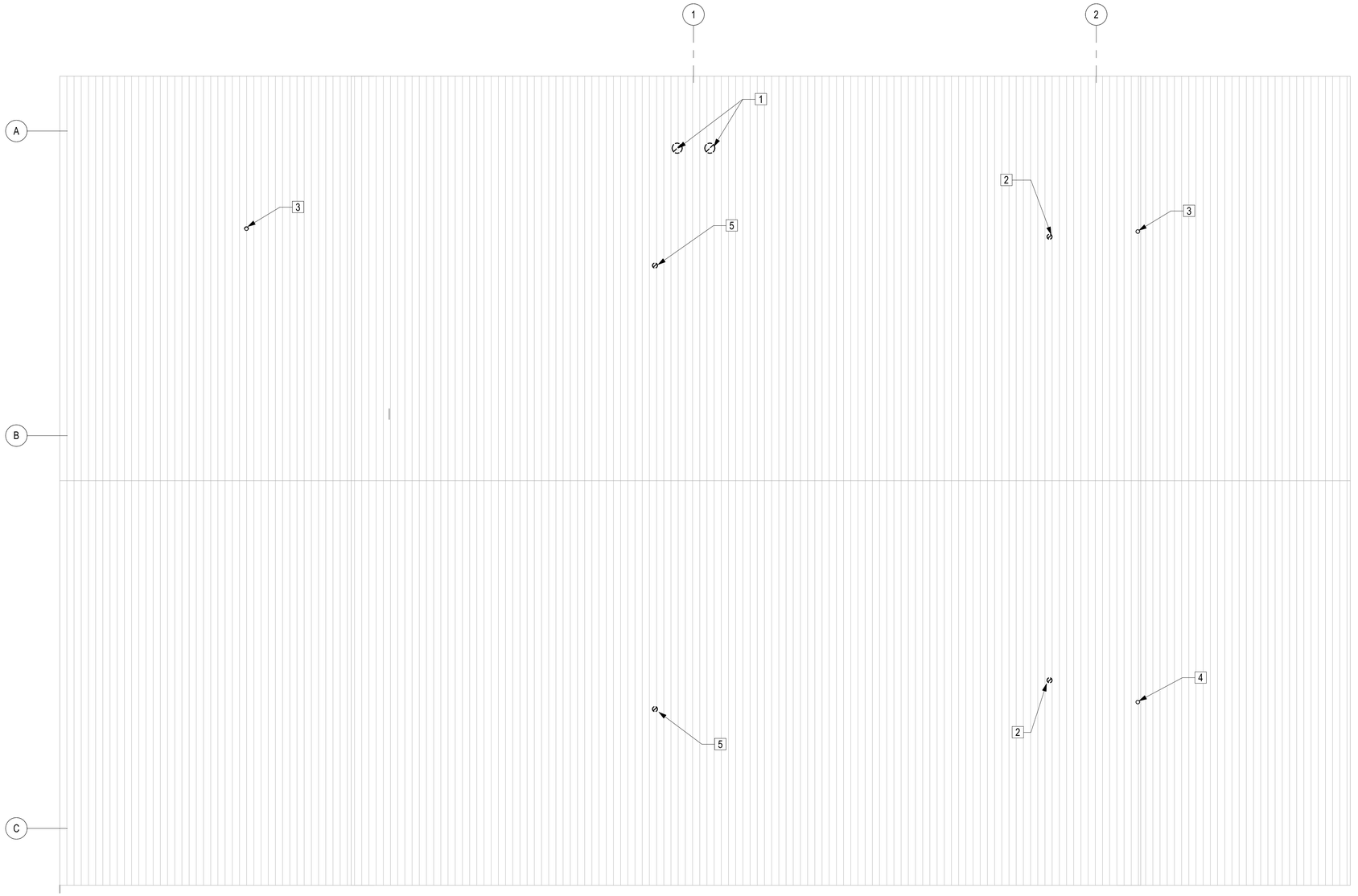
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842316

SHEET 89 OF 119

MH101

DRAWFORM REVISION: 7 FEBRUARY 2019



ROOF PLAN - MECHANICAL LAYOUT

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

PLAN NORTH

KEYNOTES

X

1 8" VEHICLE EXHAUST DUCT UP TO NO-LOSS STACK HEAD. SEE DETAIL C4 - NO-LOSS STACKHEAD, SHEET M-501. DUCT MUST BE PREMANUFACTURED WITH 14 GAUGE MINIMUM GALVANIZED STEEL.

2 4" COMBUSTION AIR INTAKE TO RADIANT HEATERS IN VEHICLE BAY. SEE DETAIL B3 - COMBUSTION AIR, ON SHEET M-502.

3 3" SANITARY VENT LINE THRU ROOF. SEE DETAIL C3 - ROOF VENT DETAIL, ON SHEET AE531.

4 2" SANITARY VENT LINE THRU ROOF. SEE DETAIL C3 - ROOF VENT DETAIL, ON SHEET AE531.

5 4" FLUE PIPE FROM RADIANT HEATERS IN VEHICLE BAY. SEE DETAIL B4 - FLUE VENT, ON SHEET M-502.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

SYM	DESCRIPTION	DATE	APPR

SEAL

A/E INFO

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FOR COMMANDER NAVFAC

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES DJG | DRW DJG | CHK MJH

PM/DM GFS/LEJ

BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA

MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

ROOF PLAN - MECHANICAL LAYOUT

SCALE: AS NOTED

EPROJECT NO.: 1672404

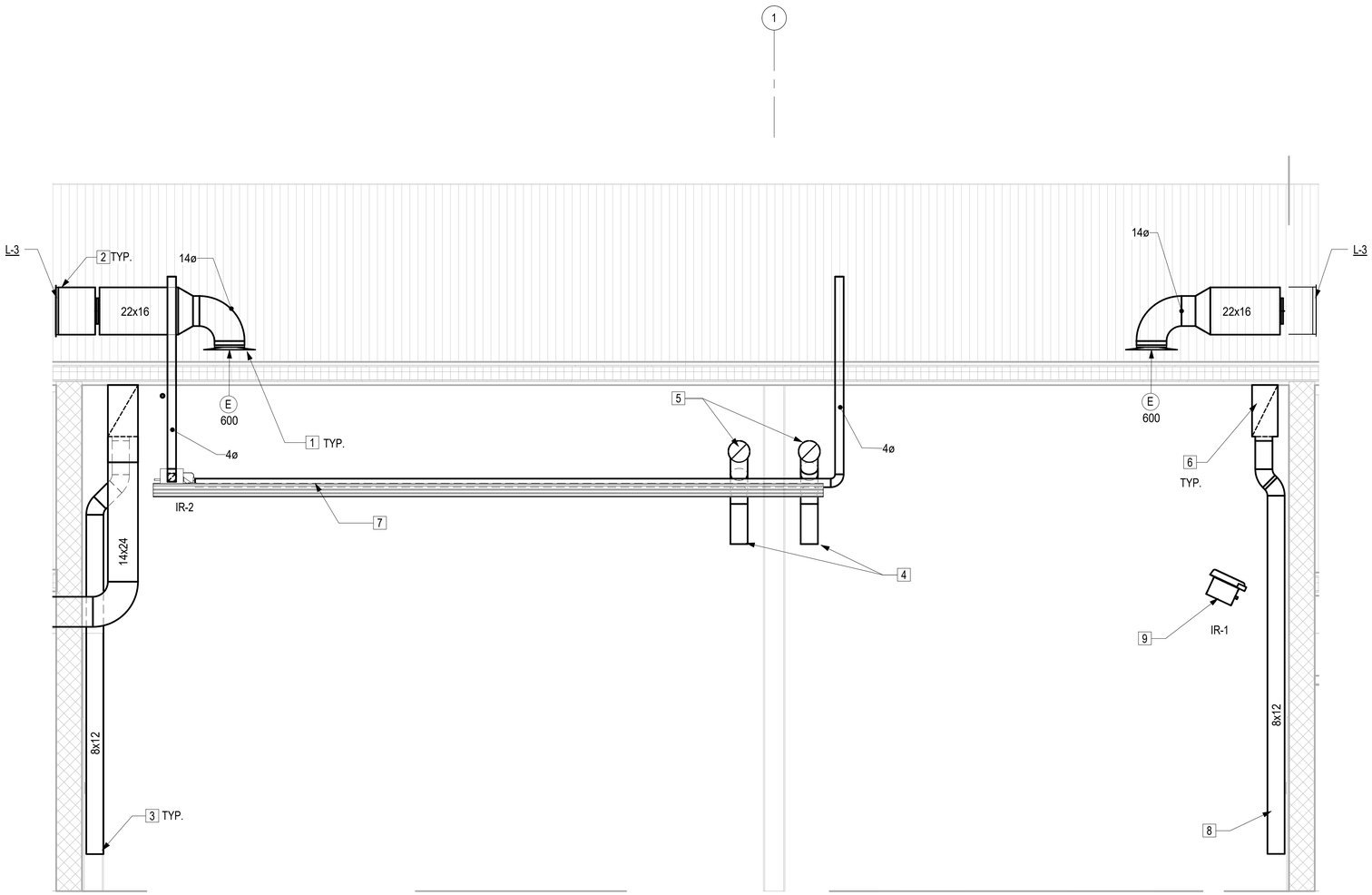
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842317

SHEET 90 OF 119

MH102

DRAWFORM REVISION: 7 FEBRUARY 2019



A1 SECTION - VEHICLE MAINTENANCE BAY ELEVATION

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

KEYNOTES

X

1 VEHICLE BAY EXHAUST MAKE UP AIR. EGG CRATE GRILL 21' AFF.
2 VEHICLE BAY EXHAUST LOUVER, L-3 THROUGH SIDE WALL 22'6" CENTERLINE AFF
3 16x8 SIDEWALL GRIILL INSTALLED ON DUCT. CAP BOTTOM OF DUCT.
4 VEHICLE EXHAUSTS DUCT INSTALL HOSE WITH SPRING BALANCER LIFTING SYSTEM.
5 VEHICLE EXHAUST DUCT TO BE INSTALLED AT 17' AFF. OUTSIDE OF CRANE CLEARANCE ZONE.
6 DUCT TO BE TO 18' 7" AFF TO CENTERLINE.
7 IR-2 15' 8" AFF.
8 BACK OF DUCT 3" OFF FINISH WALL.
9 IR-1 MINIMUM OF 12' AFF.

GRAPHIC SCALE(S)

3/8" = 1' - 0" 0 1' 2' 3' 4' 5' 10'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

A/E INFO

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FOR COMMANDER NAVFAC

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES	DJG	DRW	DJG	CHK	MJH

PM/DM GFS/LEJ

BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA

MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

BUILDING SECTIONS - MECHANICAL

SCALE: AS NOTED

EPROJECT NO.: 1672404

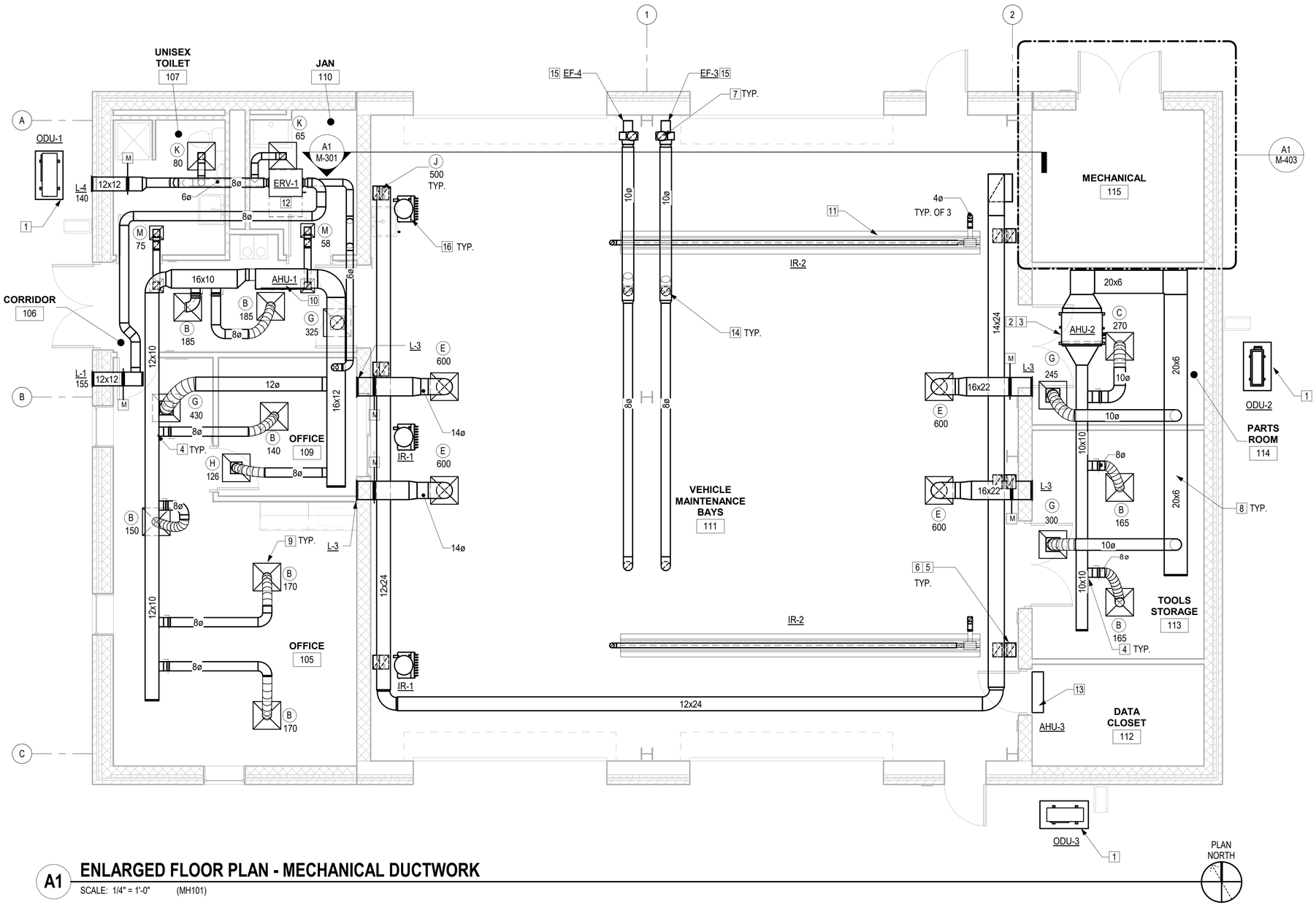
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12842318

SHEET 91 OF 119

M-301

DRAWFORM REVISION: 7 FEBRUARY 2019



A1 ENLARGED FLOOR PLAN - MECHANICAL DUCTWORK

SCALE: 1/4" = 1'-0" (MH101)

KEYNOTES

X

1 CONCRETE PAD; SEE DETAIL A1 - MECHANICAL CONCRETE PAD, SHEET M-501.
2 12x8 EXHAUST DUCT DOWN WITH BALANCING DAMPER. MOUNT BACK OF DUCT 3" OFF OF FINISHED WALL. MOUNT GRILL 18" AFF.
3 CEILING-CONCEALED MINI SPLIT DESIGN FOR SHORT-RUN DUCTWORK.
4 SEE DETAIL A2 - TAKE-OFF AND AIR DIFFUSER, SHEET M-501.
5 SEE DETAIL A4 - TYPICAL DUCT BRANCH DETAIL, SHEET M-501.
6 12x8 EXHAUST DUCT DOWN WITH BALANCING DAMPER. MOUNT BACK OF DUCT 3" OFF OF FINISHED WALL. MOUNT GRILL 18" AFF.
7 8" VEHICLE EXHAUST DUCT UP TO NO-LOSS STACK HEAD. SEE DETAIL C4 - NO-LOSS STACKHEAD, SHEET M-501. DUCT MUST BE PREMANUFACTURED WITH 14 GAUGE MINIMUM GALVANIZED STEEL.
8 SEE DETAIL A4 - DUCT HANGER DETAIL, SHEET M-502.
9 SEE DETAIL A2 - TAKE AND AIR SUPPLY AIR DIFFUSER, SHEET M-501.
10 SEE DETAIL B1 - AIR HANDLING UNIT DETAIL, SHEET M-502.
11 PROVIDE INFRARED HEATERS PER MANUFACTURER'S RECOMMENDATION, INCLUDING MAKE-UP AND FLUE VENT. SEE DETAIL B4 - FLUE VENT, SEE SHEET M-502.
12 SEE DETAIL A2 - ENERGY RECOVERY VENTILATOR, ON SHEET M-502.
13 SEE DETAIL C1 - AIR CONDITIONING UNIT, SHEET M-501.
14 8" VEHICLE EXHAUST DUCT TAP, WITH EXHAUST HOSE AND SPRING BALANCER MOUNTED TO CEILING ABOVE.
15 SEE DETAIL C1 - VEHICLE EXHAUST SYSTEM, ON SHEET M-502.
16 IR-1 HEATER MINIMUM 12' AFF. ROTATE UP 25 DEGREES FROM THE HORIZON. SEE DETAIL C4 - IR HEATER IR-1, ON SHEET M-502.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES	DJG	DRW	DJG	CHK	MJH

PM/DM GFS/LEJ
BRANCH MANAGER SCW
CHIEF ENG/ARCH EA
FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA
MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

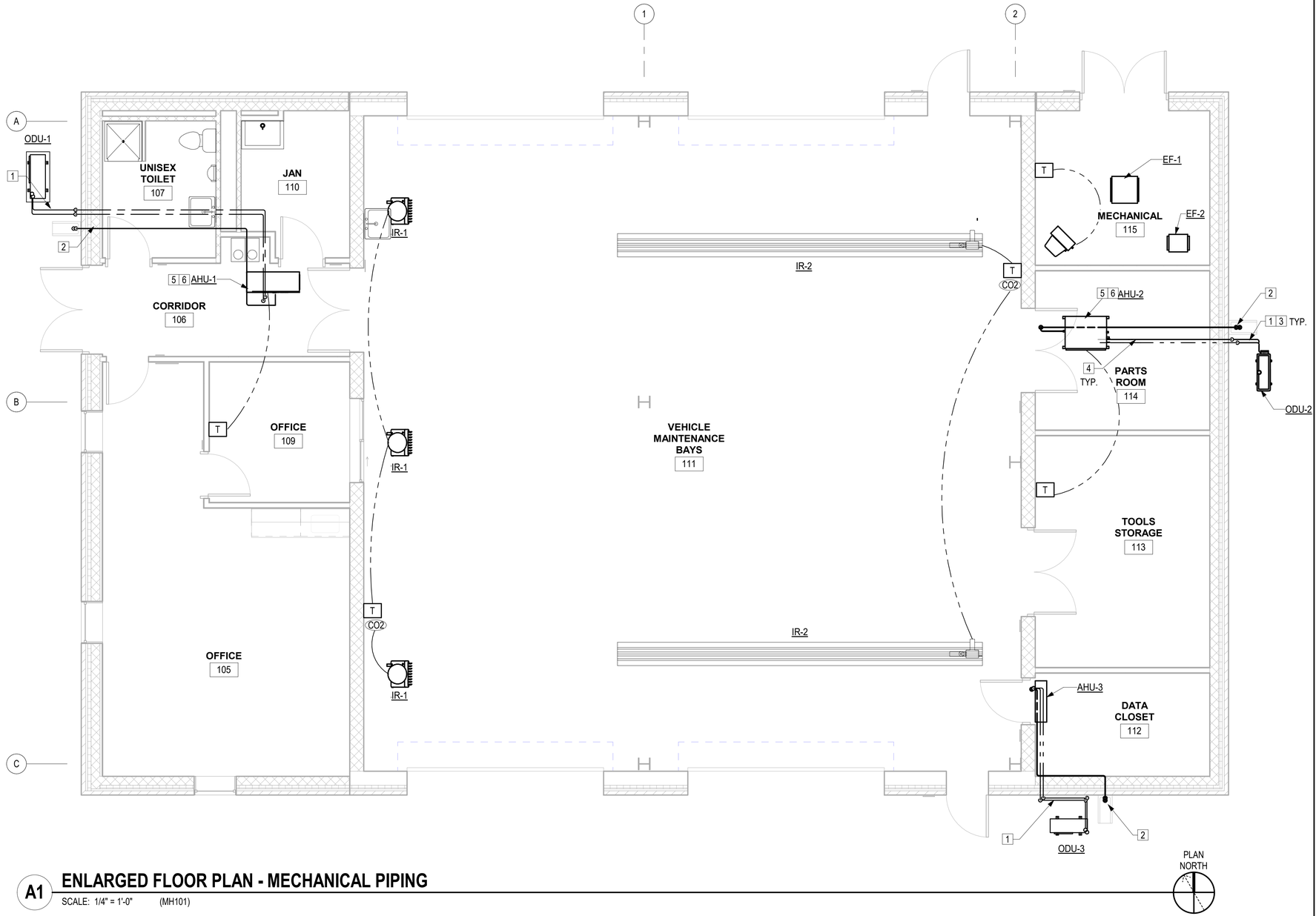
P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

ENLARGED FLOOR PLAN - MECHANICAL DUCTWORK

SCALE: AS NOTED
EPROJECT NO.: 1672404
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12842319
SHEET 92 OF 119

M-401

DRAWFORM REVISION: 7 FEBRUARY 2019



A1 ENLARGED FLOOR PLAN - MECHANICAL PIPING

SCALE: 1/4" = 1'-0" (MH101)

KEYNOTES

X

1 RL/S LINES TO INDOOR UNIT. SIZE LINES PER MANUFACTURER'S INSTRUCTIONS.
2 CONDENSATE LINE FROM INDOOR UNIT, DRAIN TO SPLASH BLOCK.
3 SEE DETAIL A1 - EXTERIOR WALL PENETRATION, SHEET P-502.
4 SEE DETAIL B4 - PIPE SUPPORT HORIZONTAL, SHEET P-501.
5 SEE DETAIL B1 - AIR HANDLING UNIT DETAIL, SHEET M-502.
6 SEE DETAIL A1 - CONDENSATE P-TAP DETAIL, SHEET M-502.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

SYM | DESCRIPTION | DATE | APPR

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES DJG | DRW DJG | CHK MJH

PM/DM GFS/LEJ

BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA

MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

ENLARGED FLOOR PLAN - MECHANICAL PIPING

SCALE: AS NOTED

EPROJECT NO.: 1672404

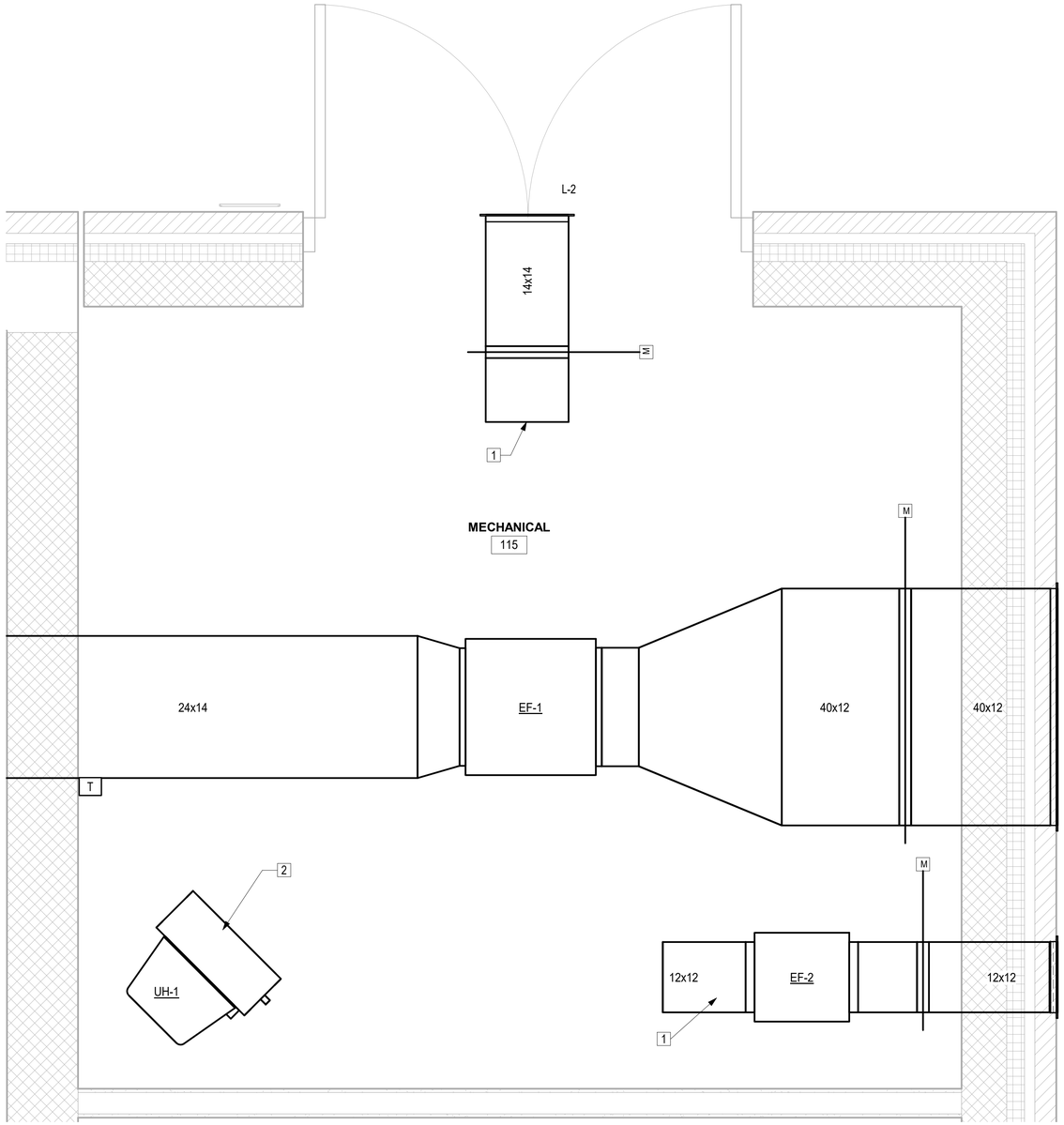
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12842320

SHEET 93 OF 119

M-402

DRAWFORM REVISION: 7 FEBRUARY 2019



A1 ENLARGED FLOOR PLAN - MECHANICAL ROOM

SCALE: 1" = 1'-0" (M-401)

KEYNOTES

X

1 1/4" WIRE MESH AT INLET/OUTLET
2 SEE DETAIL C2 - ELECTRIC UNIT HEATER, SHEET M-501

GRAPHIC SCALE(S)

1" = 1' - 0"

0 6" 1' 2' 3'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

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P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

ENLARGED FLOOR PLAN - MECHANICAL ROOM

SCALE: AS NOTED

EPROJECT NO.: 1672404

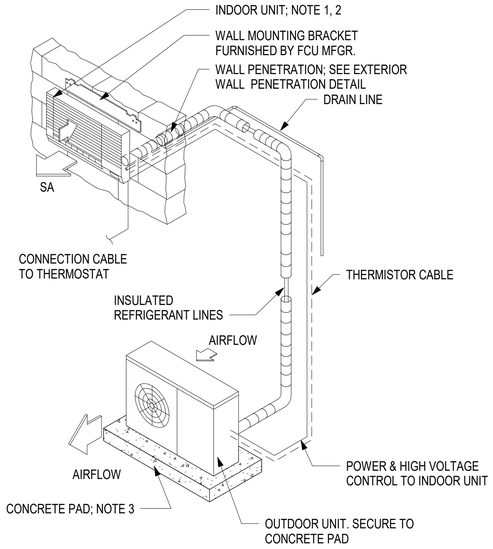
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842321

SHEET 94 OF 119

M-403

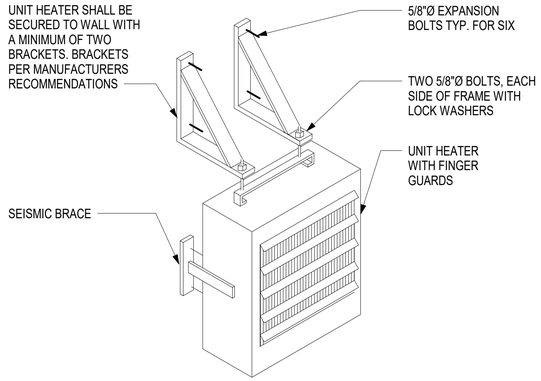
DRAWFORM REVISION: 7 FEBRUARY 2019



NOTE: 1. UNIT MUST BE SUPPORTED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. CASSETTE AND DUCTED STYLE UNIT INSTALLATION SIMILAR.
3. SEE DETAIL A1, MECHANICAL CONCRETE PADS, SHEET M-501.

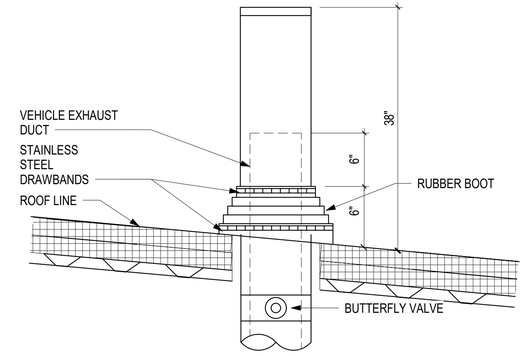
C1 DETAIL - AIR CONDITIONING UNIT

SCALE: NOT TO SCALE M-401



C2 DETAIL - ELECTRIC UNIT HEATER

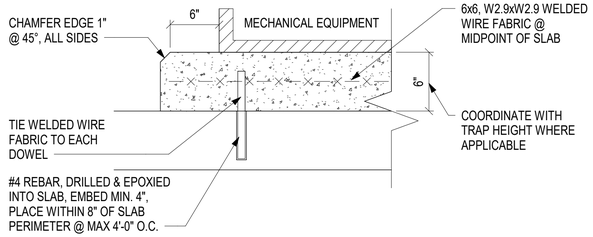
SCALE: NOT TO SCALE M-403



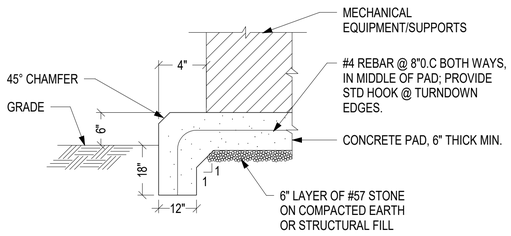
NOTE: DUCT MUST BE BE PRE-MANUFACTURED WITH GALVANIZED STEEL, 14 GAUGE MINIMUM.

C4 DETAIL - NO-LOSS STACKHEAD

SCALE: NOT TO SCALE MH102,M-301,M-401



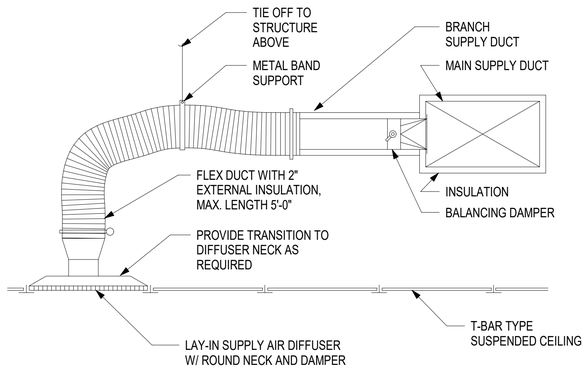
CONCRETE PAD ON SLAB



CONCRETE PAD ON GRADE

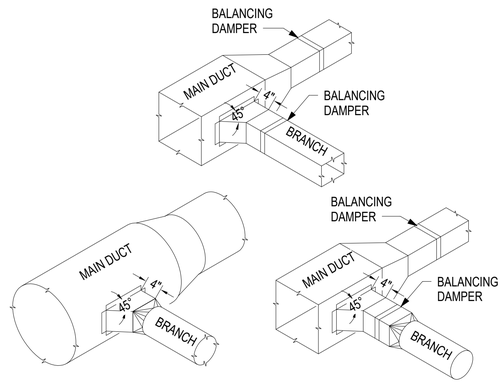
A1 DETAIL - MECHANICAL CONCRETE PADS

SCALE: NOT TO SCALE M-401,P-403



A2 DETAIL - TAKE-OFF AND AIR SUPPLY AIR DIFFUSER

SCALE: NOT TO SCALE M-401



USE ONLY AT LAST TAKEOFF BEFORE OUTLETS & THEN ONLY WHERE ROUND RUNOUTS ARE INDICATED ON DRAWINGS

A4 DETAIL - TYPICAL DUCT BRANCH DETAIL

SCALE: NOT TO SCALE M-401

SYM	DESCRIPTION	DATE	APPR

SEAL

A/E INFO

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FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

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NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA
MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

MECHANICAL DETAILS

SCALE: AS NOTED

EPROJECT NO.: 1672404

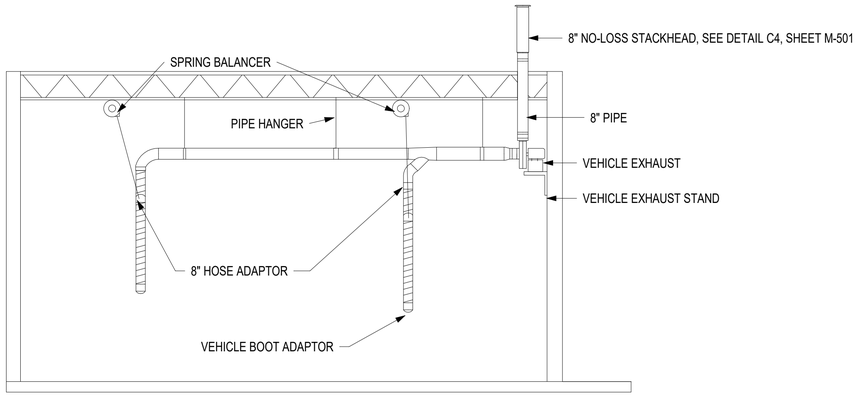
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12842322

SHEET 95 OF 119

M-501

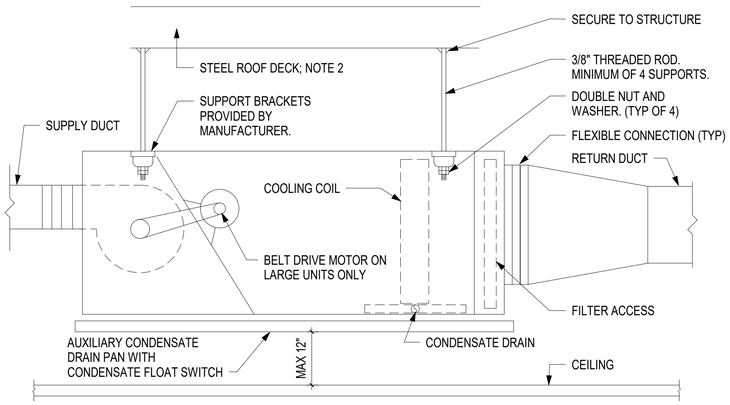
DRAWFORM REVISION: 7 FEBRUARY 2019



C1 DETAIL - VEHICLE EXHAUST SYSTEM

SCALE: NOT TO SCALE

M-401



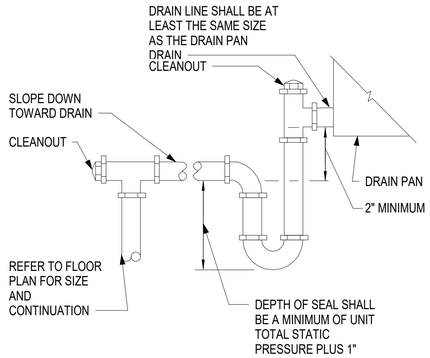
NOTES:

1. REFER TO THE FLOOR PLANS FOR DUCT SIZES FOR RETURN AND SUPPLY AIR DUCTS
2. SEE DETAIL C4, CONCENTRATED LOADS AT JOISTS, ON SHEET SF501; FOR HANGER SUPPORT.

B1 DETAIL - AIR HANDLING UNIT

SCALE: NOT TO SCALE

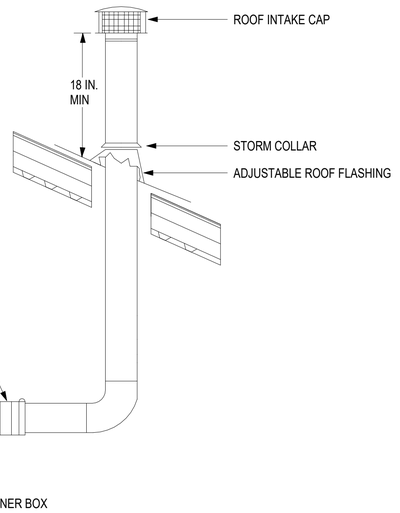
M-401,M-402



A1 DETAIL - CONDENSATE P-TRAP

SCALE: NOT TO SCALE

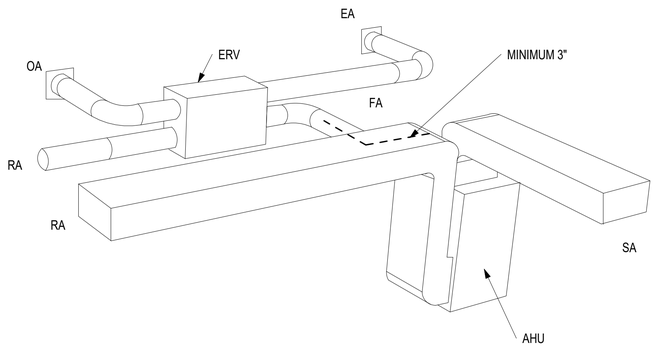
M-402



B3 DETAIL - COMBUSTION AIR

SCALE: NOT TO SCALE

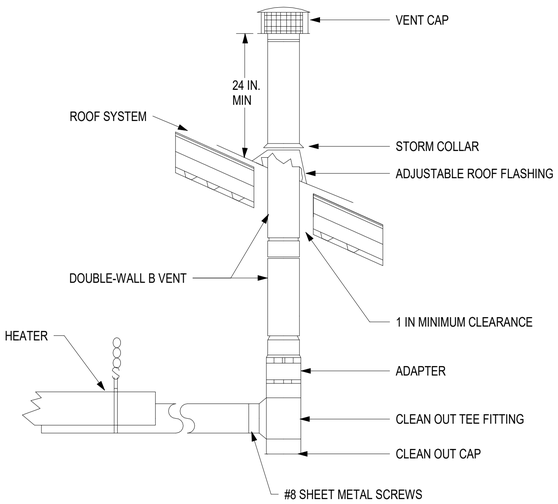
MH102



A2 DETAIL - ENERGY RECOVERY VENTILATOR

SCALE: NOT TO SCALE

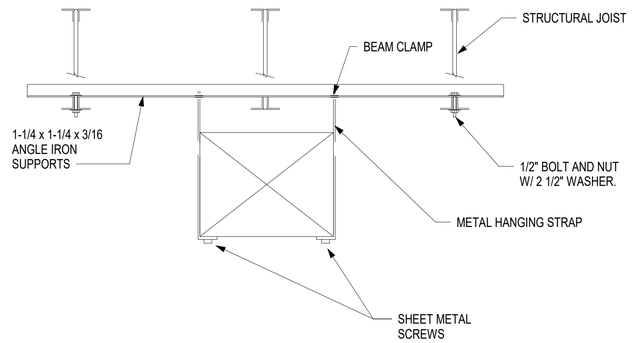
M-401



B4 DETAIL - FLUE VENT

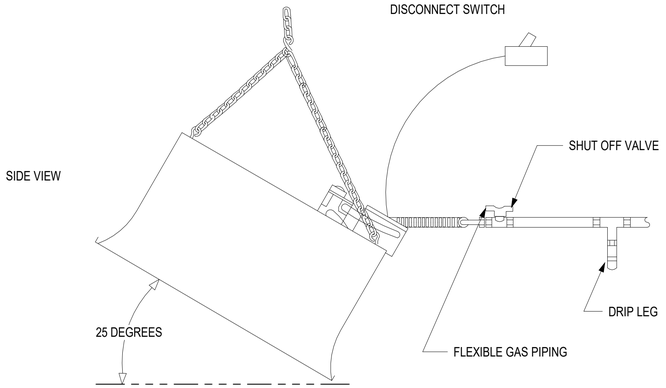
SCALE: NOT TO SCALE

M-401, MH102



A4 DETAIL - DUCT HANGER DETAIL

SCALE: NOT TO SCALE



C4 DETAIL - IR HEATER IR-1

SCALE: NOT TO SCALE

M-502

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

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BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
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MIDLANT DC CORE

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA

MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

MECHANICAL DETAILS

SCALE: AS NOTED

EPROJECT NO.: 1672404

CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842323

SHEET 96 OF 119

M-502

DRAWFORM REVISION: 7 FEBRUARY 2019

UNIT HEATER SCHEDULE

MARK	LOCATION	CFM	ELECTRICAL			NOTES
			kW	V	PH	
UH-1	MECHANICAL ROOM	400	3.3	208	1	1,2,3

NOTES:
1. PROVIDE MANUFACTURER'S STANDARD WALL BRACKET MOUNTING.
2. PROVIDE FINGER GUARDS AT INLET AND OUTLET.
3. PROVIDE LOW VOLTAGE, WALL MOUNTED THERMOSTAT.

EXHAUST FAN SCHEDULE

MARK	LOCATION	TYPE	DRIVE	CFM	ESP (IN.WC)	SONES (DBA)	RPM	ELECTRICAL DATA				NOTES
								HP	V	PH	Hz	
EF-1	MECHANICAL ROOM	INLINE CABINET FAN	DIRECT	2942	0.55	18.6	1725	1.00	208	3	60	1,2,3,4,6
EF-2	MECHANICAL ROOM	INLINE CABINET FAN	DIRECT	285	0.50	9.0	1290	0.25	208	3	60	1,2,3,4
EF-3	VEHICLE BAY	VEHICLE EXHAUST	DIRECT	2472	4.00	86.0	3450	7.50	208	3	60	4,5,6
EF-4	VEHICLE BAY	VEHICLE EXHAUST	DIRECT	2472	4.00	86.0	3450	7.50	208	3	60	4,5,6

NOTES:
1. PROVIDE WITH UNIT MOUNT SPEED CONTROLLER.
2. PROVIDE WITH ELECTRONICALLY COMMUTATED (ECM) MOTOR.
3. FAN MUST BE RATED IN ACCORDANCE WITH UL-705
4. ALL ELEVATED SUSPEND SERVICEABLE EQUIPMENT MUST HAVE A CLEAR SPACE BENEATH IT SUCH THAT A MATERIAL LIFT CAN LOWER THE EQUIPMENT TO THE FLOOR WITHOUT REMOVING OR MODIFYING ANY OTHER SYSTEM.
5. FAN MUST HAVE FLEXIBLE HOSE WITH MIN LENGTH OF 35 FEET WITH SPRING BALANCER MOUNTED TO CEILING ABOVE.
6. SPARK PROOF CONSTRUCTION.

INDOOR UNIT EQUIPMENT SCHEDULE

MARK	LOCATION	CFM	COOLING DATA				TOTAL HEATING CAPACITY (BTUH)	NOTES
			TOTAL CAPACITY (BTUH)	SENSIBLE CAPACITY (BTUH)	EAT (DB °F)	EAT (WB °F)		
AHU-1	CORRIDOR	1000	30000.0	21400.0	80.0	67.0	34000.0	1,2,3
AHU-2	PARTS ROOM	600	18000.0	13350.0	90.0	73.0	21000.0	1,2,3
AHU-3	DATA	317	12000.0	10680.0	95.0	75.0	18000.0	1,2,3

NOTES:
1. CFM CAN VARY, BASED ON MANUFACTURER'S STANDARD UNIT AS REQUIRED TO MEET MINIMUM COOLING CAPACITY. UNITS SHALL HAVE MULTISPEED FANS, HIGH SPEED CFM INDICATED.
2. EQUIPMENT FURNISHED SHALL BE MANUFACTURED BY THE SAME COMPANY AS THE ODU'S AND TESTED / RATED BY THE MANUFACTURER'S AS A COMPLETE SYSTEM.
3. HP-HEAT PUMP; DU-CONCEALED DUCTED UNIT; CU-CASSETTE UNIT, WH-WALL HUNG.

OUTDOOR UNIT EQUIPMENT SCHEDULE

MARK	UNIT SERVED	COOLING CAPACITY (BTUH)	HEATING CAPACITY (BTUH)	ELECTRICAL DATA						NOTES
				SEER	EER	V	PH	MCA	MFA	
ODU-1	AHU-1	30000	32000	16	12.5	208	1	29	35	2
ODU-2	AHU-2	15000	18000	18.6	12.5	208	1	11	30	1,2
ODU-3	AHU-3	12000	14000	18.6	12.5	208	1	11	30	1,2

NOTES:
1. COP AND HEATING CAPACITY IS RATED AT 47 f AMBIENT AIR CONDITION.
2. EQUIPMENT FURNISHED SHALL BE MANUFACTURED BY THE SAME COMPANY AS THE IDU'S AND TESTED/ RATED BY THE MANUFACTURER AS A COMPLETE SYSTEM.

DIFFUSER, REGISTER, AND GRILLE SCHEDULE

MARK	TYPE/MOUNTING	FACE SIZE	NECK SIZE (IN.)	AIRFLOW RANGE (CFM)		MAX. APD (IN. WC)	THROW (FT)	MAX. ALLOWED N.C.	NOTES
				MIN	MAX				
B	CSD	24x24	8ø	120	240	0.035	9	15	1,2,3,4
C	SG	24x24	10ø	240	400	0.049	15	26	1,2,3,4
E	RG	24x24	14ø	600	900	0.080	22	26	1,2,3,4,5
G	CRG	24x24	12x12	0	450	0.06	-	14	1,2,3,4
H	CRG	24x24	10x10	0	450	0.13	-	17	1,2,3,4
J	RG	14X12	12X10	0	500	0.071	-	23	1,2,3,4
K	CRG	24x24	6x6	0	145	0.148	-	14	
M	CRG	12x12	6x6	0	100	0.148	-	12	

NOTES:
1. CSD = CEILING SUPPLY DIFFUSER, CRG = CEILING RETURN GRILL, SG = SUPPLY GRILL; RG = RETURN GRILL
2. CFM INDICATED FOR APD AND THROW DATA ONLY, SEE FLOOR PLANS FOR BALANCE AIRFLOW. THROW DATA AT 50 FPM, 0°.
3. ALUMINUM CONSTRUCTION, WITH OPPOSED BLADE DAMPER. DIFFUSERS, REGISTERS AND GRILLES SERVING HIGH BAY SHALL HAVE PAINT GRIP FINISH FOR FIELD PAINTING. COLOR TO BE SELECTED BY ARCHITECT. ALL OTHER DIFFUSERS, REGISTERS, AND GRILLES SHALL HAVE WHITE FINISH.
4. IF DIFFUSER IS LOCATED IN A LAY-IN CEILING, THE SUPPLY RUNOUT SHALL HAVE A DAMPER IN THE MAIN. IF THE DIFFUSER IS SURFACE MOUNTED, PROVIDE OPPOSED BLADE DAMPER IN THE NECK SO THAT THE DIFFUSER CAN BE BALANCED.
5. EGG CRATE TYPE GRILL

LOUVER SCHEDULE

MARK	# COUNT	SIZE (IN.)	FREE AREA (FT^2)	PRESSURE DROP (IN. WG)
L-1	1	12x12	0.1	0.15
L-2	1	14x14	0.4	0.08
L-2E	1	12x12	0.3	0.1
L-3	4	16x22	0.9	0.08
L-3E	1	40x12	1.6	0.42
L-4	1	12x12	0.3	0.08

ENERGY RECOVERY VENTILATOR SCHEDULE

MARK	SUPPLY													
	FAN						SUMMER				WINTER			
				ELECTRICAL DATA			EAT		LAT		EAT		LAT	
	CFM	ESP (IN WC)	MOTOR HP	V	PH	Hz	DB (°F)	WB (°F)	DB (°F)	WB (°F)	DB (°F)	WB (°F)	DB (°F)	WB (°F)
ERV-1	155	0.55	0.1	120	1	60	91.0	77.0	78.4	69.1	27	25	60.9	46.3

INFRARED HEATER SCHEDULE

MARK	LOCATION	TYPE	ELECTRICAL DATA			HEATING LENGTH	HEATING OUTPUT(MBH)	NOTES
			V	PHASE	AMPS			
IR-1	MECHANICAL	PROPANE	120	1	0.1	12' - 0"	45	1,4,5,6
IR-2	MECHANICAL	PROPANE	120	1	0.3	25' - 0"	65	1-5

NOTES:
1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
2. VERIFY TUBE LENGTH IN FIELD PRIOR TO ORDERING.
3. MIN. 3.5 IN. WCg.
4. FURNISH COMPLETE WITH ALUMINUM REFLECTORS, STAINLESS STEEL BURNER, MOUNTING CHAINS, FLEXIBLE GAS CONNECTOR AND GAS SHUT-OFF.
5. MOUNT AS HIGH AS POSSIBLE PER MANUFACTURER'S RECOMMENDATION.
6. MIN. 11 IN. WCg.

DUCT CONSTRUCTION AND LEAK TEST SCHEDULE

SYSTEM	TYPE OF PRESSURE	SMACNA PRESSURE CLASS	SEAL CLASSIFICATION	TYPE OF DUCTWORK	LEAKAGE CLASS
SUPPLY AIR DUCTWORK:					
ALL SUPPLY AIR DUCT, AHU-1, AHU-2, ERV-1	POSITIVE	+3	A	RECTANGULAR	6
				ROUND	3
OUTSIDE AIR DUCTWORK:					
DUCTWORK UNDER POSITIVE CONDITIONS	POSITIVE	+2	A	RECTANGULAR	6
				ROUND	3
DUCTWORK UNDER NEGATIVE CONDITIONS	NEGATIVE	-2	A	RECTANGULAR	6
				ROUND	3
RETURN/ EXHAUST AIR DUCTWORK (EXCLUDING VEHICLE EXHAUST DUCTWORK)	NEGATIVE	-2	A	RECTANGULAR	6
				ROUND	3
VEHICLE EXHAUST DUCTWORK	NEGATIVE	4	A	RECTANGULAR	6
				ROUND	3

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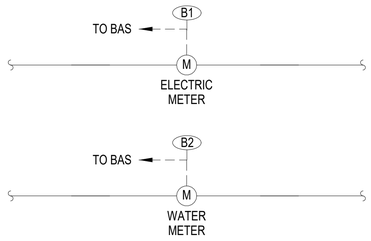
P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP
MECHANICAL SCHEDULES

SCALE: AS NOTED
EPROJECT NO.: 1672404
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
12842324
SHEET 97 OF 119
M-601
DRAWFORM REVISION: 7 FEBRUARY 2019

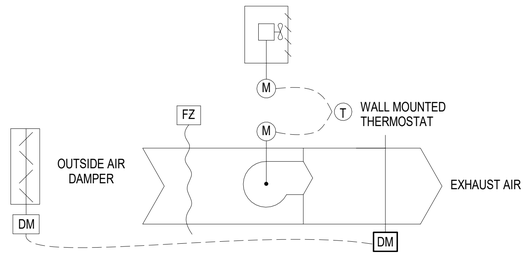
UTILITY METERING POINTS LIST

CONTROL MARK	POINT NAME	TYPE	ALARMS		GRAPHIC	TREND
			ALARM LO	ALARM HI		
B1	ELECTRIC METER	AI			BLDG.	COV
B2	WATER METER	AI			BLDG.	COV.



UNIT CONTROLS - UTILITY METERING

NOT TO SCALE



UNIT CONTROLS - EXHAUST FAN AND UNIT HEATER (EF-2 UH-1)

NOT TO SCALE

SEQUENCE OF OPERATION

THE DDC SHALL MONITOR THE DATA FROM THE ELECTRIC, WATER AND LP-GAS METERS.

SEQUENCE OF OPERATION

THE EXHAUST FAN AND UNIT HEATER SHALL OPERATE UNDER MANUFACTURER'S CONTROLS. ON A RISE IN TEMPERATURE (ABOVE 85°F ADJ), THE MOTORIZED OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL OPEN AND THE EXHAUST FAN SHALL BE ENERGIZED. ONCE THE ZONE TEMPERATURE IS SATISFIED, THE EXHAUST FAN SHALL BE DE-ENERGIZED AND THE MOTORIZED OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL CLOSE.

ON A FALL IN SPACE TEMPERATURE BELOW 60°F (ADJ), THE UNIT HEATER HEATING COIL SHALL BE ENABLED, AND AFTER A TIME DELAY, THE FAN SHALL BE ENABLED. ON A RISE IN ROOM TEMPERATURE ABOVE 55°F, (ADJ), THE REVERSE SHALL OCCUR. A FREEZESTAT SHALL DENERGIZE THE EXHAUST FAN UPON DETECTION OF LOW TEMPERATURE CONDITIONS.

CONTROLS GENERAL NOTES

CONTROL DIAGRAMS ARE DIAGRAMMATIC AND DO NOT INDICATE ALL CONTROLLERS, RELAYS, CONTACTORS, ETC. CONTRACTOR SHALL PROVIDE ALL CONTROLLERS, RELAYS, CONTACTORS, CONDUIT, WIRE, ETC. NECESSARY TO PROVIDE A COMPLETE BAS. ALL TEMPERATURES STATED HEREIN ARE IN DEGREES FAHRENHEIT. ALL CONTROL SET POINTS, TIMES, DIFFERENTIALS, AND THROTTLING RANGES SHALL BE FULLY ADJUSTABLE THRU THE DDC GRAPHICS PACKAGE.

DDC SYSTEM: SEE CONTROL DRAWINGS ON THIS SHEET THRU M-702 FOR DDC REQUIREMENTS FOR EACH PIECE OF EQUIPMENT.

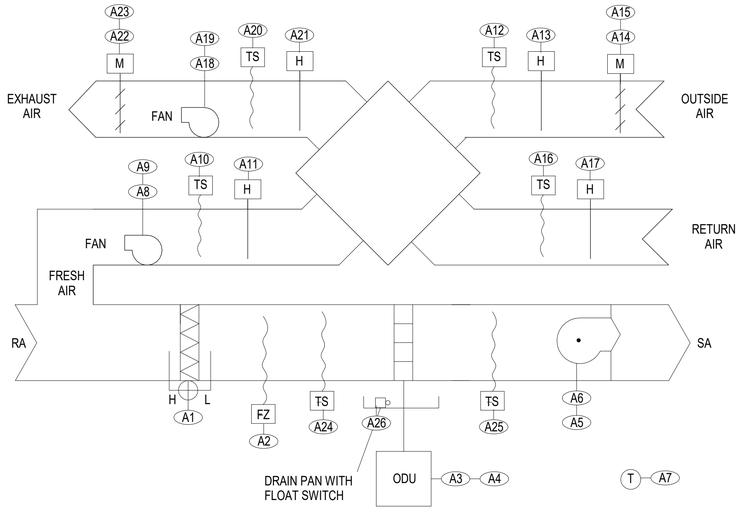
1. PROVIDE ALL MOTORIZED DAMPER WITH LIMIT SWITCHES AND END SWITCHES TO INDICATE THAT THE DAMPER IS OPEN OR CLOSED, WHICH IN TURN, ALLOWS THE FAN TO START OR SIGNALS IT TO STOP.
2. SYSTEM GENERATOR MODE: DDC SYSTEM SHALL BE POWERED BY STANDBY GENERATOR (SEE ELECTRICAL DRAWINGS). INTENT OF GENERATOR MODE FOR HVAC SYSTEM IS TO ALLOW CONTINUOUS USE OF SERVER ROOM, 039 WHEN UTILITY ELECTRIC POWER IS LOST. AFTER GENERATOR STARTS AND STANDBY POWER IS AVAILABLE, DDC SYSTEM SHALL "SOFT-START" ALL HVAC EQUIPMENT POWERED BY GENERATOR: CRAC-201 & 202. UPON RESTORATION OF UTILITY ELECTRICAL POWER, DDC SYSTEM SHALL STAGE-ON ("SOFT-START") ALL HVAC EQUIPMENT TO MINIMIZE ELECTRICAL SYSTEM DEMAND.
3. MECHANICAL EQUIPMENT WHICH IS PROVIDED WITH MANUFACTURER'S INSTALLED CONTROLS SHALL BE STARTED UP BY MANUFACTURER'S REPRESENTATIVE IN CONJUNCTION WITH CONTROLS CONTRACTOR (NOT MECHANICAL CONTRACTOR). TRAINING AND MANUALS FOR THE MANUFACTURER'S INSTALLED CONTROLS SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER'S REPRESENTATIVE. CONTROLS CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH MANUFACTURER'S REPRESENTATIVE FOR COMMUNICATION OF DDC SYSTEM TO THE MANUFACTURER'S INSTALLED CONTROLS.
4. MOUNT ROOM WALL THERMOSTATS AND CO2 SENSORS 48" AFF, ADJACENT TO SPACE LIGHT SWITCH AT SPACE ENTRY DOOR. FLOOR PLANS INDICATE APPROXIMATE LOCATIONS.
5. PROVIDE BUILDING OPTIMAL START CAPABILITY FOR MORNING WARM-UP/COOL-DOWN MODE. AFTER SET-BACK, STAGE-ON ("SOFT-START") ALL HVAC EQUIPMENT TO MINIMIZE ELECTRICAL SYSTEM DEMAND. BUILDING OCCUPANCY SCHEDULE SHALL BE AS INDICATED BELOW:

CONTROL LEGEND

AMS	AIRFLOW MEASURING STATION	OS	OCCUPANCY SENSOR
C02	CARBON DIOXIDE SENSOR	S	ON/OFF SWITCH
CR	CURRENT RELAY	PS	POSITION SWITCH
DM	DAMPER ACTUATOR	PT	PRESSURE TRANSMITTER
DPS	DIFFERENTIAL PRESSURE SENSOR	R	RELAY
DS	DISCONNECT SWITCH	SD	SMOKE DETECTOR
$	EMERGENCY SHUTOFF SWITCH	SL	STATIC PRESSURE LIMIT SENSOR
FM	FLOW METER	SS	SMART SWITCH
FS	FLOW SWITCH	TS	TEMPERATURE SENSOR
GM	GATEWAY MODULE	T	THERMOSTAT
HS	HUMIDITY SENSOR	UC	UNIT CONTROLLER
LL	LOW LIMIT (FREEZESTAT)	VFD	VARIABLE FREQUENCY DRIVE
M	MOTOR	WS	WALL SWITCH
MD	MOISTURE DETECTOR	WL	WATER LEVEL SENSOR
FZ	FREEZE STAT		

DX WITH ERV SYSTEM POINTS LIST

CONTROL MARK	POINT NAME	TYPE	ALARMS		GRAPHIC	TREND
			ALARM LO	ALAR M HI		
A1	FILTER DIFFERENTIAL PRESSURE	AI		X	BLDG	COV
A2	FREEZESTAT	BI	X		BLDG	COV.
A3	REVERSING VALVE	BO			BLDG	CPV.
A4	COMPRESSOR	BO			BLDG	COV.
A5	FAN STATUS	BI	X		BLDG	COV.
A6	FAN START/STOP	BO			BLDG	COV
A7	ZOME TEMP	AI			BLDG	COV.
A8	VAF STATUS	BI	X		BLDG	COV.
A9	VAF START/STOP	BO			BLDG	COV.
A10	VA TEMP	AI			BLDG	COV.
A11	VA HUMIDITY	AI			BLDG	COV.
A12	OA TEMP	AI			BLDG	COV.
A13	OA HUMIDITY	AI			BLDG	COV.
A14	OA DAMPER	BO			BLDG	COV.
A15	OA DAMPER STATUS	BI			BLDG	COV.
A16	RA TEMP	AI			BLDG	COV.
A17	RA HUMIDITY	AI			BLDG	COV.
A18	EF STATUS	BI	X		BLDG	COV.
A19	EF START/STOP	BO			BLDG	COV.
A20	EF TEMP	AI			BLDG	COV.
A21	EF HUMIDITY	AI			BLDG	COV.
A22	EA DAMPER	BO			BLDG	COV.
A23	EA DAMPER	BI			BLDG	COV.
A24	MA TEMP	AI	X	X	BLDG	COV.
A25	SA TEMP	AI	X	X	BLDG	COV.
A26	CONDESATE OVERFLOW	AI	X		BLDG	COV.



UNIT CONTROLS - DX SPLIT SYSTEM HEAT PUMP (IDU/ODU-1) AND ENERGY RECOVERY VENTILATOR (ERV-1)

NOT TO SCALE

SEQUENCE OF OPERATION

THE OUTDOOR AIR UNIT, ODU, AND INDOOR UNIT, IDU SHALL OPERATE UNDER MANUFACTURER'S CONTROLS TO MAINTAIN THE INDOOR DESIGN CONDITION SHOWN ON SHEET M-001.

OCCUPIED MODE: THE IDU AND ERV SUPPLY AIR FAN SHALL ALWAYS OPERATE AT LEAST AT THE MANUFACTURER'S MINIMUM SPEED BUT THE IDU/ODU UNIT CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND SHALL INCREASE THE FAN SPEED BASED ON THE DIFFERENCE BETWEEN THE SETPOINT (78 F COOLING, 68 F HEATING ADJ.) AND THE SENSED SPACE TEMPERATURE. THE ODU UNIT COMPRESSOR SPEED SHALL VARY TO MATCH ROOM LOAD. REFRIGERANT LOAD FROM THE HEAT PUMP SHALL BE CONTROLLED BY, MEANS OF AN ELECTRONIC LINEAR EXPANSION VALVE. THE MOTORIZED EXHAUST AND OUTSIDE AIR DAMPERS SHALL OPEN TO MAXIMUM POSITION.

UNOCCUPIED MODE: THE IDU SUPPLY AIR FAN SHALL ALWAYS OPERATE AT LEAST AT THE MANUFACTURER'S MINIMUM SPEED BUT THE IDU/ODU UNIT CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND SHALL INCREASE THE FAN SPEED BASED ON THE DIFFERENCE BETWEEN THE SETPOINT (85 F COOLING, 60 F HEATING ADJ.) AND THE SENSED SPACE TEMPERATURE. THE ODU UNIT COMPRESSOR SPEED SHALL VARY TO MATCH ROOM LOAD. REFRIGERANT LOAD FROM THE HEAT PUMP SHALL BE CONTROLLED BY, MEANS OF AN ELECTRONIC LINEAR EXPANSION VALVE. THE THERMOSTAT SHALL HAVE AN OVERRIDE SWITCH FOR THE OCCUPANT TO PUT THE UNIT INTO OCCUPIED MODE. THE MOTORIZED EXHAUST AND OUTSIDE AIR DAMPERS SHALL BE IN THE CLOSED POSITION. ERV FAN MOTOR SHALL BE DE-ENERGIZED/LOCKED UP

SAFETIES AND ALARMS: IF CONDENSATE IS SENSED IN THE PRIMARY DRAIN PAN BY THE FLOAT SWITCH, THE AUXILIARY CONTACTS OF THE FLOAT SWITCH SHALL DE-ENERGIZE THE SYSTEM. WHEN CONDENSATE IS NO LONGER SENSED, THE SYSTEM SHALL START IN NORMAL OPERATION.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC 7/14/2021

ACTIVITY

Approved by LtCol Roger Holliday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES	DJG	DRW	DJG	CHK	MJH

PM/DM GFS/LEJ

BRANCH MANAGER SCW

CHIEF ENG/ARCH EA

FIRE PROTECTION DSN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MIDLANT DC CORE
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION - NORFOLK, VA
MCAS NEW RIVER
JACKSONVILLE, NORTH CAROLINA

P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

MECHANICAL CONTROLS

SCALE: AS NOTED

EPROJECT NO.: 1672404

CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842325

SHEET 98 OF 119

M-701

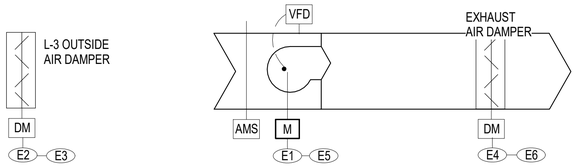
DRAWFORM REVISION: 7 FEBRUARY 2019

EXHAUST FAN (EF-1) POINTS LIST

CONTROL MARK	POINT NAME	TYPE	ALARMS		GRAPHIC	TREND
			ALARM LO	ALARM HI		
E1	EXHAUST FAN START/STOP	BO			BLDG.	COV.
E2	OUTSIDE AIR DAMPERS	BO			BLDG.	COV.
E3	OUTSIDE AIR DAMPER STATUS	BI	X		BLDG	COV.
E4	EXHAUST AIR DAMPER	BO			BLDG	COV.
E5	FAN STATUS	BI	X		BLDG	COV.
E6	EXHAUST AIR DAMPER STATUS	BI	X		BLDG	COV.

SEQUENCE OF OPERATION: THE EXHAUST FAN SHALL BE ENERGIZED BY THE BAS UPON BUILDING OCCUPATION, AND DE-ENERGIZED AT END OF OPERATIONAL DAY. THE EXHAUST FAN SHALL MODULATE WHEN VEHICLE EXHAUST FAN IS ENERGIZED TO MAINTAIN MAXIMUM AIRFLOW AS SHOWN ON THE CONTRACT DRAWINGS. UPON RECEIVING A START COMMAND, L-3 DAMPERS SHALL OPEN TO MAINTAIN THE MAXIMUM AIRFLOW AS SHOWN ON THE CONTRACT DRAWINGS.

ALARMS- IF THE EXHAUST DAMPER, OUTSIDE DAMPER OR EXHAUST FAN FAIL AN ALARM SHALL BE SENT TO THE BAS.



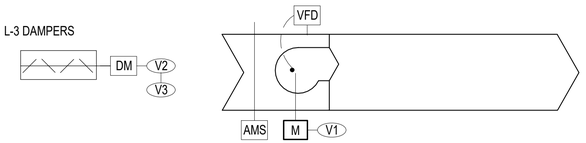
CONTROLS-UNIT CONTROL EXHAUST FAN (EF-1)

VECHILE EXHAUST

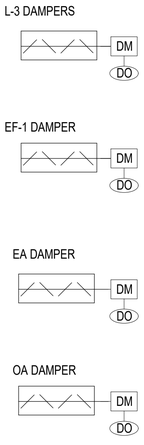
CONTROL MARK	POINT NAME	TYPE	ALARMS		GRAPHIC	TREND
			ALARM LO	ALARM HI		
V1	FAN STATUS	BI		X	BLDG.	
V2	L-3 DAMPER	BO		X	BLDG.	
V3	L-3 DAMPER STATUS	BI		X	BLDG.	

SEQUENCE OF OPERATION: THE EXHAUST FAN SHALL BE ENERGIZED BY USER, AND MOTOR STATUS TO BE SHOWN BY THE CONTROLS. WHEN FAN IS ENERGIZED L-3 DAMPER SHALL OPEN TO PROVIDE MAKE AIR.

ALARM - IF FAN OR L-3 DAMPER FAIL AN ALARM SHALL BE SENT TO THE BAS



CONTROLS-UNIT CONTROL VEHICLE EXHAUST FAN



EMERGENCY SHUT-OFF (ESO) SWITCH IS LOCATED IN LOBBY ON EACH FLOOR. ESO SWITCH IS AN ALARM BOX WITH PUSH BUTTON, HINGED COVER, AUDIBLE ALARM WHEN THE COVER IS RAISED, AND INSCRIPTION ON THE COVER "ALARM SOUNDS WHEN COVER IS RAISED". PROVIDE PLACARD BELOW SWITCH WITH INSCRIPTION "EMERGENCY HVAC SHUT OFF SWITCH".

CONTROLS-HVAC SYSTEM EMERGENCY SHUT OFF SWITCH CONTROL

INFRARED HEATER SEQUENCE OF OPERATIONS

RUN CONDITIONS - CONTINUOUS:
THE UNIT SHALL RUN CONTINUOUSLY AND SHALL MAINTAIN A HEATING SETPOINT OF 55°F (ADJ.), AND ENSURE VEHICLE BAY EXHAUST EF-1 IS ENERGIZED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

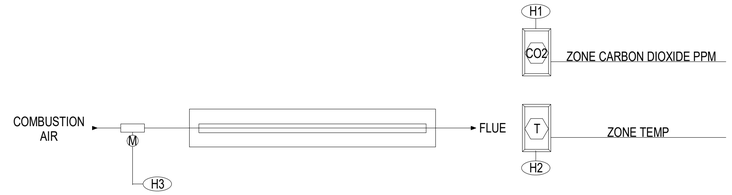
THE HEATING SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 50°F (ADJ.).
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.

ZONE CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:
THE CONTROLLER SHALL MEASURE THE ZONE CO2 CONCENTRATION.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH ZONE CARBON DIOXIDE CONCENTRATION: IF THE ZONE CO2 CONCENTRATION IS GREATER THAN 900 PPM (ADJ.) WHEN IN THE OCCUPIED MODE.

INFRARED HEATER POINTS LIST

CONTROL MARK	POINT NAME	TYPE	ALARMS		GRAPHIC	TREND
			ALARM LO	ALARM HI		
H1	ZONE CARBON DIOXIDE PPM	AI			BLDG	COV.
H2	ZONE TEMP	AI			BLDG	COV.
H3	HEATING VALUE	AO			BLDG	COV



INFRARED HEATER - CONTROL DIAGRAM

DX SPLIT SYSTEM POINTS LIST

CONTROL MARK	POINT NAME	TYPE	ALARMS		GRAPHIC	TREND
			ALARM LO	ALARM HI		
C1	FILTER DIFFERENTIAL PRESSURE	AI			BLDG	COV.
C2	ZONE TEMP	AI			BLDG	COV.
C3	FREEZESTAT	BI	X		BLDG	COV.
C4	REVERSING VALVE	BO			BLDG	COV.
C5	COMPRESSOR	BO			BLDG	COV.
C6	FAN STATUS	BI			BLDG	COV.
C7	FAN START/STOP	BO			BLDG	COV.

SEQUENCE OF OPERATION

THE OUTDOOR AIR UNIT, ODU, AND INDOOR UNIT, IDU SHALL OPERATE UNDER MANUFACTURER'S CONTROLS TO MAINTAIN THE INDOOR DESIGN CONDITION SHOWN ON SHEET M-001.

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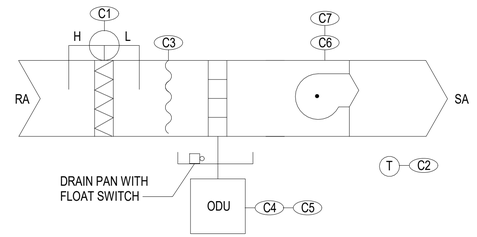
THE THERMOSTAT SHALL HAVE AN OVERRIDE SWITCH FOR THE OCCUPANT TO PUT THE UNIT INTO OCCUPIED MODE.

SAFETIES AND ALARMS: IF CONDENSATE IS SENSED IN THE PRIMARY DRAIN PAN BY THE FLOAT SWITCH, THE AUXILIARY CONTACTS OF THE FLOAT SWITCH SHALL DE-ENERGIZE THE SYSTEM. WHEN CONDENSATE IS NO LONGER SENSED, THE SYSTEM SHALL START IN NORMAL OPERATION.



UNIT CONTROLS - DX SPLIT SYSTEM HEAT PUMP (IDU/ODU-2,3)

SYM	DESCRIPTION	DATE	APPR

NAVFAC

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A/E INFO

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FOR COMMANDER NAVFAC

ACTIVITY

Approved by LtCol Roger Holiday, Director I&E, MCAS New River

SATISFACTORY TO DATE 06/14/2021

DES DJG | DRW DJG | CHK MJH

PWDM GFSI/LEJ

BRANCH MANAGER SCW

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P-685 MACS-2 AUTOMOTIVE ORGANIZATIONAL SHOP

MECHANICAL CONTROLS

SCALE: AS NOTED

EPROJECT NO.: 1672404

CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12842326

SHEET 99 OF 119

M-702

DRAWFORM REVISION: 7 FEBRUARY 2019