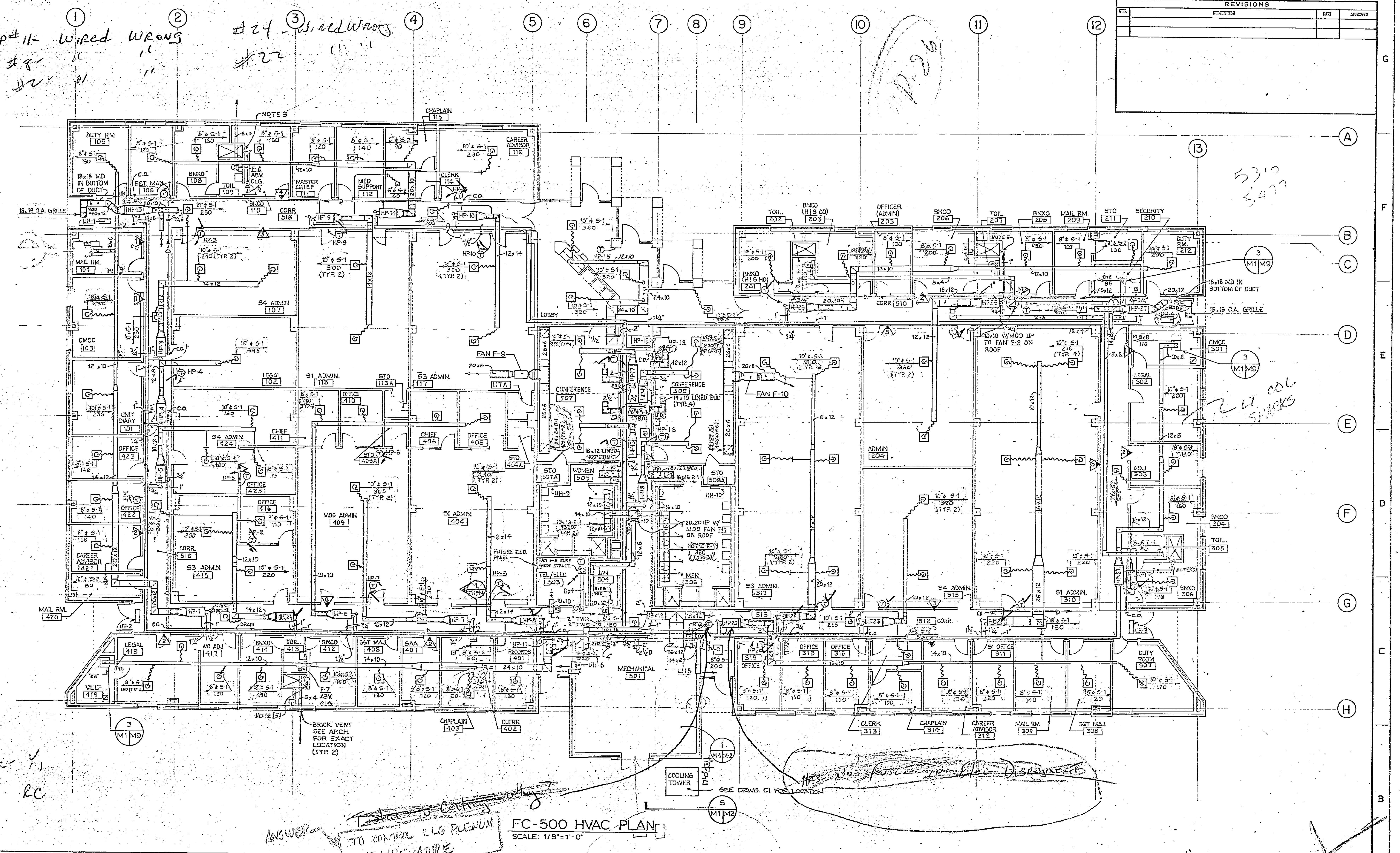


FC-500 HVAC PLAN
SCALE: 1/8"=1'-0"

DESIGN CONDITIONS		
SPACE	SUMMER	WINTER
OUTSIDE	90°F DB, 79°F WB	23°F DB
ADMIN	78°F DB, 50% RH	68°F DB
MECH. RM.	107°F DB / HEAT & VENTILATE ONLY	45°F DB
TOILETS	— / HEAT & VENTILATE ONLY	68°F DB
CLOSETS	VENTILATE ONLY	

NOTES:

1) ALL SHEET METAL DUCT SHALL BE RATED FOR 1/2" W.G. POSITIVE STATIC PRESSURE AND 2500 FPM VELOCITY. NO SEALANT REQ'D.
2) RETURN AIR THROUGH CEILINGS IS BY LIGHT TROFFERS UNLESS SHOWN OTHERWISE.
3) ROUND RUNOUTS & FLEXIBLE DUCT SHALL BE SAME SIZE AS DIFFUSER NECK.
4) UNITS HP-13, HP-27 & HP-28 SUPPLY TEMPERED OUTSIDE AIR TO PLENUM ABOVE CEILING IN CORRIDORS; UNITS ARE CONTROLLED BY T'STATS MOUNTED ABOVE THE CORRIDOR CEILING.
5) TURNDOWN HEAT PUMP CONDENSATE DRAIN LINES TO PLUMBING DRAIN. SEE PLUMBING DRAWINGS.
6) LOCATE HEAT PUMPS CENTERED IN CORRIDORS AS SHOWN IN DIAGRAM 1, M1, M4.
7) SEE ARCH. DWGS. FOR DOOR UNDERCUTS IN ROOMS 109, 113A, 117A, 202, 207, 305, 306, 404A, 409A, 412, 413, 507A, & 508A.
8) SEE REFLECTED CEILING PLAN DWG. A17 FOR EXACT DIFFUSER LOCATIONS.
9) ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTS SHALL BE INSULATED

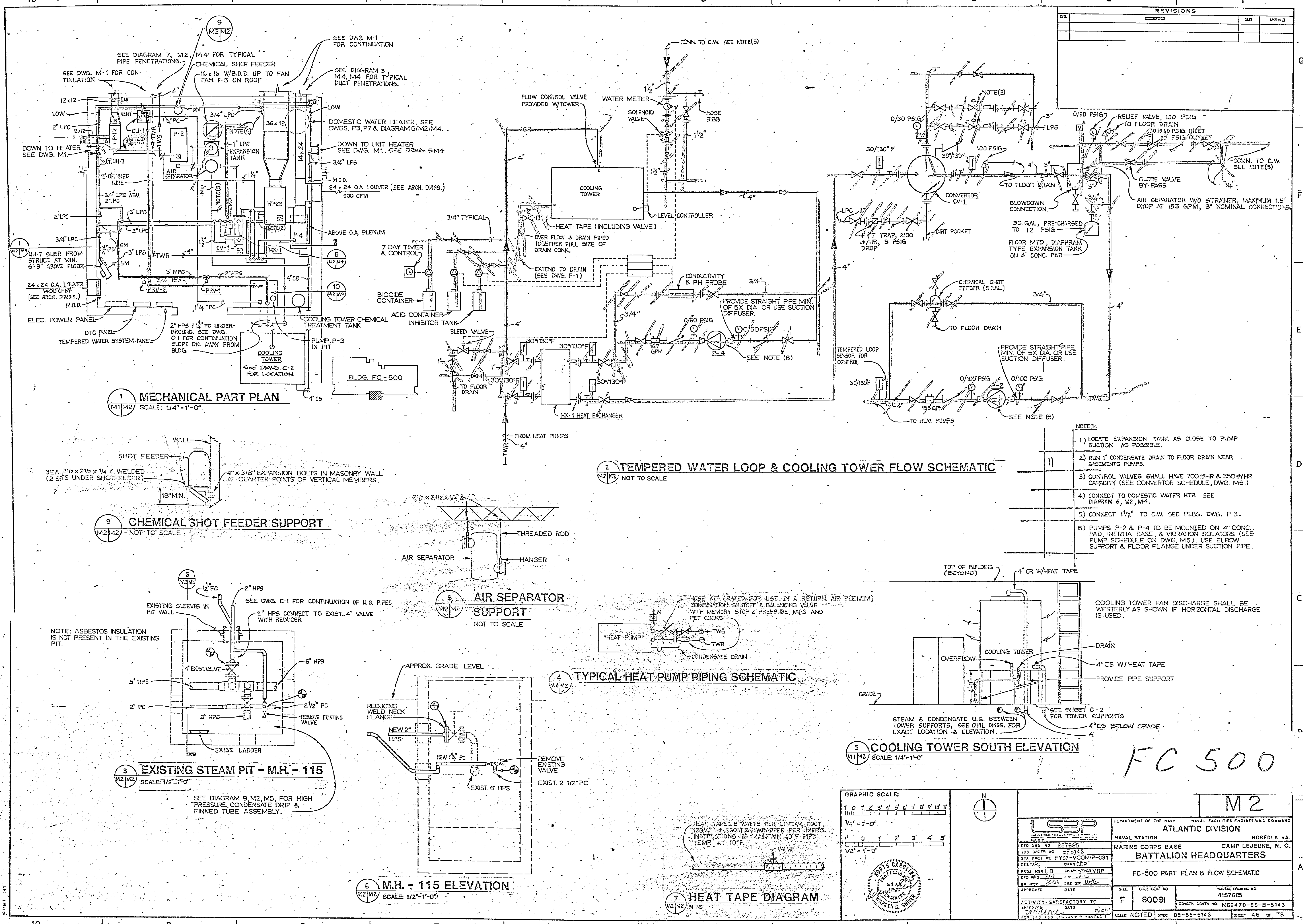
GRAPHIC SCALE 1/8"=1'-0"

M1

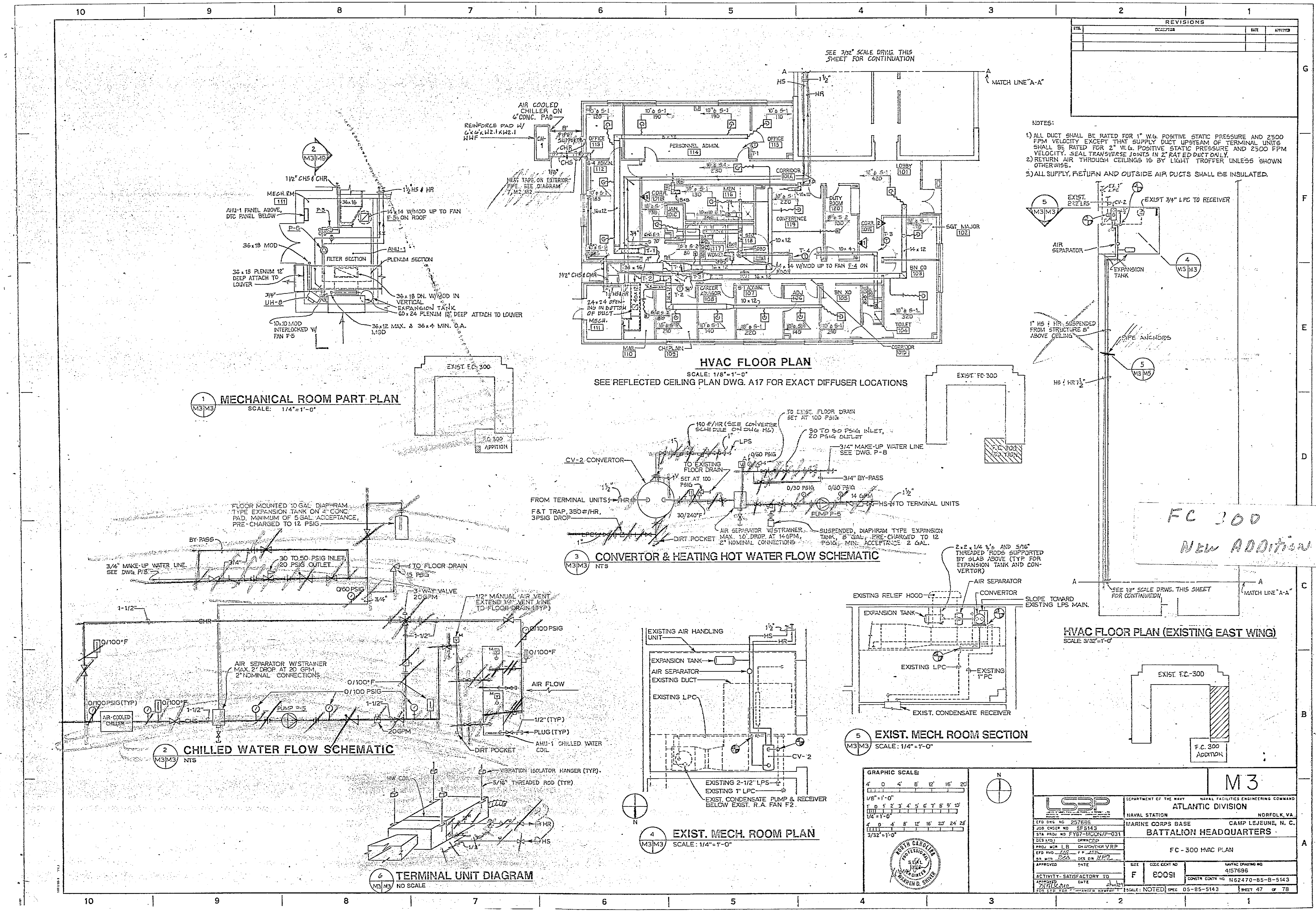
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VA.
MARINE CORPS BASE — CAMP LEJEUNE, N.C.
BATTALION HEADQUARTERS
FC-500 HVAC PLAN

EFD DWG NO 257684
JOB ORDER NO 5F5143
STA PROJ NO FY87-MCON/P-031
DES MRJ — DRWN CDP
PROJ MGR LB — CH ARCH/ENGR VRP
APPROVED — DATE
ACTIVITY - SATISFACTORY TO
APPROVED — DATE
FOR EFD FOR COMMANDER NAVFAC

SIZE F — CODE IDENT NO 80091 — NAVFAC DRAWING NO. 4157684
CONSTR CONTR NO N62470-85-B-5143
SCALE 1/8"=1'-0" — SPEC 05-85-5143 — SHEET 45 OF 78



MECHANICAL PART PLAN
SCALE: 1/4" = 1'-0"
TEMPERED WATER LOOP & COOLING TOWER FLOW SCHEMATIC
NOT TO SCALE
CHEMICAL SHOT FEEDER SUPPORT
NOT TO SCALE
AIR SEPARATOR SUPPORT
NOT TO SCALE
TYPICAL HEAT PUMP PIPING SCHEMATIC
COOLING TOWER SOUTH ELEVATION
SCALE: 1/4" = 1'-0"
EXISTING STEAM PIT - M.H. - 115
SCALE 1/2" = 1'-0"
M.H. - 115 ELEVATION
SCALE: 1/2" = 1'-0"
HEAT TAPE DIAGRAM
NTS
NOTES:
1.) LOCATE EXPANSION TANK AS CLOSE TO PUMP SUCTION AS POSSIBLE.
2.) RUN 1" CONDENSATE DRAIN TO FLOOR DRAIN NEAR BASEMENTS PUMPS.
3.) CONTROL VALVES SHALL HAVE 700#/HR & 350#/HR CAPACITY (SEE CONVERTOR SCHEDULE, DWG. M6.)
4.) CONNECT TO DOMESTIC WATER HTR. SEE DIAGRAM 6, M2, M4.
5.) CONNECT 1 1/2" TO C.W. SEE PLBG. DWG. P-3.
6.) PUMPS P-2 & P-4 TO BE MOUNTED ON 4" CONC. PAD, INERTIA BASE, & VIBRATION ISOLATORS (SEE PUMP SCHEDULE ON DWG. M6). USE ELBOW SUPPORT & FLOOR FLANGE UNDER SUCTION PIPE.
COOLING TOWER FAN DISCHARGE SHALL BE WESTERLY AS SHOWN IF HORIZONTAL DISCHARGE IS USED.
NOTE: ASBESTOS INSULATION IS NOT PRESENT IN THE EXISTING PIT.
SEE DIAGRAM 9, M2, M5, FOR HIGH PRESSURE, CONDENSATE DRIP & FINNED TUBE ASSEMBLY.
HEAT TAPE: 8 WATTS PER LINEAR FOOT, 120V, 1Ø, 60 HZ, WRAPPED PER MFR'S INSTRUCTIONS TO MAINTAIN 40°F PIPE TEMP. AT 10°F.
BLDG. FC-500
COOLING TOWER
HX-1 HEAT EXCHANGER
CONVERTOR CV-1
AIR SEPARATOR W/O STRAINER, MAXIMUM 1.5' DROP AT 153 GPM, 3" NOMINAL CONNECTIONS.
30 GAL. PRE-CHARGED TO 12 PSIG FLOOR MTD. DIAPHRAM TYPE EXPANSION TANK ON 4" CONC. PAD
REVISIONS
GRAPHIC SCALE:
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.
MARINE CORPS BASE CAMP LEJEUNE, N. C.
BATTALION HEADQUARTERS
FC-500 PART PLAN & FLOW SCHEMATIC
M2
FC 500
SIZE F CODE IDENT NO 80091
NAVFAC DRAWING NO 4157665
CONSTR CONTR NO N62470-85-B-5143
SCALE NOTED SPEC 05-85-5143 SHEET 46 OF 78



MECHANICAL ROOM PART PLAN
SCALE: 1/4"=1'-0"
HVAC FLOOR PLAN
SCALE: 1/8"=1'-0"
SEE REFLECTED CEILING PLAN DWG. A17 FOR EXACT DIFFUSER LOCATIONS
SEE 3/32" SCALE DRWS. THIS SHEET FOR CONTINUATION
MATCH LINE "A-A"
NOTES:
1.) ALL DUCT SHALL BE RATED FOR 1" W.G. POSITIVE STATIC PRESSURE AND 2500 FPM VELOCITY EXCEPT THAT SUPPLY DUCT UPSTEAM OF TERMINAL UNITS SHALL BE RATED FOR 2" W.G. POSITIVE STATIC PRESSURE AND 2500 FPM VELOCITY. SEAL TRANSVERSE JOINTS IN 2" RATED DUCT ONLY.
2.) RETURN AIR THROUGH CEILINGS IS BY LIGHT TROFFER UNLESS SHOWN OTHERWISE.
3.) ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTS SHALL BE INSULATED.
EXIST. 2 1/2" LPS
EXIST 3/4" LPC TO RECEIVER
AIR SEPARATOR
EXPANSION TANK
PIPE ANCHORS
HVAC FLOOR PLAN (EXISTING EAST WING)
SCALE: 3/32"=1'-0"
EXIST. F.C. 300
F.C. 300 ADDITION
FC 300 New Addition
CONVERTOR & HEATING HOT WATER FLOW SCHEMATIC
NTS
CV-2 CONVERTOR
FROM TERMINAL UNITS
TO TERMINAL UNITS
F&T TRAP, 350#/HR, 3PSIG DROP
DIRT POCKET
CHILLED WATER FLOW SCHEMATIC
NTS
AIR-COOLED CHILLER
AIR SEPARATOR W/STRAINER MAX. 2' DROP AT 20 GPM. 2" NOMINAL CONNECTIONS
AHU-1 CHILLED WATER COIL
AIR FLOW
TERMINAL UNIT DIAGRAM
NO SCALE
EXIST. MECH. ROOM PLAN
SCALE: 1/4"=1'-0"
EXISTING AIR HANDLING UNIT
EXISTING 2-1/2" LPS
EXISTING 1" LPC
EXIST. CONDENSATE PUMP & RECEIVER BELOW EXIST. R.A. FAN F2.
EXIST. MECH. ROOM SECTION
SCALE: 1/4"=1'-0"
EXIST. CONDENSATE RECEIVER
REVISIONS
GRAPHIC SCALE:
1/8"=1'-0"
1/4"=1'-0"
3/32"=1'-0"
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL WARREN D. SHIVER
LSBP
EFD DWG NO 257686
JOB ORDER NO 5F5143
STA PROJ NO FY87-MCON/P-031
DES MRJ
DRWN CDP
PROJ MGR LB
CH ARCH/ENGR VRP
APPROVED DATE
ACTIVITY- SATISFACTORY TO
FOR EFD FOR COMMANDER NAVFAC
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.
MARINE CORPS BASE CAMP LEJEUNE, N. C.
BATTALION HEADQUARTERS
FC-300 HVAC PLAN
M3
SIZE F
CODE IDENT NO 80091
NAVFAC DRAWING NO. 4157686
CONSTR CONTR NO. N62470-85-B-5143
SCALE: NOTED
SPEC 05-85-5143
SHEET 47 OF 78

HVAC SYMBOLS

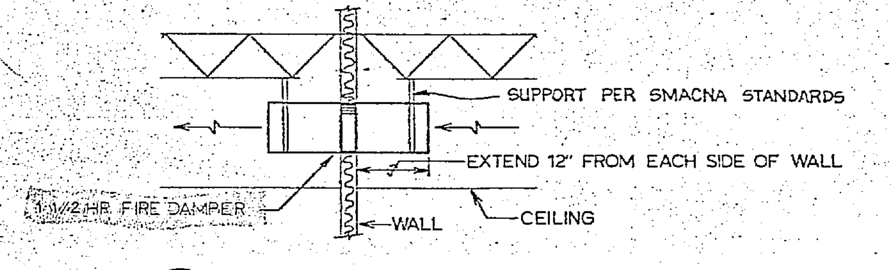
- CHS — CHILLED WATER SUPPLY
- CHR — CHILLED WATER RETURN
- CS — COOLING TOWER SUPPLY
- CR — COOLING TOWER WATER RETURN
- D — DRAIN
- BLIND FLANGE
- HOSE END CONNECTION
- PIPE CAP
- C.O. — CLEANOUT (CO) IN DRAIN LINE
- DIRECTION OF FLOW
- ELBOW - 45°
- ELBOW - 90°
- ELBOW - TURNED DOWN
- ELBOW - TURNED UP
- SM — STEAM METER (ANNUBAR TYPE)
- FLOOR DRAIN, SEE PLUMBING DRAWINGS
- STRAINER
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC
- TEE
- TEE OUTLET DOWN
- TEE OUTLET UP
- UNION OR FLANGE
- BALL VALVE
- CHECK VALVE
- VACUUM BREAKER
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- GATE OR BUTTERFLY VALVE (SEE SPEC. FOR TYPE AND USE)
- GLOBE VALVE
- QUICK OPENING VALVE
- PRESSURE REDUCING VALVE
- RELIEF VALVE
- SOLENOID VALVE
- BALANCING VALVE (SQUARE HEAD COCK)
- FLOW MEASURING DEVICE (A-ANNULAR TYPE; V-VENTURI TYPE)
- AIR VENT (M-MANUAL TYPE; A-AUTOMATIC TYPE)
- THERMOMETER
- PRESSURE GAUGE AND COCK (W/SYPHON TUBE FOR STEAM)
- GAUGE COCK (W/SYPHON TUBE FOR STEAM)
- THERMOMETER WELL
- 20X20 — DUCT (1ST. DIMENSION IS SIDE SHOWN, DIMENSIONS ARE INSIDE CLEAR)
- DUCT LINING (DIMENSIONS ARE INSIDE CLEAR)
- SUPPLY DUCT SECTION
- RETURN, EXHAUST, OR OUTSIDE AIR DUCT SECTION
- R — INCLINED RISE (R) OR DROP (D), ARROW IN DIRECTION OF AIR FLOW
- TRANSITION
- SPIN-IN FITTING WITH FLEXIBLE DUCT, AIR SCOOP & DAMPER.
- SPIN-IN FITTING WITH AIR SCOOP, DAMPER, & ROUND RUNOUT TO FLEXIBLE DUCT.

- STEAM TRAPS
- 90° BRANCH TAKEOFF WITH SPLITTER
- 12X12 / 12"ø — TRANSITION FROM RECTANGULAR TO ROUND DUCTWORK
- DUCTWORK TEE WITH SPLITTER DAMPER AND VANED ELBOWS
- MD / BD — MANUAL BALANCING DAMPER (MD), BACKDRAFT DAMPER (BD)
- MOTOR OPERATED DAMPER (M.O.D.)
- FD — FIRE DAMPER (FD)
- TURNING VANES
- FLEXIBLE CONNECTION-DUCTWORK OR FAN
- 24X12 S- 700 — SIDEWALL SUPPLY GRILLE OR REGISTER W/SIZE, TYPE, & CFM
- 20X12 R- 700 — SIDEWALL RETURN OR EXHAUST GRILLE OR REGISTER W/SIZE, TYPE, & CFM
- 18X18 R- 800 — CEILING RETURN OR EXHAUST GRILLE OR REGISTER W/SIZE, TYPE, & CFM
- 12"ø S- 700 — RIGID DUCT & CEILING SUPPLY DIFFUSER W/NECK SIZE, TYPE, & CFM
- 12"ø S- 700 — FLEX. DUCT & CEILING SUPPLY DIFFUSER W/NECK SIZE, TYPE, & CFM
- 2 SQUARE FOOT OPENING IN WALL ABOVE CEILING LEVEL
- 2 SQUARE FOOT OPENING IN WALL ABOVE CEILING LEVEL WITH FD
- SD — 2 SQUARE FOOT OPENING IN WALL ABOVE CEILING LEVEL WITH SD/FD
- 2 SQUARE FOOT OPENING IN WALL ABOVE CEILING LEVEL WITH SD
- FLEXIBLE DUCT
- TERMINAL UNIT
- (T) — THERMOSTAT
- (T) — TEMPERATURE SENSOR
- (N) — NIGHT SETBACK THERMOSTAT
- (H) — HUMIDISTAT

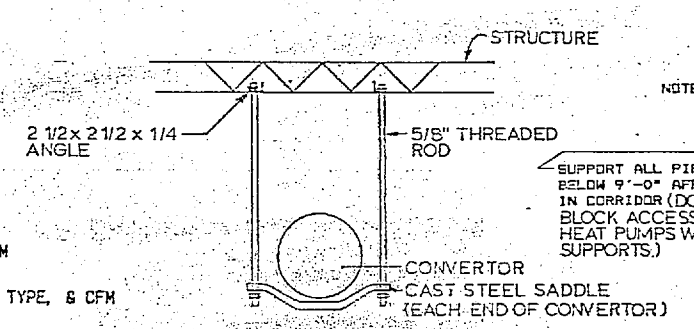
ABBREVIATIONS

- FD — FIRE DAMPER
- AP — ACCESS PANEL
- AD — ACCESS DOOR
- OA — OUTSIDE AIR
- RA — RETURN AIR
- FC — FLEXIBLE CONNECTION
- DB — DRY BULB
- WB — WET BULB
- ϕ — ROUND DUCTWORK
- NTS — NOT TO SCALE
- EAT — ENTERING AIR TEMPERATURE
- EWT — ENTERING WATER TEMPERATURE
- LWT — LEAVING WATER TEMPERATURE
- APD — AIR PRESSURE DROP
- WPD — WATER PRESSURE DROP
- HS — HOT WATER SUPPLY
- HR — HOT WATER RETURN
- TWS — TEMPERED WATER SUPPLY
- TWR — TEMPERED WATER RETURN
- HPS — HIGH PRESSURE STEAM
- MPS — MEDIUM PRESSURE STEAM
- LPS — LOW PRESSURE STEAM
- LPC — LOW PRESSURE CONDENSATE
- PC — PUMPED CONDENSATE
- CONNECT TO EXISTING
- COMBINATION SHUTOFF & BALANCING VALVE W/PRESSURE TAPS

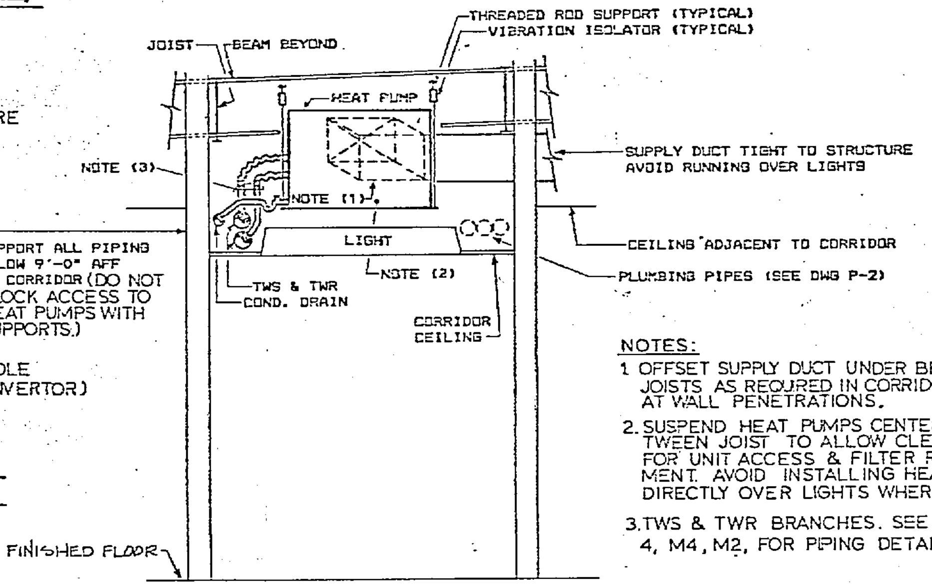
DETAILS



(3 / M4 M4) TRANSFER DUCT (TYPICAL)
NTS



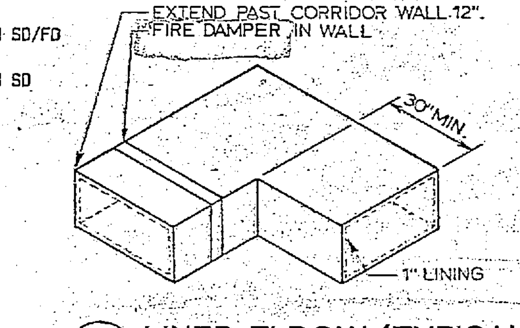
(8 / M2 M4) CONVERTOR SUPPORT
NO SCALE
(CV-1 ONLY)



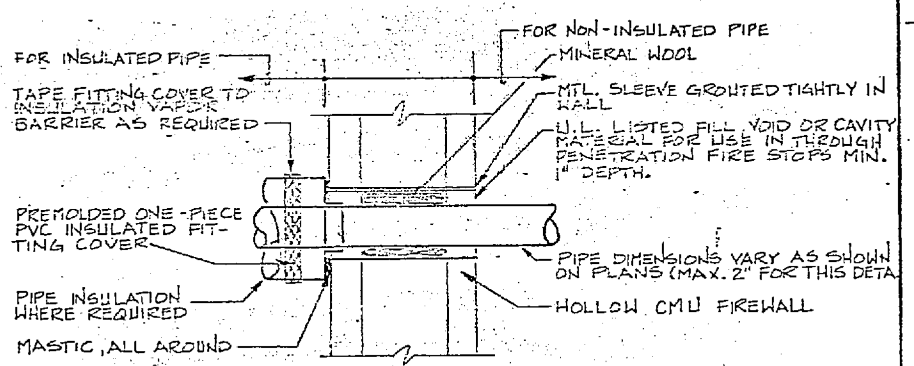
NOTES:

1. OFFSET SUPPLY DUCT UNDER BEAMS & JOISTS AS REQURED IN CORRIDORS AND AT WALL PENETRATIONS.
2. SUSPEND HEAT PUMPS CENTERED BETWEEN JOIST TO ALLOW CLEARANCE FOR UNIT ACCESS & FILTER REPLACEMENT. AVOID INSTALLING HEAT PUMPS DIRECTLY OVER LIGHTS WHERE POSSIBLE
3. TWS & TWR BRANCHES. SEE DIAGRAM 4, M4, M2, FOR PIPING DETAILS.

(1 / M1 M4) SECTION THROUGH CORRIDOR AT HEAT PUMP
SCALE: 1/2"=1'-0"

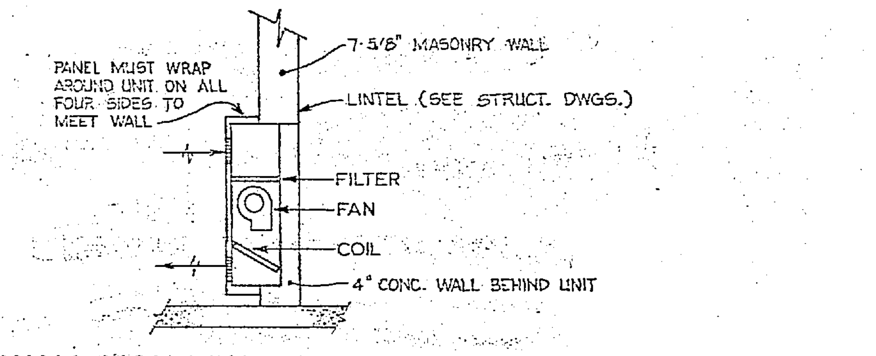


(4 / M4 M4) LINED ELBOW (TYPICAL)
NTS

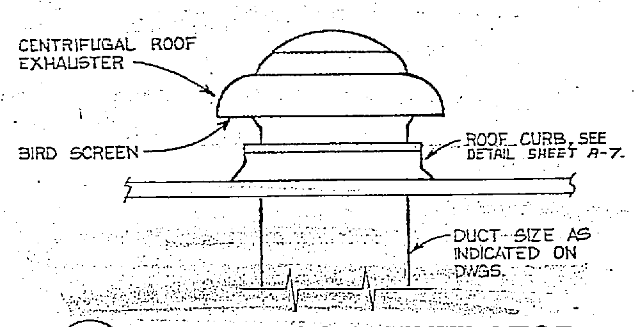


(7 / M2 M4) PIPE PENETRATION DETAIL
(THROUGH FIRE RATED WALL)
SIMILAR TO U.L. SYSTEM NO.49

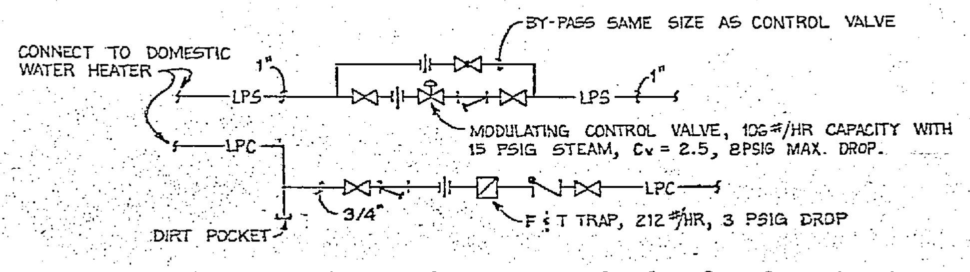
NOTE:
DETAIL ILLUSTRATES PIPE INSULATION ON ONE SIDE OF FIRE RATED WALL, WHERE PIPE IS REQUIRED TO BE INSULATED ON BOTH SIDES, THE INSULATION END TREATMENT SHALL BE DUPLICATED ON BOTH SIDES.



(5 / M4 M4) WALL MOUNTED CABINET UNIT HEATER
NTS



(2 / M4 M4) POWER ROOF VENTILATOR
NTS

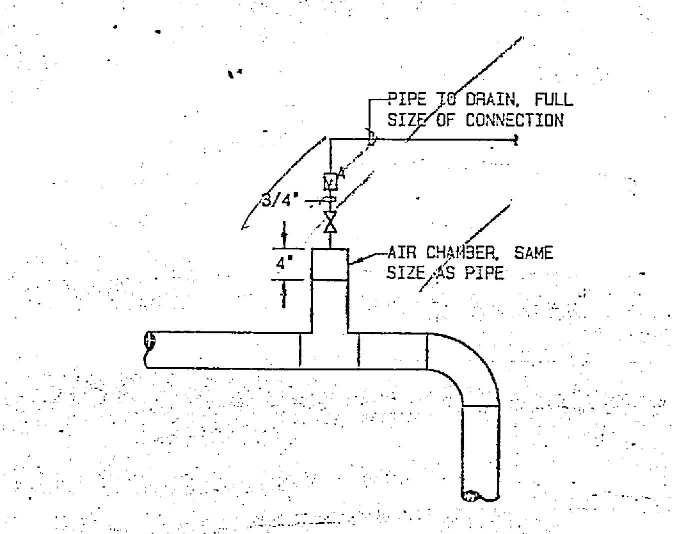


(6 / M2 M4) STEAM AND CONDENSATE CONNECTIONS TO DOMESTIC WATER HEATER IN BLDG. FC-500
NO SCALE

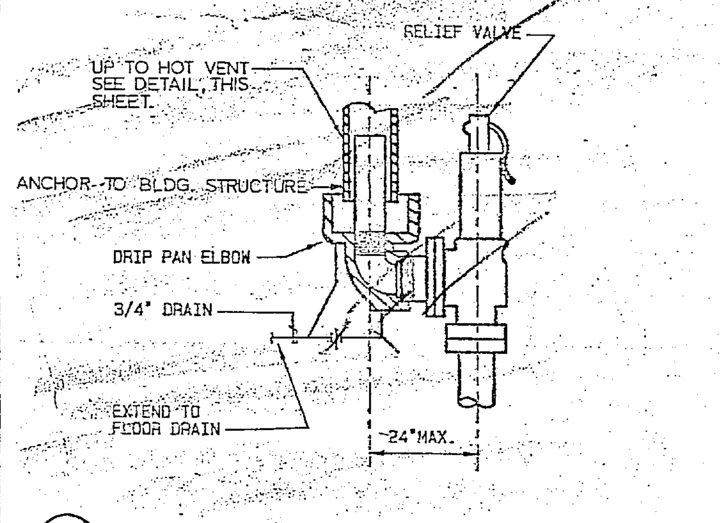
GRAPHIC SCALE:
12" 0 1 2 3 4 5
1/2" = 1'-0"

DRAWING	M4
LSBP	DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND — ATLANTIC DIVISION — NAVAL STATION NORFOLK, VA.
EFD DWG NO 257687	MARINE CORPS BASE CAMP LEJEUNE, N. C.
JOB ORDER NO 5F5143	BATTALION HEADQUARTERS
STA PROJ NO FY87-MCON/P-031	
DES MRJ / DRWN CDP	HVAC SYMBOLS, ABBREVIATIONS & DETAILS
PROJ MGR LB / CH ARCH/ENGR VRP	
APPROVED / DATE	SIZE F — CODE IDENT NO 80091 — NAVFAC DRAWING NO. 4157687
ACTIVITY- SATISFACTORY TO	CONSTR CONTR NO N62470-85-B-5143
FOR EFD FOR COMMANDER NAVFAC	SCALE NOTED — SPEC 05-85-5143 — SHEET 48 OF 78

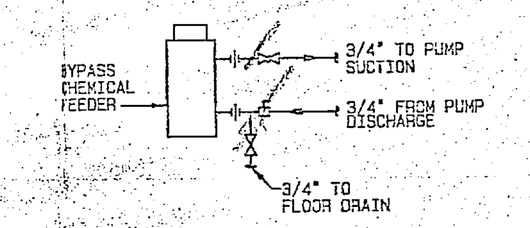
FC500



1 M5 M5 AUTOMATIC AIR VENTS
NO SCALE
NOTES:



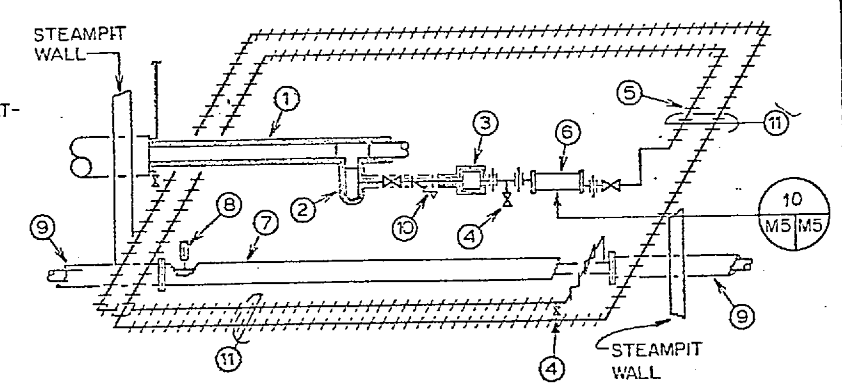
2 M5 M5 STEAM PRESSURE RELIEF VALVES
NO SCALE
NOTES:
1. FOR RELIEF VALVES WITH DISCHARGES 2-1/2" AND LARGER.



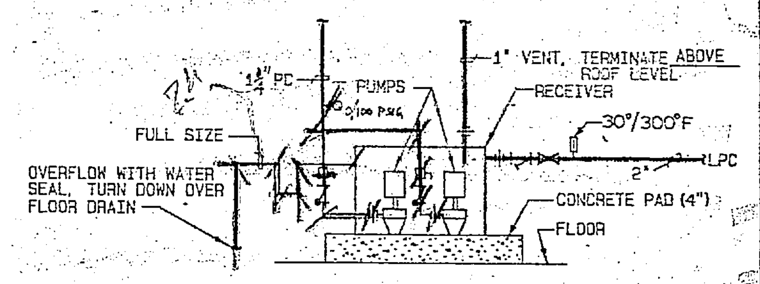
3 M5 M5 BYPASS CHEMICAL FEEDERS
NO SCALE
NOTES:
1. BRACKET FEEDERS TO WALLS OR COLUMNS.

NOTES:
1. INSULATED STEAM MAIN.
2. FULL SIZE DRIP POCKET AS DEEP AS DESIGN PERMITS, BUT NOT LESS THAN 8".
3. INVERTED BUCKET TRAP W/FORMED REMOVABLE INSULATION. TRAP SIZED AS REQ'D FOR 3X STM LOAD.
4. 1/2" TEST CONNECTION.
5. 50 L.F. OF 2" FIN TUBE RADIATION W/EXPANDED STEEL COVER AROUND INSIDE WALL OF STM M.H. (±1000 BTUH/FT. @ 200°F AVG. WALL TEMP., 65°ENT.)
6. CONDENSATE EXPANSION BAFFLE CHAMBER VESSEL. (UNINSULATED)
7. SECTION OF INSULATED STEEL PIPE WITHIN MANHOLE.
8. THERMOMETER 50° - 300°F.
9. FRP CONDENSATE RETURN MAIN - INSULATED.
10. FULL SIZE STRAINER W/BLOW DOWN VALVE. (USED TO AID IN COLD START-UP VENTING.)
11. ROUTE ABOVE ELEVATION OF CONDENSATE MAIN.
12. PROVIDE OSHA REQUIRED CLEARANCE AROUND LADDER ON SOUTH WALL OF PIT.

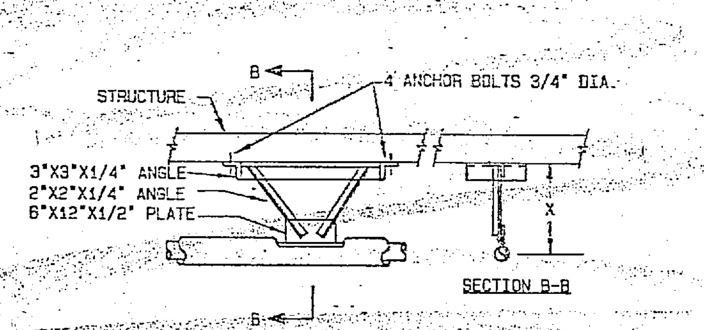
REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



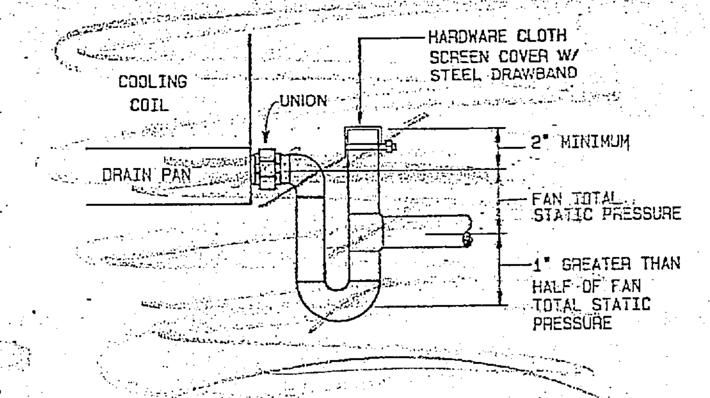
9 M2 M5 HIGH PRESSURE CONDENSATE DRIP AT STEAM PIT (MH-115)
NO SCALE



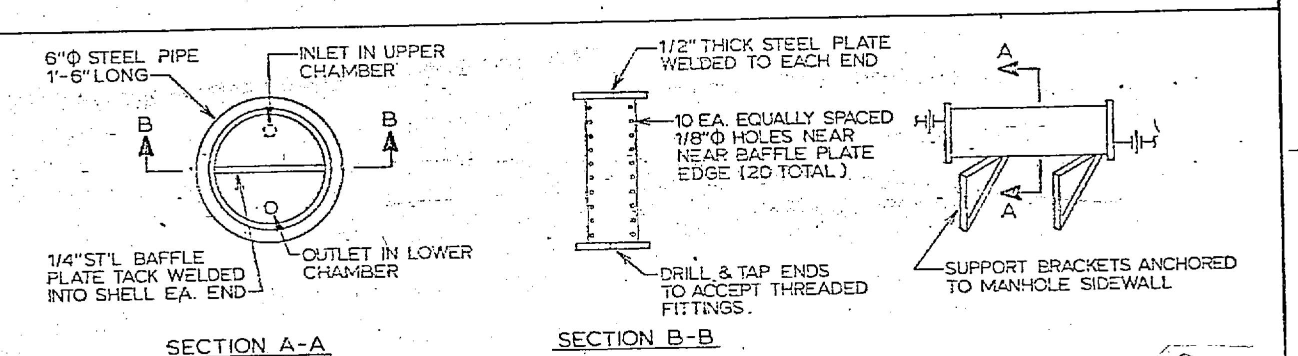
4 M2 M5 CONDENSATE RETURN UNITS (VERTICAL)
NO SCALE
NOTES:



5 M3 M5 ANCHOR FOR HORIZONTAL PIPING
NO SCALE
NOTES:
1. ALL ANGLE AND PLATE CONNECTIONS SHALL BE MADE WITH CONTINUOUS WELDS.
2. FOR BAR JOIST OR STEEL CONSTRUCTION, PROVIDE SUPPLEMENTAL MEMBERS AS REQUIRED AND ATTACH ANCHOR ASSEMBLY BY WELDING.
3. PROVIDE BRACING AS REQUIRED FOR LATERAL STABILITY WHERE X ≥ 3'-0".
4. PROVIDE ISOLATOR ANCHORS WITH BASEPLATES BETWEEN STRUCTURE AND ANCHOR WHERE SPECIFIED.

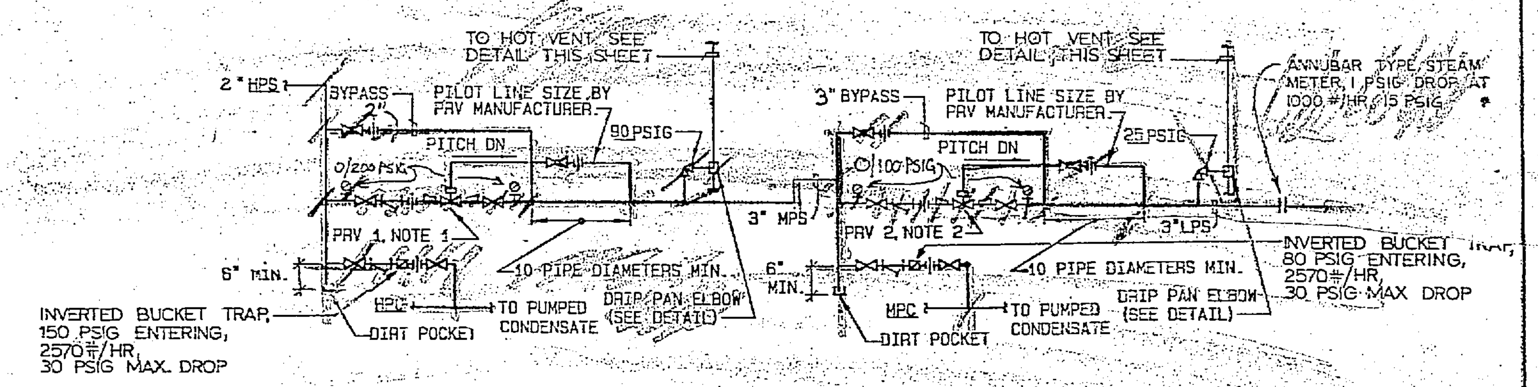


6 M5 M5 CONDENSATE DRAIN FOR DRAW-THROUGH COOLING COILS
NO SCALE
NOTES:
1. ALL PIPING SHALL BE FULL SIZE OF DRAIN CONNECTION.



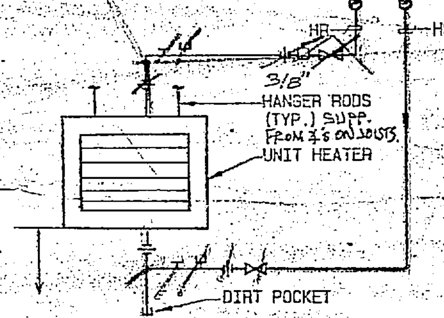
6"Ø STEEL PIPE 1'-6" LONG
INLET IN UPPER CHAMBER
OUTLET IN LOWER CHAMBER
1/4" STL BAFFLE PLATE TACK WELDED INTO SHELL EA. END
SECTION A-A
1/2" THICK STEEL PLATE WELDED TO EACH END
10 EA. EQUALLY SPACED 1/8"Ø HOLES NEAR BAFFLE PLATE EDGE (20 TOTAL)
DRILL & TAP ENDS TO ACCEPT THREADED FITTINGS
SECTION B-B
SUPPORT BRACKETS ANCHORED TO MANHOLE SIDEWALL

10 M5 M5 BAFFLE CHAMBER CONSTRUCTION
NO SCALE

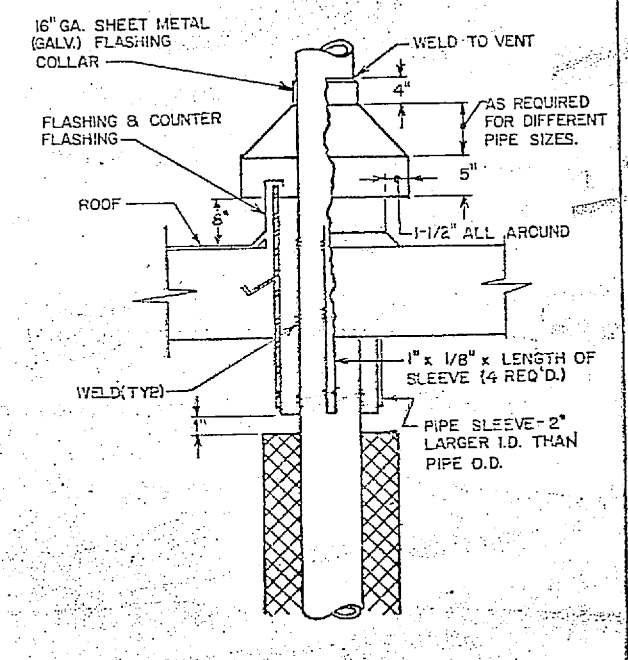


TO HOT VENT SEE DETAIL THIS SHEET
2" HPS
BYPASS
PILOT LINE SIZE BY PRV MANUFACTURER
PITCH DN
PRV 1 NOTE 1
6" MIN.
INVERTED BUCKET TRAP, 150 PSIG ENTERING, 2570#/HR, 30 PSIG MAX. DROP
DIRT POCKET
HPC
TO PUMPED CONDENSATE
10 PIPE DIAMETERS MIN.
DRIP PAN ELBOW (SEE DETAIL)
3" BYPASS
3" MPS
PRV 2, NOTE 2
3" LPS
ANNUBAR TYPE STEAM METER
INVERTED BUCKET TRAP, 80 PSIG ENTERING, 2570#/HR, 30 PSIG MAX DROP
MPC

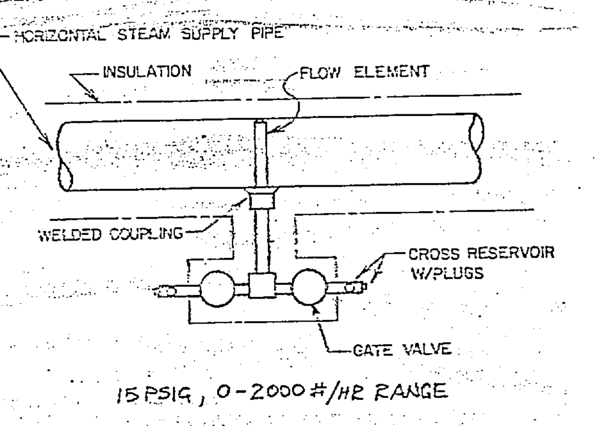
7 M2 M5 TWO-STAGE STEAM PRESSURE REDUCING VALVE ASSEMBLY
NO SCALE
NOTES:
1. CAPACITY: 1287 POUNDS/HOUR; 145 PSIG ENTERING, 80 PSIG LEAVING.
2. CAPACITY: 1287 POUNDS/HOUR; 80 PSIG ENTERING, 15 PSIG LEAVING.



8 M3 M5 HOT WATER UNIT HEATERS
NO SCALE



11 M5 M5 HOT VENT DETAIL
NO SCALE



12 M2 M5 STEAM METER (PLAN VIEW)
NO SCALE

FC500

M5

LSBP	DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NAVAL STATION — NORFOLK, VA
EFD DWG NO 257688	MARINE CORPS BASE — CAMP LEJEUNE, N. C.
JOB ORDER NO 5F5143	BATTALION HEADQUARTERS
STA PROJ NO FY87-MCON/P-031	
DES MRJ — DRWN JJH/CDP	HVAC DETAILS
PROJ MGR LB — CH ARCH/ENGR VRP	
EFD RVD — F P —	
BR MGR — DES DIR —	
APPROVED — DATE	SIZE F — CODE IDENT NO 80091 — NAVFAC DRAWING NO 4157688
ACTIVITY - SATISFACTORY TO	CONSTR CONTR NO N62470-85-B-5143
APPROVED — DATE FOR EFD FOR COMMANDER NAVFAC	SCALE: NONE — SPEC 05-85-5143 — SHEET 49 OF 78

AIR HANDLING UNIT SCHEDULE

NO.	AREA SERVED (NOTE 1)	TYPE (NOTE 2)	FAN CFM	FAN RPM	FAN TYPE (NOTE 3)	FAN ESP. IN. WG (NOTE 4)	FAN MOTOR HP.	MIN. OA CFM	COOLING COIL CFM (NOTE 5)	COOLING COIL TOTAL COOLING MBH	COOLING COIL SEN. COOLING MBH	COOLING COIL CHILLED WATER GPM (NOTE 6)	EAT °F DB	EAT °F WB	LAT °F DB	LAT °F WB	VIBRATION ISOLATION TYPE	VIBRATION ISOLATION MIN. STATIC DEFLECTION, IN.	NOTES
AHU-1	FC-300 BUILDING	VT-DT	3,940	1275	FC-VV	1.35	5	250	3,940	126.1	105.8	20	83.4	67.5	59.0	57.5	NOTE(9)	1-1/2	

NOTES:

1. DESIGN CONDITIONS:

	SUMMER	WINTER
OUTSIDE	90°FDB, 79°FWB	23°F
ADMIN. SPACES	78°FDB, 50%RH	68°F
TOILETS (HEAT ONLY)	X °FDB, X %RH	68°F
CLOSETS (VENTIL. ONLY)	X °FDB, X %RH	X °F
MECH. RMS. (H & V ONLY)	107°FDB, X %RH	45°F

2. TYPES: DT DRAW-THROUGH; BT BLOW-THROUGH; HZ HORIZONTAL; VT VERTICAL; MZ MULTIZONE
3. FAN TYPES: FC FORWARD CURVED; AF AIRFOIL — CV CONSTANT VOLUME; VV VARIABLE VOLUME
4. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE UNIT CASING, OR UNIT MOUNTED HEATING AND COOLING COILS, BUT DOES INCLUDE FILTERS.
5. MAX. FOR VARIABLE VOLUME UNITS: 550 FPM COIL FACE VELOCITY, .85" WG APD.
6. CHILLED WATER BASED ON 44°F EWT, AND MAX. 8' WPD.
7. MAX. 0.2" WG. APD.
8. INLET VANE BY MFR. MINIMUM 985 CFM W/OUT SURGE.
9. UNHOUSED SPRING TYPE ISOLATOR.
10. 480 V/3ϕ MOTOR WITH NEMA SIZE 0 STARTER.

FAN SCHEDULE

NO.	AREA SERVED	TYPE (NOTE 1)	CFM	STATIC PRESSURE, IN. WG	NOMINAL WHEEL DIAMETER, IN.	MAX. RPM	MAX. MOTOR HP	DRIVE (NOTE 2)	VIBRATION ISOLATION (NOTE 3) TYPE	MINIMUM STATIC DEFLECTION, IN.	VIBRATION BASE	NOTES
F-1	FC-500 TOILETS	C	1720	3/8	20	730	1/4	B	YES	0.4	–	4
F-2	FC-500 TOILETS	C	330	3/8	14	920	1/6	D	YES	0.4	–	4
F-3	FC-500 MECH. RM.	C	1400	3/8	20	[illegible]30	1/6	B	YES	0.4	–	4
F-4	FC-300 TOILETS	C	640	3/8	14	[illegible]32	1/4	D	YES	0.4	–	4
F-5	FC-300 MECH. RM.	C	350	1/4	14	85	1/6	D	YES	0.4	–	4
F-6 & F-7	FC-500 TOILETS	D	100	1/8	8	120	1/6	D	NO	–	–	4,6
F-8	FC-ELECT. RM.	D	500	1/5	10	1110	1/6	D	NO	–	–	4
F-9 & F-10	FC-500 CONF. RMS	B	800	1/4	12	100	1/4	D	YES	0.4	–	4

NOTES:

1. TYPES: A. PROPELLER; B. CABINET; C. POWER ROOF VENTILATOR; D. CEILING MOUNTED W/GRILLE BY FAN MFR.
2. DRIVE: B. BELT D. DIRECT
3. RUBBER-IN-SHEAR
4. DISCONNECTS BY FAN MFR.
5. BACKDRAFT DAMPER AT FAN DISCHARGE BY FAN MFR.
6. ALL FANS 120V/1ϕ.

WATER SOURCE HEAT PUMP UNIT SCHEDULE

NO.	CFM (NOTE 1)	CAPACITY, MBH (NOTE 2) SENSIBLE COOLING	TOTAL COOLING	HEATING	GPM (NOTE 3)	RUNOUT SIZES, IN.	MAX. KW INPUT	VOLTS/ϕ
HP-1	1280	32.5	39.4	25.1	7.0	3/	3.92	480/3
HP-2	960	26.8	33.2	9.0	5.0	3/	3.85	480/3
HP-3	960	25.7	32.0	8.8	5.0	3/	3.85	480/3
HP-4	395	10.0	12.4	3.2	2.0	1/	1.80	277/1
HP-5	395	14.7	18.0	4.5	2.5	1/	1.80	277/1
HP-6	395	11.5	13.6	3.4	2.0	1/	1.80	277/1
HP-7	960	26.7	33.0	8.5	5.0	3/4	5.85	480/3
HP-8	960	24.2	29.8	7.6	5.0	3/4	3.23	480/3
HP-9	660	22.0	26.9	6.7	4.0	1/4	2.70	480/3
HP-10	960	29.4	36.1	8.9	6.0	1/4	3.92	480/3
HP-11	1280	33.3	39.7	24.7	7.0	1/4	3.92	480/3
HP-12	560	11.2	13.6	8.9	2.0	1/2	1.80	277/1
HP-13	1280 (NOTE 4)	31.1	42.4	23.9	7.0	1/4	3.92	480/3
HP-14	1085	29.9	36.5	22.3	6.0	3/4	3.92	480/3
HP-15	1280	28.1	36.0	26.7	6.0	3/4	3.92	480/3
HP-16	580	10.1	20.7	8.1	3.0	1/2	2.00	277/1
HP-17	580	10.1	20.7	8.1	3.0	1/2	2.00	277/1
HP-18	960	14.1	25.8	6.6	4.0	1/2	2.70	480/3
HP-19	580	10.1	20.7	8.1	3.0	1/2	2.00	277/1
HP-20	1300	38.1	45.5	20.0	8.0	1-1/4	6.12	480/3
HP-21	1085	39.1	48.0	17.0	8.0	1-1/4	6.12	480/3
HP-22	1280	39.4	48.3	14.9	8.0	1-1/4	6.12	480/3
HP-23	1085	30.6	37.2	9.8	6.0	3/4	3.92	480/3
HP-24	1280	39.4	48.3	12.2	8.0	1-1/4	6.12	480/3
HP-25	1085	18.7	23.0	5.6	4.0	1/2	2.70	480/3
HP-26	1280	26.7	32.7	24.6	5.0	3/4	2.70	480/3
HP-27	1280 (NOTE 4)	31.1	42.4	23.3	7.0	3/4	3.92	480/3
HP-28	3070 (NOTE 4)	60.5	83.1	48.2	14.0	1-1/4	18.94	480/3

1525

NOTES:

1. EXTERNAL STATIC PRESSURE IS 0.4"WG.
2. COOLING CAPACITY BASED ON 80°F DB AND 67°F WB EAT, 90° EWT; HEATING CAPACITY BASED ON 68 F DB EAT, 65°F EWT, EXCEPT FOR O.A. MAKE-UP UNITS.
3. MAX. 12' WPD, INCLUDING HOSE KITS.
4. O.A. MAKE-UP UNITS COOLING CAPACITY BASED ON 82°F AND 70°FWB EAT, 90° EWT; HEATING CAPACITY BASED ON 55°F EAT, 65°EWT.
5. ALL UNITS SHALL BE HUNG WITH RUBBER-IN-SHEAR VIBRATION ISOLATORS.
6. CONDENSER COIL FOULING FACTOR .0005 ON ALL UNITS.

CONDENSATE RETURN UNIT SCHEDULE

NO.	TYPE (NOTE 1)	RECEIVER CAP. GAL.	DISCHARGE PRESSURE PSIG	GPM (NOTE 2)	MOTOR HP (NOTE 2)	NOTES
CU-1	V-C	8	62	8	3	(3)

NOTES:

1. TYPES: V VERTICAL DUPLEX — C CAST IRON RECEIVER
2. GPM AND MOTOR HP IS FOR EACH PUMP.
3. 480V, 3ϕ, 3500 RPM

UNIT HEATER SCHEDULE

NO.	AREA SERVED	TYPE (NOTE 1)	CAPACITY, MBH/KW (NOTE 2)	NOMINAL CFM	FLOW	PIPE RUNOUT SIZES, IN.		CONTROL VALVE CV	NOTES
UH-1, 2, 3&4	FC-500 ENTRANCES	CR	2.50 KW	300	–	–		–	ELECT.
UH-5&6	FC-500 ENTRANCES	W-CR	10.0 MBH	300	10.4 LB/hr	3/4" LPC	3/4" LPS	CV=.4	STEAM
UH-7	FC-500 MECH. RM.	H	20.0 MBH	300	20.7 LB/hr	3/4" LPC	3/4" LPS	CV=.6	STEAM
UH-8	FC-300 (MECH. RM.)	H	20.0 MBH	300	2 GPM	3/4" HR	3/4" HR	—	HOT WTR.
UH-9&10	FC-500 TOILETS	W	1.50 KW	200	–	–	–	–	ELECT.

NOTES:

1. TYPES: C CABINET WITH DUCT CONNECTION; H HORIZONTAL; CR CABINET RECESSED; CS CABINET SURFACE MOUNTED; W WALL; V VERTICAL
2. MBH GIVEN FOR HOT WATER & STEAM UNITS. KW FOR ELECTRIC. BASED ON 60°F EAT.
3. ALL ELECTRIC UNIT HEATERS SHALL BE 277V/1ϕ; ALL STEAM AND HOT WATER UNIT HEATERS SHALL BE 120V/1ϕ.
4. HOT WATER UNITS BASED ON 180° EWT.

COOLING TOWER SCHEDULE

NO.	EWT °F	LWT °F	GPM	MAX. MOTOR HP	VIBRATION ISOLATION TYPE	MIN. STATIC DEFLECTION, IN.	NOTES
CT-1	100	85	167	5	NONE	———	1,2,3

NOTES:

1. ENTERING AIR WET BULB: 79°F.
2. ELECTRIC BASIN HEATERS: 5 KW, 480V, 3-PHASE.
3. SIZE 0, COMBINATION STARTER.

AIR-COOLED CHILLER SCHEDULE

NO.	CAPACITY, TONS (NOTES 1&2)	MAX. KW AT FULL LOAD	EVAPORATOR EWT, °F	LWT, °F	GPM	MAX. PRESS. DROP, FT. WG	NOTES
CH-1	10	18.6	56	44	20	10	

NOTES:

1. CAPACITY BASED ON 95°F AMBIENT TEMPERATURE, .0005 FOULING FACTOR.
2. PROVIDE LOW AMBIENT OPERATION DOWN TO 20°F.
3. INTEGRAL STARTER BY MFR.
4. MINIMUM OF 2 STAGES OPERATION.

AIR DISTRIBUTION SCHEDULE

MARK	TYPE	DESCRIPTION	NOTES
S-1	CEILING DIFFUSER	24X24 LAY-IN CONE FACE	4-WAY THROW
E-1	EXHAUST REGISTER	SIZE AS SHOWN ON DRAWINGS	

CONVERTOR SCHEDULE

NO.	WATER SYSTEM	MIN. SURFACE AREA, FT²	TYPE (NOTE 1)	SHELL MEDIUM	SHELL LB/HR	SHELL PSIG	SHELL CONTROL VALVE CV	TUBES MEDIUM	TUBES GPM	TUBES ΔP, MAX	TEMP. °F ENT	TEMP. °F LVG	NOTES
CV-1	FC-500 TEMP. WTR.	10	U	STEAM	1049	7	6 / 8.2	WATER	153	1.4'	52.7	65	(2)(3)
CV-2	FC-300 ADDITION	4	U	STEAM	190	7	5.2	WATER	14.0	2.2'	157	180	(2)(3)

NOTES:

1. TYPES: U U-TUBE
2. .0005 FOULING FACTOR
3. CONTROL VALVES SIZED FOR 8 PSIG DROP.

PUMP SCHEDULE

NO.	SERVICE	TYPE (NOTE 1)	GPM	TOTAL DYNAMIC HEAD, FT. WG	MINIMUM EFFICIENCY, PERCENT	MOTOR HP	VIBRATION ISOLATION TYPE	MINIMUM STATIC DEFLECTION, IN.	INERTIA BASE	VOLTS/ϕ	NEMA STARTER SIZE
P-1	(NOT USED)										
P-2	TEMPERED WATER	E	153	80	70	5	NOTE 2	1½	YES	480/3	0
P-3	FC-500 STEAM PIT SUMP PUMP	S	25	22	N/A	1/3	NONE	—	—	115/1	NONE
P-4	COOLING TOWER	E	167	67	70	5	NOTE 2	1½	YES	480/3	0
P-5	CHILLED WATER	I	20	50	35	1	NOTE 3	0.4	NO	480/3	00
P-6	HOT WATER	I	14	50	35	3/4	NOTE 3	0.4	NO	480/3	00

NOTES:

1. TYPES: S SUBMERSIBLE SUMP PUMP; D DOUBLE SUCTION; E END SUCTION, BASE MTD.; I INLINE; V VERTICAL TURBINE
2. UNHOUSED SPRING TYPE ISOLATOR.
3. SPRING TYPE HANGER ISOLATOR
4. ALL PIPING WITHIN 25' OF SPRING-SUPPORTED EQUIP. SHALL BE HUNG WITH SPRING ISOLATOR HANGERS.

TERMINAL UNIT SCHEDULE

NO.	TYPE (NOTE 1)	PRIMARY CFM MAX.	PRIMARY CFM MIN.	FAN CFM	FAN MAX. MOTOR HP	FAN VOLTS/ϕ	HOT WATER HEATING COIL CAPACITY (MBH)	GPM	EAT (°F)	NOTES
T-1	FP-S	930	245	1000	1/3	120/1	39.4	3.4	65.8	3,4
T-2	FP-S	1000	250	1200	1/3	120/1	39.4	3.4	65.8	3,4
T-3	FP-S	910	230	1000	1/3	120/1	39.4	3.4	65.8	3,4
T-4	FP-S	1250	315	1400	1/3	120/1	19.7	1.8	65.8	3,4

NOTES:

1. TYPES: FP-S FAN POWERED, SERIES; CV CONSTANT VOLUME; R REHEAT; T TRACKING
2. CAPACITY BASED ON 55°F EAT FOR VV-R AND CV-R UNITS, AND 66°F EAT AND 180°F EWT FOR FP-S AND FP-P UNITS.
3. 10" ROUND OR OVAL INLET, 0.3" EXT. S.P., 0.5" MAX. INLET S.P. REQ'D., PRIMARY AIR VALVE NORMALLY CLOSED, MAXIMUM DEPTH OF UNIT 18".
4. RUBBER-IN-SHEAR HANGER ISOLATOR.

PLATE HEAT EXCHANGER SCHEDULE

NO.	SERVICE	CAPACITY, MBH	COOLING TOWER GPM	EWT °F	LWT °F	MAX. ΔP, FT. WG.	TEMPERED WATER GPM	EWT °F	LWT °F	MAX. ΔP, FT. WG.	NOTES
HX-1	FC-500	1255	167	100	85	20.0	153	105.4	90	20.0	(1)

NOTES: 1. SIZE EXCHANGER BASED ON 0.0005 FOULING FACTOR.

STEAM PRESSURE REDUCING VALVE ASSEMBLY SCHEDULE

NO.	LOCATION	STEAM PRESSURE (PSIG) ENTERING	LEAVING	CAPACITY LB/HR	RELIEF VALVE LB/HR	RELIEF VALVE PSIG
PRV-1	FC-500/MECH RM	100 TO 149	80	1287	1608	85
PRV-2	FC-500/MECH RM	80	15	1287	1608	20

REVISIONS

FC 500

M6

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

ATLANTIC DIVISION

NAVAL STATION — NORFOLK, VA.

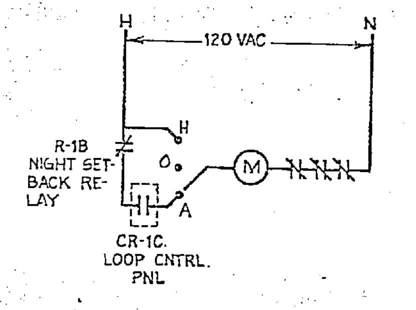
MARINE CORPS BASE — CAMP LEJEUNE, N. C.

BATTALION HEADQUARTERS

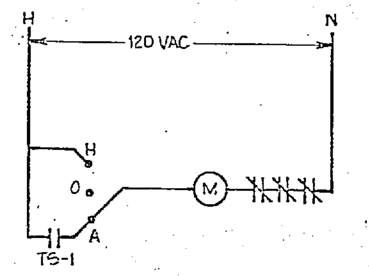
HVAC SCHEDULES

EFD DWG NO 257689
JOB ORDER NO 5F5143
STA PROJ NO FY87-MCON/P-031
DES MPJ — DRWN JJH
PROJ MGR LB — CH ARCH/ENGR VRP
APPROVED — DATE
ACTIVITY - SATISFACTORY TO —
FOR CMDR, NAVFAC

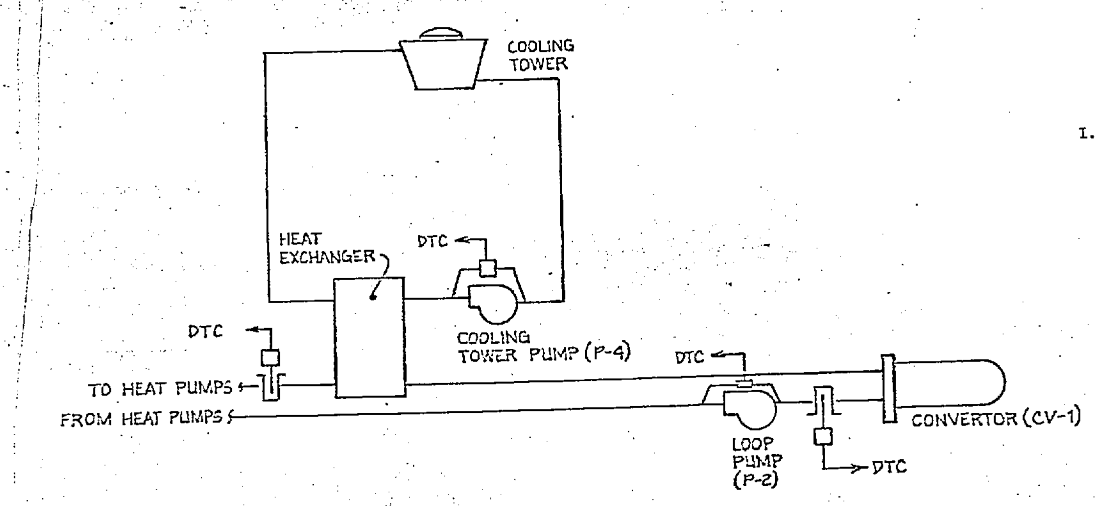
SIZE F — CODE IDENT NO 80091 — NAVFAC DRAWING NO 4157689
CONSTR CONTR NO N62470-85-B-5143
SCALE NONE — SPEC 05-85-5143 — SHEET 50 OF 78



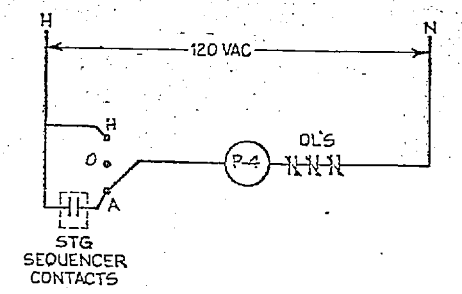
1 M7|M7 FANS F-1, F-2, F-6, F-7 F-8, F-9



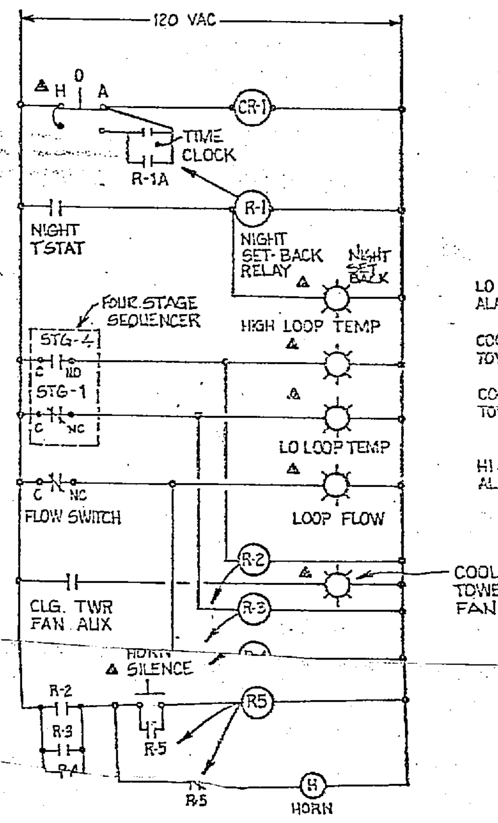
2 M7|M7 FAN F-3



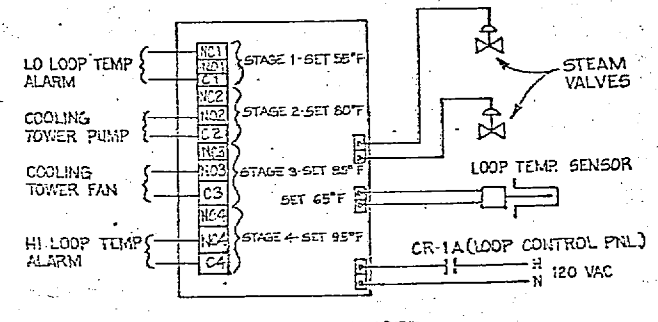
3 M7|M7 TEMPERED WATER LOOP



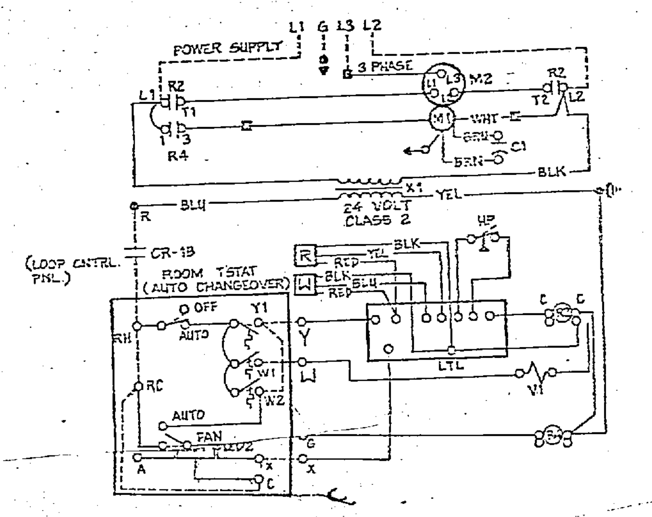
4 M7|M7 COOLING TOWER PUMPS



LOOP CONTROL PANEL



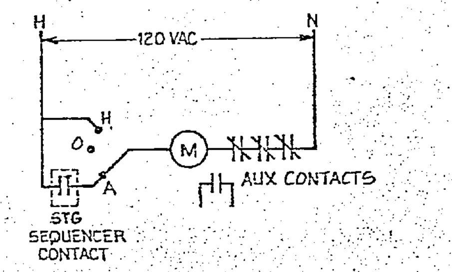
FOUR STAGE SEQUENCER



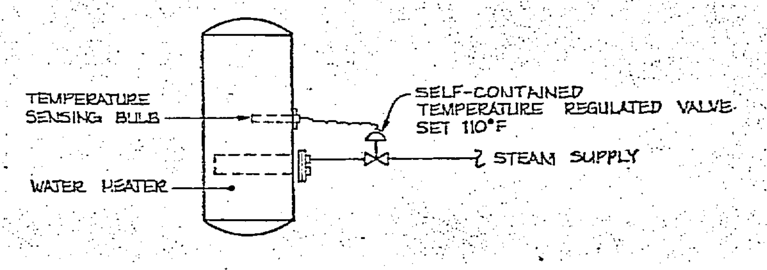
HEAT PUMP CONTROLS

6 M7|M7 TEMPERED WATER SYSTEM
NTS

NOTE:
▲ INDICATES PANEL MOUNTED DEVICES



5 M7|M7 COOLING TOWER FAN



7 M7|M7 DOMESTIC HOT WATER CONTROL

FC500

CONTROL SEQUENCES (FC-500)

I. The Controls for the Tempered Water System (serving the FC-500 Building) shall function as follows:

A. The system controls, the individual heat pump thermostats, and the tempered water loop pump P-2 shall be energized when the control panel is energized by the timeclock or by overrides.

B. A night setback thermostat shall override the timeclock "Off" position on a fall to set point. Outside air dampers at make-up air heat pumps HP-13, HP-27, and HP-28 shall remain closed and toilet exhaust fans shall remain off in this mode.

C. The H-O-A switch mounted on the control panel shall override the timeclock in the "Hand" or "Off" position.

D. The pumps, valves, and cooling tower fan shall operate as scheduled below to maintain loop temperature between 65°F and 90°F inclusive. All functions shall be controlled by one temperature sensor.

Loop Temperature	Action
95°	High Temperature Alarm
85°	C.T. Fan On
80°	C.T. Fan Off – C.T. Pump On (P-4)
75°	C.T. Pump Off (P-4)
65°	Convertor Steam Control Valve Modulates Open
55°	Low Temperature Alarm

E. The cooling tower chemical treatment system shall be energized when Pump P-4 is in operation.

F. The following shall be mounted on the control panel face unless noted otherwise:

1. Tempered water supply thermometer.
2. Tempered water return thermometer.
3. High loop temperature alarm light.
4. Low loop temperature alarm light.
5. Cooling tower fan status light.
6. Loop flow alarm light.
7. Audible alarm for all alarms.
8. Alarm silence switch.
9. Night setback override mode light.
10. Hand-Off-Automatic switch.
11. Override timer.
12. Timeclock (inside panel).

II. The Controls for Convertor CV-1 (serving FC-500 Tempered Water Loop) shall function as follows:

A. Activation of the Tempered Water System shall activate convertor controls. When the Tempered Water System is off, the controls shall be deactivated and the steam valves shall close.

B. Modulate the two steam valves (1/3, 2/3 capacity) in sequence to maintain convertor hot water leaving temperature set point.

III. The Controls for Unit Heaters UH-5, UH-6, and UH-7 (serving the FC-500 Building) shall each function as follows:

A. [illegible] thermostat shall cycle the unit heater fan and modulate the steam valve in sequence to maintain space temperature.

IV. The Controls for Unit Heaters UH-1, UH-2, UH-3, UH-4, UH-9, and UH-10 shall each function as follows:

A. An integral thermostat shall cycle the unit heater fan and heating coil to maintain space temperature.

V. The Controls for Fans F-1, F-2, F-6, and F-7 (serving the toilets in FC-500) shall function as follows:

A. The fans shall be automatically started with the Tempered Water System but shall remain off when the system is in the Night Set-back Mode.

VI. The Controls for Fan F-3 (serving the FC-500 Mechanical Room) shall operate as follows:

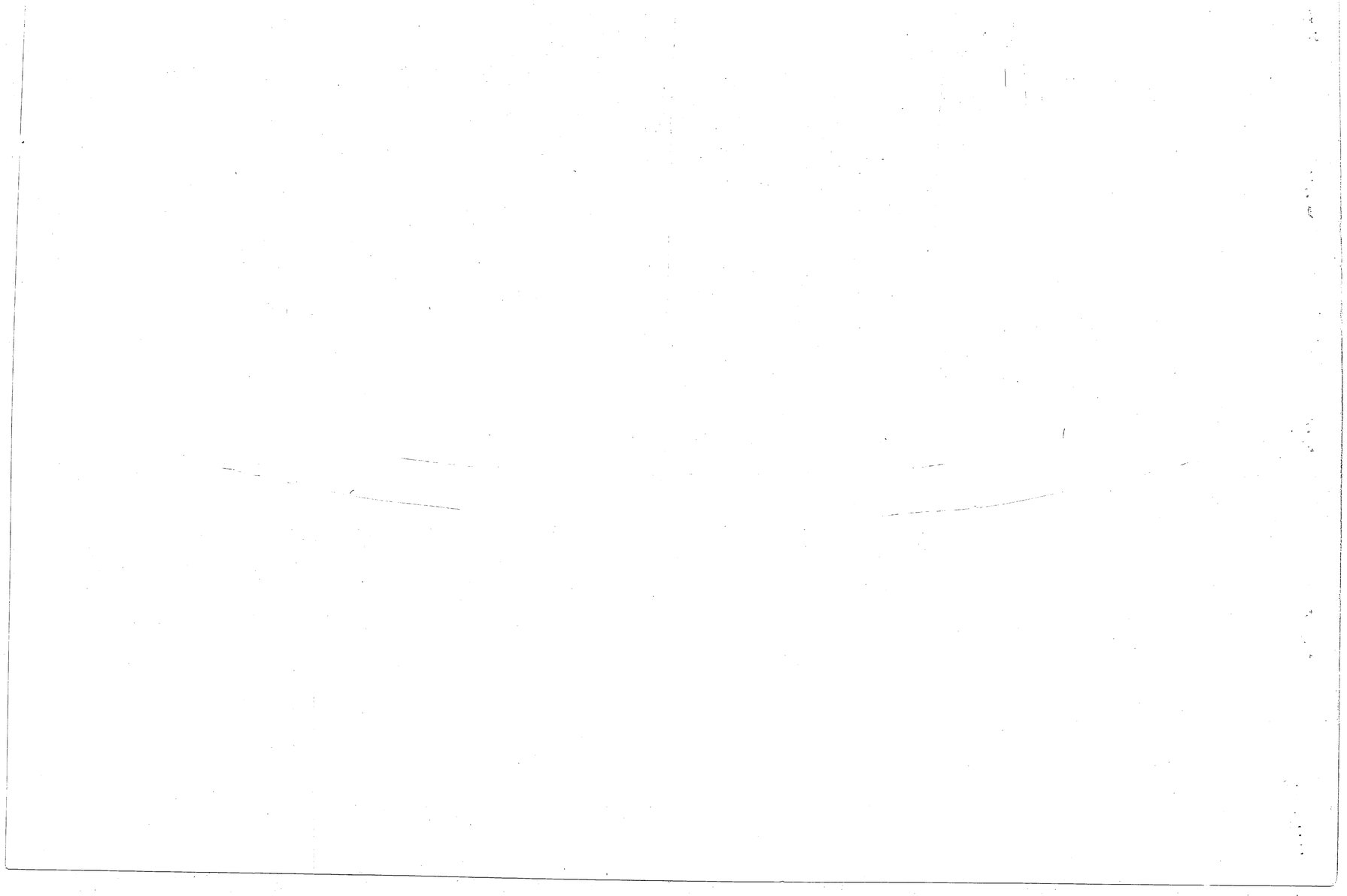
A. The fan shall be controlled by a room thermostat to maintain temperature set point.

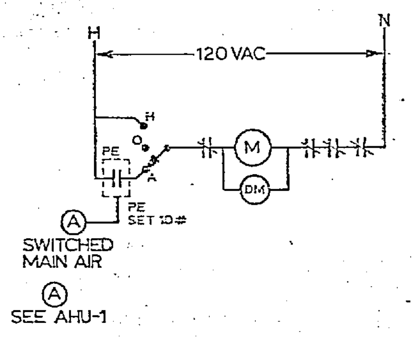
VII. The Controls for the domestic water heater shall function as follows:

A. The steam control valve shall modulate to maintain domestic hot water temperature setpoint.

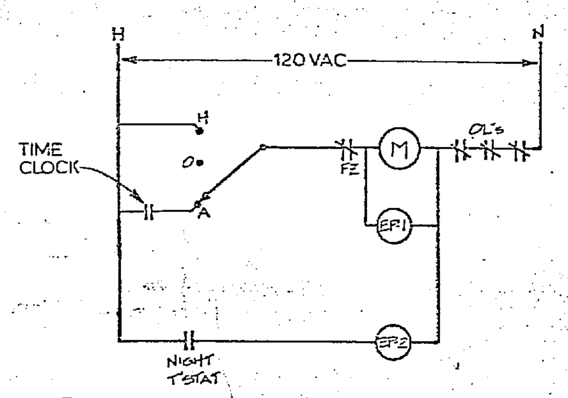
GRAPHIC SCALE:

LSBP	DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NAVAL STATION — NORFOLK, VA.
EFD DWG NO 257690 JOB ORDER NO 5F5143 STA PROJ NO FY87-MCON/P-031	MARINE CORPS BASE — CAMP LEJEUNE, N. C. BATTALION HEADQUARTERS
DES JAR — DRWN SAT PROJ MGR LB — CH ARCH/ENGR VRP EFD RVD — FP BR MGR — DES DIR	HVAC FC-500 CONTROLS
APPROVED — DATE ACTIVITY- SATISFACTORY TO APPROVED — DATE 5/15 FOR EFD FOR COMMANDER NAVFAC	SIZE F — CODE IDENT NO 80091 — NAVFAC DRAWING NO 4157690 CONSTR CONTR NO N62470-85-B-5143 SCALE NONE — SPEC 05-85-5143 — SHEET 51 OF 78

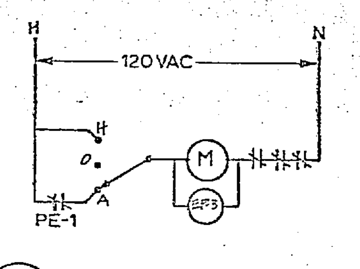




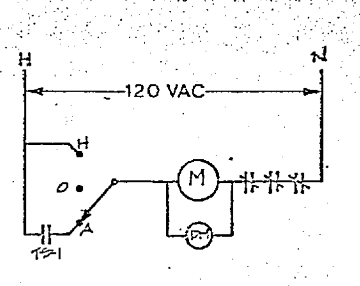
1 FAN F-4



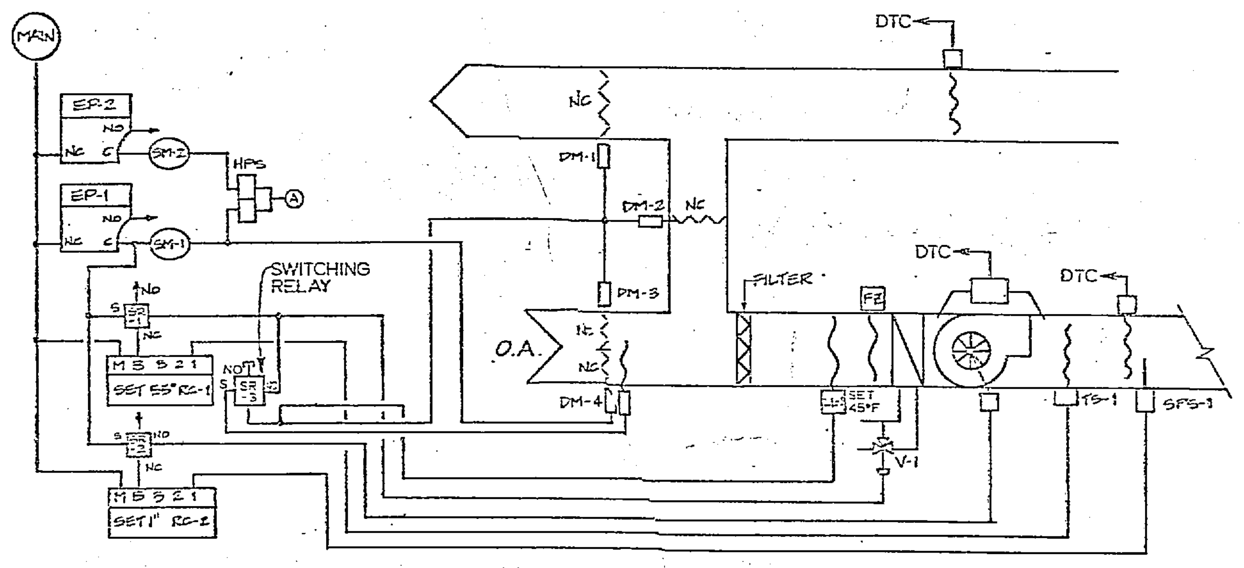
2 AHU-1 LADDER DIAGRAM



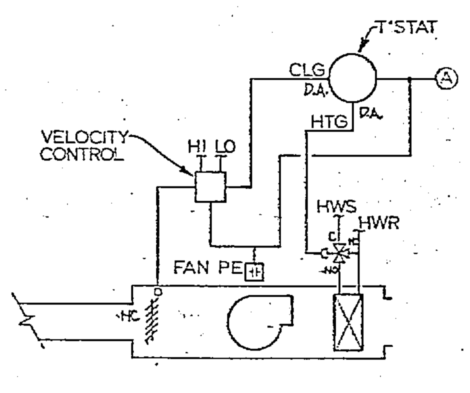
3 HOT WATER PUMP P-6 STARTER



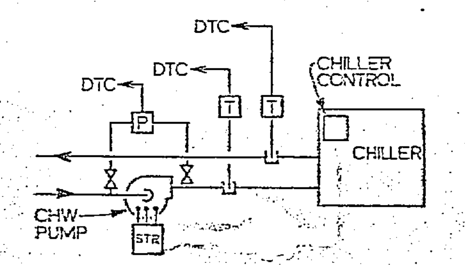
4 FAN F-3



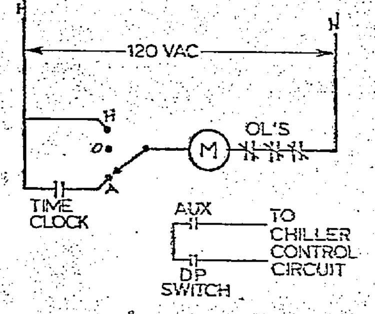
5 AHU-1 CONTROLS



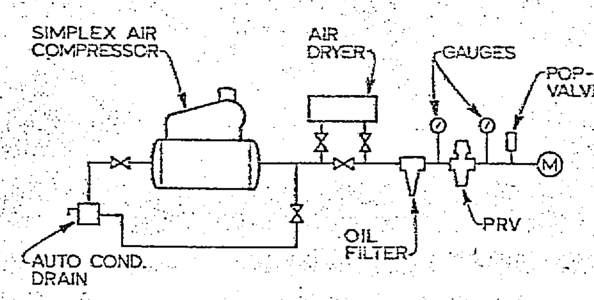
TERMINAL AIR BLENDER CONTROL (TYP)



6 CHILLER

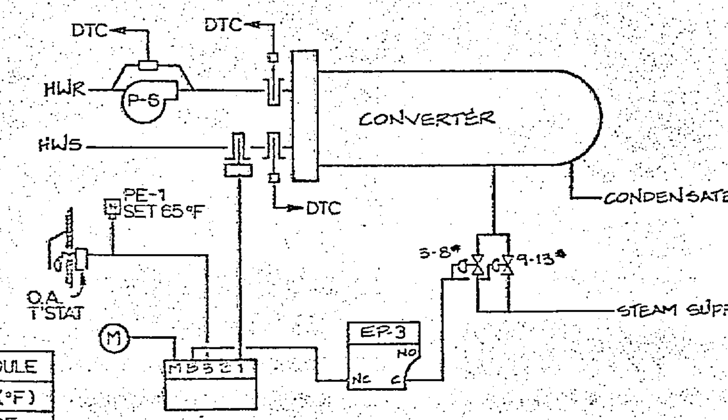


8 CHILLED WATER PUMP P-5



7 AIR COMPRESSOR

H.W. RESET SCHEDULE	
O.A. (°F DB)	HWS (°F)
23°F	150°F
60°F	90°F
65°F	VLV CLOSED



9 CONVERTOR CV-2

FC 500

CONTROL SEQUENCES (FC-300)

I. The Controls for AHU-1 (serving the FC-300 addition) shall function as follows:

A. The System shall be automatically started and stopped by the building automation system whenever the Hand-Off-Automatic Switch is in the Automatic position, and manually started and stopped by the Hand position.

B. Controls shall be energized, and the minimum outside air, and return dampers shall open prior to fan starting. The relief and maximum outside air dampers shall remain closed. Terminal air blenders shall be energized.

C. Modulate the three-way chilled water valve to maintain system discharge air temperature set point.

D. Initiate Economizer Mode operation on a drop in outside air dry bulb temperature below set point.

E. With the unit operating in the Economizer Mode, modulate the return, relief and maximum outside air dampers to maintain discharge air temperature set point. The return air damper shall modulate closed simultaneously as the relief and maximum outside air dampers modulate open. If the maximum outside air damper is fully open and the discharge air temperature set point still is not satisfied, the chilled water valve shall be modulated open to satisfy demand. A low limit control with averaging element sensing air entering the coils, overriding all other damper controls, shall modulate the maximum outside air and return dampers to limit mixed air temperature to 45°F adjustable minimum.

F. A separate low limit thermostat with element sensing the coldest portion of air entering the cooling coil, set at 40°F adjustable, shall stop the fan.

G. On power interruption or fan shutdown, the minimum and maximum outside air, relief and return dampers, and chilled water and hot water valves shall close, and the fan powered terminal units shall be de-activated.

H. Modulate the inlet vanes to maintain duct static pressure set point.

I. Terminal units:

1. Fan powered, series type - the fan shall be interlocked with the system. Each room thermostat cooling output shall, on a drop in temperature, modulate the primary air valve to the minimum position. Once the primary air valve is at minimum flow, the room thermostat heating output shall modulate the three-way hot water valve to maintain space temperature.

J. A drop in space temperature below night setback set point shall override the supply fan interlock and allow the fan powered terminal units to run. The units shall operate under normal control during this mode. Outside air and relief dampers shall remain closed.

K. On morning warm-up mode, the minimum and maximum outside air and relief dampers and chilled water valve shall be closed, all terminal units shall be fully open until return air temperature rises above a warm-up mode set point.

II. Controls for the Chilled Water System (serving the FC-300 addition) shall function as follows:

A. The chilled water pump P-5 shall be activated by the timeclock.

B. The chiller's internal controls shall be activated, and the capacity controller shall be reset by a remote bulb thermostat sensing chilled water return. The compressors shall start unloaded.

C. The chiller shall have the following fail safe controls:

1. A pressure differential controller shall stop the compressor in case of inadequate water flow through the cooler (low pressure differential across cooler).

2. A manually reset pressure switch shall stop the compressor in case of low oil pressure.

3. A manually reset pressure switch shall stop the compressor in case of high condenser pressure.

4. A manually reset temperature switch shall stop the compressor in case of low refrigerant temperature.

5. A thermostat with element in cooler discharge shall stop the compressor in case of low chilled water temperature.

D. All chiller controls provided and/or installed under this Section shall be approved by the chiller manufacturer.

III. The Controls for Fan F-4 (serving FC-300 toilets) shall function as follows:

A. The fan shall be interlocked to operate with AHU-1, except when the system is in the Night Set-back or Warm-up Modes.

IV. The Controls for Convertor CV-2 (serving FC-300 Addition) shall function as follows:

A. Activation of Hot Water Pump P-6 shall activate convertor controls. When the pump is off, the controls shall be deactivated and the steam valve shall close.

V. The Controls for Unit Heater UH-8 (serving the FC-300 Mechanical Room) shall function as follows:

A. An integral thermostat shall cycle the unit heater fan to maintain space temperature.

VI. The Controls for Fan F-5 (serving the FC-300 Mechanical Room) shall function as follows:

A. The fan shall be controlled by a room thermostat to maintain temperature setpoint.

VII. The Controls for hot water pump P-5 shall operate as follows:

A. The pump shall run when the outside air is at or below 65°F (adjustable).

REVISIONS

GRAPHIC SCALE:

M8

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VA.

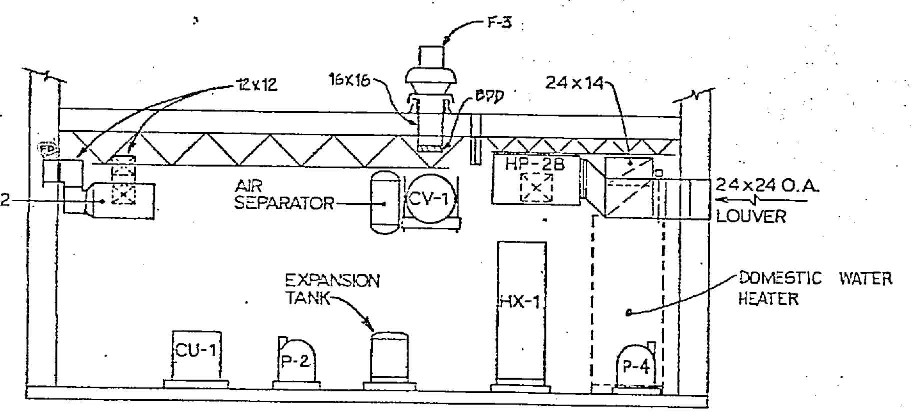
MARINE CORPS BASE — CAMP LEJEUNE, N. C.
BATTALION HEADQUARTERS

FC-300 HVAC CONTROLS

EFD DWG NO	257691
JOB ORDER NO	5F5143
STA PROJ NO	FY87-MCCN/P-031
DES	MRJ
PROJ MGR	LB
CH ARCH/ENGR	VRP
SIZE	F
CODE IDENT NO	80091
NAVFAC DRAWING NO	4157691
CONSTR CONTR NO	N62470-85-B-5143
SCALE	NONE
SPEC	05-85-5143
SHEET	52 OF 78

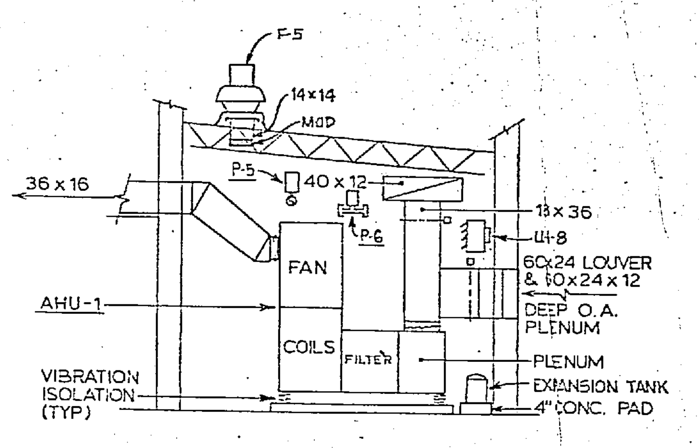
APPROVED — DATE
ACTIVITY- SATISFACTORY TO
APPROVED — DATE
FOR EFD FOR COMMANDER NAVFAC

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED



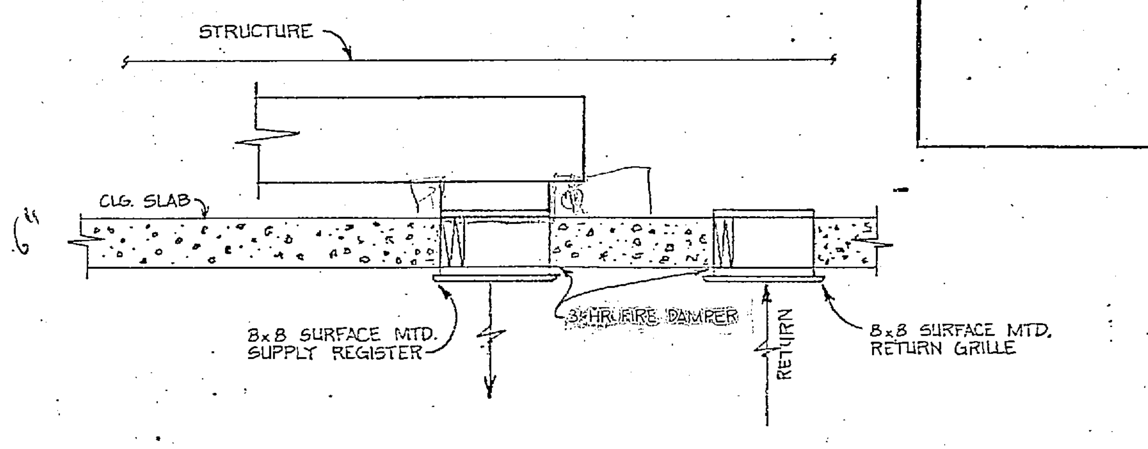
1 M2 M9 SECTION THROUGH BLDG. FC-500 MECH. ROOM

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



2 M3 M9 SECTION THROUGH BLDG. FC-300 ADDITION MECH. ROOM

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

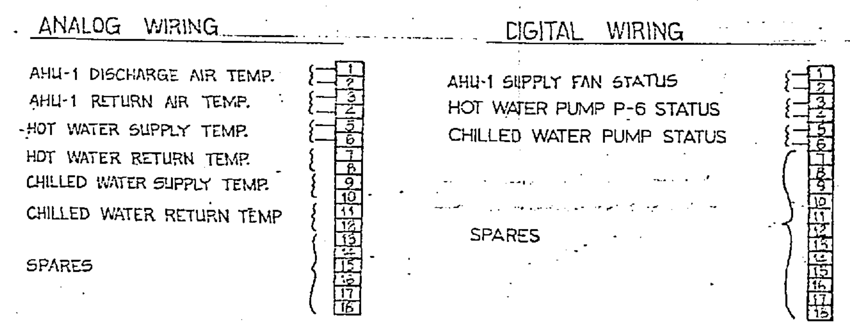


3 M1 M9 SUPPLY AIR & RETURN AIR PENETRATIONS AT CEILINGS IN ROOMS 104, 301, 419, & 210

NO SCALE

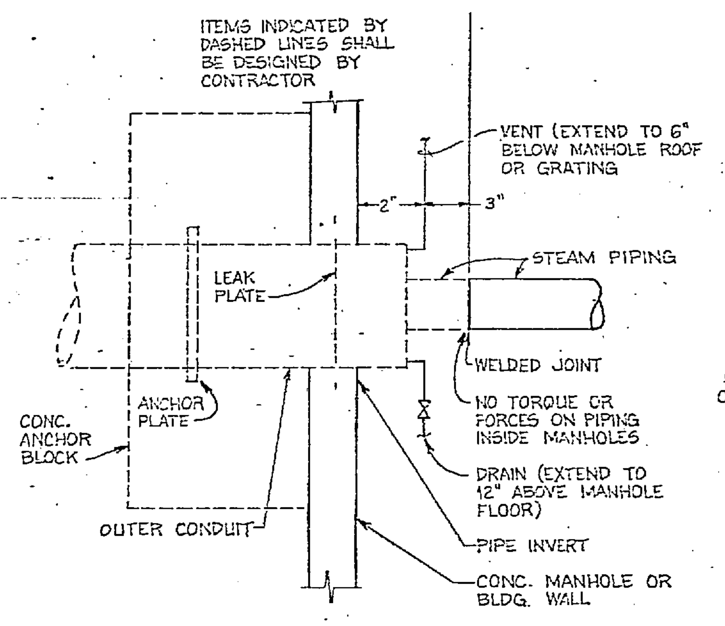
INPUT/OUTPUT SUMMARIES FC-300	SYSTEM GRAPHIC DISPLAY	OUTPUTS DIGITAL START/STOP	OUTPUTS DIGITAL ENABLE/DISABLE	OUTPUTS DIGITAL OPEN/CLOSE	OUTPUTS ANALOG SETPOINT ADJUST	OUTPUTS ANALOG DDC CONTROL	INPUTS DIGITAL DIFF. PRESSURE SWITCH	INPUTS DIGITAL AUX. CONTACT	INPUTS DIGITAL ALARM CONTACT	INPUTS DIGITAL PULSE CONTACT	INPUTS ANALOG TEMPERATURE	INPUTS ANALOG RELATIVE HUMIDITY	INPUTS ANALOG PRESSURE
AHU-1													
SUPPLY FAN STATUS							•						
DISCHARGE AIR TEMPERATURE											•		
RETURN AIR TEMPERATURE											•		
CONVERTER CV-2													
HOT WATER PUMP P-6 STATUS							•						
HOT WATER SUPPLY TEMPERATURE											•		
HOT WATER RETURN TEMPERATURE											•		
CHILLER													
CHILLED WATER PUMP STATUS							•						
CHILLED WATER SUPPLY TEMPERATURE											•		
CHILLED WATER RETURN TEMPERATURE											•		

4 M9 M9 FC-300 I/O SUMMARIES


ANALOG WIRING
AHU-1 DISCHARGE AIR TEMP.
AHU-1 RETURN AIR TEMP.
HOT WATER SUPPLY TEMP.
HOT WATER RETURN TEMP.
CHILLED WATER SUPPLY TEMP.
CHILLED WATER RETURN TEMP
SPARES
DIGITAL WIRING
AHU-1 SUPPLY FAN STATUS
HOT WATER PUMP P-6 STATUS
CHILLED WATER PUMP STATUS
SPARES

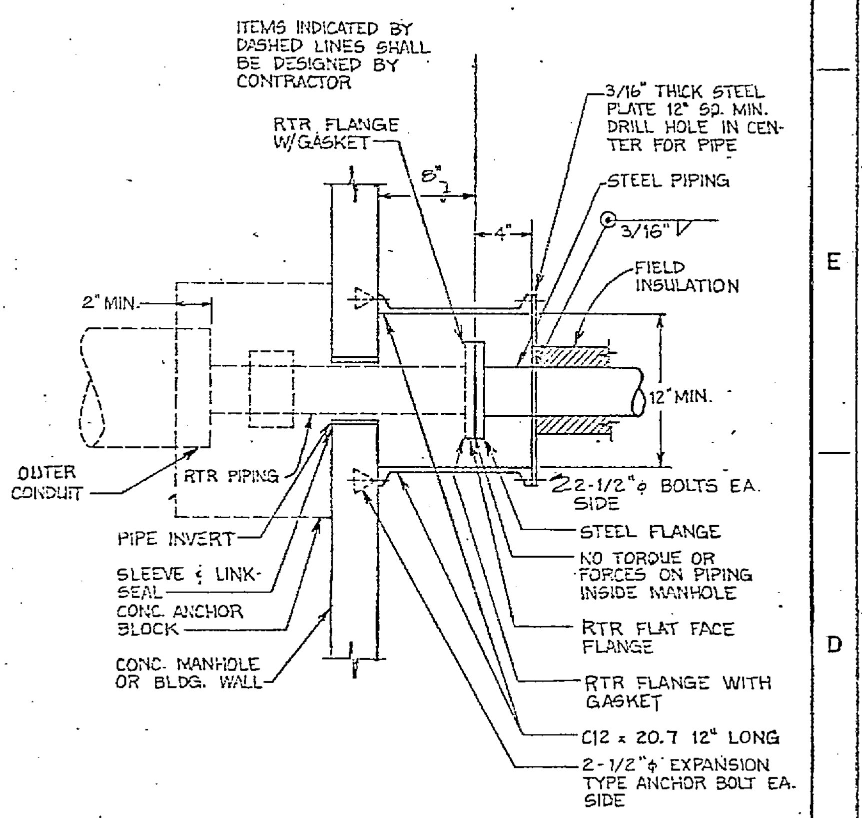
5 M9 M9 FC-300 DTC WIRING

NO SCALE


ITEMS INDICATED BY DASHED LINES SHALL BE DESIGNED BY CONTRACTOR
VENT (EXTEND TO 6" BELOW MANHOLE ROOF OR GRATING
LEAK PLATE
STEAM PIPING
WELDED JOINT
CONC. ANCHOR BLOCK
ANCHOR PLATE
NO TORQUE OR FORCES ON PIPING INSIDE MANHOLES
DRAIN (EXTEND TO 12" ABOVE MANHOLE FLOOR)
PIPE INVERT
OUTER CONDUIT
CONC. MANHOLE OR BLDG. WALL

8 M2 M9 STEAM PIPE WALL PENETRATION

NO SCALE

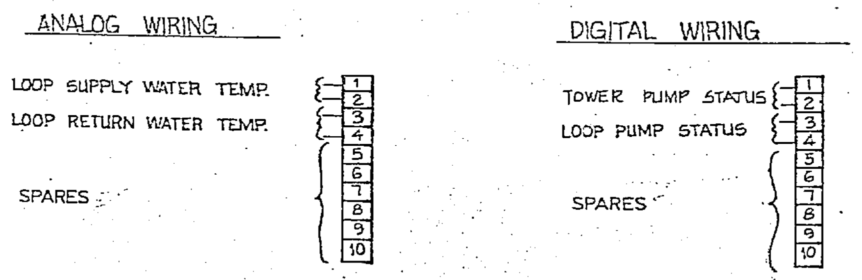

ITEMS INDICATED BY DASHED LINES SHALL BE DESIGNED BY CONTRACTOR
3/16" THICK STEEL PLATE 12" SQ. MIN. DRILL HOLE IN CENTER FOR PIPE
RTR FLANGE W/GASKET
STEEL PIPING
3/16"
FIELD INSULATION
2" MIN.
12" MIN.
OUTER CONDUIT
RTR PIPING
2-1/2"ø BOLTS EA. SIDE
STEEL FLANGE
PIPE INVERT
SLEEVE & LINK-SEAL
NO TORQUE OR FORCES ON PIPING INSIDE MANHOLE
CONC. ANCHOR BLOCK
RTR FLAT FACE FLANGE
CONC. MANHOLE OR BLDG. WALL
RTR FLANGE WITH GASKET
C12 x 20.7 12" LONG
2-1/2"ø EXPANSION TYPE ANCHOR BOLT EA. SIDE

9 M2 M9 CONDENSATE PIPE WALL PENETRATION

NO SCALE

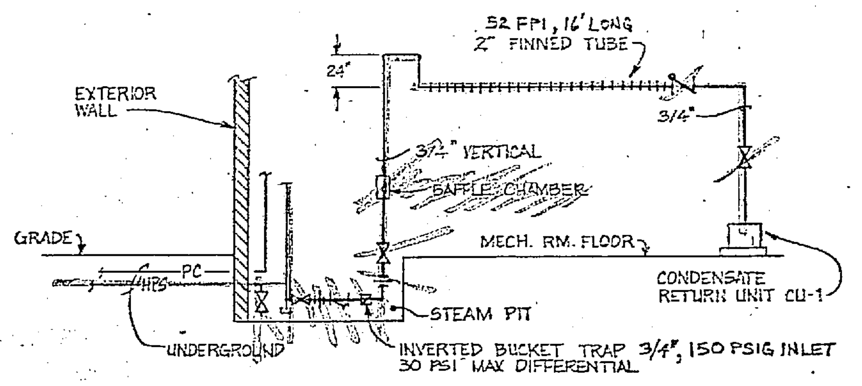
INPUT/OUTPUT SUMMARIES FC-500	SYSTEM GRAPHIC DISPLAY	OUTPUTS DIGITAL START/STOP	OUTPUTS DIGITAL ENABLE/DISABLE	OUTPUTS DIGITAL OPEN/CLOSE	OUTPUTS ANALOG SETPOINT ADJUST	OUTPUTS ANALOG DDC CONTROL	INPUTS DIGITAL DIFF. PRESSURE SWITCH	INPUTS DIGITAL AUX. CONTACT	INPUTS DIGITAL ALARM CONTACT	INPUTS DIGITAL PULSE CONTACT	INPUTS ANALOG TEMPERATURE	INPUTS ANALOG RELATIVE HUMIDITY	INPUTS ANALOG PRESSURE
TEMPERED WATER LOOP													
LOOP PUMP STATUS							•						
TOWER PUMP STATUS							•						
LOOP SUPPLY WATER TEMP.											•		
LOOP RETURN WATER TEMP.											•		

6 M9 M9 FC-500 I/O SUMMARIES



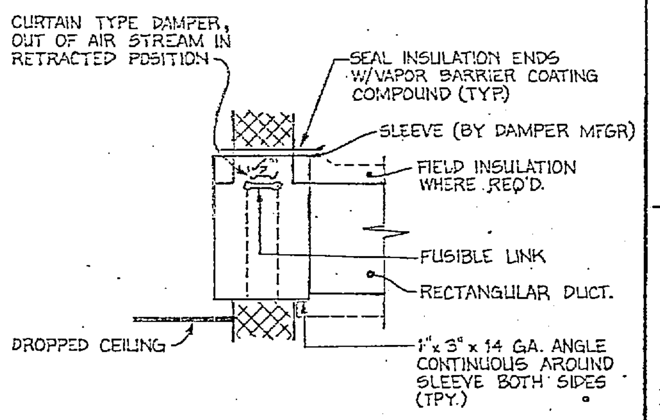
7 M9 M9 FC-500 DTC WIRING

NO SCALE



10 M2 M9 BLDG. FC-500 MECH. ROOM STEAM PIT PIPING

NO SCALE


CURTAIN TYPE DAMPER, OUT OF AIR STREAM IN RETRACTED POSITION
SEAL INSULATION ENDS W/VAPOR BARRIER COATING COMPOUND (TYP)
SLEEVE (BY DAMPER MFGR)
FIELD INSULATION WHERE REQ'D.
FUSIBLE LINK
RECTANGULAR DUCT
DROPPED CEILING
1"x3"x14 GA. ANGLE CONTINUOUS AROUND SLEEVE BOTH SIDES (TYP.)

11 M9 M9 FIRE DAMPER IN WALL

NO SCALE

FC 500

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER WARREN D. SHIVER

M9

LSBP

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

ATLANTIC DIVISION

NAVAL STATION — NORFOLK, VA.

MARINE CORPS BASE — CAMP LEJEUNE, N. C.

BATTALION HEADQUARTERS

HVAC DETAILS & EMCS

EFD DWG NO	257692
JOB ORDER NO	SF5143
STA PROJ NO	FY87-MCON/P-031
DES HSG	DRWN CDP
PROJ MGR LB	CH ARCH/ENGR VRP
SIZE	F
CODE IDENT NO	80091
NAVFAC DRAWING NO	4157692
CONSTR CONTR NO	N62470-85-B-5143
SCALE	NOTED
SPEC	05-85-5143
SHEET	53 OF 78

APPROVED — DATE

ACTIVITY - SATISFACTORY TO

APPROVED — DATE

FOR EFD FOR COMMANDER NAVFAC

BATTALION HQ'S
BLDGS FC-300 & FC-500

TRANE
Force Flo Heater
RE46E003
388L 80858

TRANSFORMER
277 Pri
120V Sec
100VA

FUSE
277VAC