

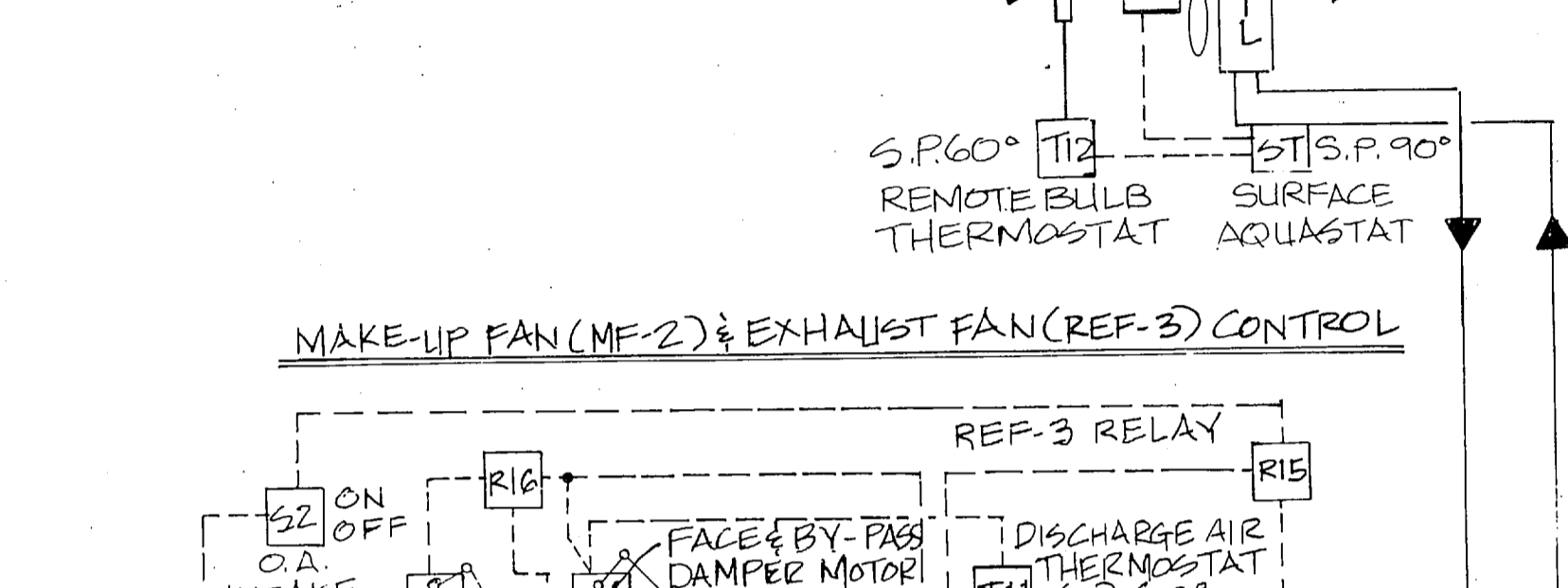
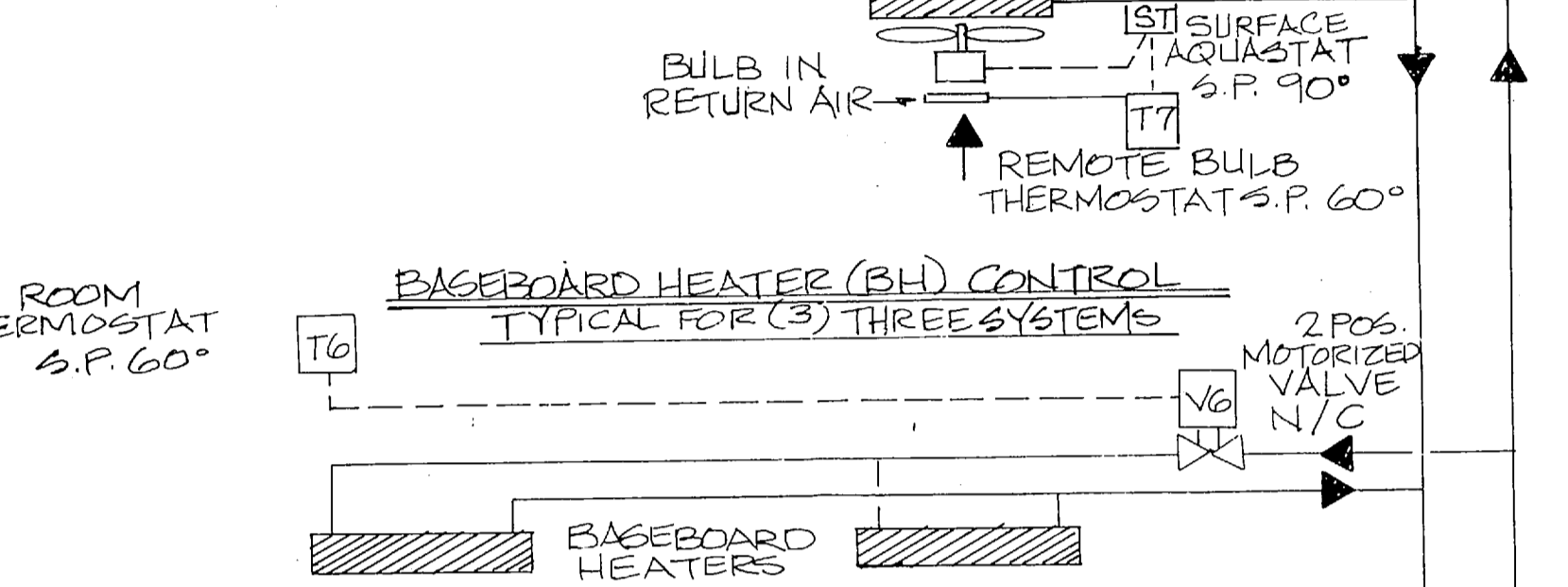
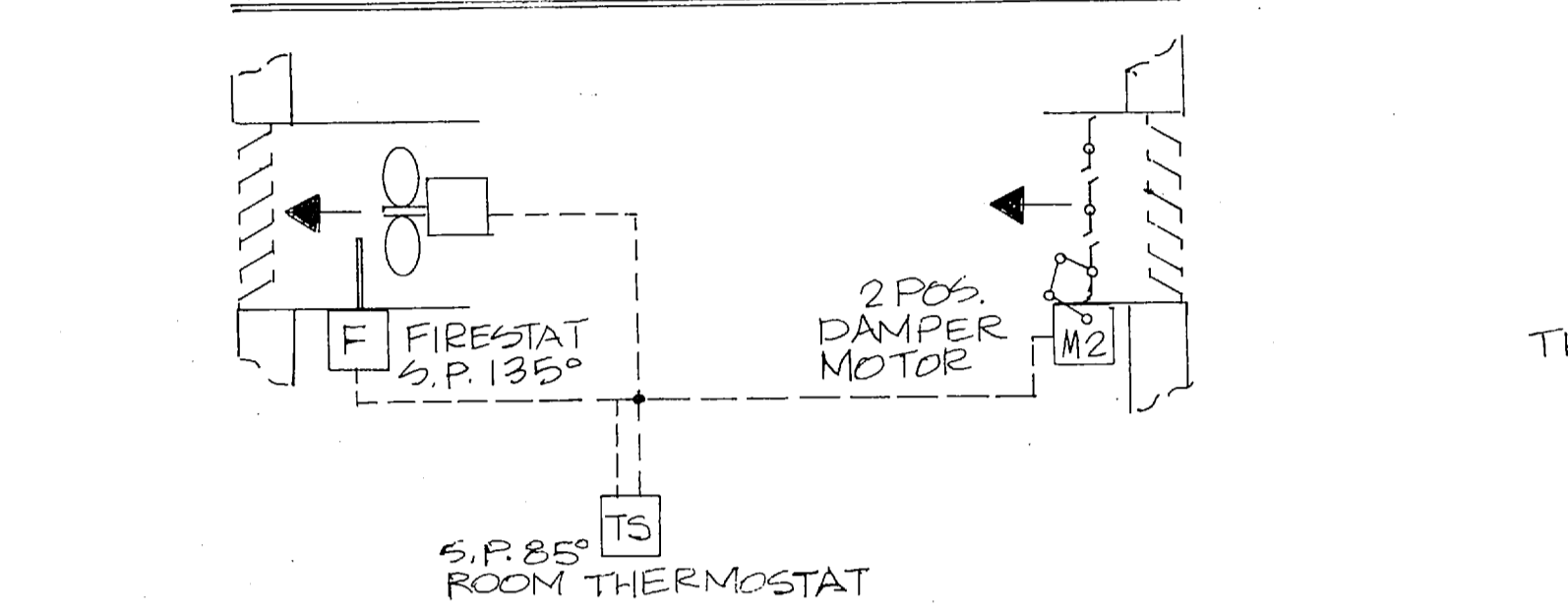
1. SYSTEM CONTROL:
- MANUAL OPERATION: WITH HEAT-AUTO-COOL SWITCH "SS" IN "HEAT" POSITION, SYSTEM IS MANUALLY INDEXED TO HEATING CYCLE. WITH HEAT-AUTO-COOL SWITCH "SS" IN "COOL" POSITION, SYSTEM IS MANUALLY INDEXED TO COOLING CYCLE. WITH HEAT-AUTO-COOL SWITCH "SS" IN "AUTO" POSITION, SYSTEM IS AUTOMATICALLY INDEXED BY OUTDOOR THERMOSTAT "T13" TO HEAT OR COOL.
 - HEATING: WITH OUTDOOR TEMPERATURE BELOW SETPOINT (65°F) OF THERMOSTAT "T13" THE SYSTEM IS INDEXED TO HEATING CYCLE. VENTILATION SYSTEMS ARE OPERABLE BUT MECHANICAL COOLING SYSTEMS ARE INOPERATIVE.
 - COOLING: WITH OUTDOOR TEMPERATURE ABOVE SETPOINT (65°F) OF THERMOSTAT "T13" THE SYSTEM IS INDEXED TO COOLING CYCLE. VENTILATION SYSTEMS ARE OPERABLE BUT HOT WATER PUMPS ARE OFF AND STEAM VALVES ARE CLOSED.
2. DAY/NIGHT CONTROL:
- DAY OPERATION: TIME CLOCK "TC" ON "DAY" CYCLE ENERGIZES "MAIN OR STAND-BY" HOT WATER CIRCULATOR AS SELECTED BY SWITCH "S1" ON CONTROL PANEL DOOR. WHEN CIRCULATOR PUMP IS ENERGIZED THRU RELAYS "R4" OR "R5" THE HEAT EXCHANGER MOTORIZED VALVES ARE POWERED AND THE RESET CONTROL "RC" IS PLACED IN OPERATION.
 - NIGHT OPERATION: TIME CLOCK "TC" ON "NIGHT" CYCLE STOPS CIRCULATOR PUMP, CLOSES THE STEAM VALVES, AND STOPS ALL UNITS ENERGIZED BY CLOCK. WHEN HOT WATER LINES TO UNIT HEATERS COOL, THE SURFACE AQUASTAT "ST" BREAKS THE CIRCUIT TO STOP UNIT HEATER FANS. NIGHT LOW-LIMIT THERMOSTAT "NT" WILL OVERRIDE "TC" POSITION OF TIME CLOCK "TC" AND RETURN SYSTEM TO OPERATION TO MAINTAIN A MINIMUM LOW TEMPERATURE OF 50°.

- HOT WATER RESET CONTROL: RESET CONTROL "RC" POSITIONS STEAM VALVES "V4" & "V5" IN SEQUENCE TO MAINTAIN HOT WATER SUPPLY TEMPERATURE IN ACCORDANCE WITH OUTDOOR TEMPERATURE. RE: FOR EVERY ONE DEGREE DROP IN OUTDOOR TEMPERATURE FROM 68° THE HOT WATER SUPPLY TEMPERATURE IS INCREASED TWO DEGREES FROM INITIAL SET POINT UP 90°. SETPOINTS - MAIN 68°, AUXILIARY 80°, RATIO 1:2.
- UNIT HEATER CONTROL: WITH HOT WATER CIRCULATING AS SENSED BY SURFACE AQUASTATS "ST" THERMOSTATS "T1, T2, & T12" ENERGIZE UNIT HEATER FANS ON A DROP IN SPACE TEMPERATURE BELOW ITS SETPOINT (60°).
- ENGINE EXHAUST: WHEN ENGINE EXHAUST FANS (UF) ARE MANUALLY STARTED, VENTILATION FANS (V) ARE ENERGIZED AND MOTORS "M5" OPEN OUTSIDE AIR INTAKE DAMPERS. THERMOSTATS "T8" ARE PLACED IN CONTROL OF FACE & BYPASS DAMPER MOTORS "M8" TO POSITION DAMPERS TO MAINTAIN 60° DISCHARGE AIR TEMPERATURE. FREEZESTATS "FR7" STOP VENTILATION FANS AND CLOSE OUTDOOR AIR INTAKE DAMPER SHOULD DISCHARGE AIR DROP BELOW 36°.
- ILF-1, ILF-2, REF-2, AND WEF-1 & 2:
 - WINTER: SWITCH "S3" TO "WINTER" POSITION AND TIME CLOCK "TC" ON "DAY" CYCLE ENERGIZES RELAY "R8" WHICH STARTS VENTILATION FAN "V12" AND ENERGIZES MOTOR "M6" WHICH OPENS "WINTER" DAMPER. SUMMER DAMPER REMAINS CLOSED. THERMOSTAT "T10" POSITIONS FACE & BYPASS MOTOR "M10" TO MAINTAIN DISCHARGE AIR TEMPERATURE OF 60°. FREEZESTAT "FR5" STOPS FAN AND CLOSES "WINTER" DAMPER SHOULD DISCHARGE AIR DROP BELOW 36°.

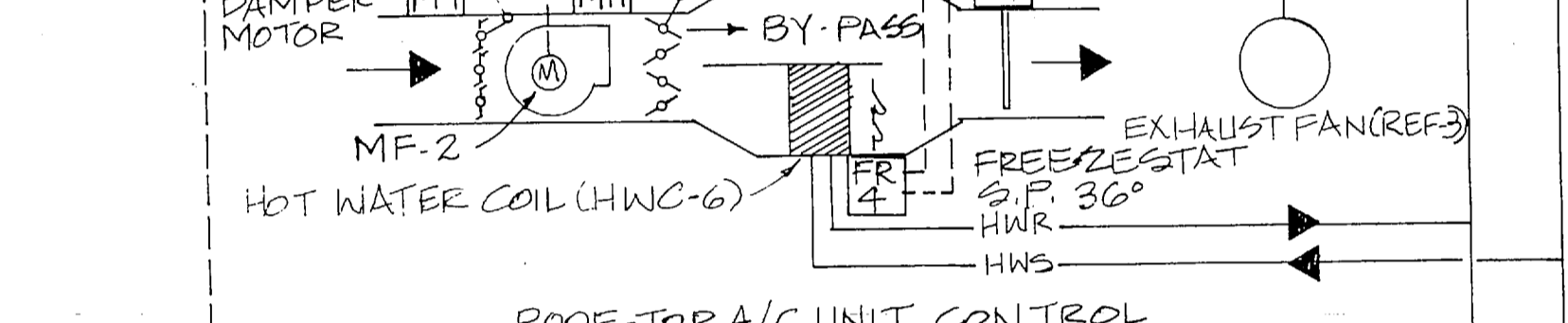
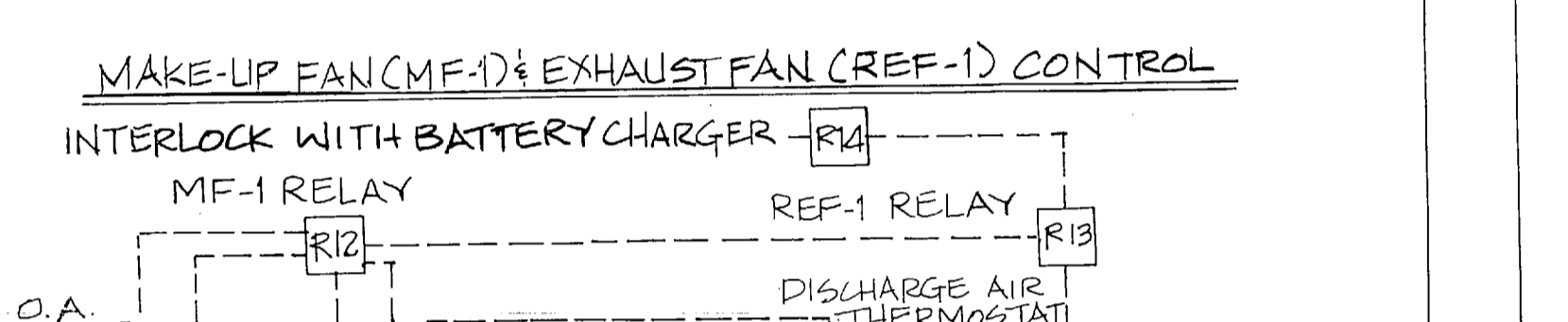
- MF-1 AND REF-1: WHEN BATTERY CHARGER IS IN OPERATION, RELAY "R14" ENERGIZES TO START EXHAUST FAN "REF-1" AND MAKE-UP FAN "MF-1". RELAY "R12" ENERGIZES MOTOR "M4" TO OPEN OUTDOOR AIR INTAKE DAMPER AND TO PLACE THERMOSTAT "T9" IN CONTROL OF FACE & BYPASS MOTOR "M8". MOTOR IS POSITIONED BY "T9" TO MAINTAIN DISCHARGE AIR TEMPERATURE OF 60°. FREEZESTAT "FR6" STOPS MAKE-UP FAN "MF-1" AND CLOSES OUTDOOR AIR INTAKE DAMPER "M4" SHOULD DISCHARGE AIR TEMPERATURE DROP TO 36°.
- MF-2 AND REF-3: SWITCH "S2" TO "ON" POSITION ENERGIZES RELAY "R15" TO START EXHAUST FAN "REF-3". RELAY "R16" ENERGIZES MOTOR "M9" TO OPEN OUTDOOR AIR INTAKE DAMPER AND PLACE THERMOSTAT "T11" IN CONTROL OF FACE AND BYPASS MOTOR "M11". MOTOR IS POSITIONED BY "T11" IN CONTROL OF FACE DISCHARGE AIR TEMPERATURE OF 60°. FREEZESTAT "FR4" STOPS MAKE-UP FAN "MF-2" AND CLOSES OUTDOOR AIR INTAKE DAMPER "M9" SHOULD DISCHARGE AIR TEMPERATURE DROP TO 36°.
- FINNED TUBE RADIATION: THERMOSTATS "T6" ENERGIZE VALVES "V6" TO OPEN ON A CALL FOR HEAT IN AREAS SERVED BY FINNED TUBE RADIATION.

- ROOFTOP A/C UNIT, AHU-1 AND AHU-2:
 - HEATING: THERMOSTATS "T1-T3" ARE PLACED IN CONTROL OF THEIR RESPECTIVE UNITS BY DAY-NITE RELAYS "R1-R3" WHICH ARE ENERGIZED BY TIME CLOCK "TC" ON DAY CYCLE. WHEN SPACE TEMPERATURE DROPS TO 68°, THERMOSTATS "T1-T3" OPEN THEIR RESPECTIVE VALVES "V1-V3". THE UNIT FAN ENERGIZES ON A CALL FOR HEAT AND STOPS WHEN SPACE TEMPERATURE IS SATISFIED. FREEZESTATS "FR1-FR3" STOP THEIR RESPECTIVE UNIT FAN WHEN DISCHARGE AIR TEMPERATURE DROPS TO 36°.
 - COOLING: THERMOSTATS "T1-T3" ARE PLACED IN CONTROL OF THEIR RESPECTIVE UNITS BY DAY-NITE RELAYS "R1-R3" WHICH ARE ENERGIZED BY TIME CLOCK "TC" ON DAY CYCLE. WHEN SPACE TEMPERATURE RISES TO 78°, THERMOSTATS "T1-T3" ENERGIZE THE MECHANICAL COOLING OF EACH UNIT. THE UNIT FAN OPERATES CONTINUOUSLY DURING DAY CYCLE OF OPERATION.
- CLOCK OVERRIDE: TIME CLOCK "TC" ON "NIGHT" CYCLE STOPS ALL UNITS AND PLACES OVERRIDE SWITCH "S4" IN CONTROL, WHICH WILL MANUALLY RETURN SYSTEM TO OPERATION FOR ANY PERIOD OF TIME UP TO SIX HOURS.
- FREEZE PROTECTION: TIME CLOCK "TC" ON "NIGHT" CYCLE AND OUTDOOR TEMPERATURE DROPS BELOW SETTING OF THERMOSTAT "T14" (35°F), CIRCULATING PUMP "P1" OPERATES SHALL START AS SELECTED BY SWITCH "S5". STEAM VALVES "V4" & "V5" WILL CLOSE DURING THIS CYCLE TO PREVENT SURFACE AQUASTAT FROM ENERGIZING ALL UNIT HEATERS.

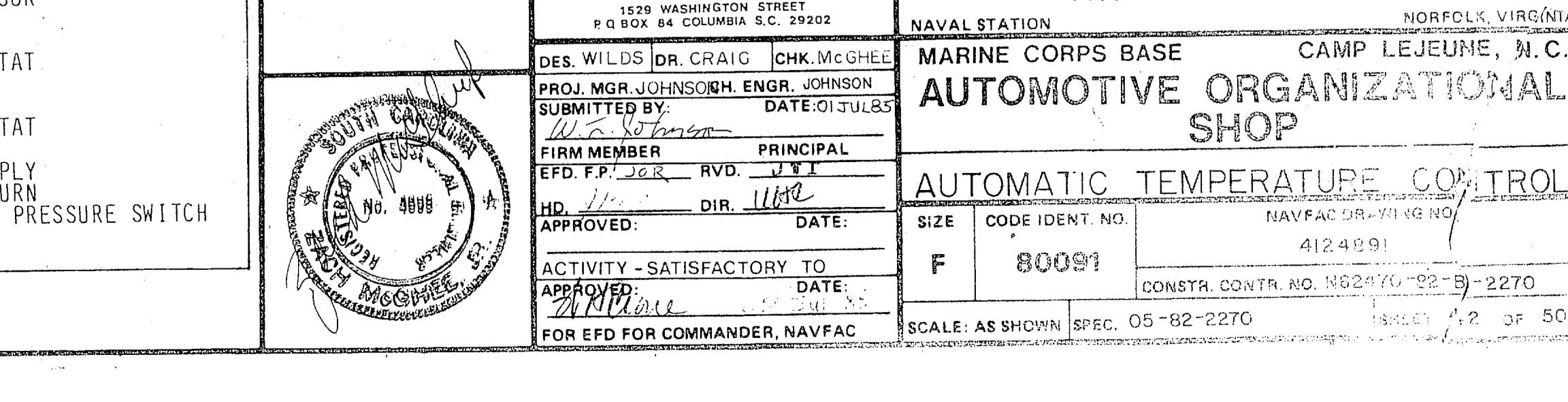
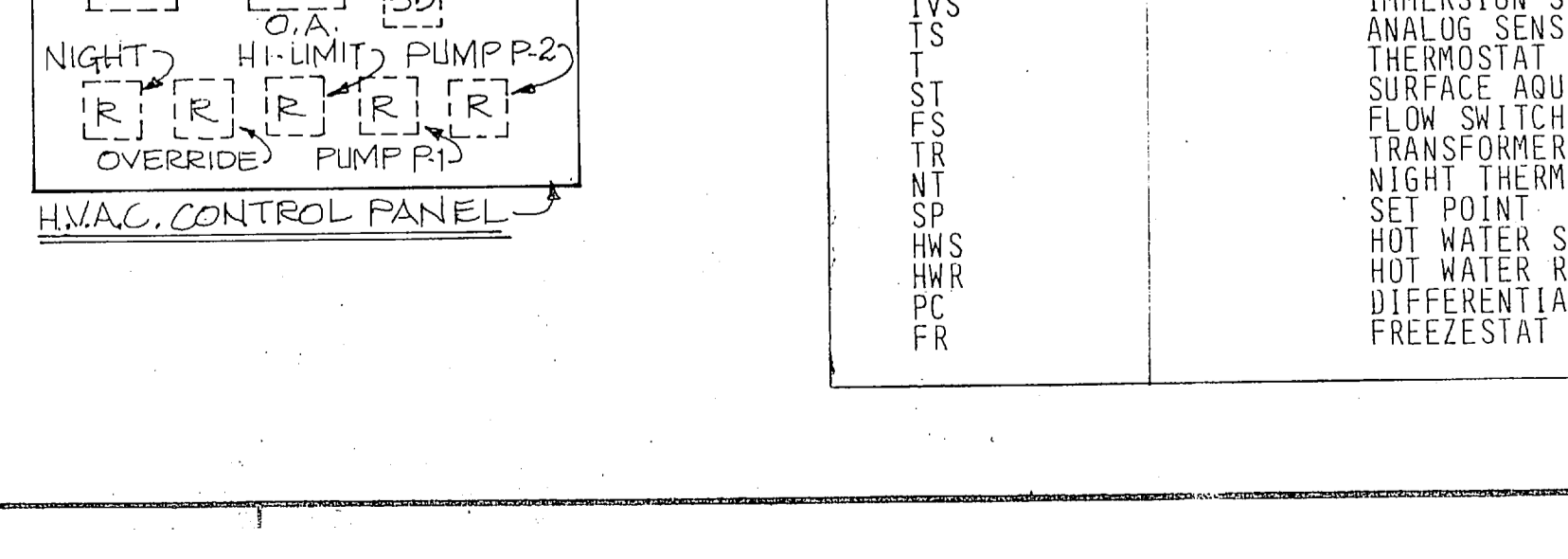
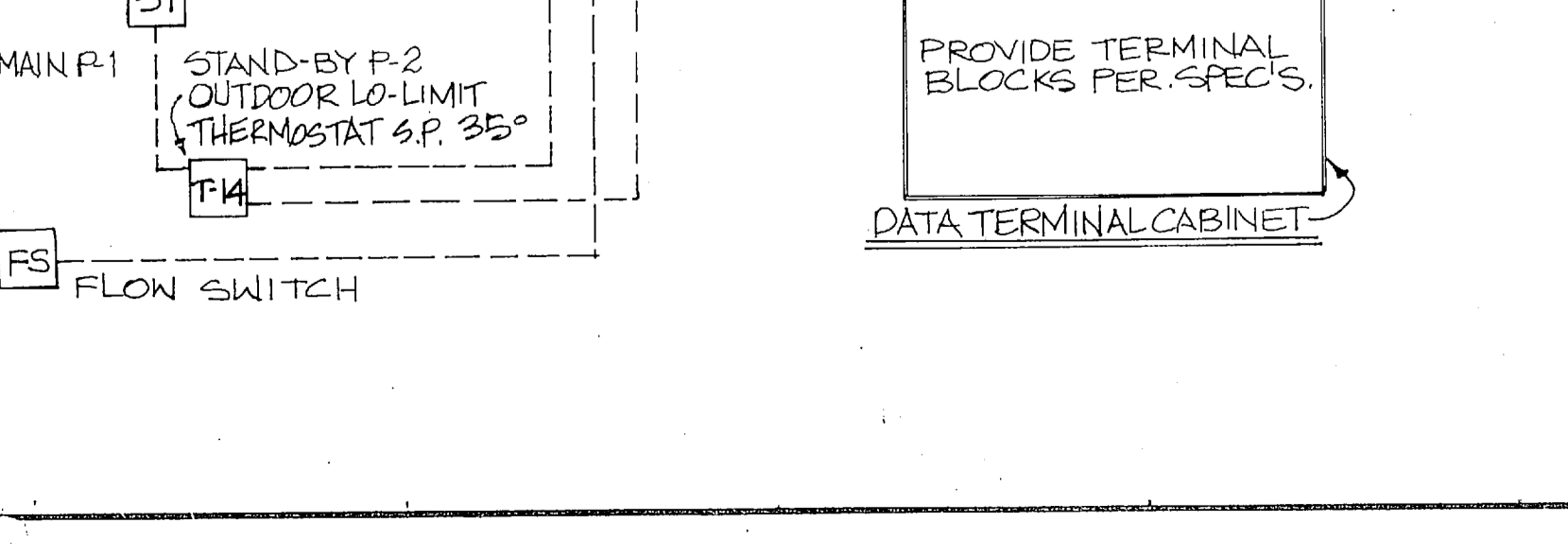
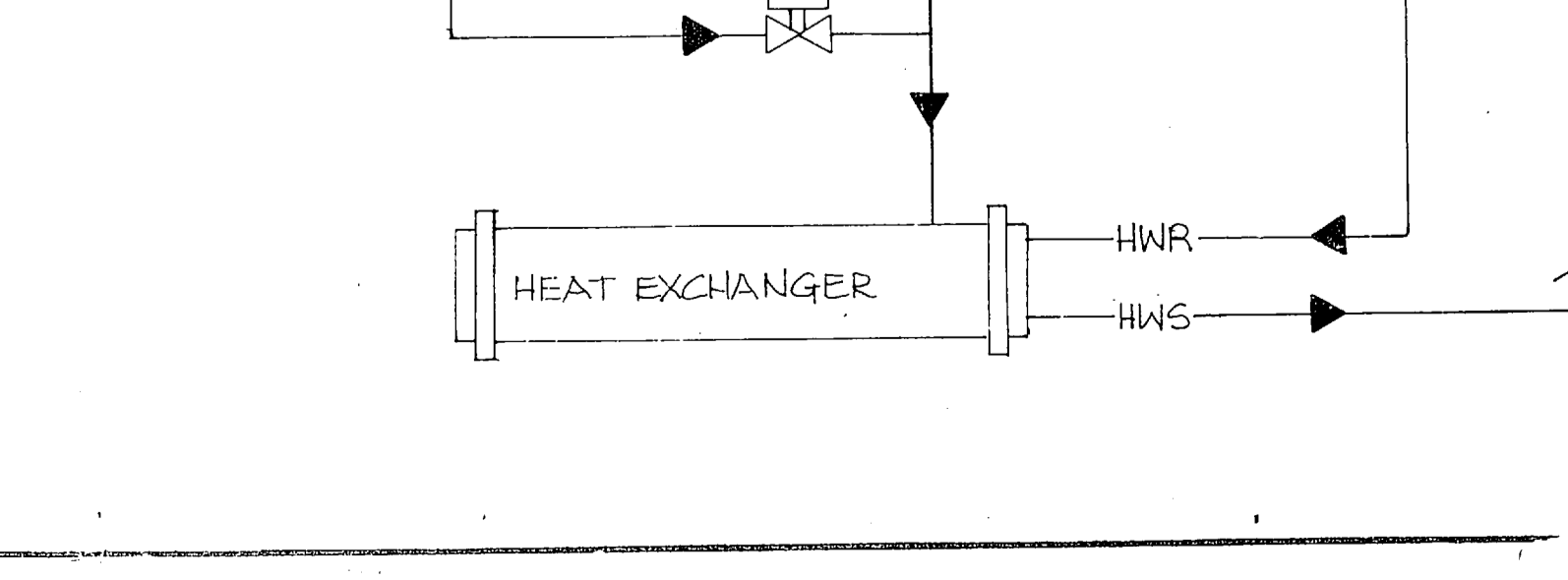
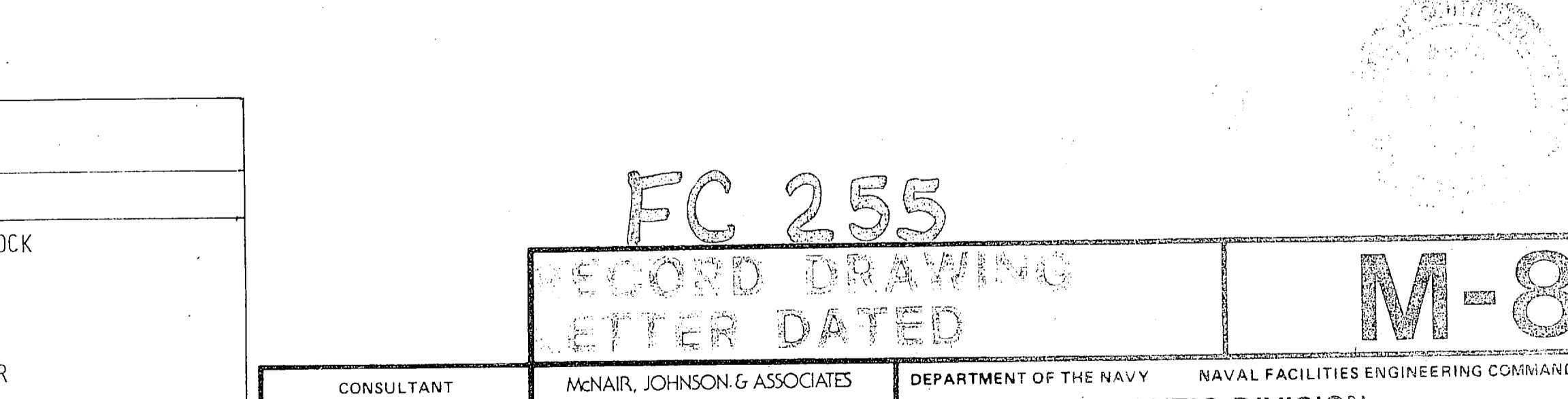
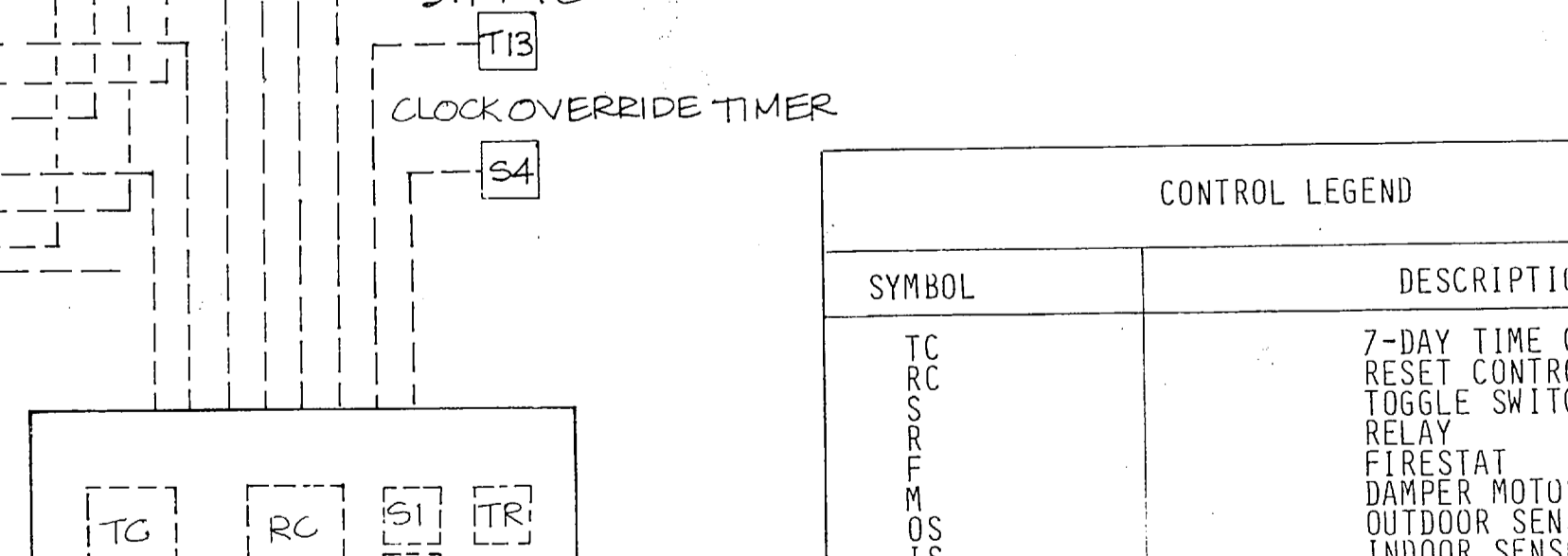
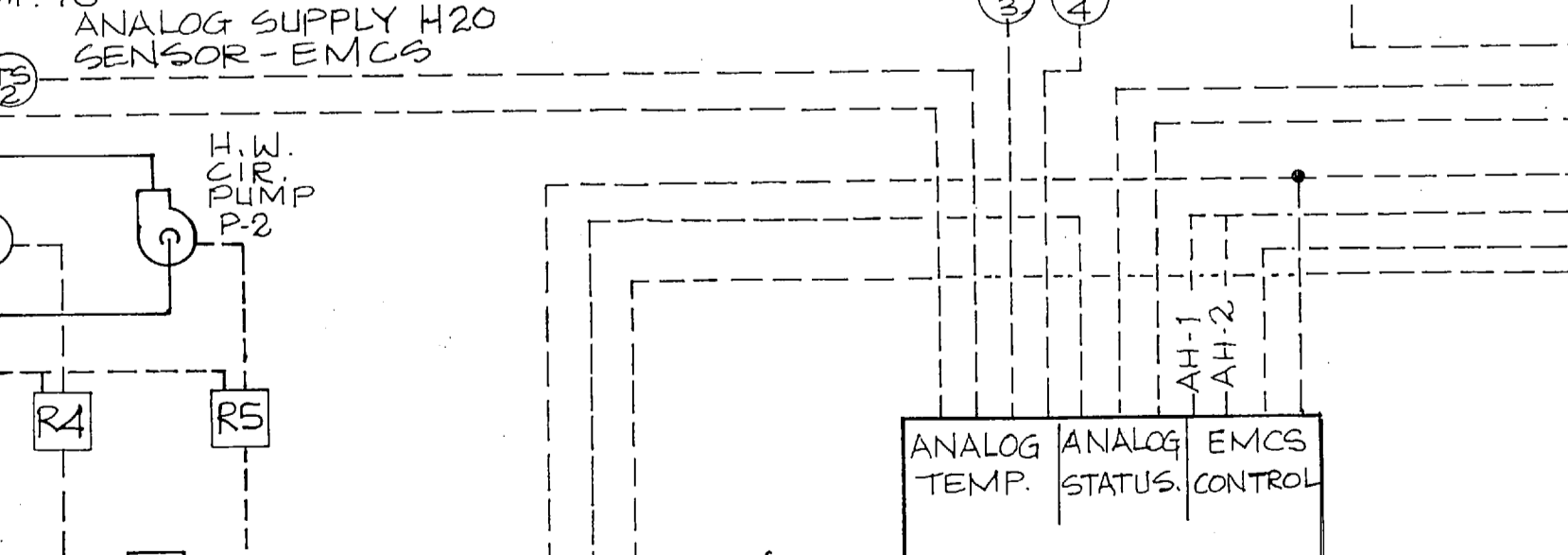
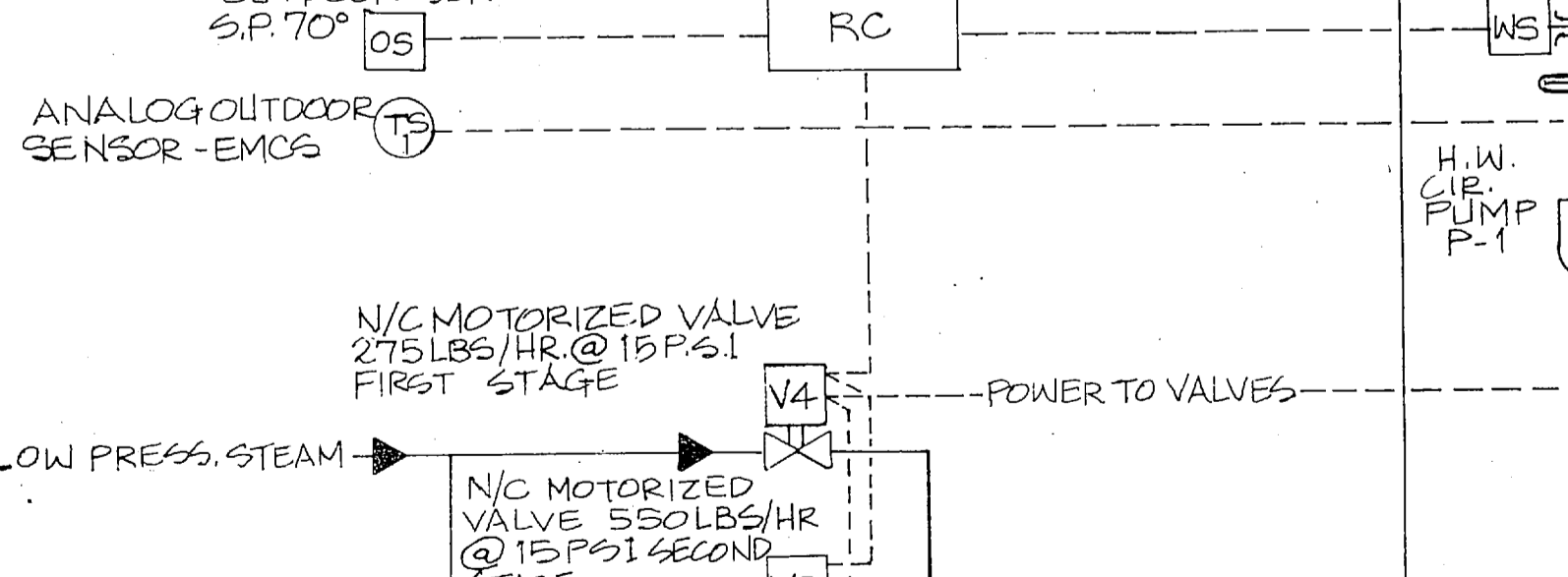
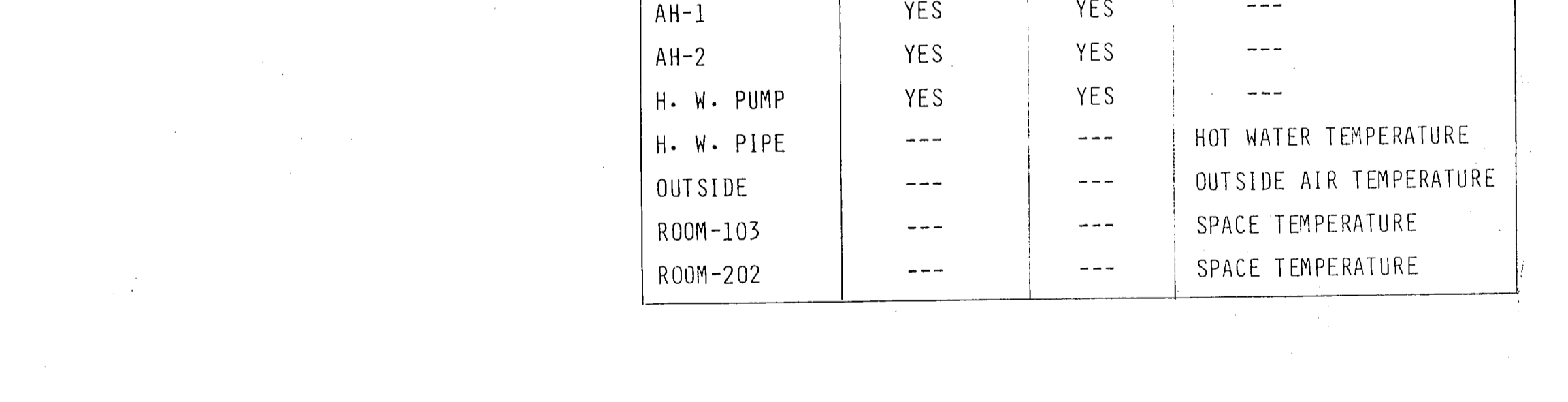
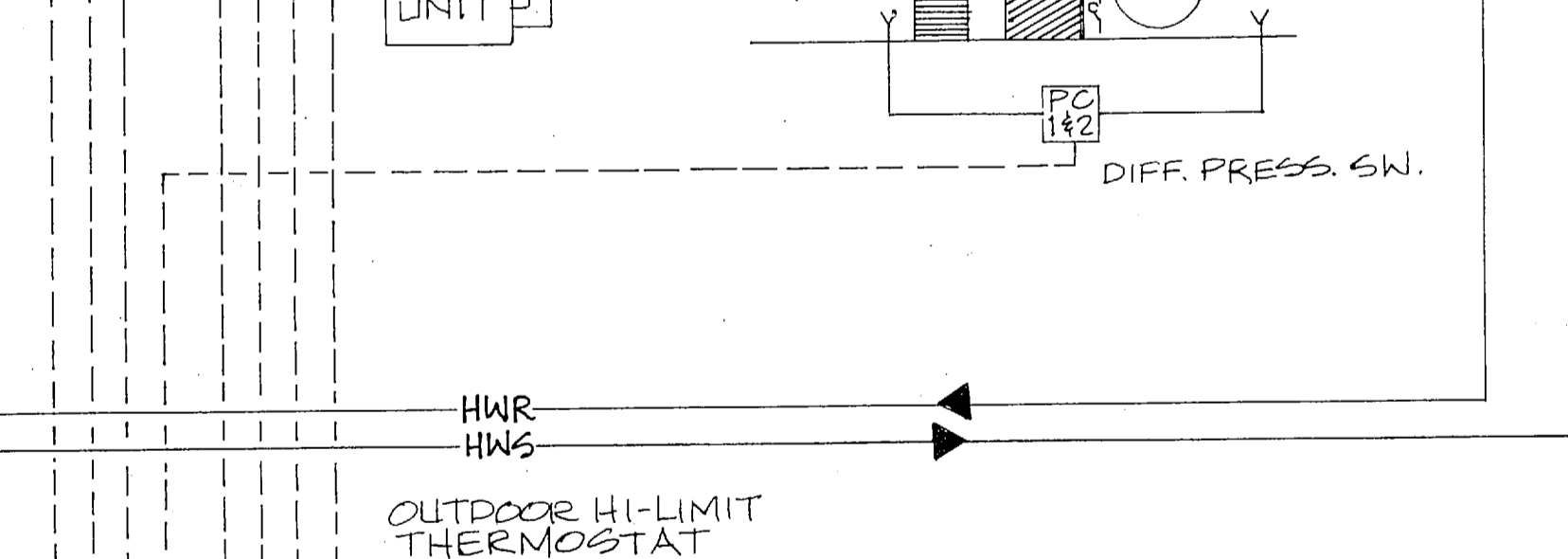
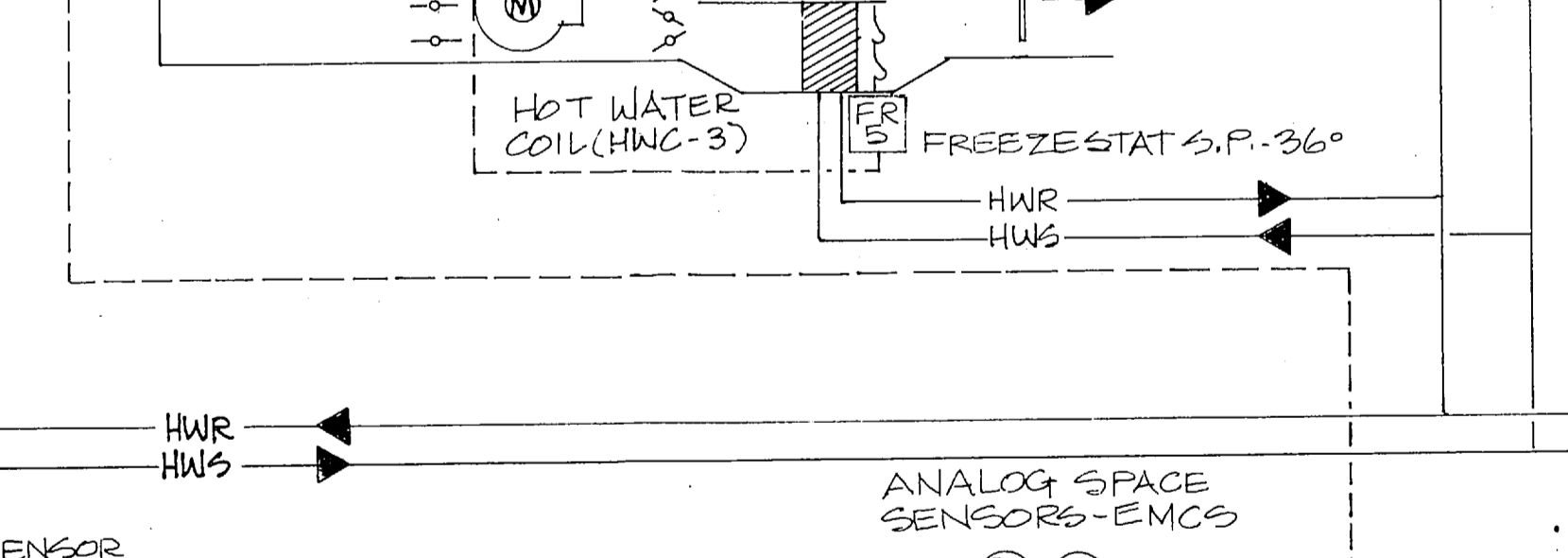
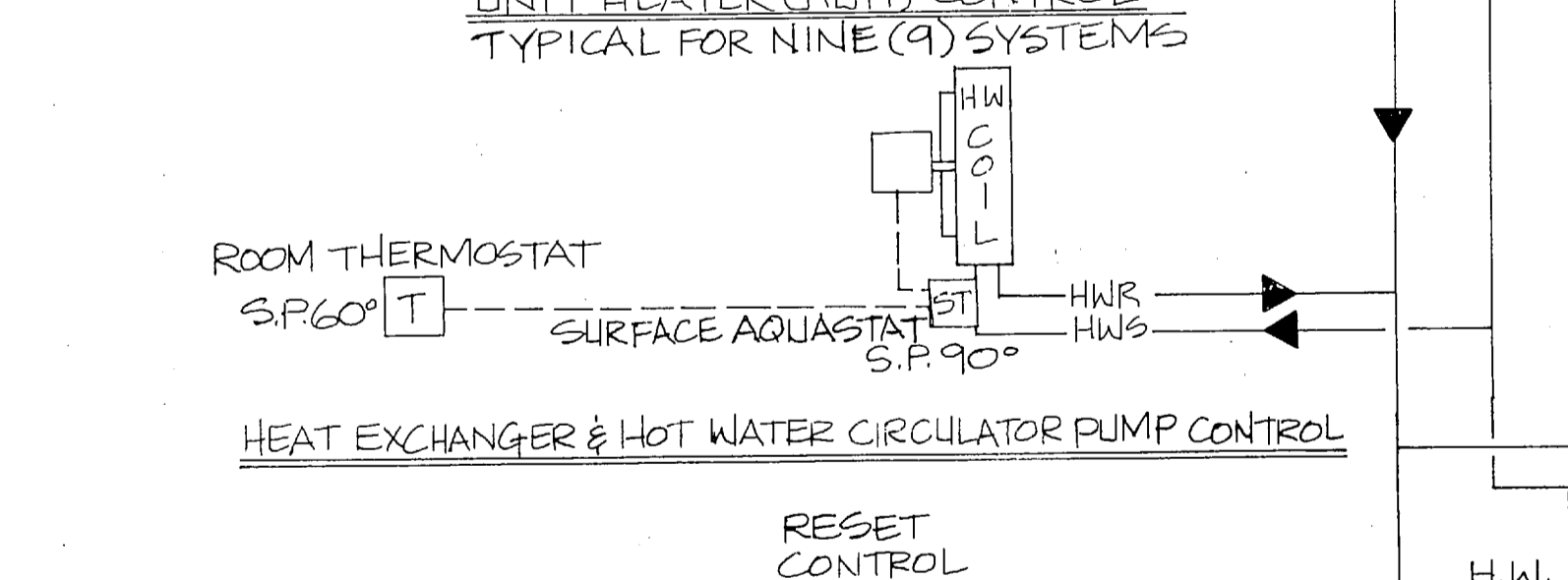
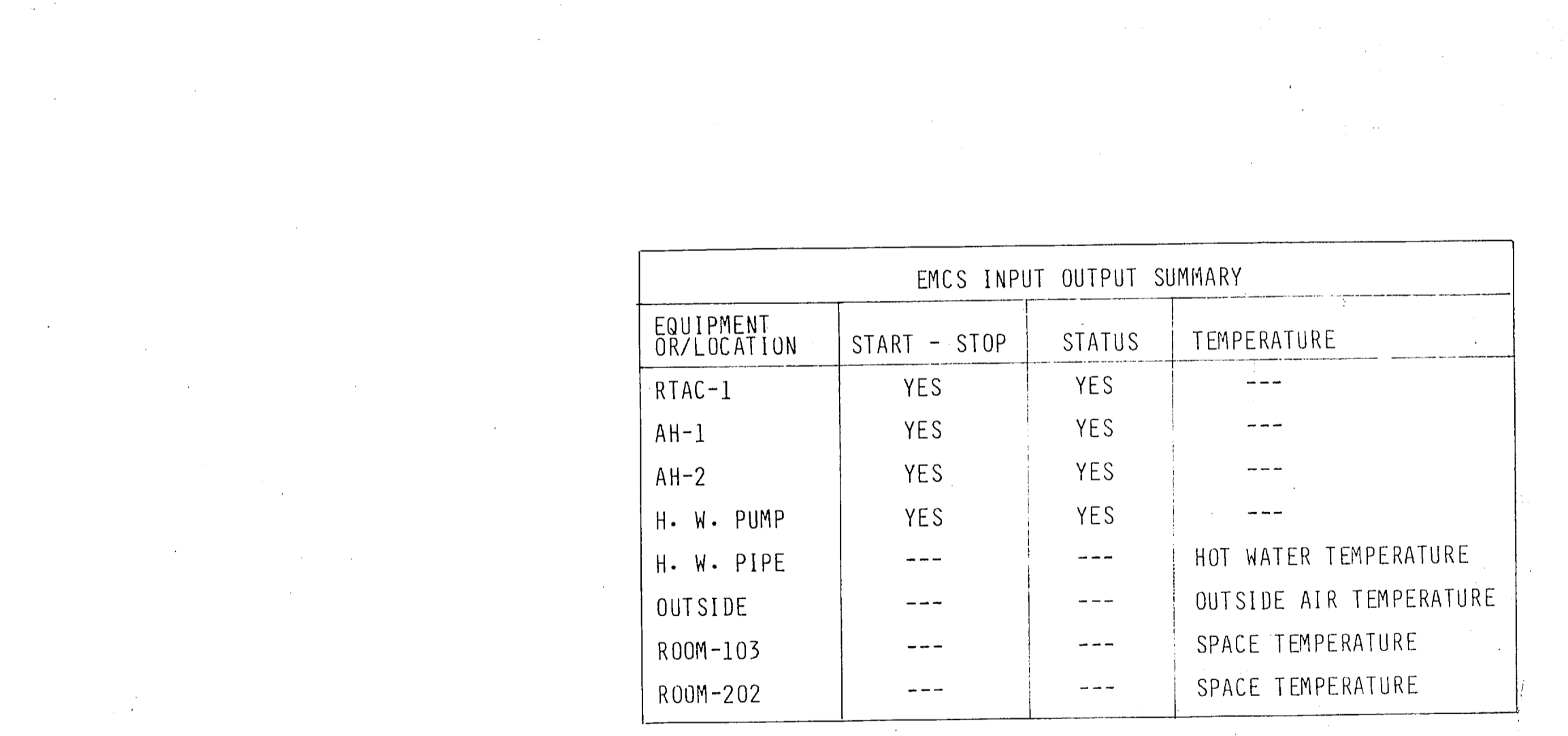
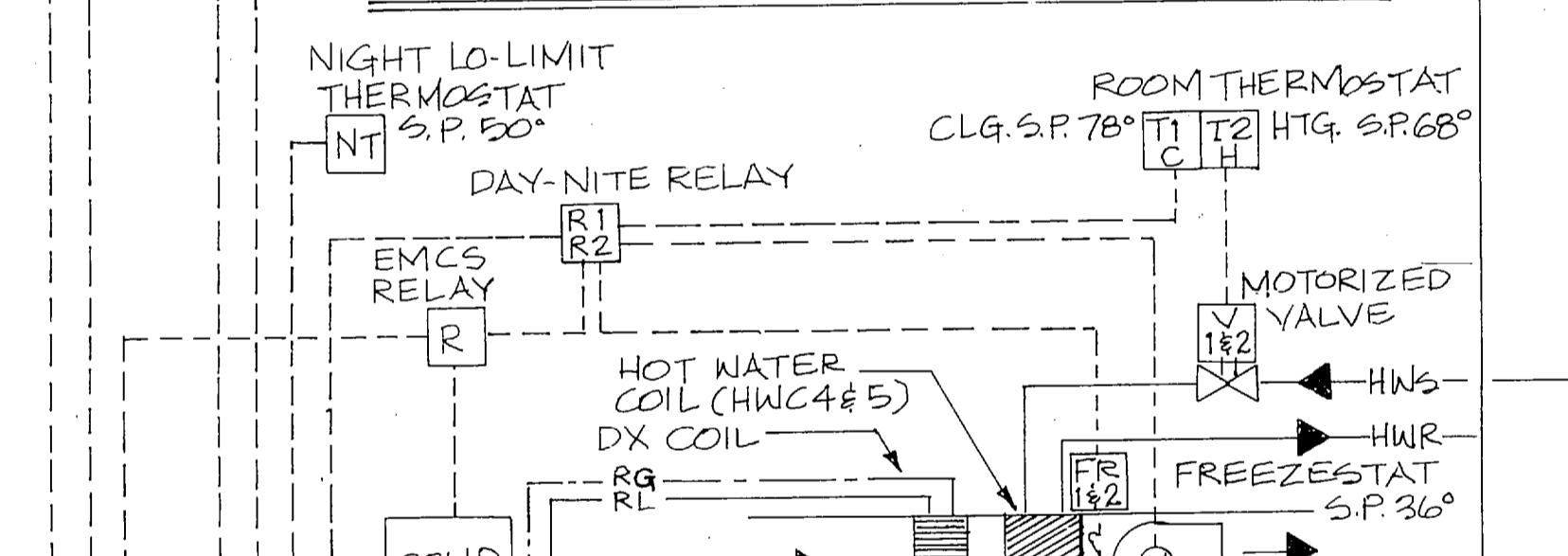
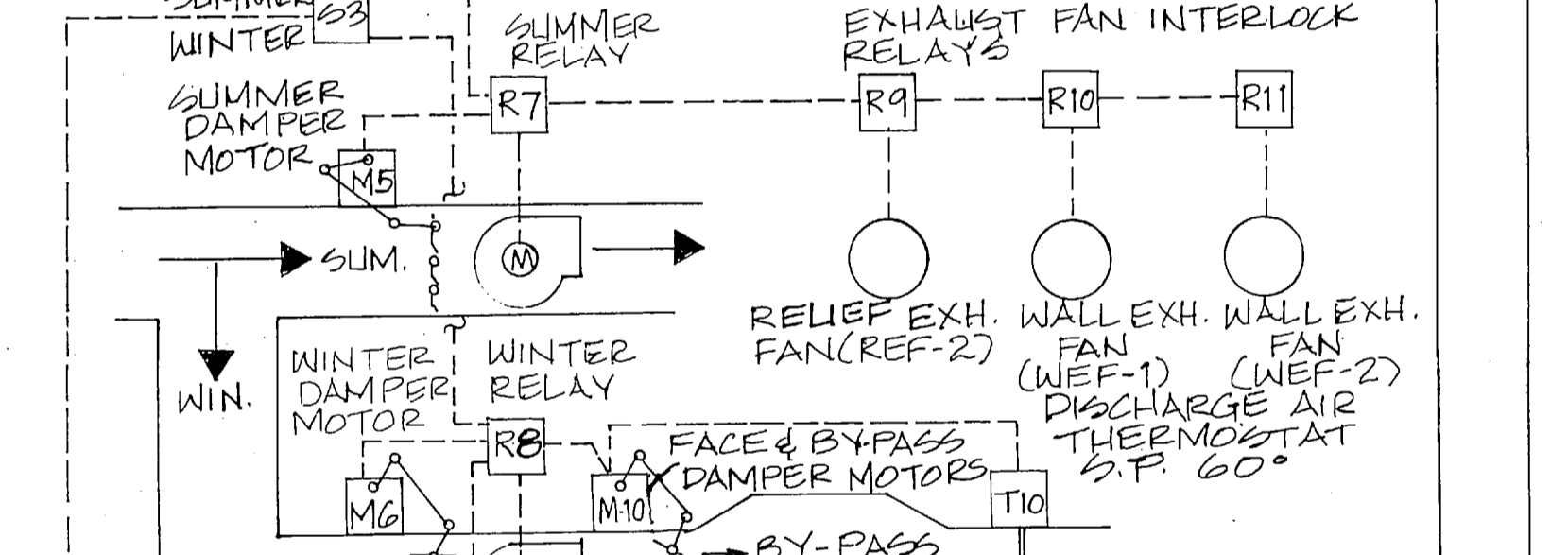
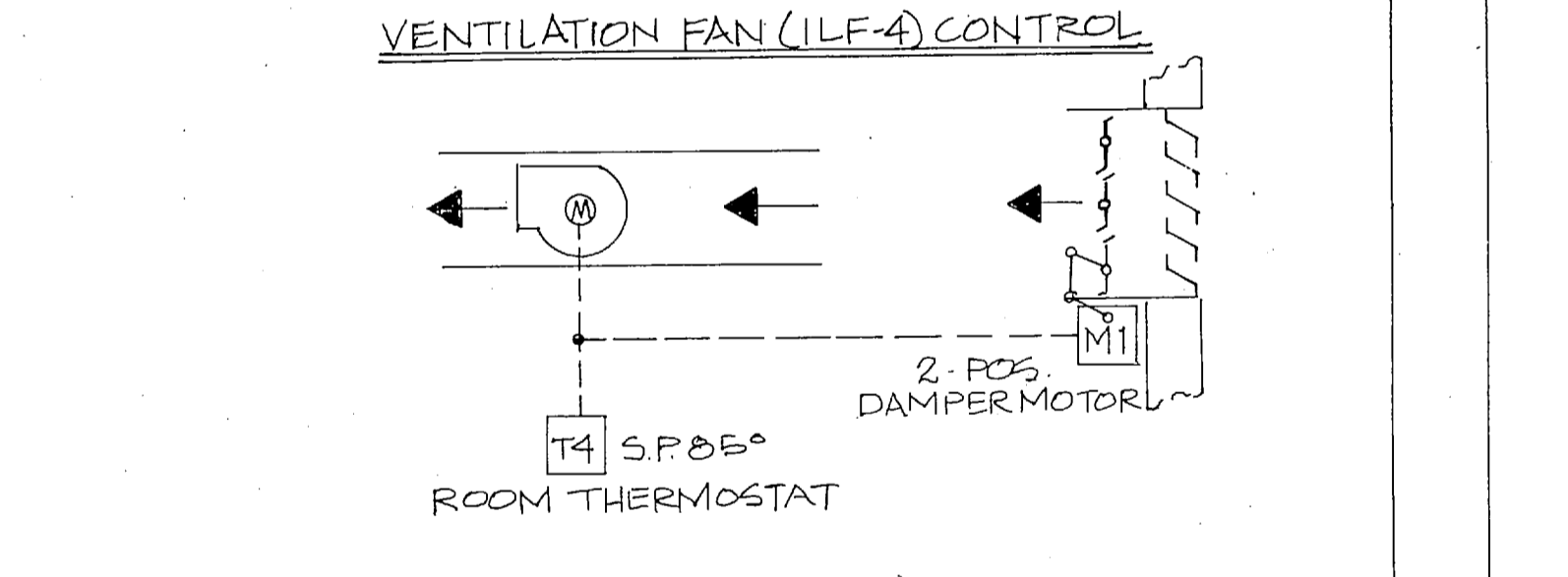
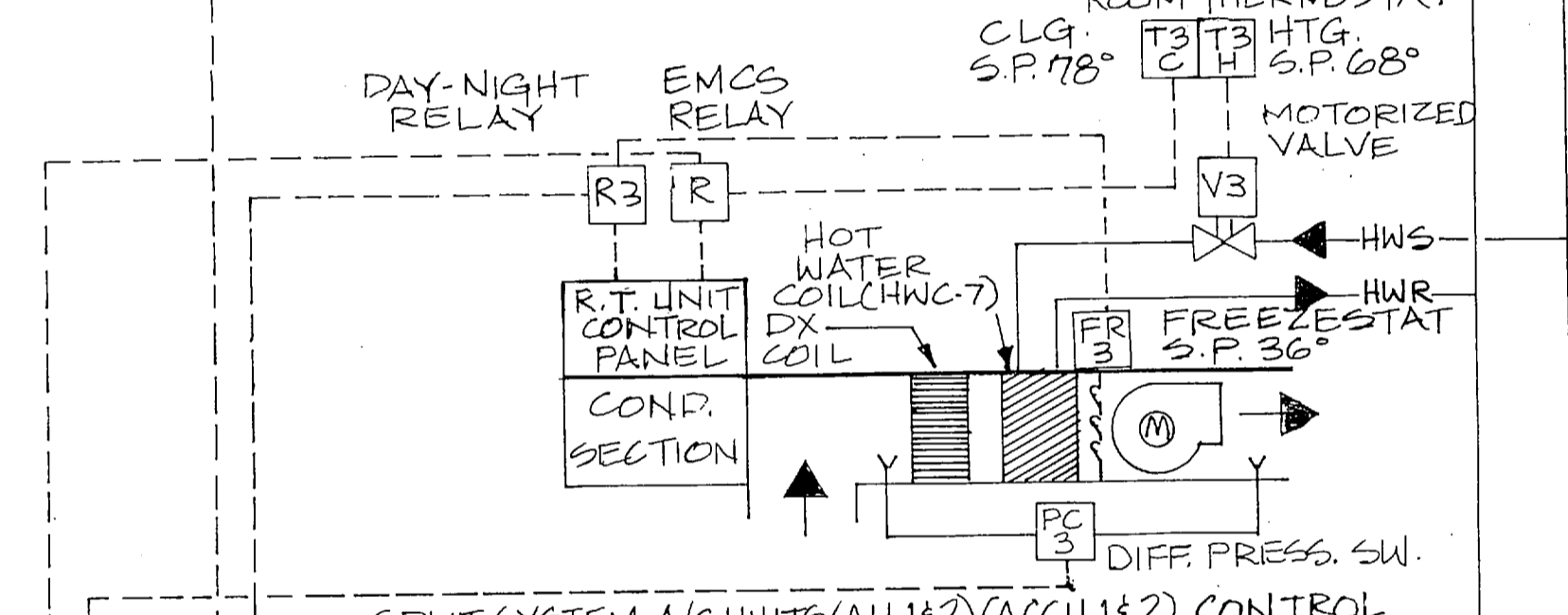
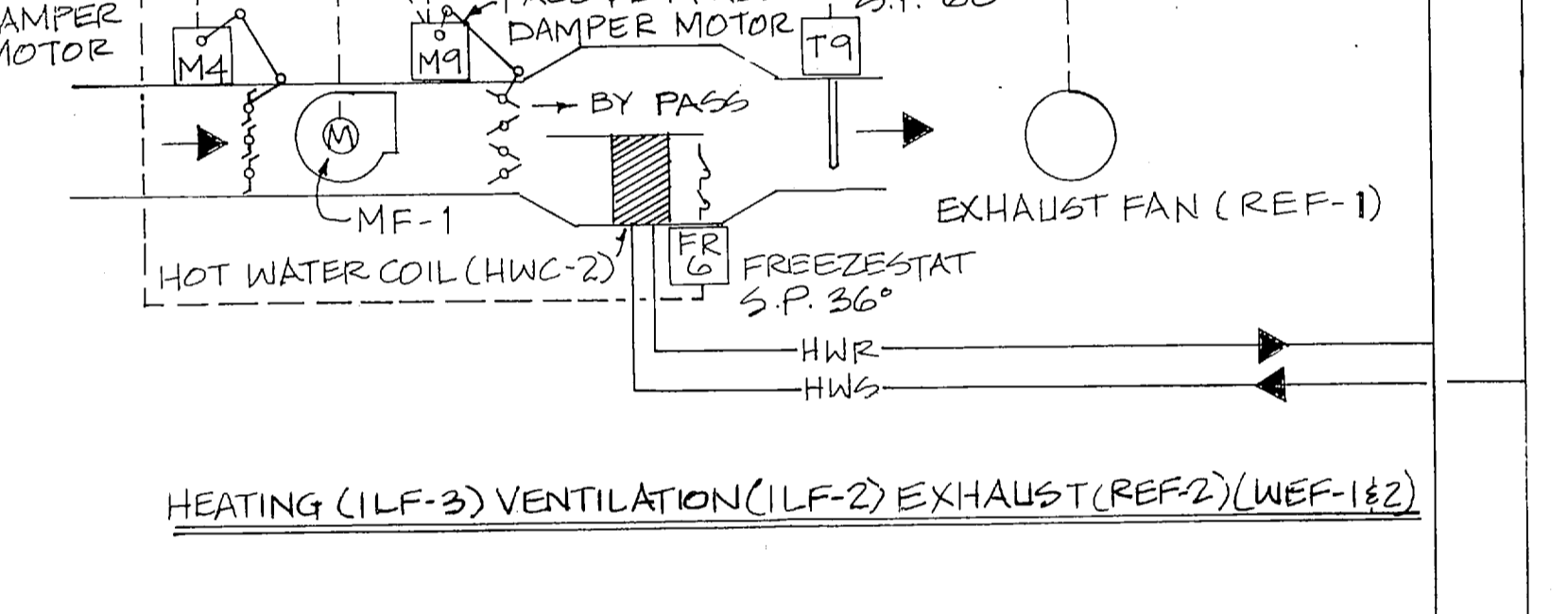
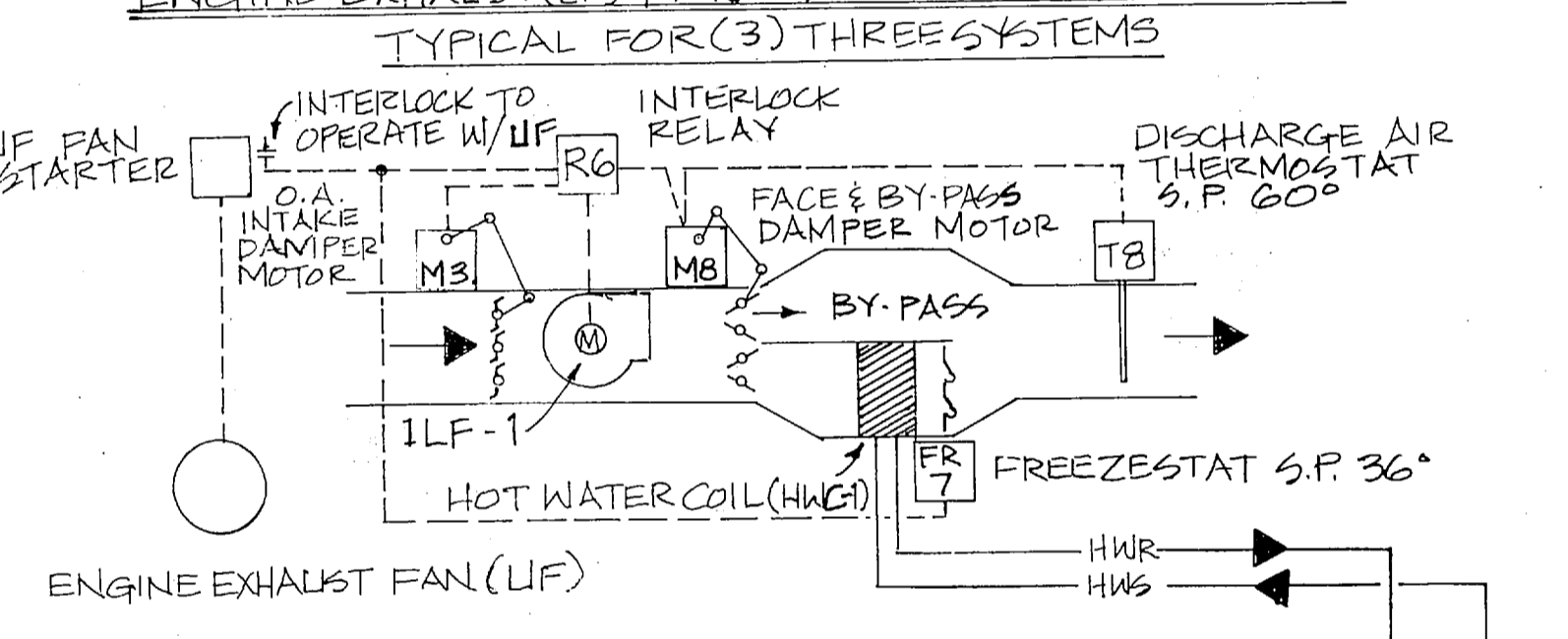
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	AS BUILT, NO CORRECTION	4/17/84	EVJ



SYMBOL	DESCRIPTION	SETTING	2-POS.	MOD.	DIFF.	T.R.	FUNCTION
TC	7-DAY TIME CLOCK	PER SCHEDULE					START/STOP OF SYSTEM
RC	H.W. RESET CONTROL	MAIN-70° AUX-90°					POSITIONS VALVES "V4" & "V5"
S1	SPDT SWITCH	PUMP-1/PUMP-2					PUMP ALTERNATOR SWITCH
S2	SPDT SWITCH	ON-OFF					START/STOP REF-3 & MF-2
S3	SPDT SWITCH	SUMMER/WINTER					CLG./HTG. FOR ILF-2 & ILF-3
S4	6-HR. TIMED OVERRIDE	NORM./OPEN					OVERRIDE NIGHT (OFF) CYCLE OF TIME CLOCK "TC"
S5	SINGLE POLE 3-POS. FREEZESTAT	ADJUSTABLE 36° MAN. RESET					HEAT-AUTO-COOL SYSTEM SWITCH
FR	DIFF. PRESS. SWITCH	0.2" W.C.				0-5	FREEZE PROTECTION
ST	SURFACE AQUASTAT	90°				10°	UNIT HEATER CONTROL
OS	OUTDOOR SENSOR	70°					RESET CONTROL SENSOR
M5	HOT WATER MOTOR	NORM./CLOSED					OPEN INTAKE DAMPERS
M8-M11	DAMPER MOTOR	NORM./CLOSED					FACE & BYPASS MOTORS
R	RELAY	NORM./CLOSED					ENERGIZED TO STOP COND. UNIT
R1-R3	SPDT RELAYS	NORM./OPEN					ENERGIZED TO START UNITS
R4, R5	SPDT RELAY	NORM./OPEN					STARTS H.W. CIRCULATING PUMPS
R6	DPST RELAY	NORM./OPEN					ENERGIZES "M8" & PLACES "T8"
R7	DPST RELAY	NORM./OPEN					IN CONTROL OF "M8"
R8	DPST RELAY	NORM./OPEN					STARTS ILF-2 OPENS "M5"
R9-R11	DPST RELAY	NORM./OPEN					STARTS ILF-3 ENERGIZES MOTORS "M6" & "M10"
R12	DPST RELAY	NORM./OPEN					STARTS REF-2 & WEF-1 & 2
R13	DPST RELAY	NORM./OPEN					STARTS ME-1 ENERGIZES "M9"
R14	DPST RELAY	NORM./OPEN					PLACES "S9" IN CONTROL OF "M9"
R15	DPST RELAY	NORM./OPEN					ENERGIZED BY BATTERY CHARGER
R16	DPST RELAY	NORM./OPEN					STARTS REF-3 ENERGIZES "R16"
T	RM. THERMOSTAT	60°				3°	CONTROLS UNIT HEATER FAN
T1-T3	RM. THERMOSTAT	CLG./HTG. 68°				2°	CONTROLS VALVE & COND. UNIT
T4	RM. THERMOSTAT	85°				3°	CONTROLS FAN & DAMPER MOTOR
T5	RM. THERMOSTAT	85°				3°	CONTROLS FAN & DAMPER MOTOR
T6	RM. THERMOSTAT	60°				4°	CONTROLS VALVE "V6"
T7	REMOTE BULB T' STAT	60°				3°	CONTROL UNIT HEATER FAN
T8-T11	DUCT THERMOSTAT	60°				3°	CONTROLS F & BP MOTOR "M8-M11"
T12	REMOTE BULB T' STAT	60°				4°	CONTROLS UNIT HEATER FAN
T13	REMOTE BULB T' STAT	70°				3°	CONTROLS WINTER CHANGEOVER HEATING AHU & 2, RIU-1
V1-V3	H-W. VALVE	NORM./CLOSED					HOT WATER GENERATOR
V4, V5	STEAM VALVE	NORM./CLOSED				10°	BASEBOARD HEATER VALVE
V6	H-W. VALVE	NORM./CLOSED					OUTDOOR ANALOG SENSOR
WS	ANALOG SENSOR	VARIABLE					HOT WATER ANALOG SENSOR
TS	ANALOG SENSOR	VARIABLE					ROOM ANALOG SENSOR
TS1	ANALOG SENSOR	VARIABLE					ROOM ANALOG SENSOR
TS2	ANALOG SENSOR	VARIABLE					ROOM ANALOG SENSOR
TS3	ANALOG SENSOR	VARIABLE					ROOM ANALOG SENSOR
TS4	ANALOG SENSOR	VARIABLE					ROOM ANALOG SENSOR

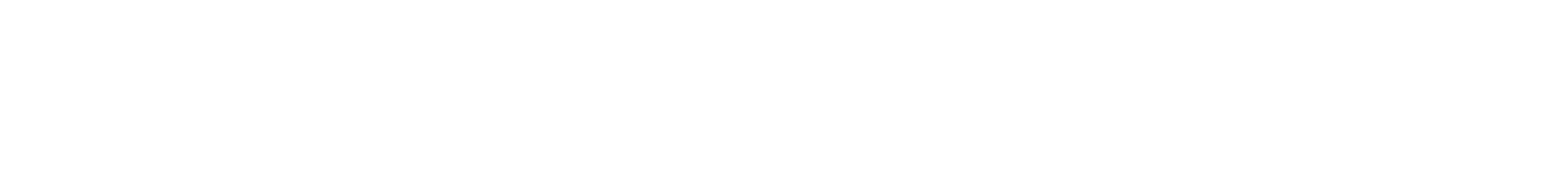
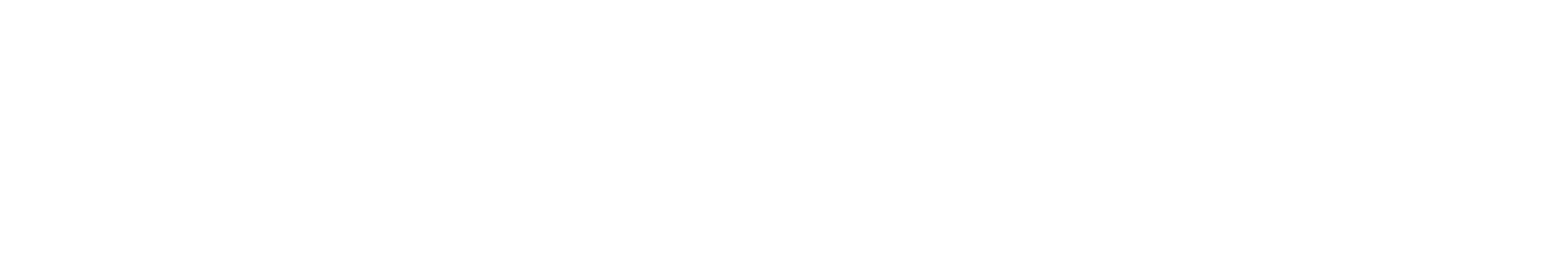
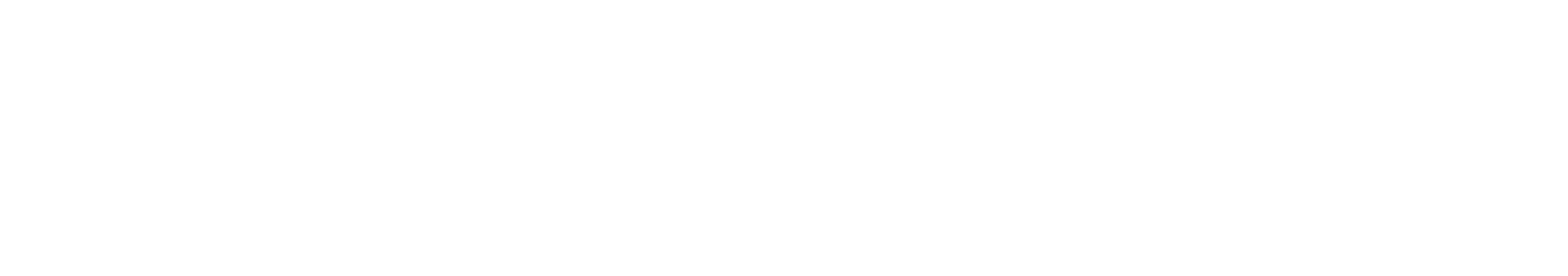
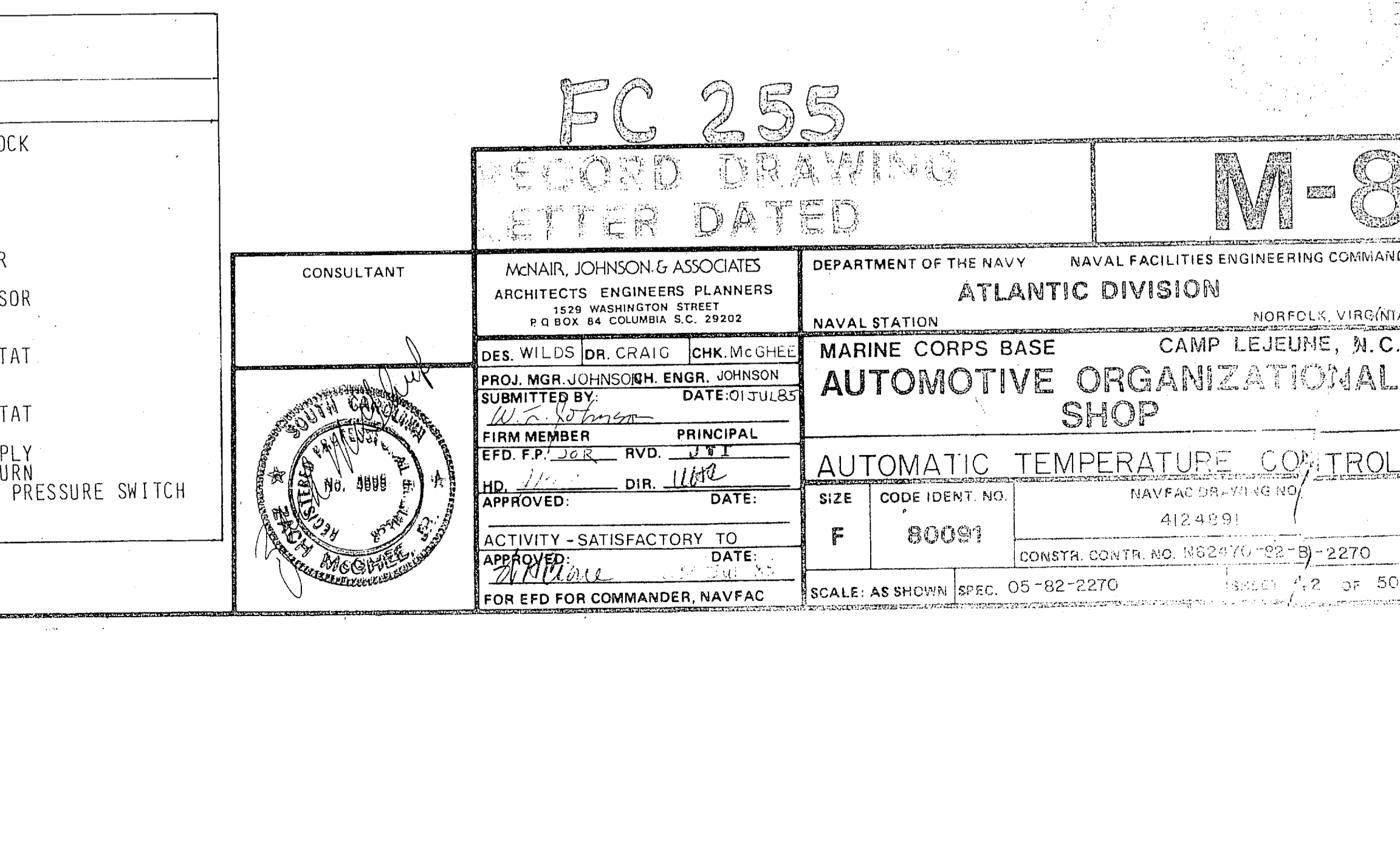
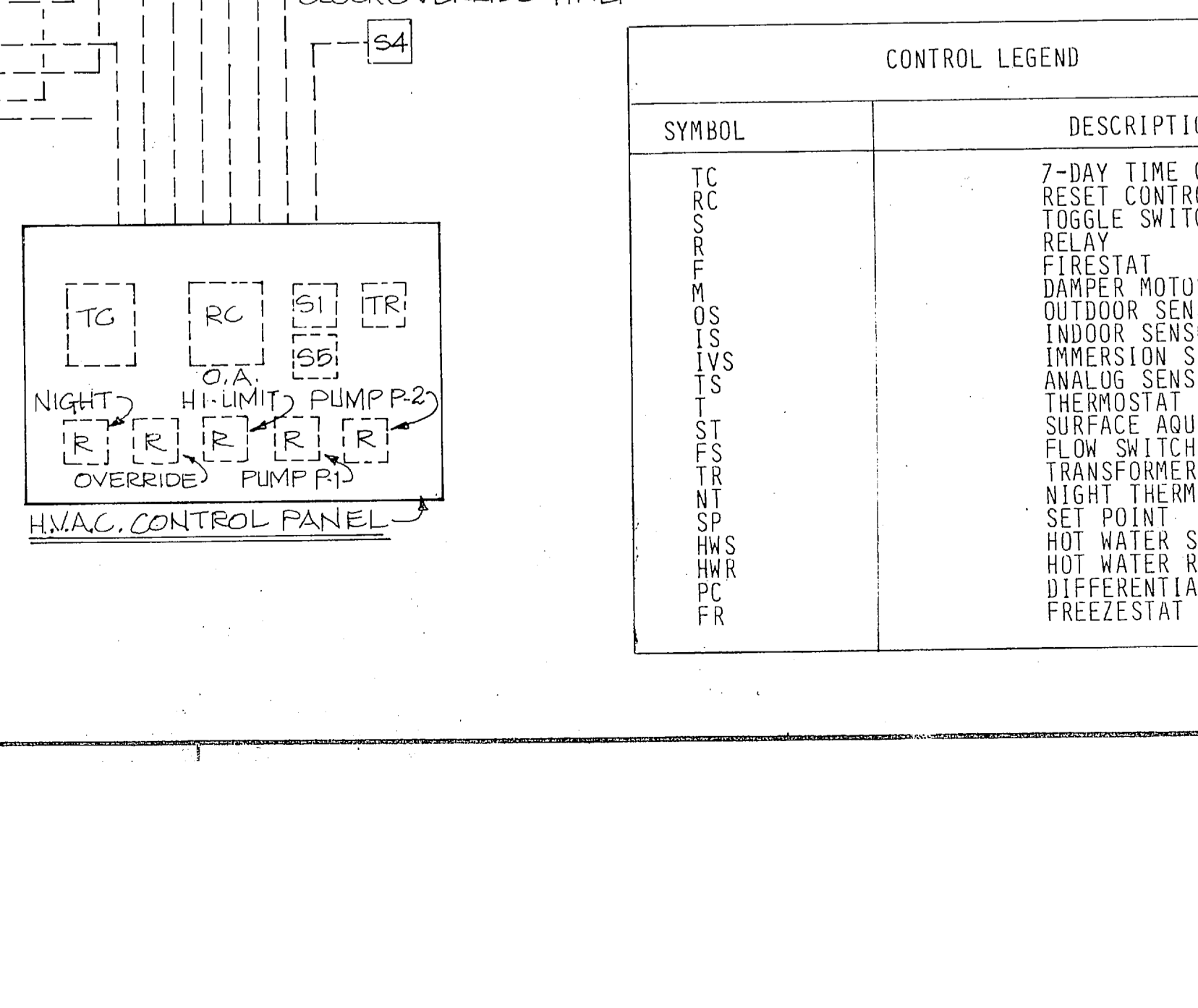
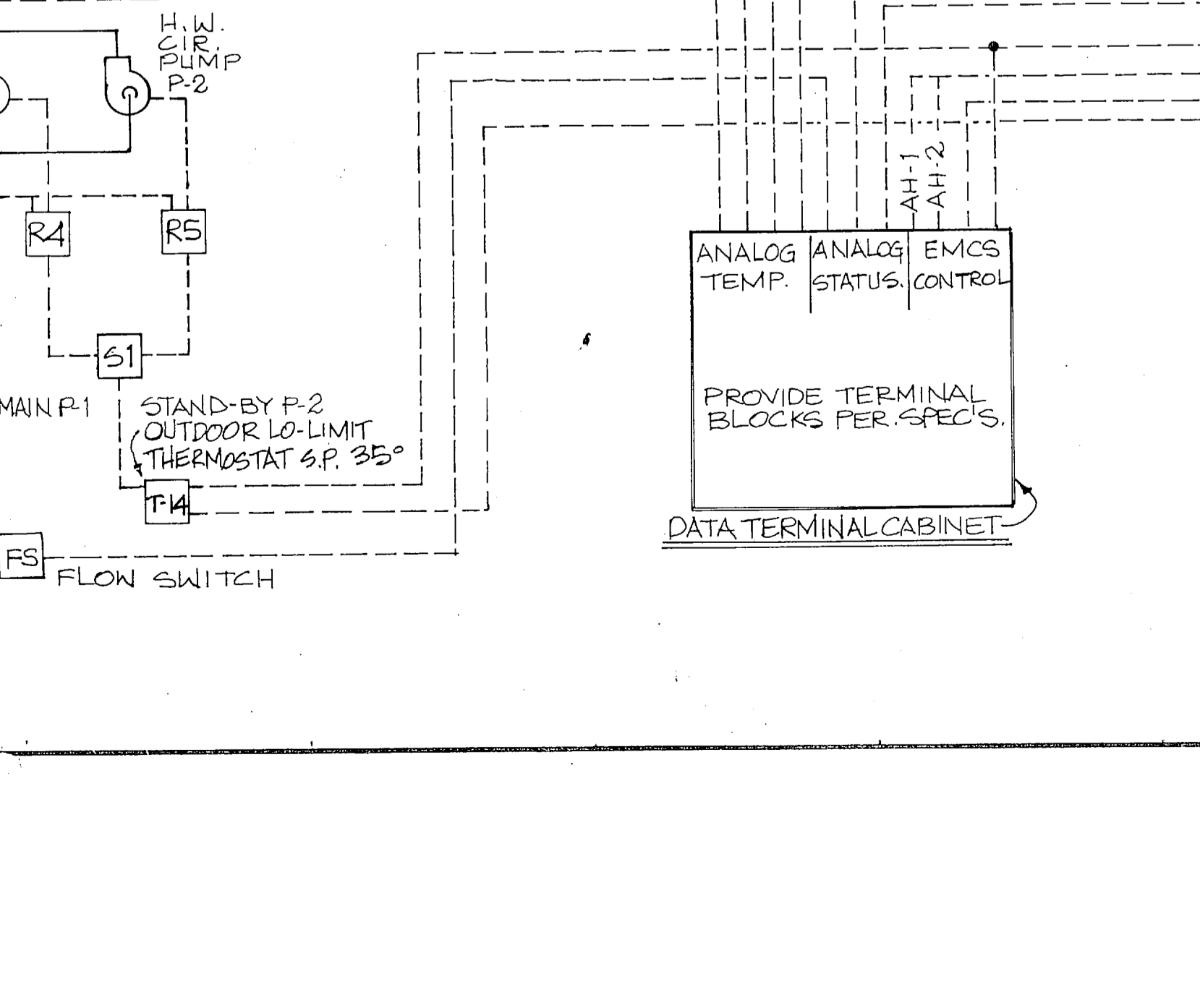
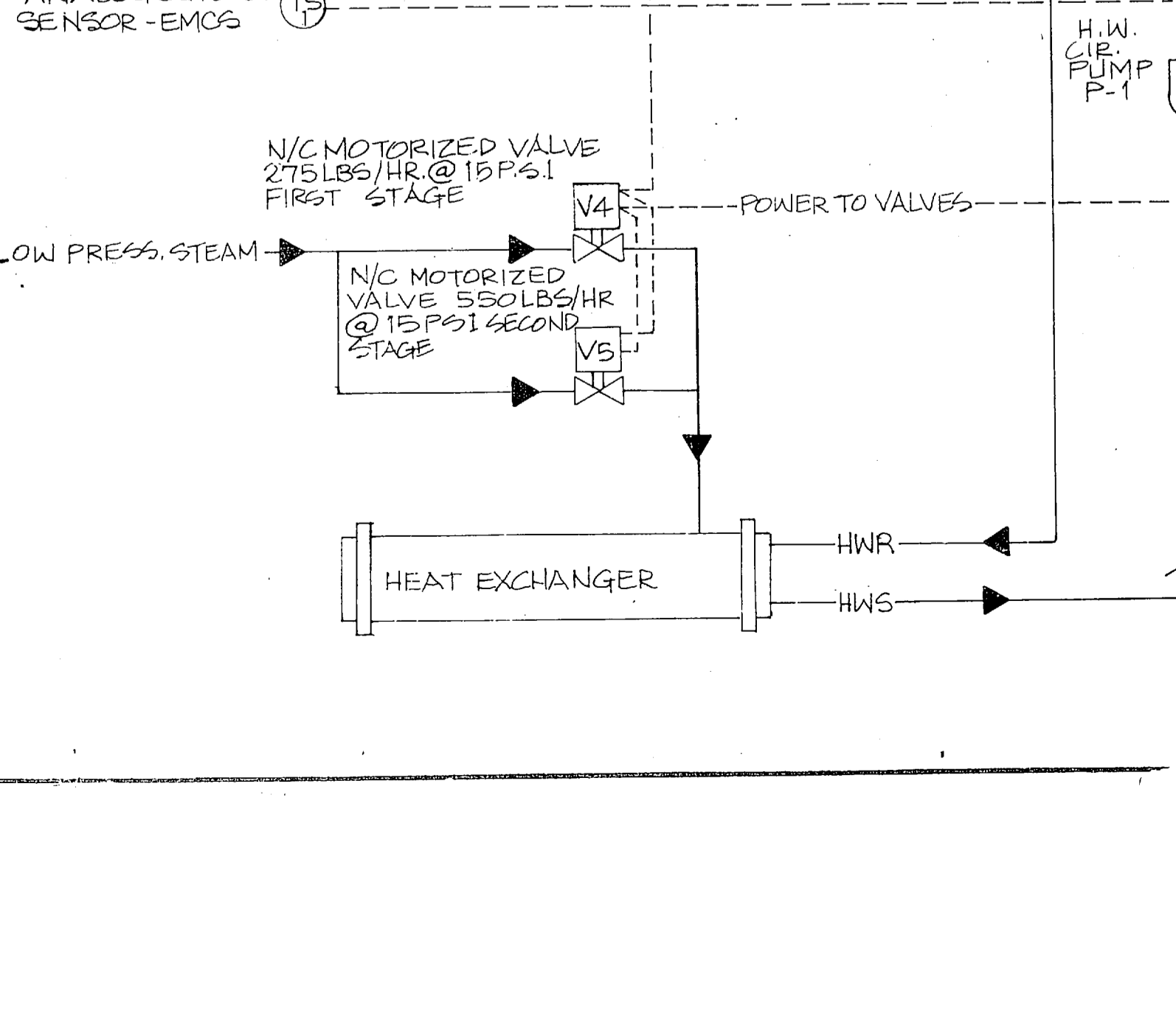


EMCS INPUT OUTPUT SUMMARY			
EQUIPMENT OR LOCATION	START - STOP	STATUS	TEMPERATURE
RTAC-1	YES	YES	---
AH-1	YES	YES	---
AH-2	YES	YES	---
H. W. PUMP	YES	YES	---
H. W. PIPE	---	---	HOT WATER TEMPERATURE
OUTSIDE	---	---	OUTSIDE AIR TEMPERATURE
ROOM-103	---	---	SPACE TEMPERATURE
ROOM-202	---	---	SPACE TEMPERATURE

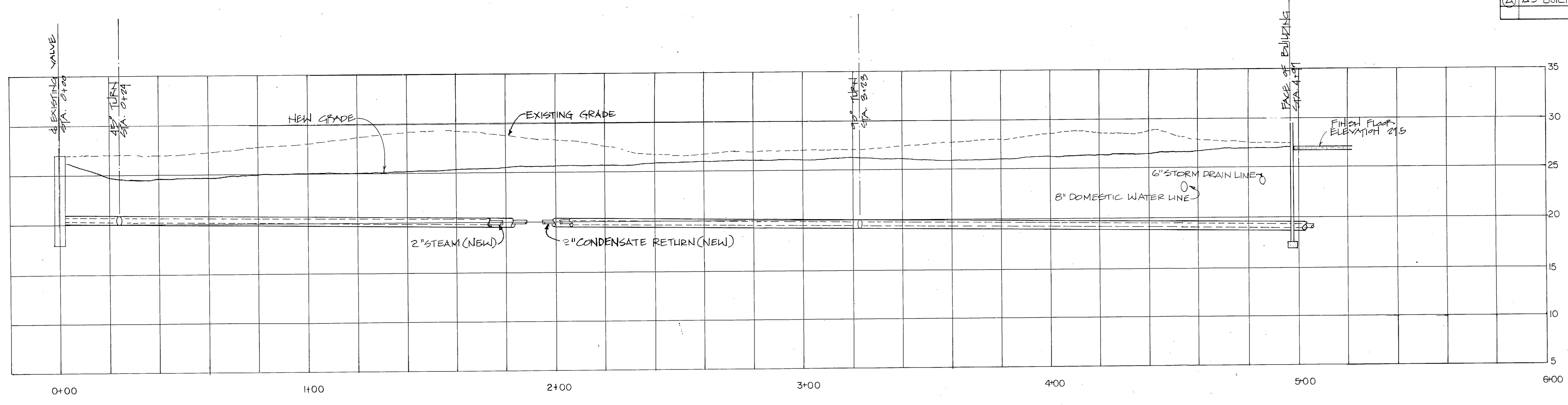


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RECORD DRAWING
ENTER DATED

M-8

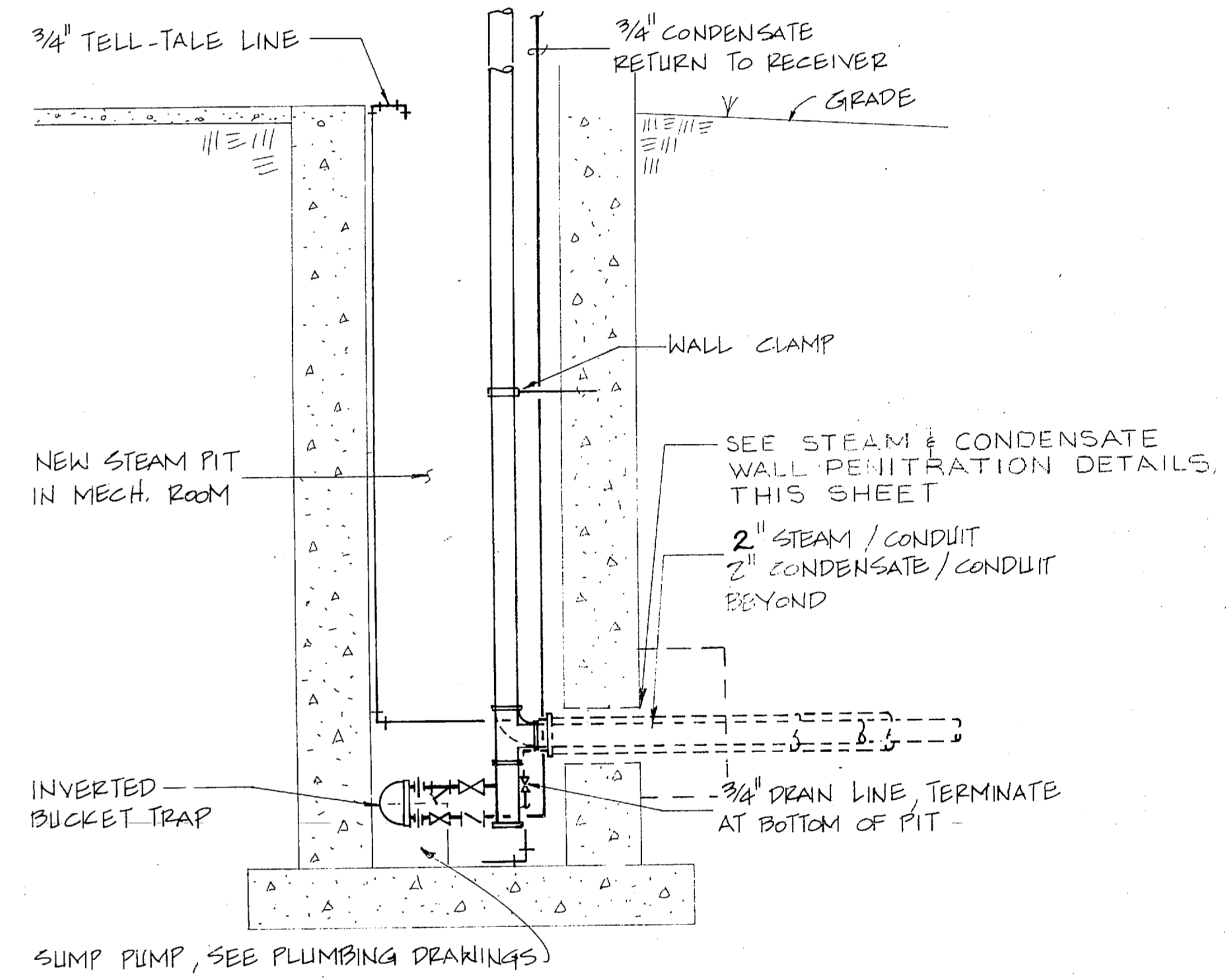
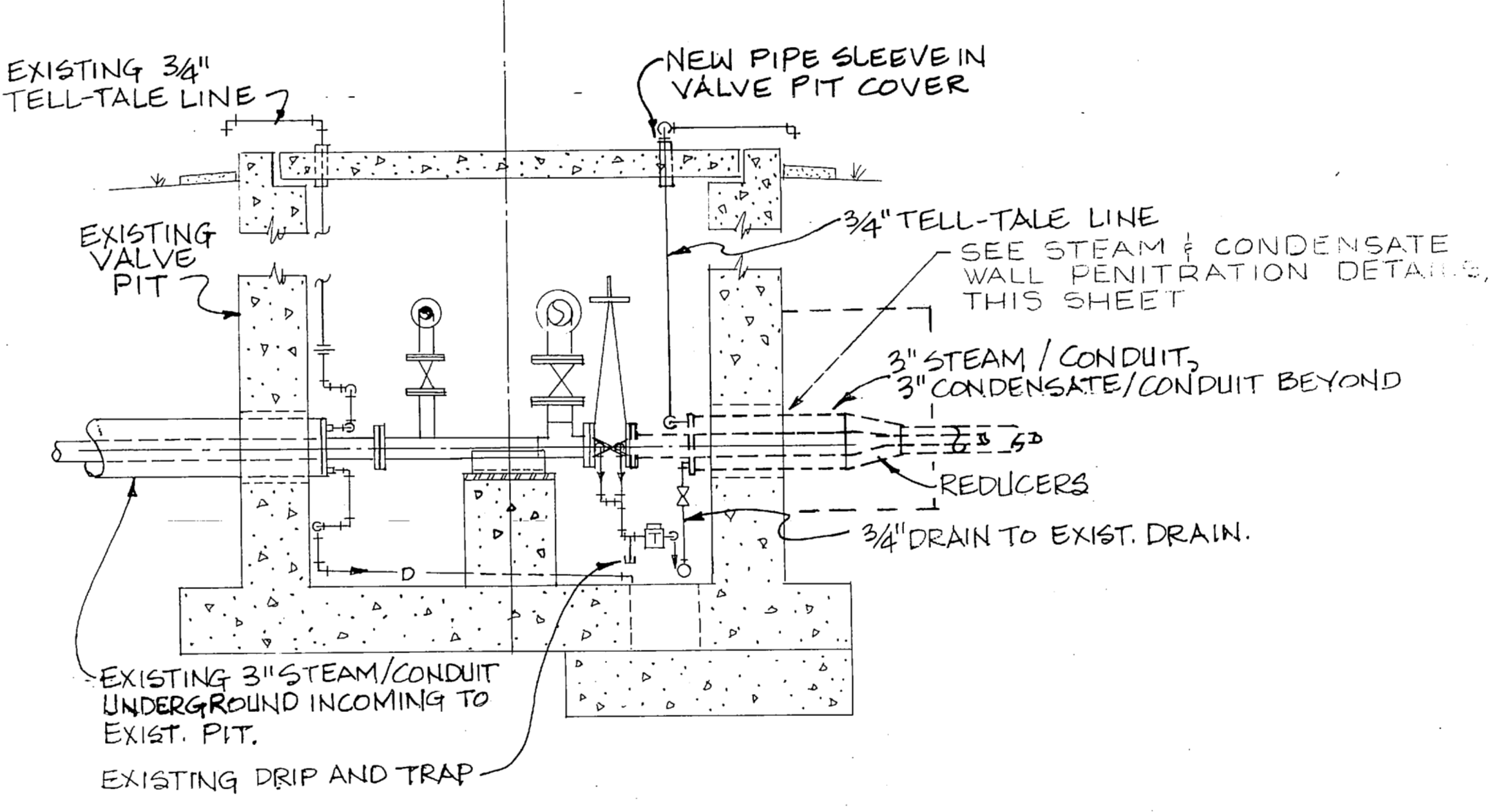
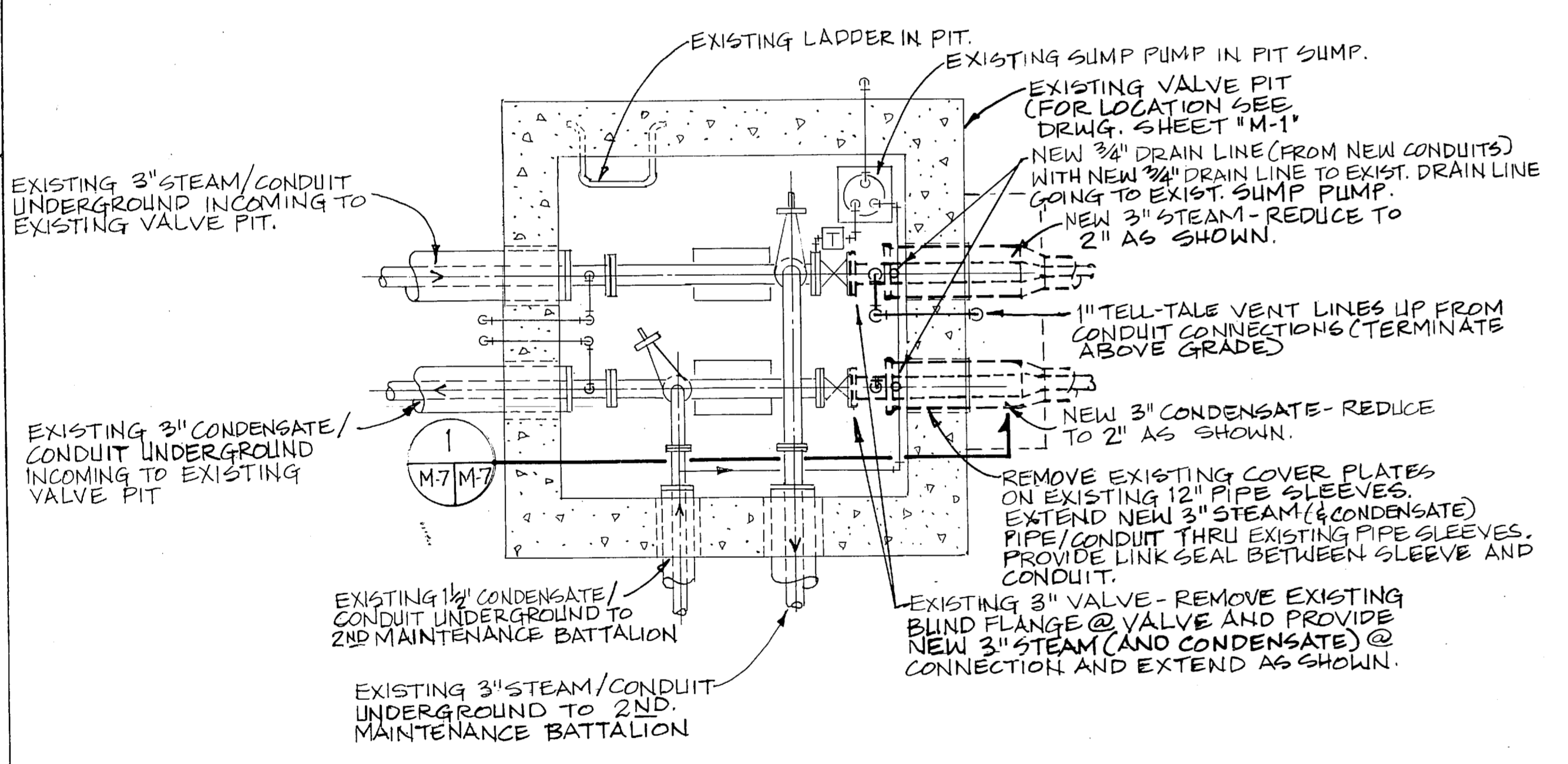


REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	AS BUILT, NO CORRECTIONS	11/17/81	EV.S.



STEAM AND PUMPED CONDENSATE RETURN MAINS

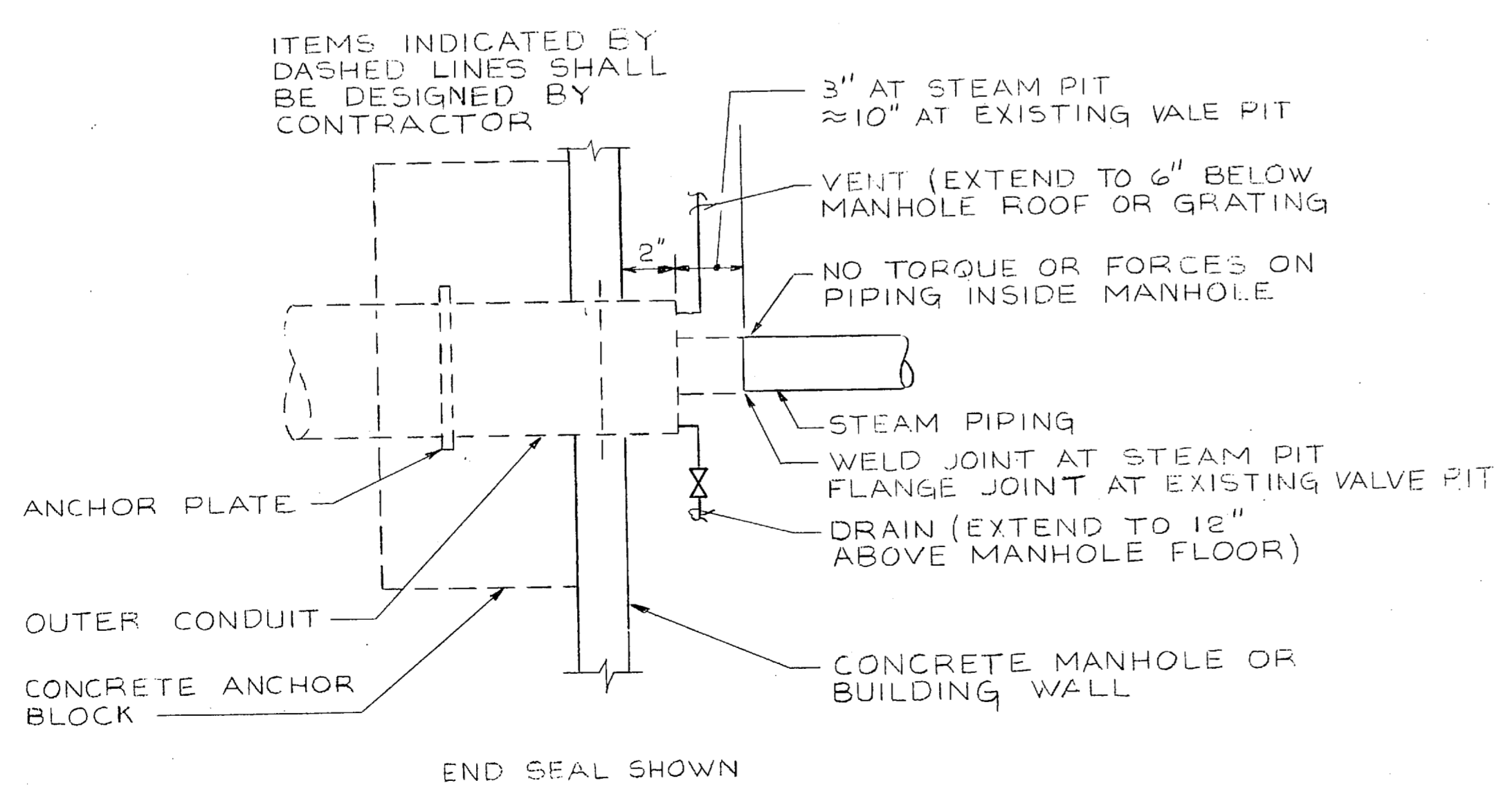
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1" = 5'-0" VERT.
GRAPHIC SCALES
20' 15' 10' 5' 0' 20'
5' 4' 3' 2' 1' 0' 5'



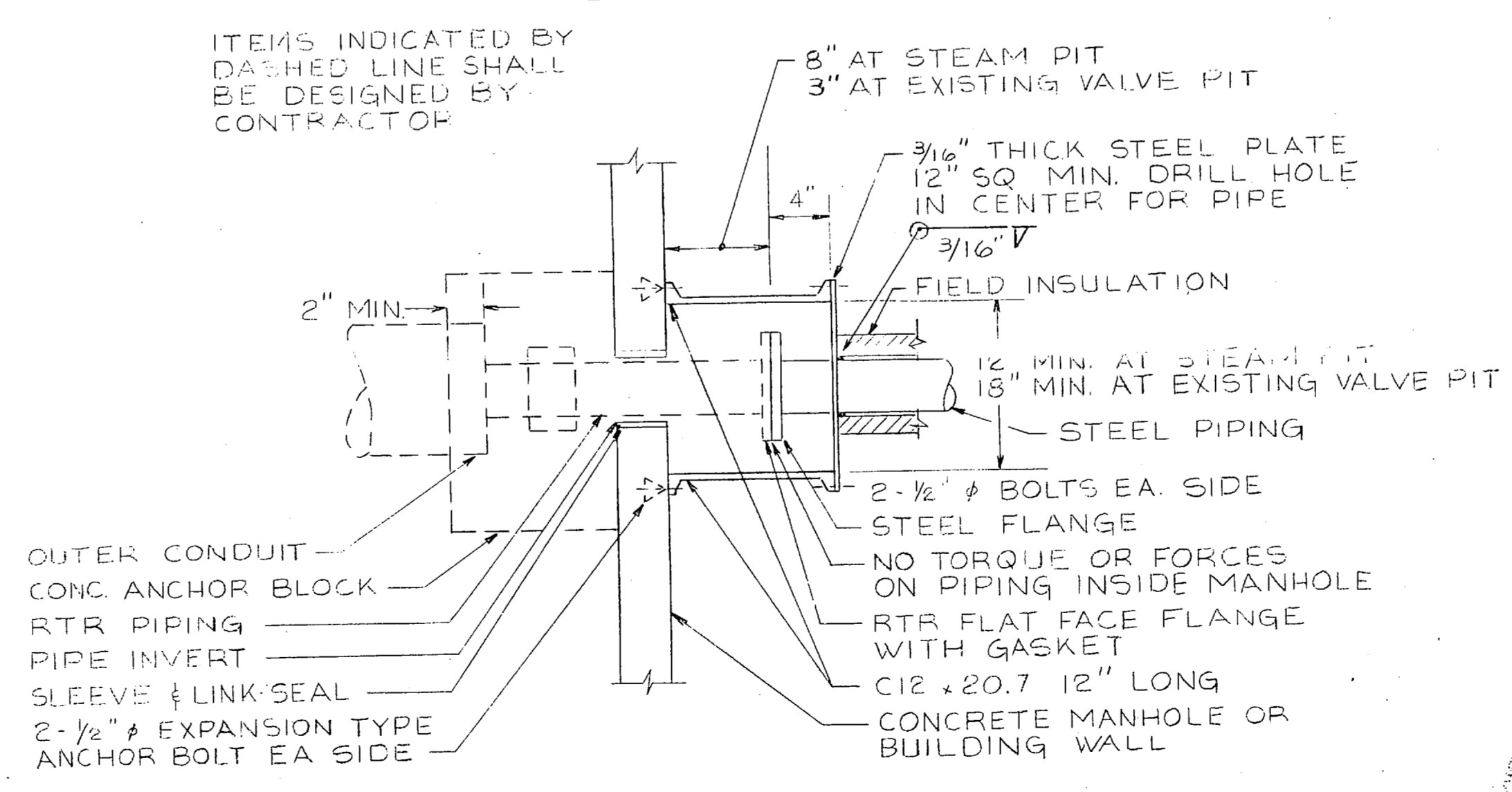
PLAN - EXISTING VALVE PIT
SCALE 1/2" = 1'-0"

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

STEAM PIT DETAIL
SCALE: 1/2" = 1'-0"



STEAM WALL PENITRATION DETAIL
NOT TO SCALE



CONDENSATE WALL PENITRATION DETAIL
NOT TO SCALE

FC 255

RECORD DRAWING
LETTER DATED 10/1/81

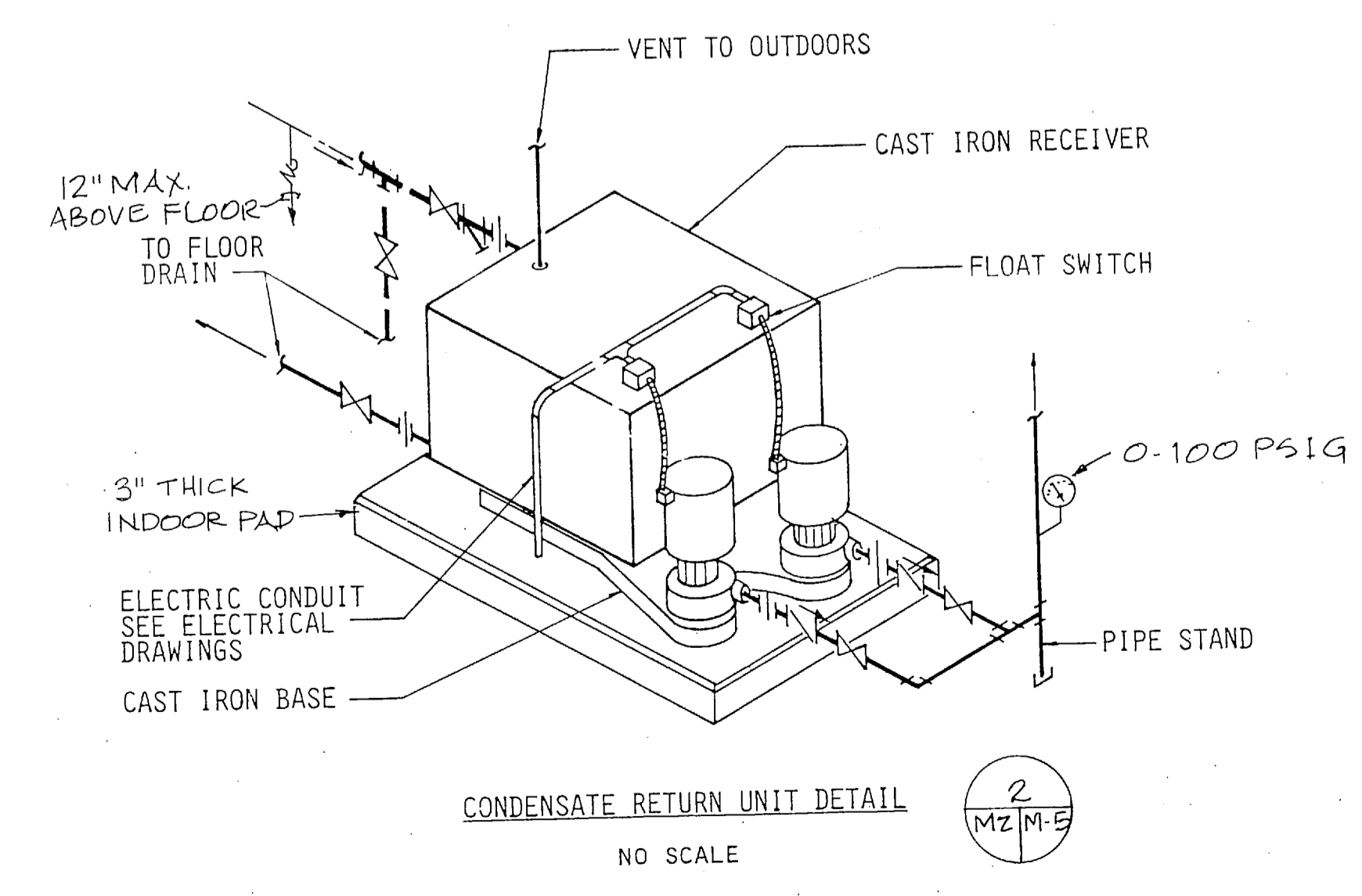
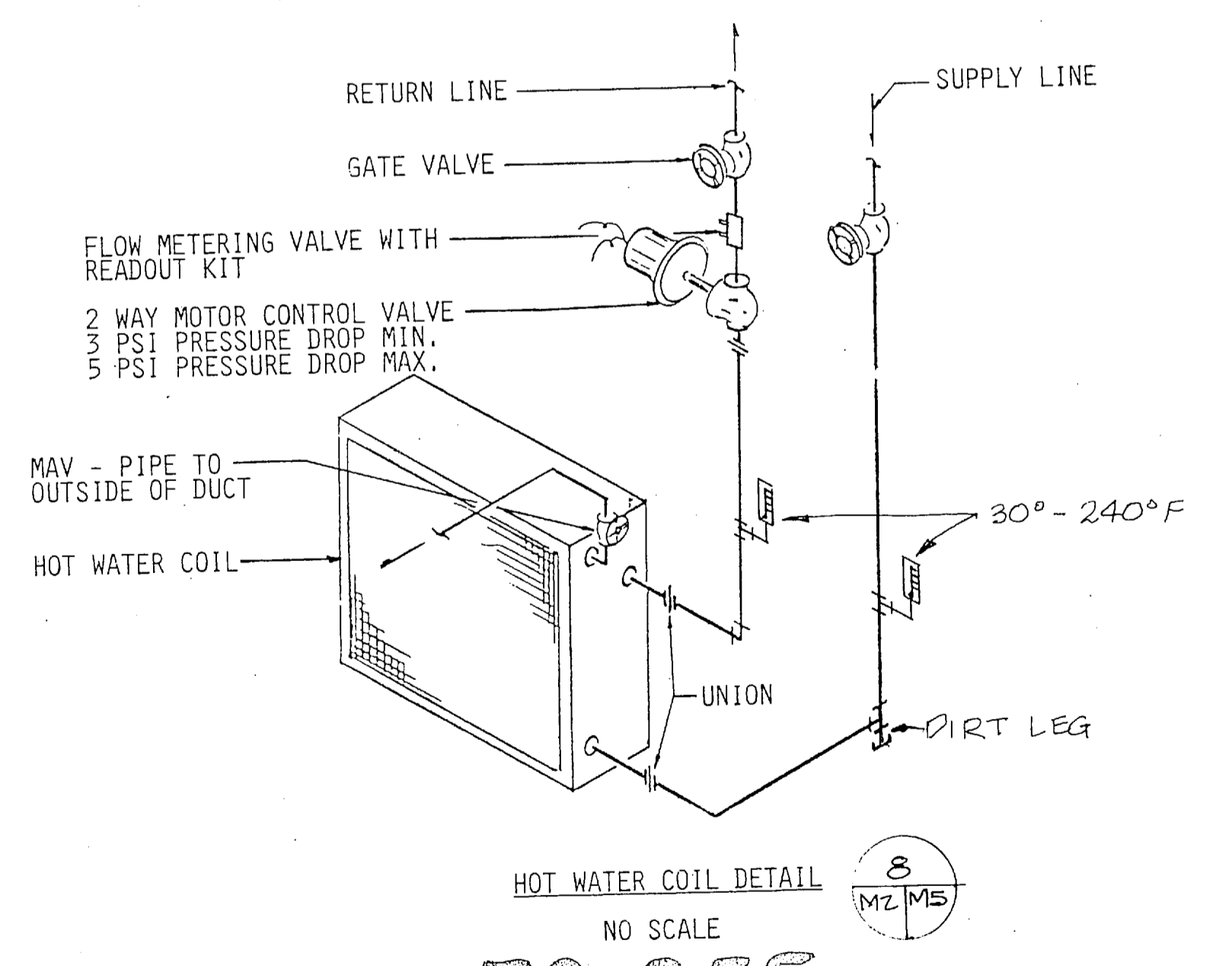
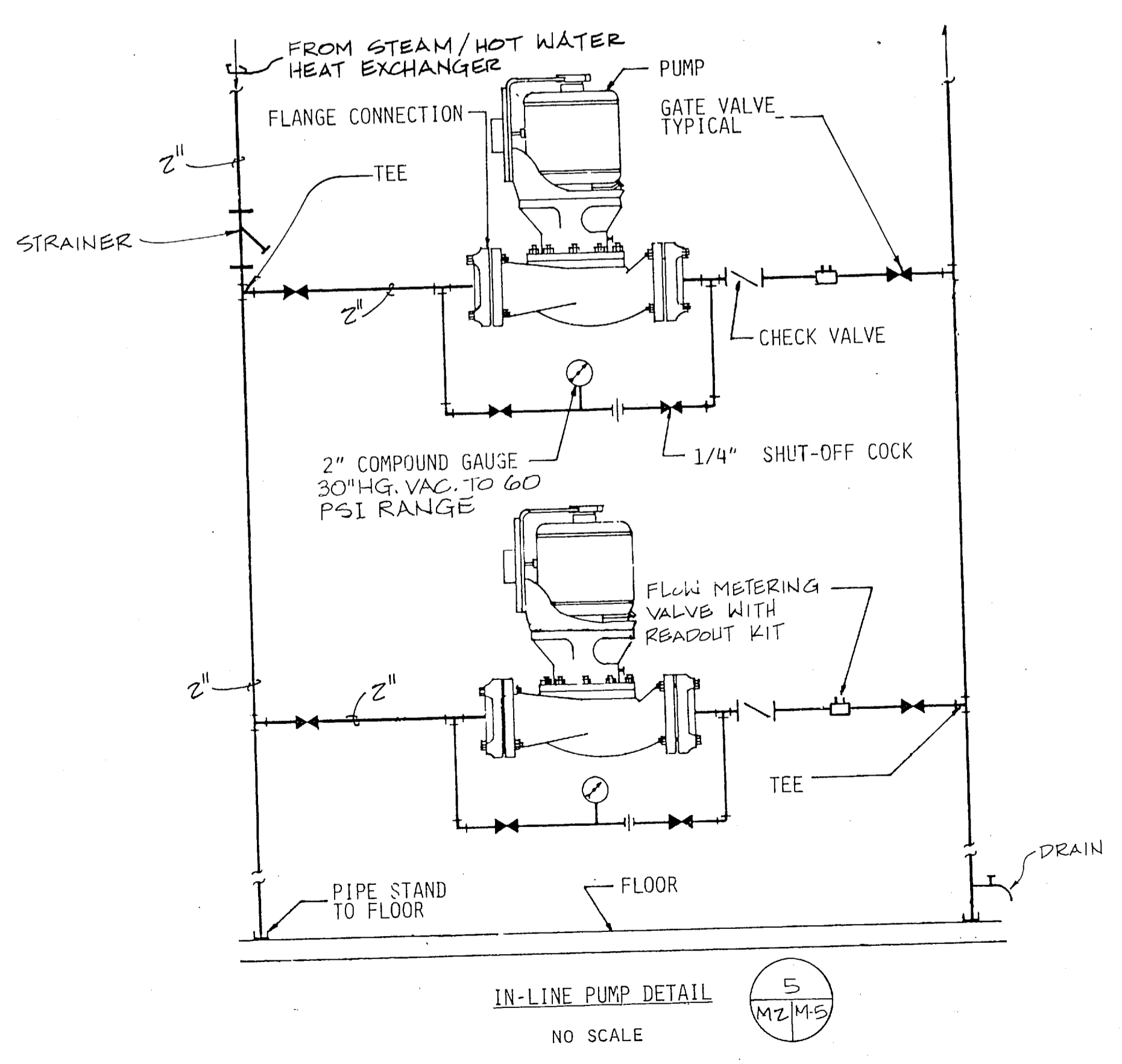
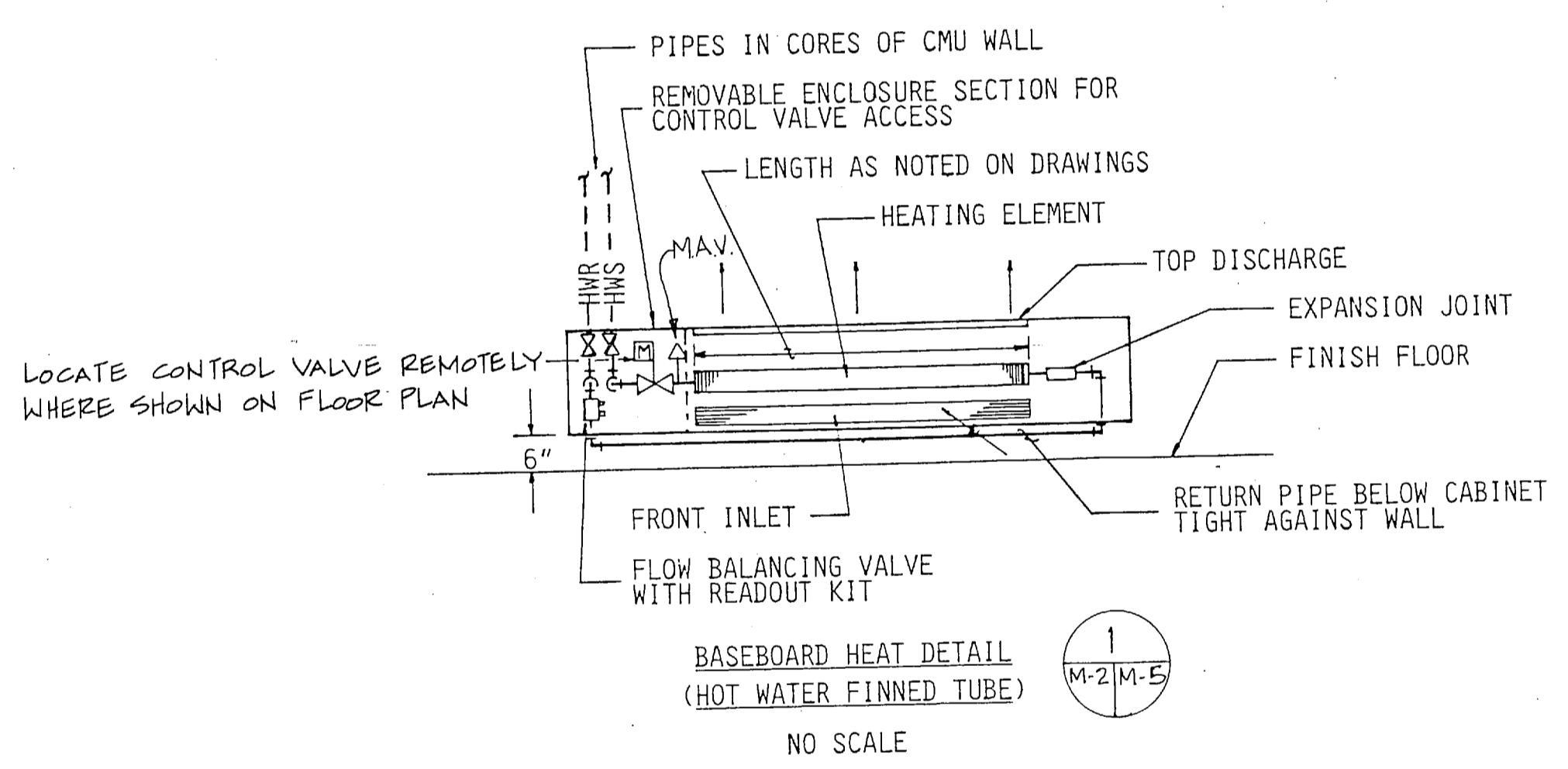
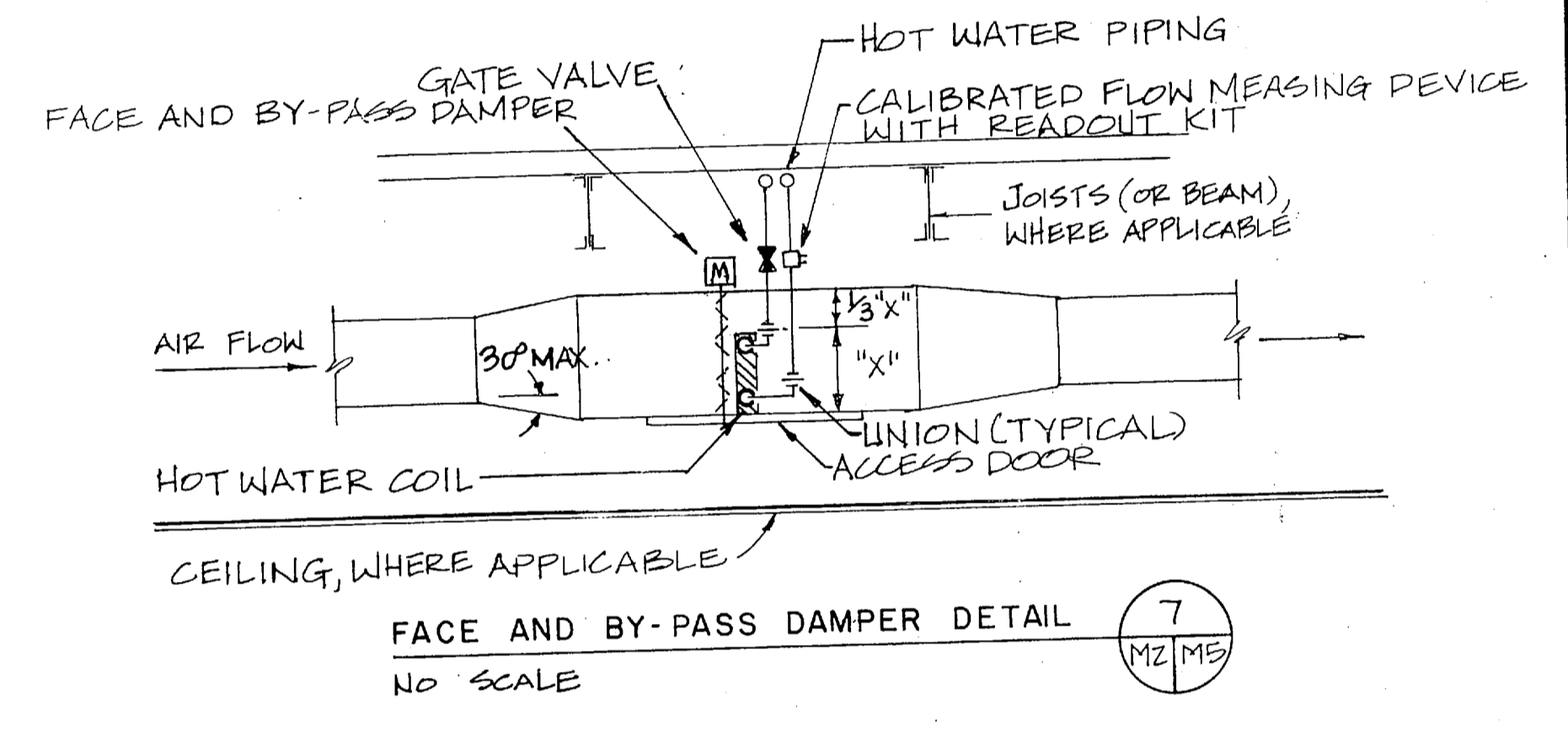
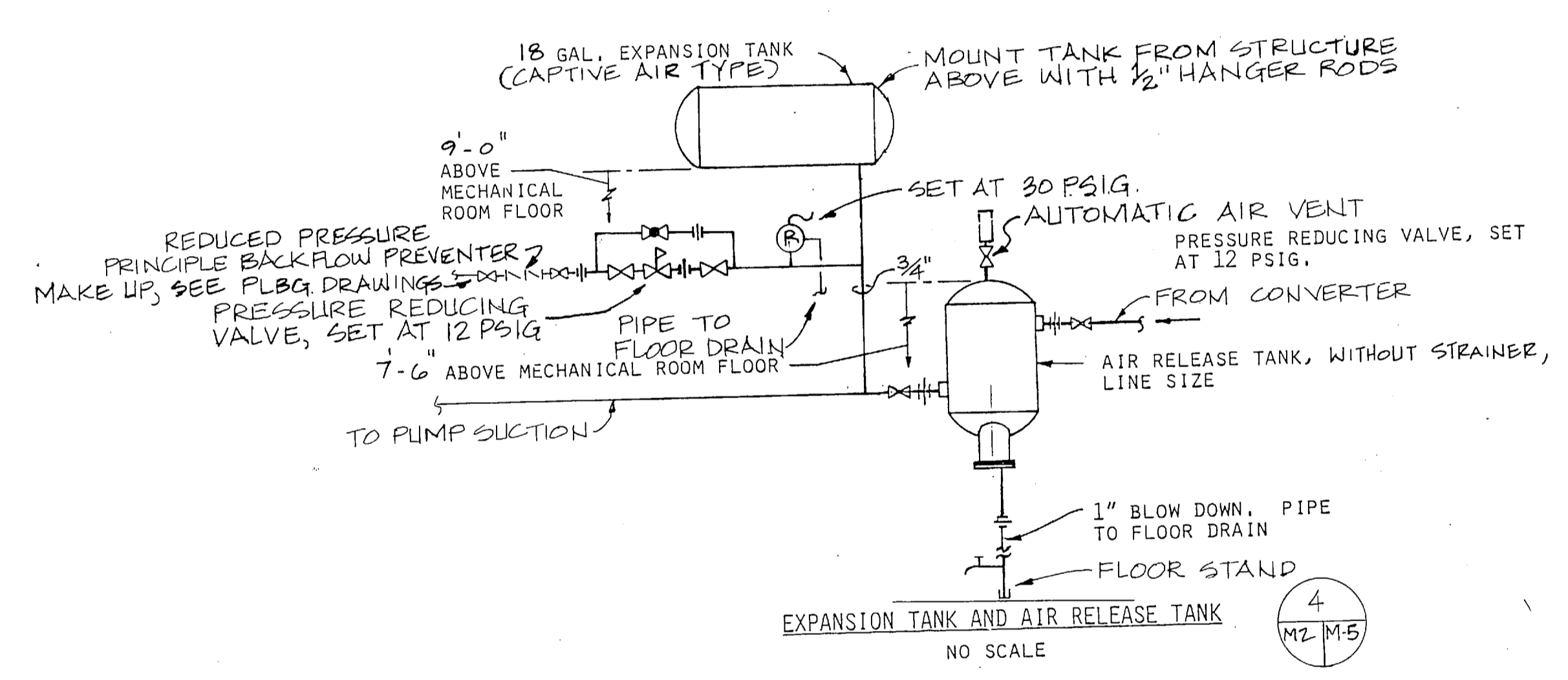
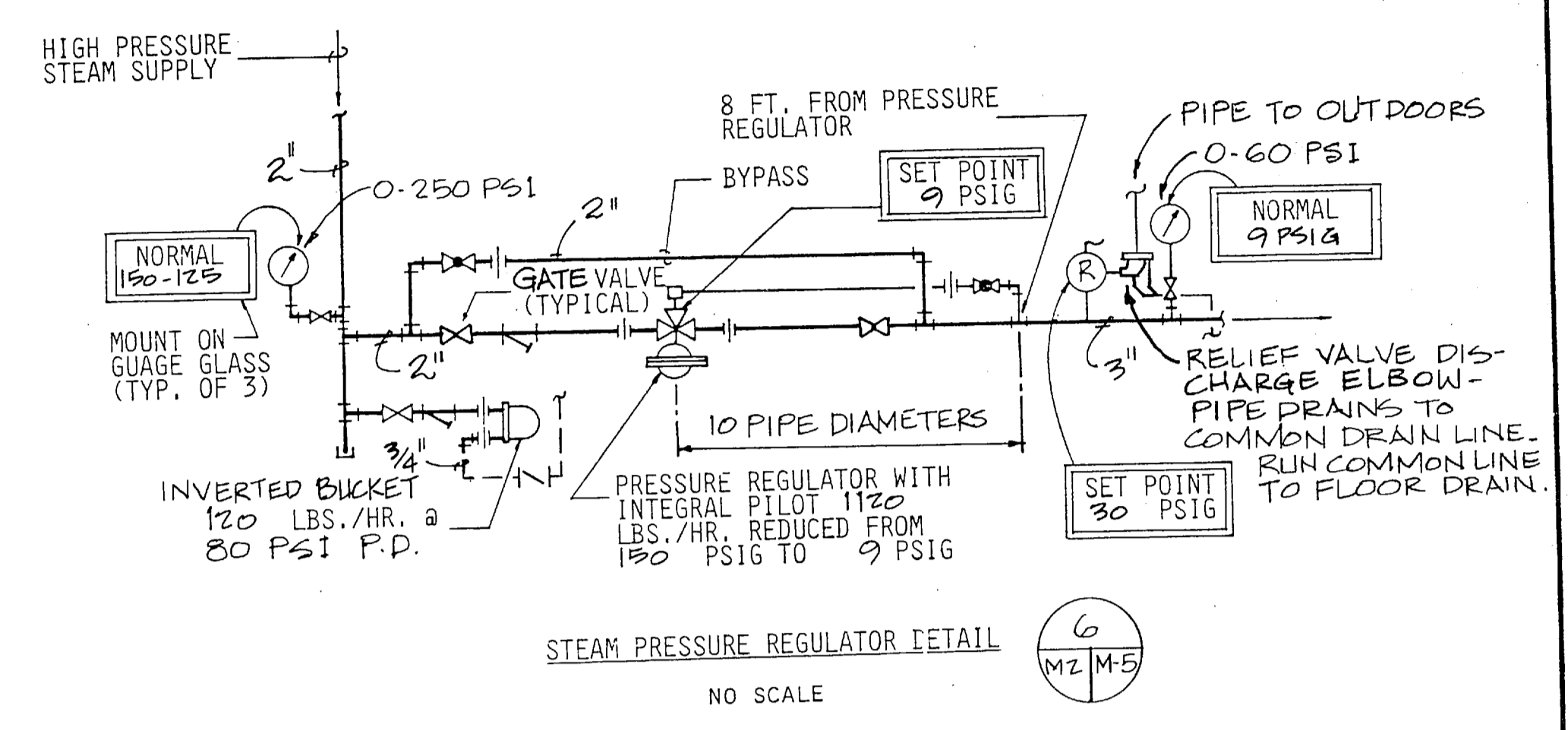
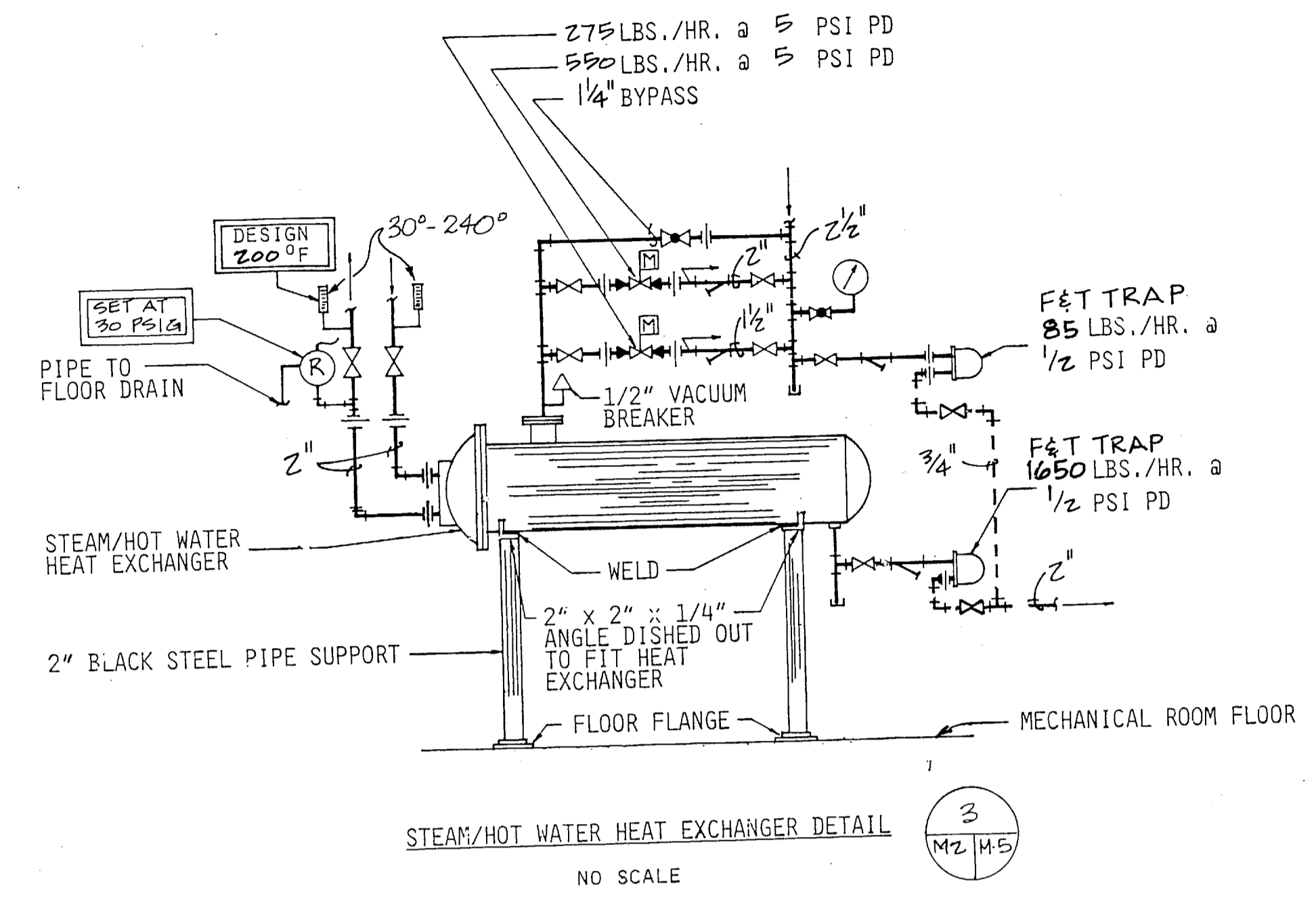
M-7

CONSULTANT	MONAR, JOHNSON & ASSOCIATES ARCHITECTS ENGINEERS PLANNERS 1522 WASHINGTON STREET # 6100, SA COLUMBIA, S.C. 29202	DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION			
DESIGNED BY	DR. CARTER, CHK. MCGHEE	NAVAL STATION	NORFOLK, VIRGINIA			
PROJ. MGR.	JOHNSON, ENGR. JOHNSON	MARINE CORPS BASE	CAMP LEJEUNE, N.C.			
SUBMITTED BY	DATE: 01/14/82	AUTOMOTIVE ORGANIZATIONAL SHOP				
FIRM MEMBER	PRINCIPAL					
EFD. P.P.	JACK	RVD.	JTX	UTILITY STEAM PROFILE & DETAILS		
HD.	DIR. WLR	DATE:				
APPROVED:		DATE:		SIZE	CODE IDENT. NO.	NAVFAC DRAWING NO.
ACTIVITY - SATISFACTORY TO		DATE:		F	80091	4124890
FOR EFD FOR COMMANDER, NAVFAC		DATE:		SCALE: AS SHOWN	SPEC. 05-82-2270	SHEET 41 OF 50

EFD. DWG. NO. 224890

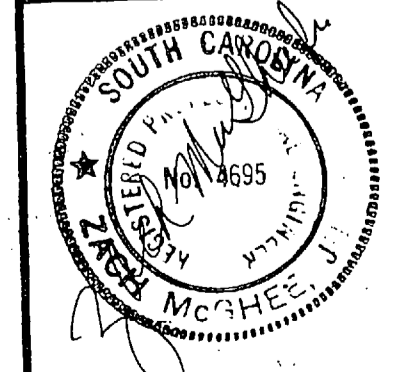
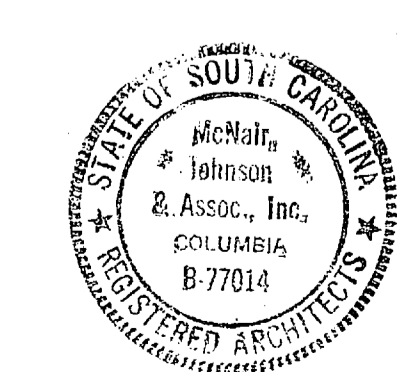
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	AS BUILT, NO CORRECTIONS	4/17/83	E.V.S.

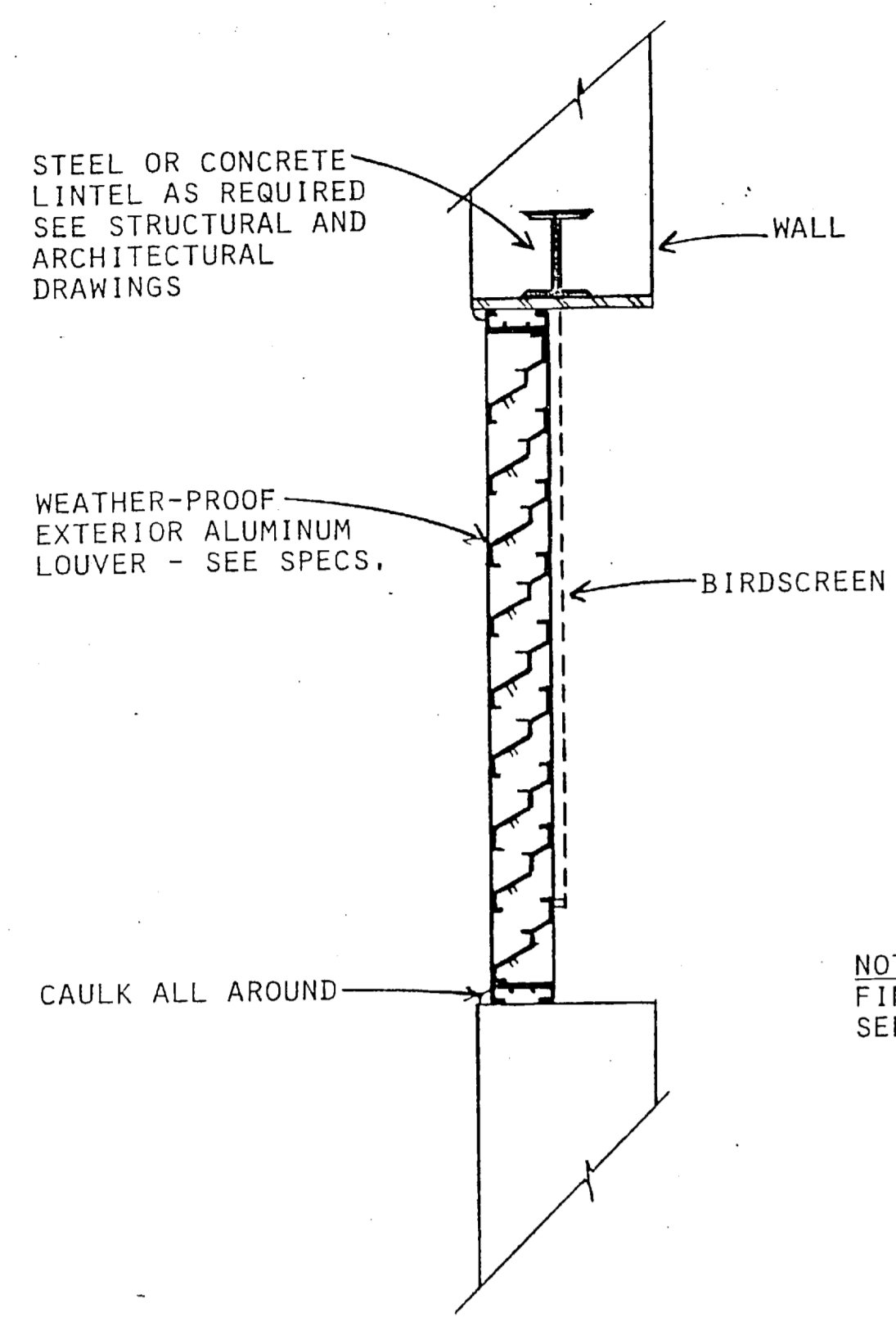


FC 255
RECORD DRAWING
LETTER DATED

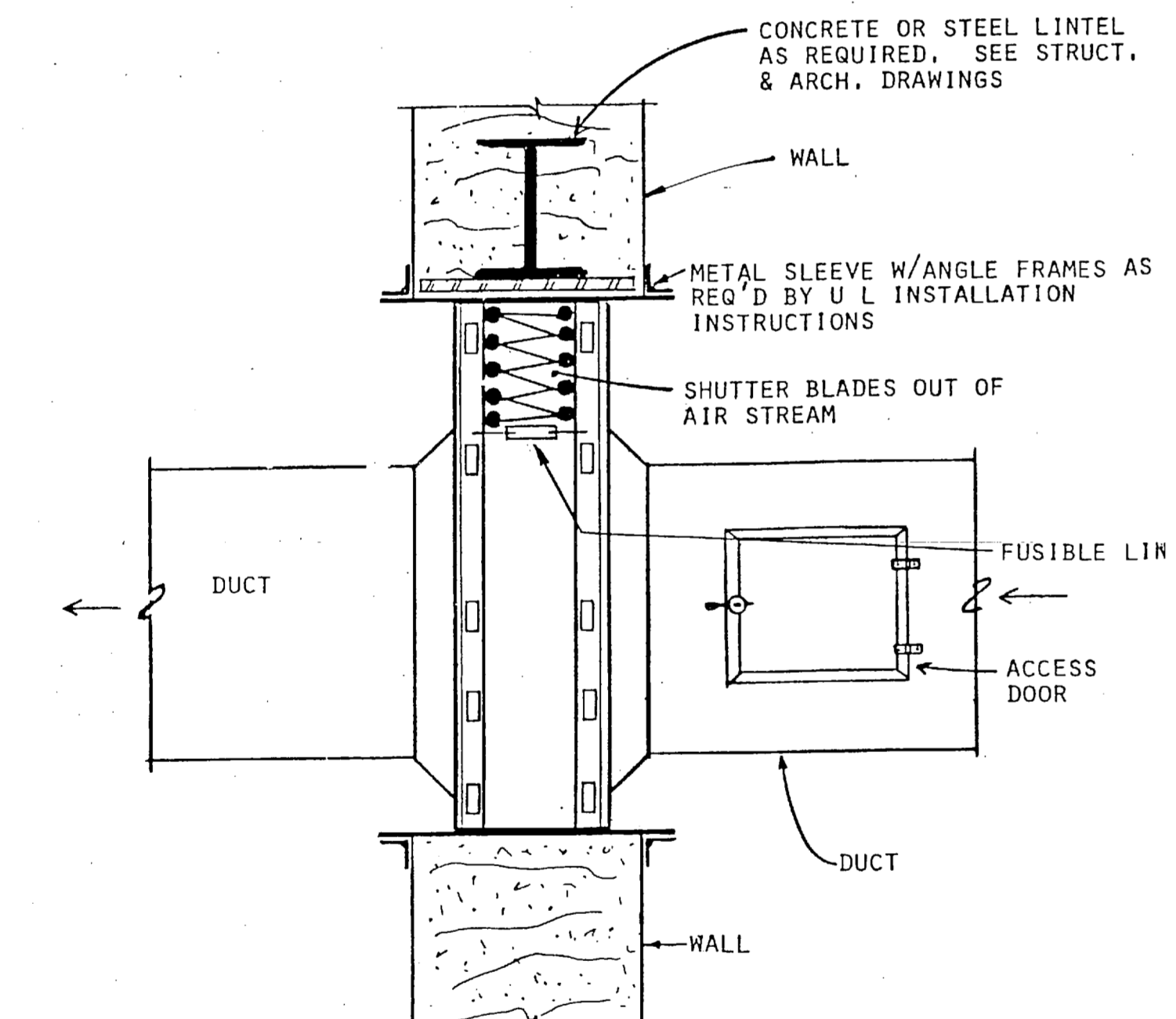
CONSULTANT	MCNAIR, JOHNSON & ASSOCIATES ARCHITECTS ENGINEERS PLANNERS 1528 WASHINGTON STREET P.O. BOX 84 COLUMBIA S.C. 29202	DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION
DESIGNED BY	DR. WILDS, DR. WILDS, CHK. MCGHEE	NAVAL STATION	NORFOLK, VIRGINIA
PROJECT	PROJ. MGR. JOHNSON, ENGR. JOHNSON	MARINE CORPS BASE	CAMP LEJEUNE, N.C.
DATE	6/25/82	AUTOMOTIVE ORGANIZATIONAL SHOP	
FIRM MEMBER	MEMBER	MECHANICAL DETAILS	
NO.	DATE	SIZE	CODE IDENT. NO.
APPROVED:	DIR. JHG	F	80091
ACTIVITY - SATISFACTORY TO	DATE: 25 Jan 83	NAVFAC DRAWING NO.	4124898
FOR EFD FOR COMMANDER, NAVFAC		CONSTR. CONTR. NO.	N62470-82-B-2270
		SCALE:	AS SHOWN SPEC 05-82-2270
			SHEET 39 OF 50



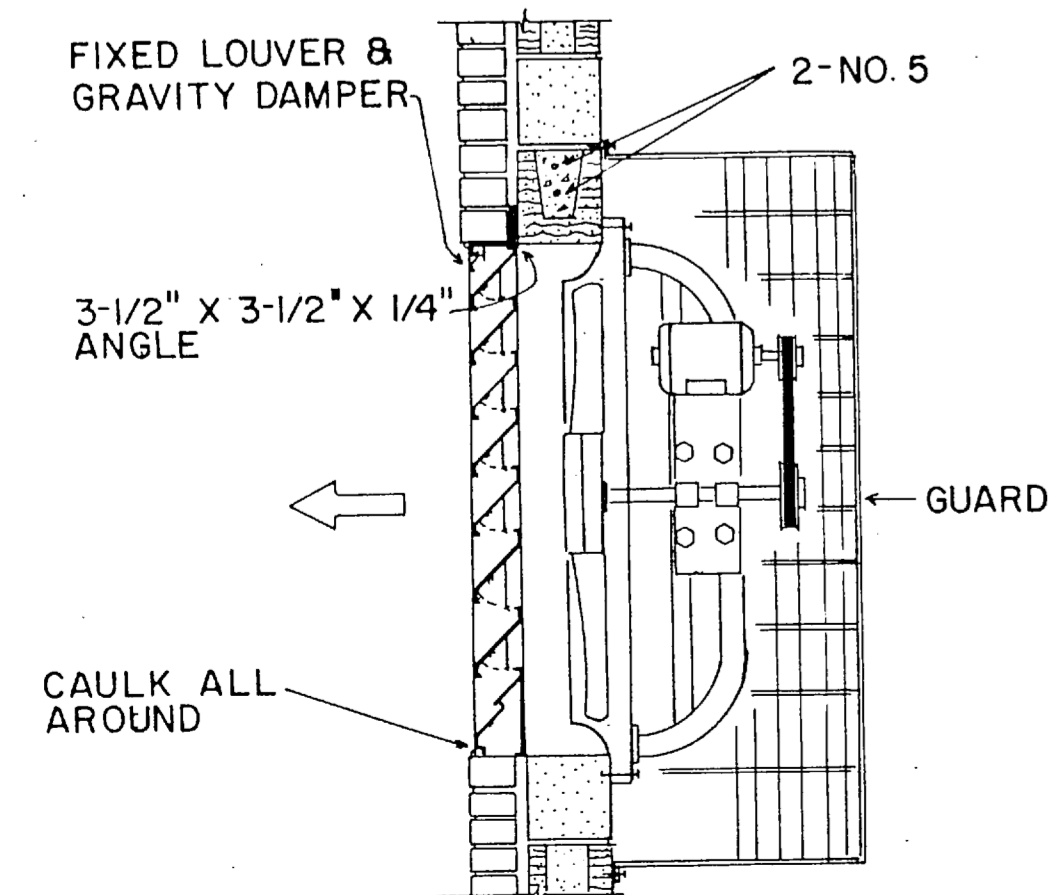
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	CORRECTED TO AS-BUILT	9/7/89	MC



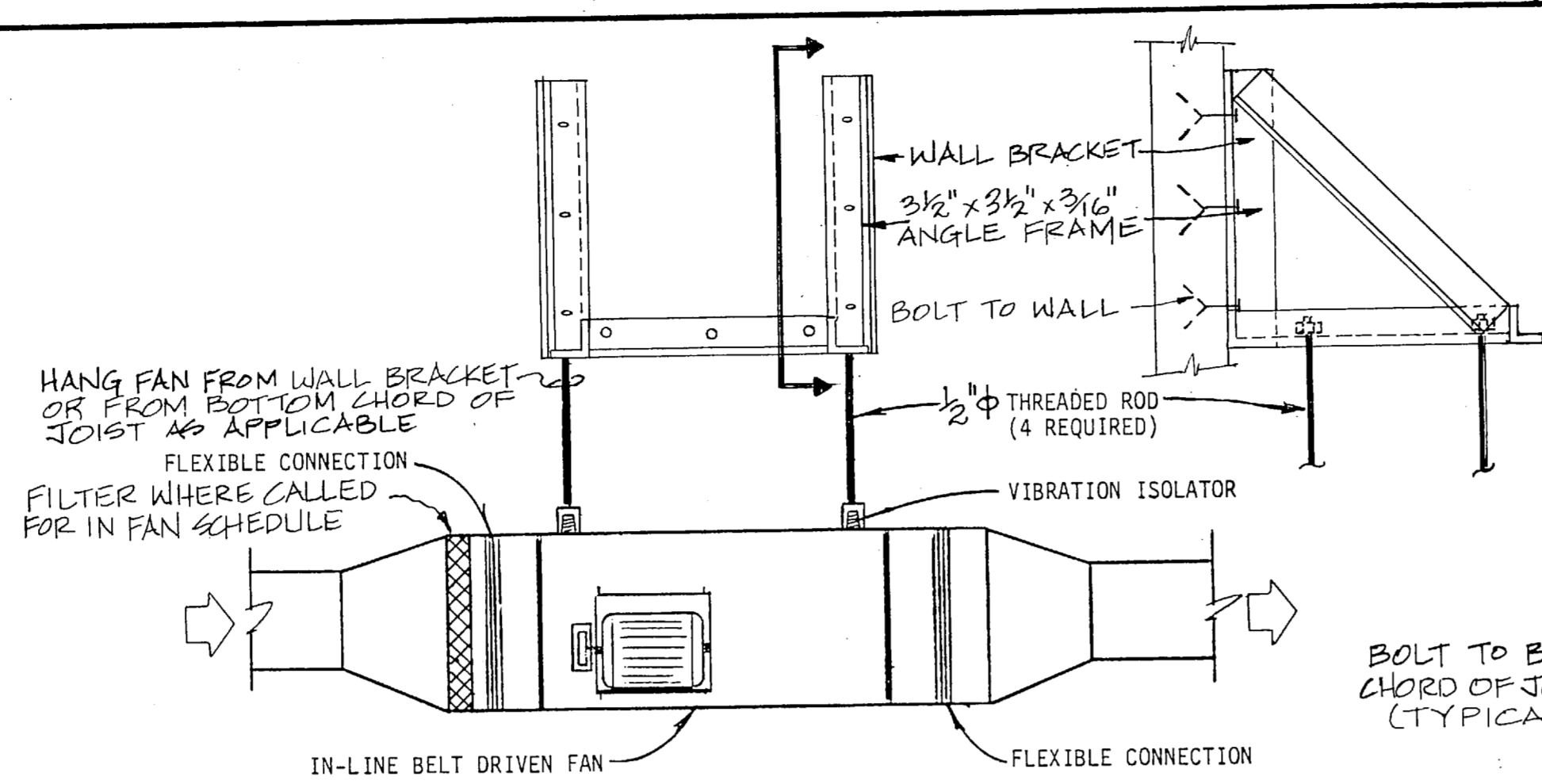
LOUVER DETAIL
NO SCALE
9
M-2/M-6



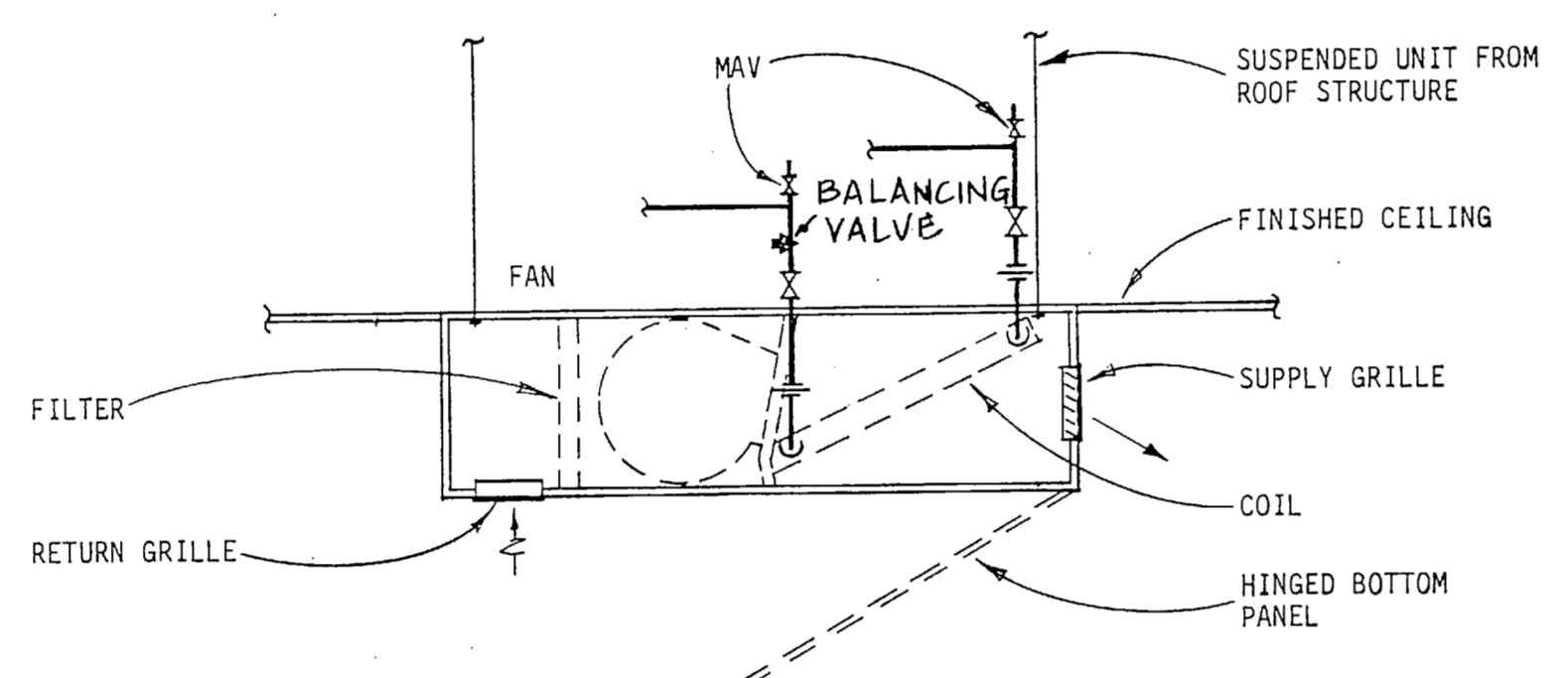
FIRE DAMPER DETAIL
NO SCALE
10
M-2/M-6



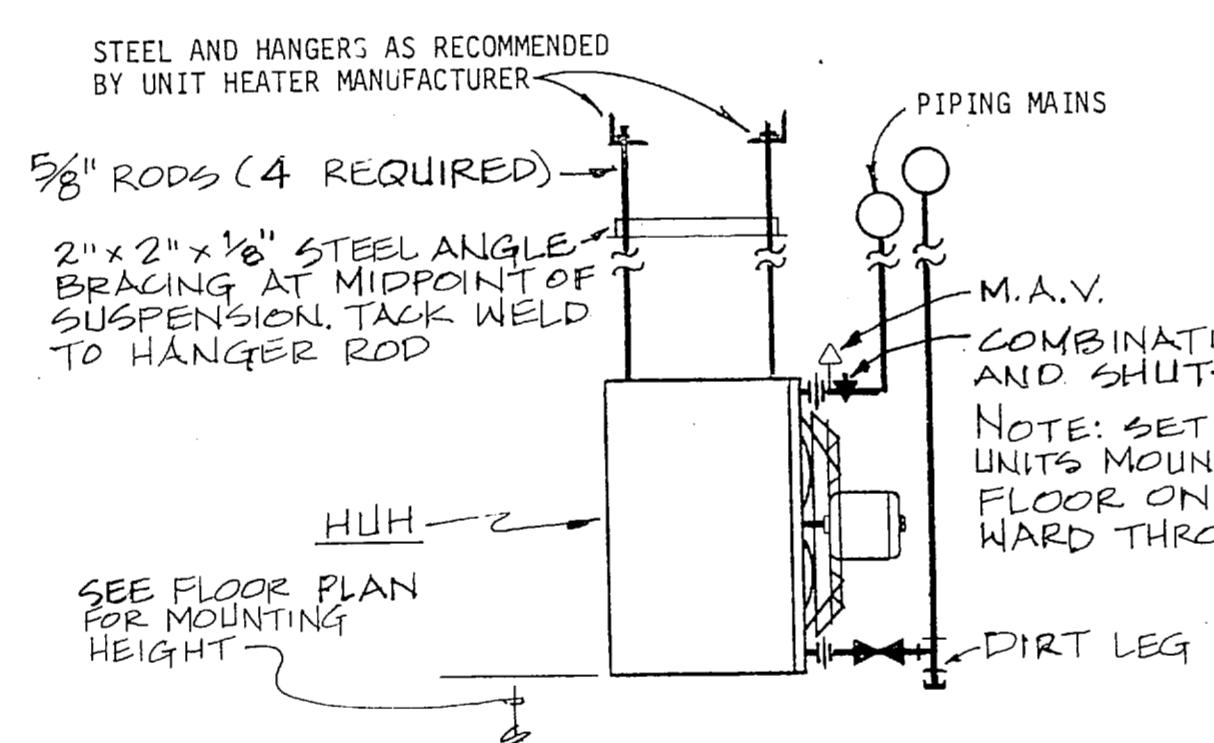
WALL MOUNTED FAN
NO SCALE
11
M-2/M-6



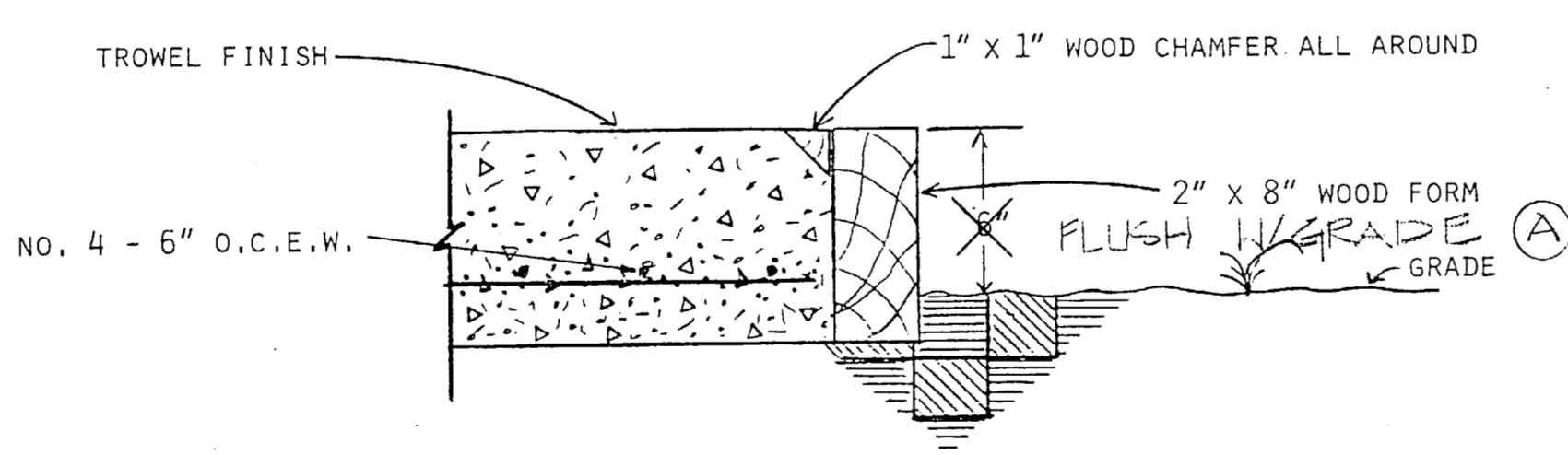
IN-LINE FAN
NO SCALE
12
M-2/M-6



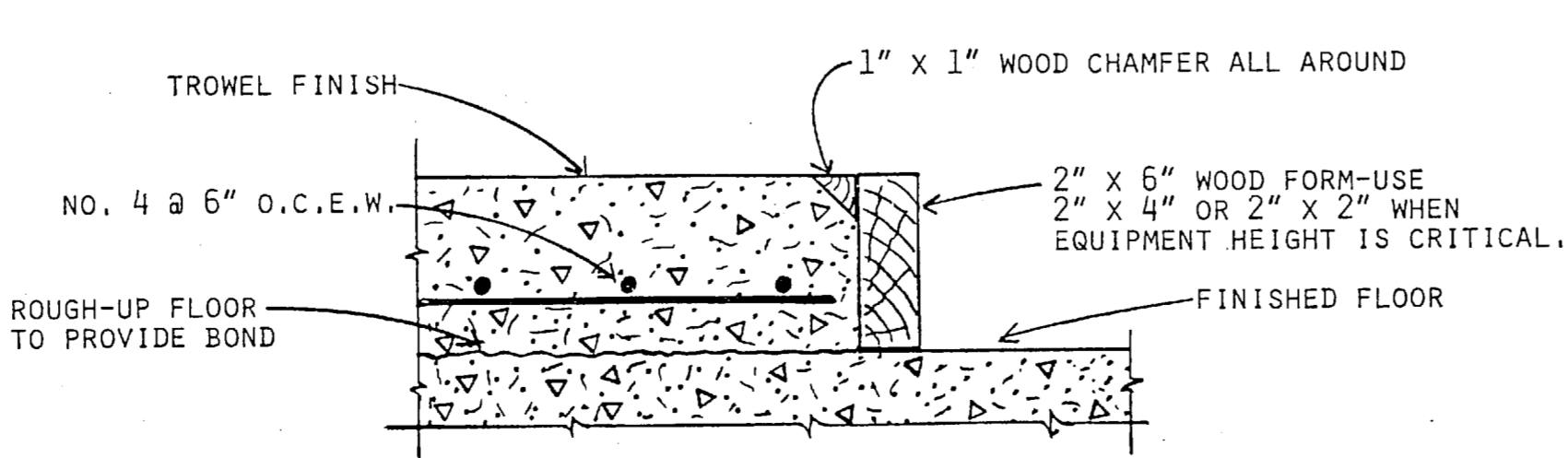
CABINET UNIT HEATER
NO SCALE
13
M-2/M-6



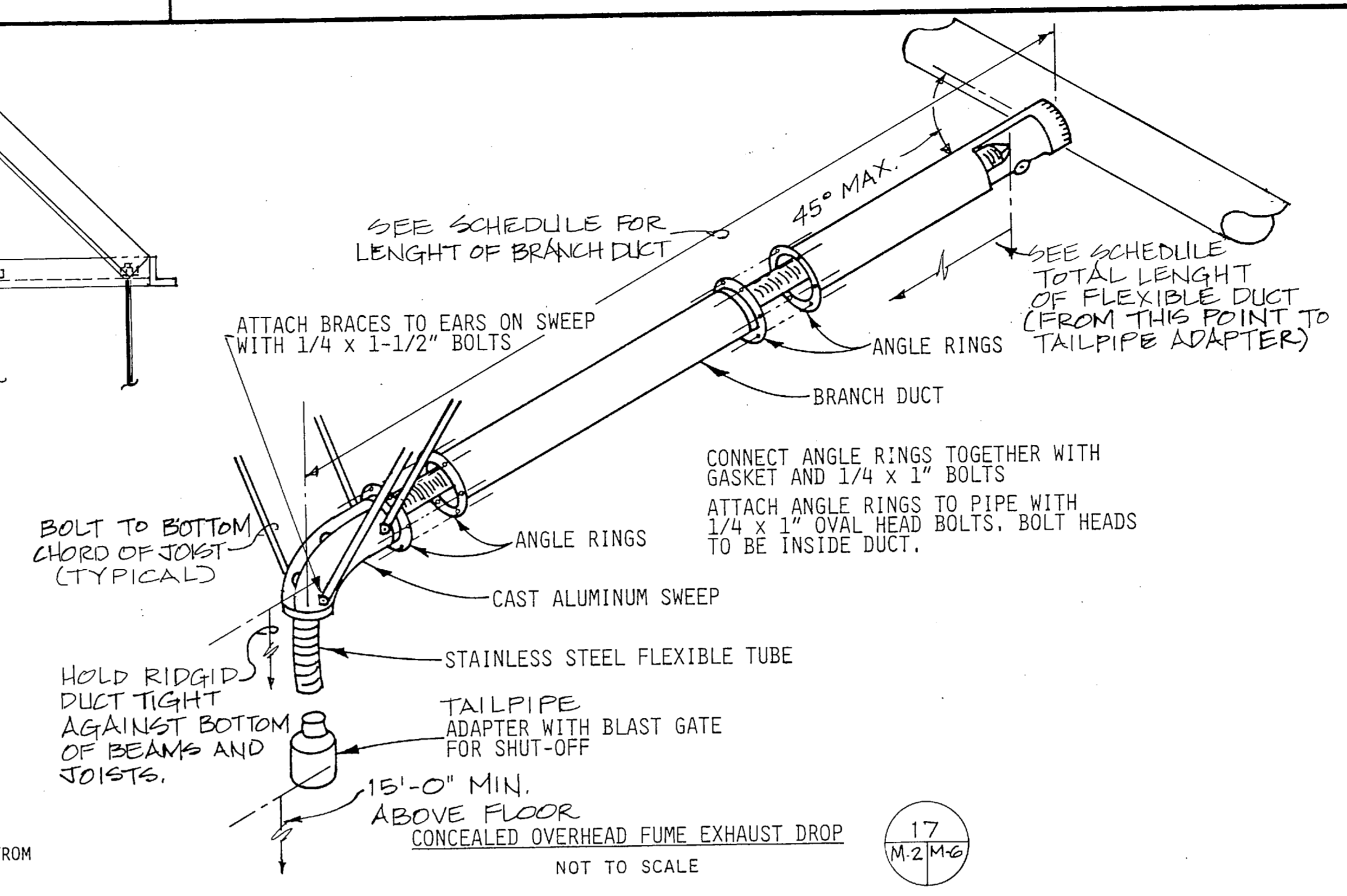
HORIZONTAL HOT WATER UNIT HEATER DETAIL
NO SCALE
14
M-2/M-6



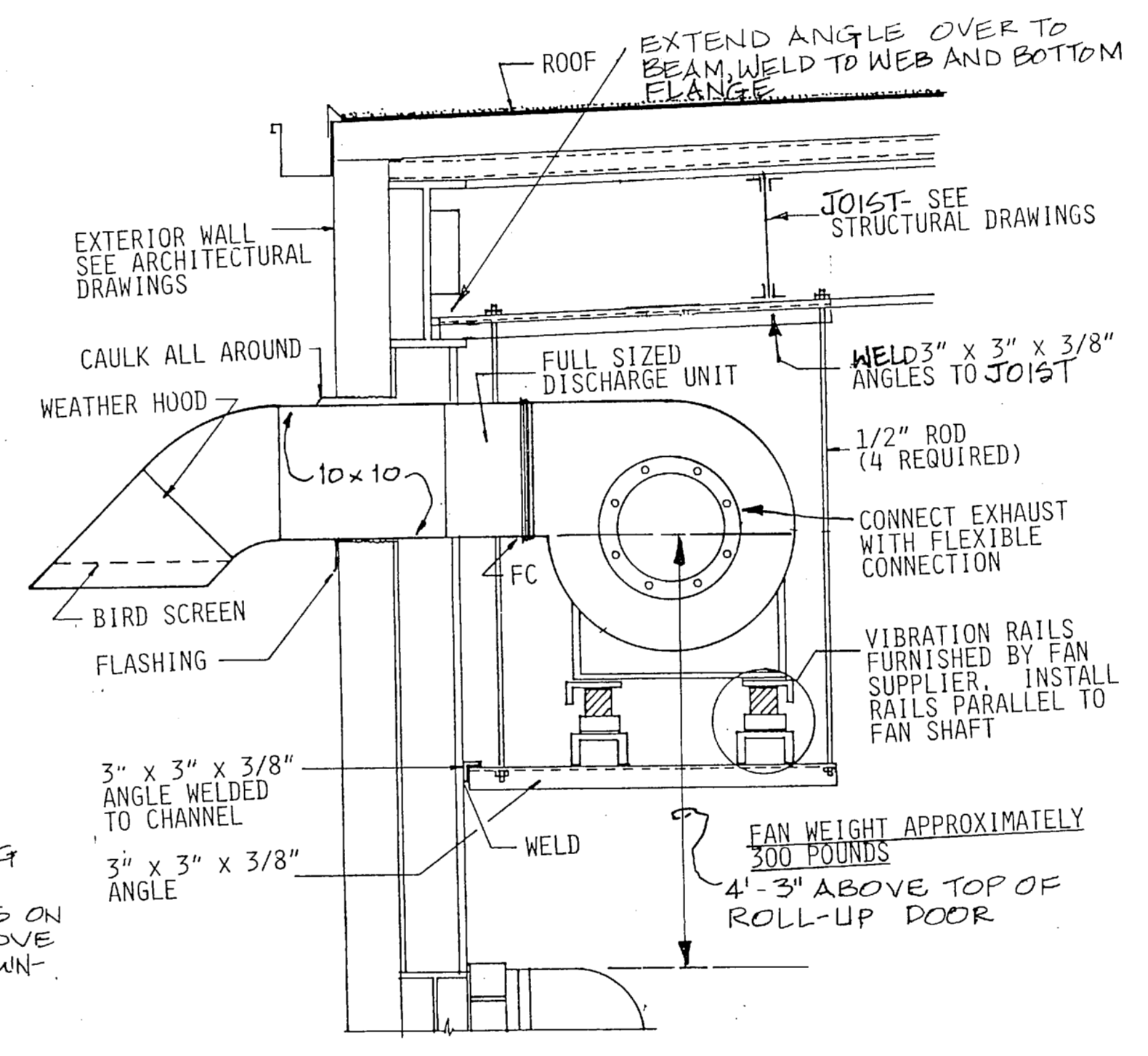
OUTDOOR EQUIPMENT FOUNDATION
NO SCALE
15
M-2/M-6



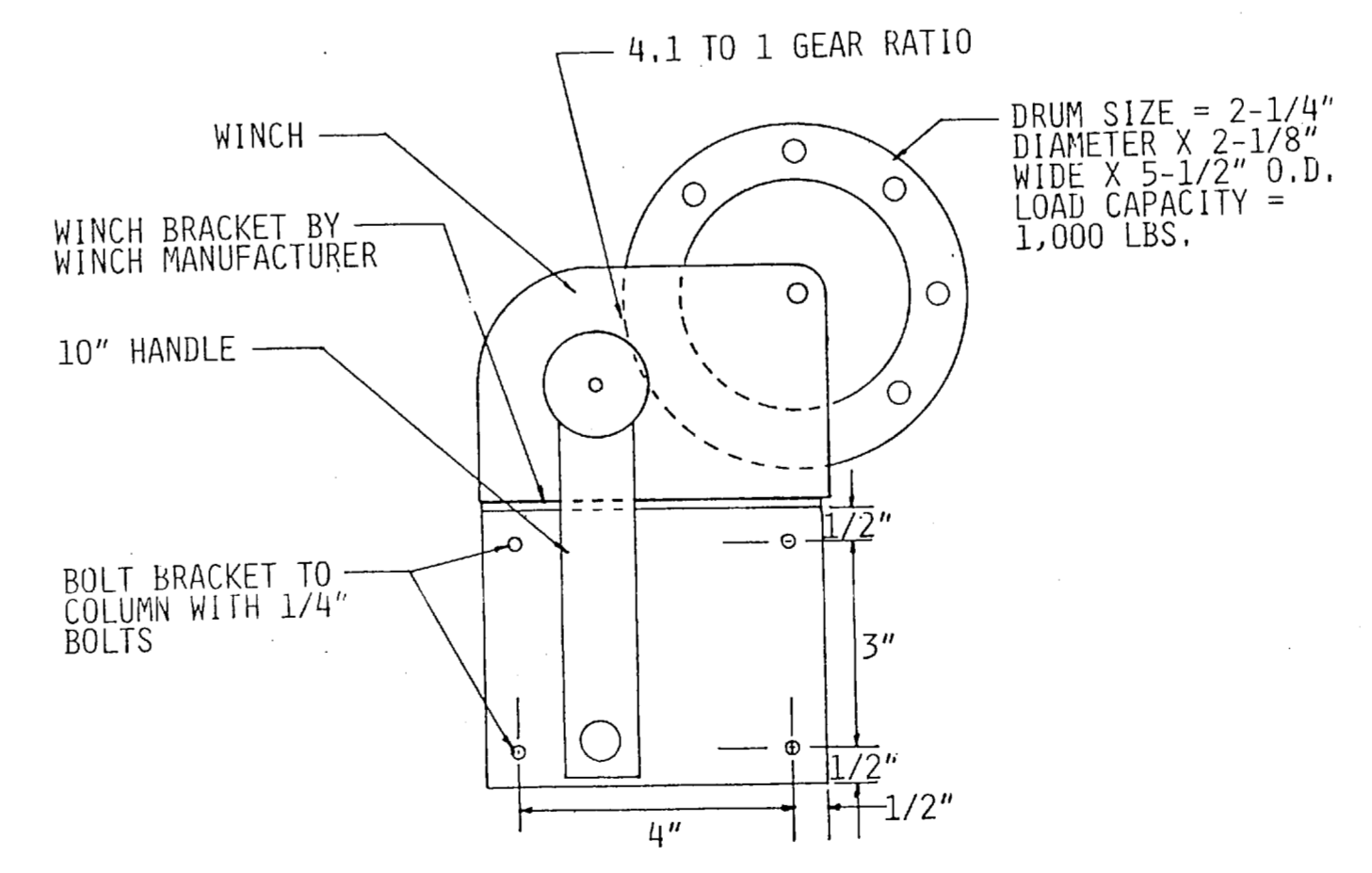
INDOOR EQUIPMENT FOUNDATION
NO SCALE
16
M-2/M-6



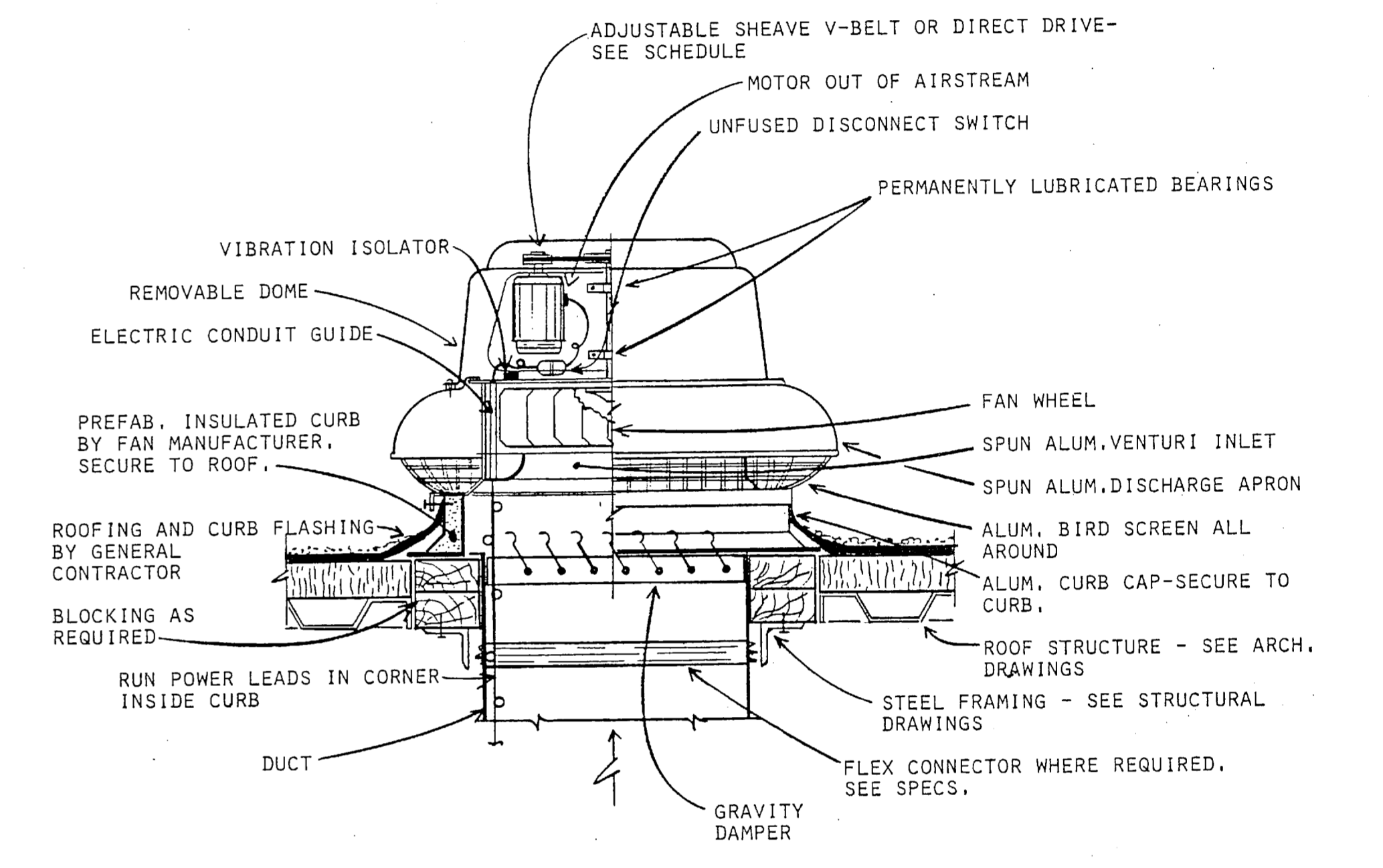
ROOF EXHAUST FAN
NO SCALE
17
M-2/M-6



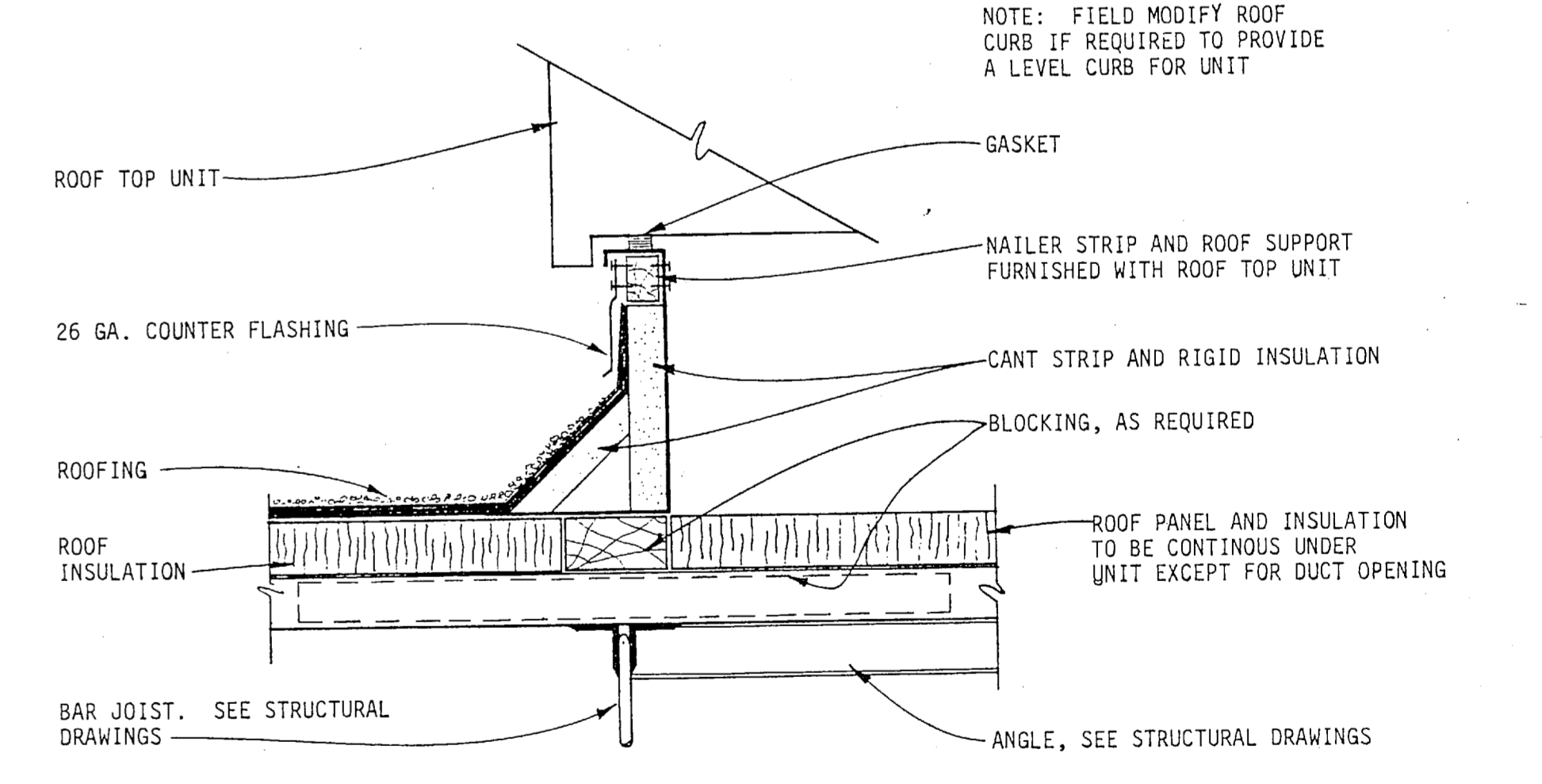
UTILITY FAN DETAIL
(ENGINE EXHAUST FAN)
NO SCALE
18
M-2/M-6



WINCH DETAIL
NO SCALE
19
M-2/M-6



ROOF EXHAUST FAN
NO SCALE
20
M-2/M-6



ROOF TOP UNIT EQUIPMENT SUPPORT
NO SCALE
21
M-3/M-6

FC 255
RECORD DRAWING
LETTER DATED

M-6

CONSULTANT	McNAIR, JOHNSON & ASSOCIATES ARCHITECTS ENGINEERS PLANNERS 1629 WASHINGTON STREET P.O. BOX 84 COLUMBIA, S.C. 29902	DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
DESIGNED BY	DR. WILDS, DR. WILDS, CHM. MCGHEE	NAVAL STATION	ATLANTIC DIVISION
PROJECT MGR.	JOHNSON, ENGR. JOHNSON	MARINE CORPS BASE	CAMP LEJEUNE, N.C.
SUBMITTED BY	DATE: 01/11/89	AUTOMOTIVE ORGANIZATIONAL SHOP	
FIRM MEMBER	DATE: 01/11/89	MECHANICAL DETAILS	
PRINCIPAL		SIZE	CODE IDENT. NO.
APPROVED:	DATE: 1/11/89	F	80091
ACTIVITY - SATISFACTORY TO	DATE: 05/31/85	NAVFAC DRAWING NO.	4124889
FOR EFD FOR COMMANDER, NAVFAC		CONSTR. CONTR. NO.	N62470-82-B-2270
		SCALE:	AS SHOWN SPEC. 05-82-2270
			SHEET 40 OF 60



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	AS BUILT, NO CORRECTIONS	4/17/84 E.V.S.	

STEAM TO WATER CONVERTER SCHEDULE								
MARK	TYPE	WATER SIDE (TUBE)				STEAM SIDE (SHELL)		
		GPM	E.W.T.*F	L.W.T.*F	MEH	P.D.FT.	LBS/HR	ENTERING PRESSURE
HE-1	SHELL & TUBE	48	145	180	78.7	3	828	3 PSI

NOTE: FOULING FACTOR SHALL BE .0015

SPLIT SYSTEM A.C. UNIT SCHEDULE															
MARK	TYPE	CFM	O.A. CFM	ESP	HP	VOLTS/PHASE	INDOOR SECTION				OUTDOOR SECTION				
							TOTAL	SENSIBLE	ENT. AIR	HOT WATER CAPACITY	H.W. GPM	H.W. COLL. MAX. FACE VELOCITY	MARK	VOLTS/PHASE	EER
AH-1	VERTICAL	1600	50	65"	1/2	208/1	41.6	36.0	78.3	65.0	SEE HNC-4	ACCU-1	480/3	8.5	R-22
AH-2	VERTICAL	200	100	45"	1/2	208/1	30.3	23.2	78.5	66.4	SEE HNC-5	ACCU-1	480/3	7.8	R-22

* NET COOLING (NET COOLING = GROSS COOLING - FAN MOTOR HEAT)

ELECTRIC CONVECTION HEATER			
LOCATION	KW	VOLTS/PHASE	CONTROL
PAINT STORAGE	1.8	120/1	INTEGRAL T-STAT

NOTE: HEATER SHALL BE WALL MOUNTED; CLASS 1, GROUP D, DIVISION 2 EXPLOSION PROOF. LENGTH = 44"

CONDENSATE PUMP SCHEDULE						
MARK	NO. OF PUMPS	G.P.M.	DISC. PRESS.	H.P.	VOLTS/PHASE	RECEIVER SIZE
CP-1	2	9	60 PSI	2	480/3	14 GAL.

ROOF TOP A.C. UNIT SCHEDULE										
SYMBOL	AREA SERVED	CFM	O.A. CFM	E.S.P.	HP	VOLTS/PHASE	NET COOLING (MBH)			EER @ 81°
							TOT.	SENS.	ENT. AIR	
RTU-1	MATERIAL HANDLING	1400	100	.55"	1/2	480/3	33.7	30.0	78.1/66.6	8.6

NOTE: NET COOLING = GROSS COOLING - FAN MOTOR HEAT

WATER PUMP SCHEDULE						
MARK	TYPE	GPM	HEAD	RPM	HP*	VOLTS/PHASE
PI#2	INLINE	45	65	1750	1/2	208/3

* NEMA STARTER SIZE $\phi\phi$

HEAT PUMP SCHEDULE (OUTDOOR SECTION)						
MARK	SERVICE	VOLTS/PHASE	COMPRESSOR		OUTDOOR FAN	
			NO. 1 RATED	KW	NO.	HP EACH
HP-1	DISPATCHERS BLDG.	480/3	1	6.8	3.7	1 1/3

VENTILATING FAN SCHEDULE											
MARK	TYPE	AREA SERVED	CFM	ESP	HP	SUNES	DRIVE	VOLTS/PHASE	CONTROLLED	NEMA STARTER SIZE	
VF-1	WALL PROPELLOR	0.5M SER-10	3000	.1"	1/4	12.1	BELT	120/1	THERMOSTAT	NA	
MF-1	ROOF MTR SUPPLY	107 MAKE-UP	2400	.41"	1 1/2	700 RPM	BELT	208/3	INTERLOCKED WITH REF-1	$\phi\phi$	
MF-2	ROOF MTR SUPPLY	LOCKER MAKEUP	2015	.4"	1	650 RPM	BELT	208/3	INTERLOCKED WITH REF-3	$\phi\phi$	
UF-1	UTILITY	103 # 113	800	3.5"	1	1300 RPM	BELT	208/3	WALL SWITCH-SEE ELECTRICAL	$\phi\phi$	
CEF-1	CEILING MOUNTED	PROPAGATING TOILET	90	.2"	1/50	3.1	DIRECT	120/1	LIGHT SWITCH	NA	
WEF-1**	WALL MOUNTED	107	320*	.2"	1/2	3.7	DIRECT	120/1	INTERLOCKED WITH ILF-2	$\phi\phi$	
WEF-2	WALL MOUNTED	114	220*	.2"	1/25	3.6	DIRECT	120/1	INTERLOCKED WITH ILF-2	$\phi\phi$	
ILF-1	INLINE	103 # 113	800	.62"	1/4	8.7	BELT	120/1	INTERLOCKED W/ RESPECTIVE UP-1	$\phi\phi$	
ILF-2		TRIPLE AREA SUMMER VENTIL.	4470	.5"	1 1/2	17.4	BELT	208/3	WALL SWITCH-SEE ELECTRICAL	$\phi\phi$	
ILF-3		TRIPLE AREA WINTER VENTIL.	250	.4"	1/4	1.4	DIRECT	120/1	WALL SWITCH-SEE ELECTRICAL	NA	
ILF-4		MECH. ROOM VENTILATION	440	.2"	1/2	6.3	BELT	120/1	THERMOSTAT	$\phi\phi$	
ILF-5			110 # 111	220	.22"	1/30	1.4	DIRECT	120/1	EITHER LT. SWITCH	$\phi\phi$
REF-1**	ROOF MTR UPBLAST	107 HOD	2400	.1"	3/4	12.6	BELT	208/3	INTERLOCK WITH BATTERY CHARGER	$\phi\phi$	
REF-2	ROOF MOUNTED	181 FL. ETR. AREA	3710	.24"	1/2	10.9	BELT	120/1	INTERLOCK WITH ILF-2	ϕ	
REF-3	ROOF MOUNTED	LOCKER RMS	2090	.19"	1/4	7.3	BELT	120/1	WALL SWITCH-SEE ELECTRICAL	NA	
REF-4	ROOF MOUNTED	122 # 123	2435	.22"	1/30	5.4	DIRECT	120/1	EITHER LT. SWITCH	NA	
REF-5	ROOF MOUNTED	125	1800	.1"	1/4	5.4	BELT	120/1	THERMOSTAT	NA	

* BALANCE AIR FLOW WITH SOLID STATE SPEED CONTROLLER
 **EXPLOSION PROOF FAN AND MOTOR (CLASS 1, GROUP D, DIVISION 2)
 NOTE: PROVIDE MF-1 #2 WITH INTEGRAL FILTER. PROVIDE ILF-1 AND ILF-3 WITH FILTER RACK

FUME EXHAUST DROP ADAPTER SCHEDULE					
MARK	FLEXIBLE DROP SIZE	ADAPTER SIZE	TOTAL LENGTH OF FLEXIBLE DUCT	LENGTH OF RIGID BRANCH DUCT	REMARKS
ALL DROPS	4 1/2"	6"	25'-6"	20'-0"	SEE DETAIL DESCRIPTION OF LENGTHS 17 FOR M6

HEAT PUMP SCHEDULE (INDOOR SECTION)										
MARK	VOLTS/PHASE	CFM	FAN ESP	HP	NET COOLING*		HEATING		O.A. CFM	
					TOT	SEN E.A.	CAP. @ 17°F DB	AUX. HTRS.		
AH-3	208/1	1050	35"	1/2	25.9	20.9	75.1/67.7	21.6 MBH	3.6 KW	90

NOTE: NET COOLING = GROSS COOLING - FAN MOTOR HEAT
 * @ A.R.I. CONDITIONS: SEER = 8.0, HSPF = 6.0, SEER + HSPF = 14.5

HOT WATER CABINET UNIT HEATER SCHEDULE									
MARK	AREA SERVED	TYPE	VOLTS/PHASE	HP	MBH*	WATER TEMPERATURE		GPM	CFM
						ENT. °F	LEAVE °F		
HUH-1	105, 115, 214, 213, 210	ROOF INLET FRONT DISC	120/1	1/60	9.6	180	140	0.5	14.5
HUH-1	109 AND 127	VEPT. FRONT INLET, TOP DISC	120/1	1/60	9.6	180	140	0.5	14.5

* BASED ON 60°F EAT, 1.0 FT. WATER P.D.
 NOTE: PROVIDE 3/4" RUNOUTS, SUPPLY AND RETURN FOR EACH HEATER. PROVIDE HEATERS WITH INTERNAL THERMOSTATS

UNIT HEATER SCHEDULE									
MARK	AREA SERVED	TYPE	VOLTS/PHASE	HP	MBH*	WATER TEMPERATURE		GPM	CFM
						ENT. °F	LEAVE °F		
HUH-1	101	HOT WATER	120/1	1/20	19.7	180	150	1.35	815
HUH-2	103	HOT WATER	120/1	1/8	28.1	180	140	1.45	1214
HUH-3	113	HOT WATER	120/1	1/8	36.7	180	150	2.52	1214
HUH-4	125	HOT WATER	120/1	1/20	19.7	180	150	1.35	815

* BASED ON 60°F EAT, 1.0 FT. WATER P.D. MAX.
 NOTE: PROVIDE 3/4" RUNOUTS, SUPPLY AND RETURN FOR EACH HEATER.

DUCT MOUNTED HOT WATER COIL SCHEDULE									
MARK	FAN SERVED	CFM	SIZE	CAPACITY (MBH)	GPM	WATER P.D. (FT.)	AIR P.D. (IN.)	SUPPLY RUNOUT SIZES	RETURN
HWC-1	ILF-1	800	16x12	32.0*	1.6	1.0	0.2	3/4"	3/4"
HWC-2	MF-1	2400	26x24	96.4*	4.8	1.0	0.2	1"	1"
HWC-3	ILF-3	250	12x12	10.1*	1.0	1.0	0.1	3/4"	3/4"
HWC-4	AH-1	1600	34x12	69.2**	3.5	1.0	0.2	3/4"	3/4"
HWC-5	AH-2	1200	26x12	43.2**	2.9	1.0	0.2	3/4"	3/4"
HWC-6	MF-2	2230	32x18	89.6*	4.5	1.0	0.2	1"	1"
HWC-7	RTU-1	1400	20x18	60.5**	3.1	1.0	0.2	3/4"	3/4"

* BASED ON 180°F ENT AND 23°F EAT
 ** BASED ON 180°F ENT AND 66°F E.A.T.
 NOTE: PROVIDE HWC-1, 2, 3, & 6 WITH FACE AND BY-PASS DAMPERS, SEE DETAIL 7 M2/M5

HOT WATER FINNED RADIATION SCHEDULE									
SYMBOL	TYPE	MBH*	ROWS	ELEMENT LENGTH (FT)	DEPTH (IN)	HEIGHT (IN)	RUNOUT	MOTOR VALVE	TD
BH	WALL FIN	827	1	SEE NOTE	6	12	1/2"	2.1	3 PSI

NOTE: SCHEDULE IS PER FOOT OF BASEBOARD. LENGTH IS SPECIFIED ON FLOOR PLAN (BH - 2'-0" = 2'-0"). WALL FIN ELEMENT SHALL BE 1" COPPER TUBE/ALUMINUM FIN CONSTRUCTION, 68 FINS PER FOOT.

FC 255

RECORD DRAWING
LETTER DATED

CONSULTANT

MONAR, JOHNSON & ASSOCIATES
ARCHITECTS ENGINEERS PLANNERS
1520 WASHINGTON STREET
P.O. BOX 84 COLUMBIA, S.C. 29202

DESIGNED BY: DR. WILDS, DR. CARTER, CH. MCGHEE
PROJ. MGR. JOHNSON, ENGR. JOHNSON
SUBMITTED BY: [Signature]
TEAM MEMBER: [Signature] PRINCIPAL
EFD. P.F. 200 RVD. 1/78

APPROVED: [Signature] DATE: 2/21/84

ACTIVITY - SATISFACTORY TO DATE
APPROVED: [Signature] DATE: 2/21/84

FOR EFD FOR COMMANDER, NAVFAC

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

ATLANTIC DIVISION

NAVAL STATION NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.

AUTOMOTIVE ORGANIZATIONAL SHOP

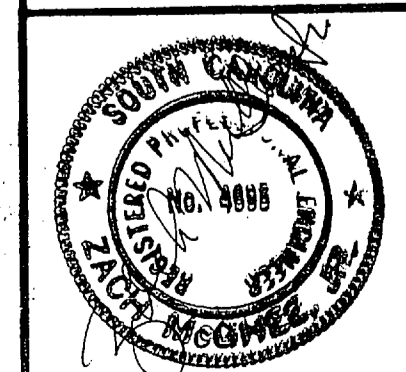
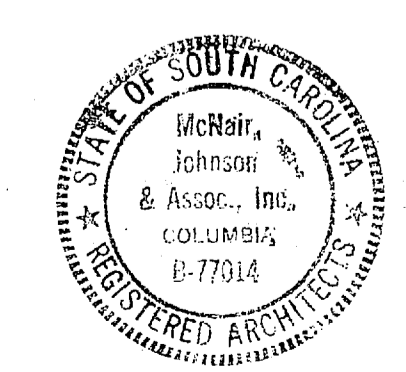
MECHANICAL SCHEDULE

SIZE: CODE IDENT. NO. NAVFAC DRAWING NO.
F 80091 4124887

CONSTR. CONTR. NO. N62470-82-B-2270

SCALE: AS SHOWN SPEC. 05-82-2270 SHEET 38 OF 50

M-4



10

1000

HVAC NOTES

- DO NOT SCALE DRAWINGS. ROUGH FROM EQUIPMENT MANUFACTURER'S AND ARCHITECTURAL DRAWINGS.
- DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
- WHEREVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE."
- ELECTRICAL CHARACTERISTICS SHOWN ON SCHEDULES OR DRAWINGS ARE DESIGN VALUES ONLY AND SHALL BE VERIFIED BEFORE ORDERING EQUIPMENT.
- WHERE NOTED, LOCATE ABOVE CEILING.
- WHERE NOTED, LOCATE EXPOSED. HOLD HIGH AS PRACTICABLE.
- WHERE NOTED, RUN INSIDE WALL.
- PROVIDE "P" TRAP FOR ALL CONDENSATE DRAINS AND SAFETY DRAINS. PROVIDE INSULATED DRAIN LINES FROM ALL DRAIN CONNECTIONS TO FLOOR DRAINS OR DRAINAGE SYSTEM.
- DUCT SIZES SHOWN ON DRAWINGS ARE INTERIOR DIMENSIONS.
- CONSTRUCT DUCTWORK AS JOB PROGRESSES AND AFTER COORDINATING WITH ALL CONCERNED TRADES AND CONTRACTORS.
- WHERE DUCTS PASS OVER RECESSED LIGHT FIXTURES, MAINTAIN 7-INCH CLEARANCE FROM CEILING TO BOTTOM OF DUCT.
- CEILING DIFFUSERS ARE FOUR-WAY BLOW UNLESS OTHERWISE INDICATED.
- RUN REFRIGERANT LINES 12-INCHES BELOW GRADE IN PVC PIPE. SEAL OUTDOOR ENDS WATER TIGHT.
- PROVIDE GATE VALVES AND UNIONS FOR EACH PIECE OF PIPED EQUIPMENT.
- PIPE DRAINS TO ABOVE FLOOR DRAIN. KEEP WALKING AND SERVICE AREAS CLEAR OF PIPING, ETC.
- PIPE RELIEF VALVE DISCHARGE TO OUTDOORS. PROVIDE ELBOW LOOKING DOWN AT END OF PIPE.
- PROVIDE BALANCING VALVES AT EACH FLOW METER NOT INTERNALLY EQUIPPED.
- PROVIDE ACCESS DOORS FOR ALL HOT WATER COILS AND FIRE DAMPERS.
- 6-INCH DIAMETER OUTSIDE AIR DUCT UP TO ROOF INTAKE VENT.
- SLOPE CONDENSATE RETURN PIPING GOING TO CONDENSATE RETURN UNIT RECEIVER 1/4-INCH PER 10-FEET IN DIRECTION OF FLOW.

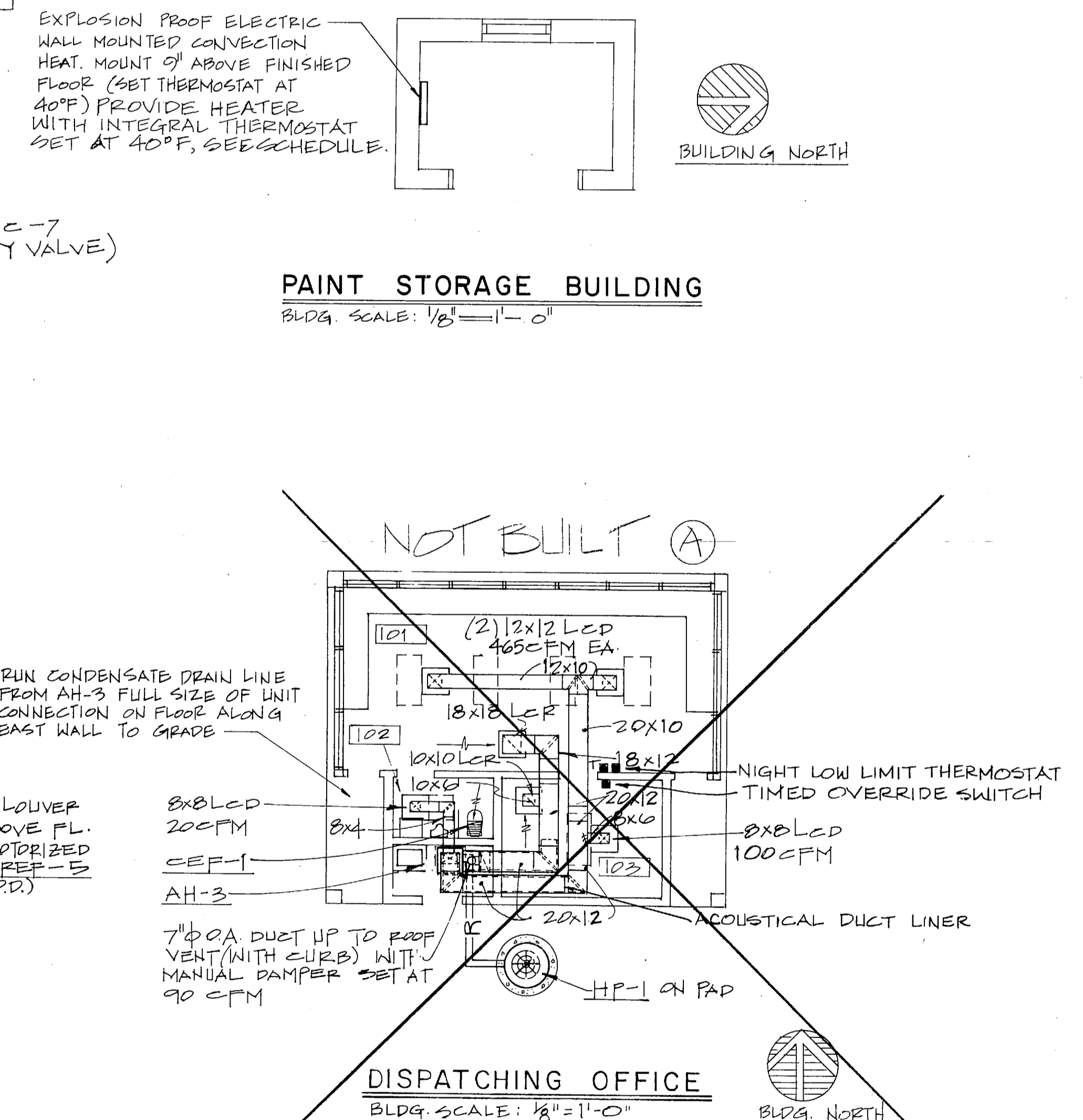
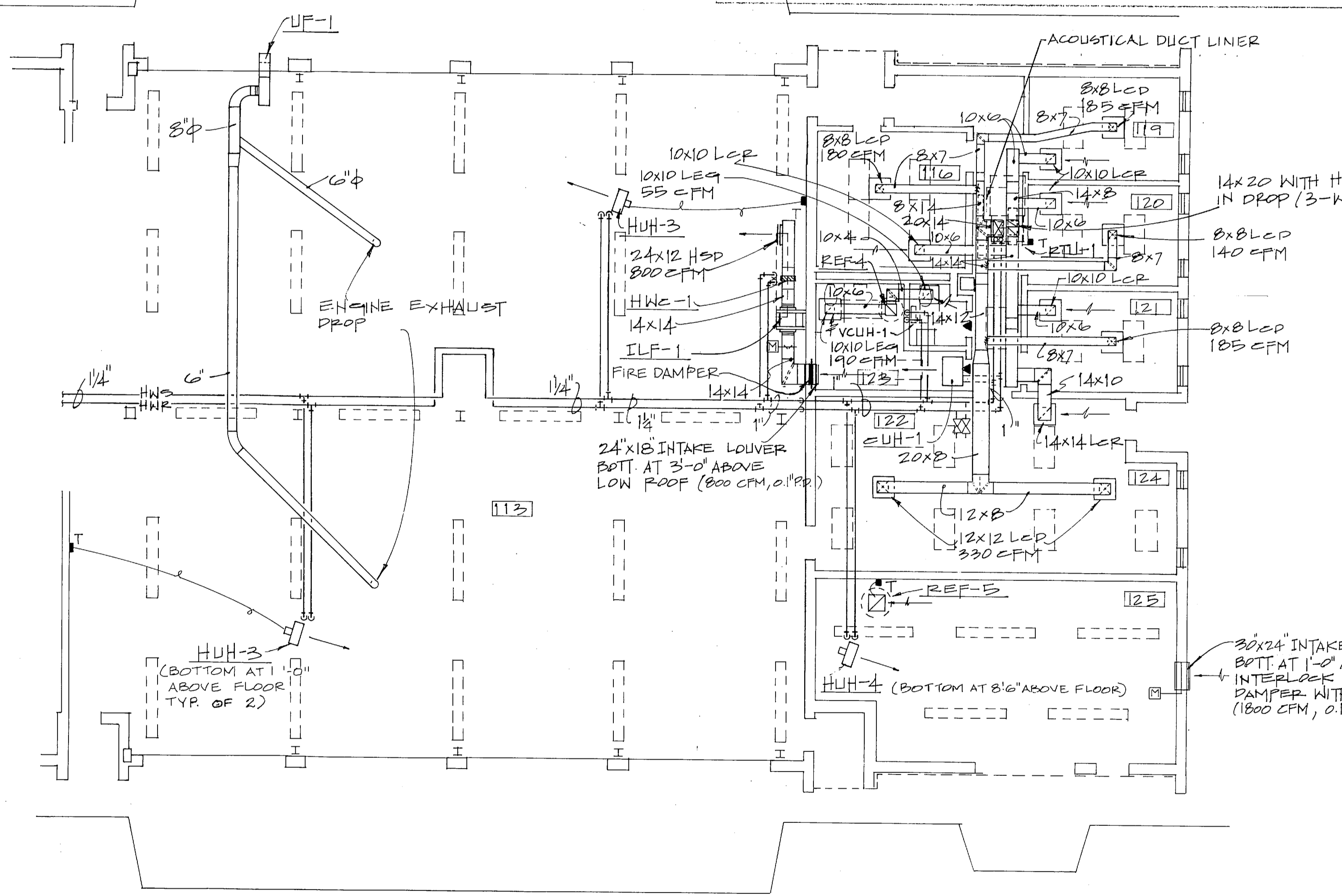
HVAC SYMBOLS

☐	SUPPLY AIR DUCT	— —	CHECK VALVE
☐	RTN. OR O.A. DUCT	— —	GLOBE VALVE
CFM	CUBIC FEET PER MIN.	— —	PRESS. REDUCING VALVE
— —	MANUAL DAMPER	— —	PRESS. RELIEF VALVE
— —	SPLITTER DAMPER	— —	SQUARE HEAD BALANCING COCK
— —	TURNING VANE	— —	MOTOR OPERATED VALVE
FC	FLEXIBLE CONNECTION	— —	CIRCUIT SETTER
■	THERMOSTAT	— —	CIRCUIT SENSOR
— —	REFRIGERANT PIPING	— —	AAV AUTOMATIC AIR VENT
— —	PIPE RISING	— —	MAV MANUAL AIR VENT
— —	PIPE TURNING DOWN	— —	HOSE END DRAIN VALVE
— —	FL. DRAIN, SEE PLBG. DWGS.	— —	THERMOMETER
▲	UNDERCUT DOOR APPROX 1" SEE ARCH. DWGS.	— —	PRESSURE GAGE
— —	DRAIN PIPE	— —	PIPE GUIDE
— —	F.D.P.R. FIRE DAMPER	— —	PIPE ANCHOR
— —	GAS PIPE	— —	EXPANSION JOINT
— —	DG DOOR GRILLE	— —	CONDENSER WATER SUPPLY PIPE
— —	NAMEPLATE	— —	CONDENSER WATER RETURN PIPE
— —	HWS HEATING WATER SUPPLY PIPE	— —	FOS FUEL OIL SUPPLY PIPE
— —	HWR HEATING WATER RETURN PIPE	— —	FOR FUEL OIL RETURN PIPE
— —	CWS CHILLED WATER SUPPLY PIPE	— —	FOG FUEL OIL GAGE PIPE IN CONDUIT
— —	CWR CHILLED WATER RETURN PIPE	— —	FUV FUEL OIL VENT PIPE
— —	UNION	— —	MPS MEDIUM PRESSURE STEAM PIPE
— —	PITCH PIPE DOWN	— —	MPC MED. PRESS. COND. RTN. PIPE
— —	STRAINER	— —	HPS HIGH PRESSURE STEAM PIPE
— —	GATE VALVE	— —	HPC HIGH PRESS. COND. RTN. PIPE
— —	FAN SWITCH	— —	LPS LOW PRESSURE STEAM PIPE
		— —	LPC LOW PRESS. COND. RTN. PIPE

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
①	CORRECTED PER 0002	4/17/89	MC

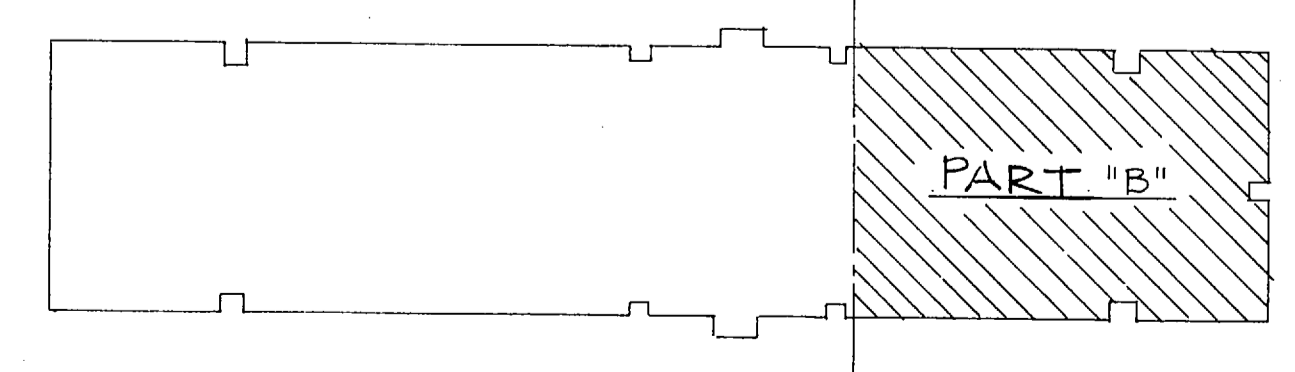
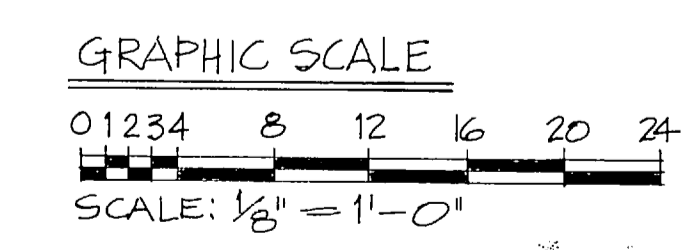
GRILLE & DIFFUSER SCHEDULE

MARK	DESCRIPTION
LCD	LAY-IN PERFORATED SUPPLY DIFFUSER WITH OBD
LCR	LAY-IN PERFORATED CEILING RETURN GRILLE WITH OBD
CEG	PERFORATED SURFACE MOUNTED CEILING EXHAUST GRILLE WITH OBD
LEG	LAY-IN PERFORATED CEILING EXHAUST GRILLE WITH OBD
HSD	HIGH SIDEWALL DIFFUSER (DOUBLE DEFLECTION) WITH OBD
RAG	SIDEWALL RETURN AIR GRILLE
EG	SIDEWALL EXHAUST GRILLE WITH OBD



FIRST FLOOR PLAN - PART "B"
BLDG SCALE: 1/8" = 1'-0"

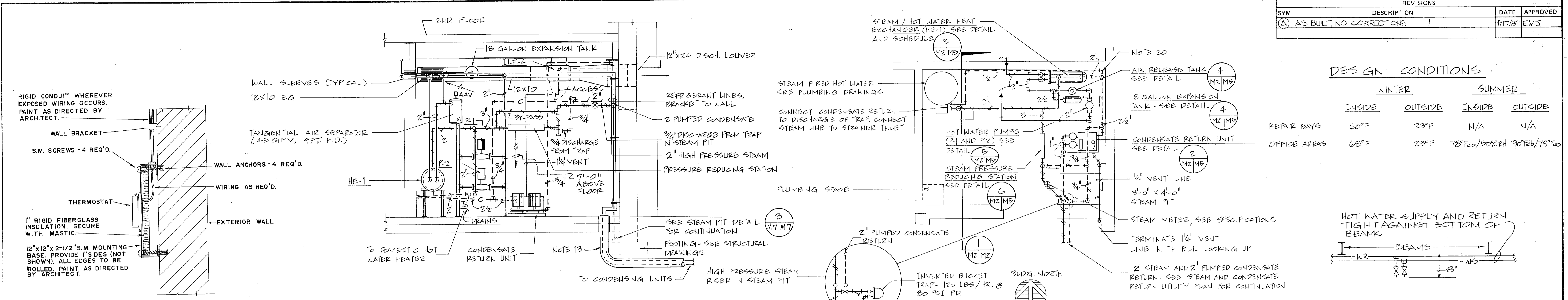
BLDG. NORTH



FC 255
RECORD DRAWING
LETTER DATED 4/8/89
M-3

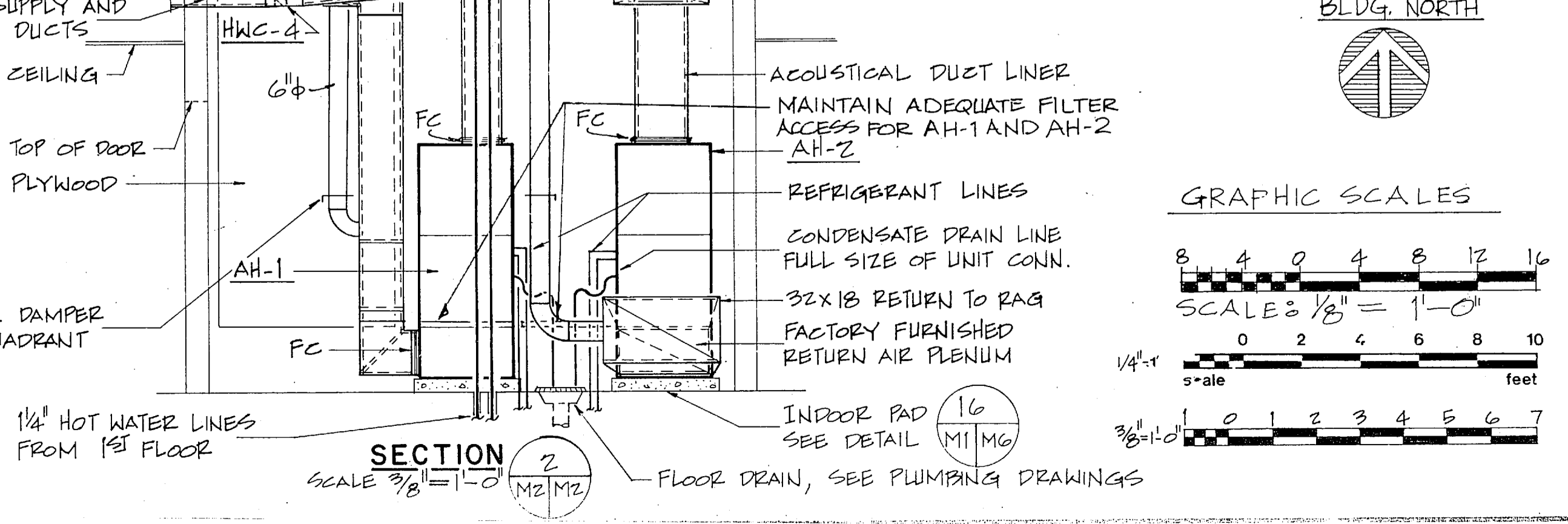
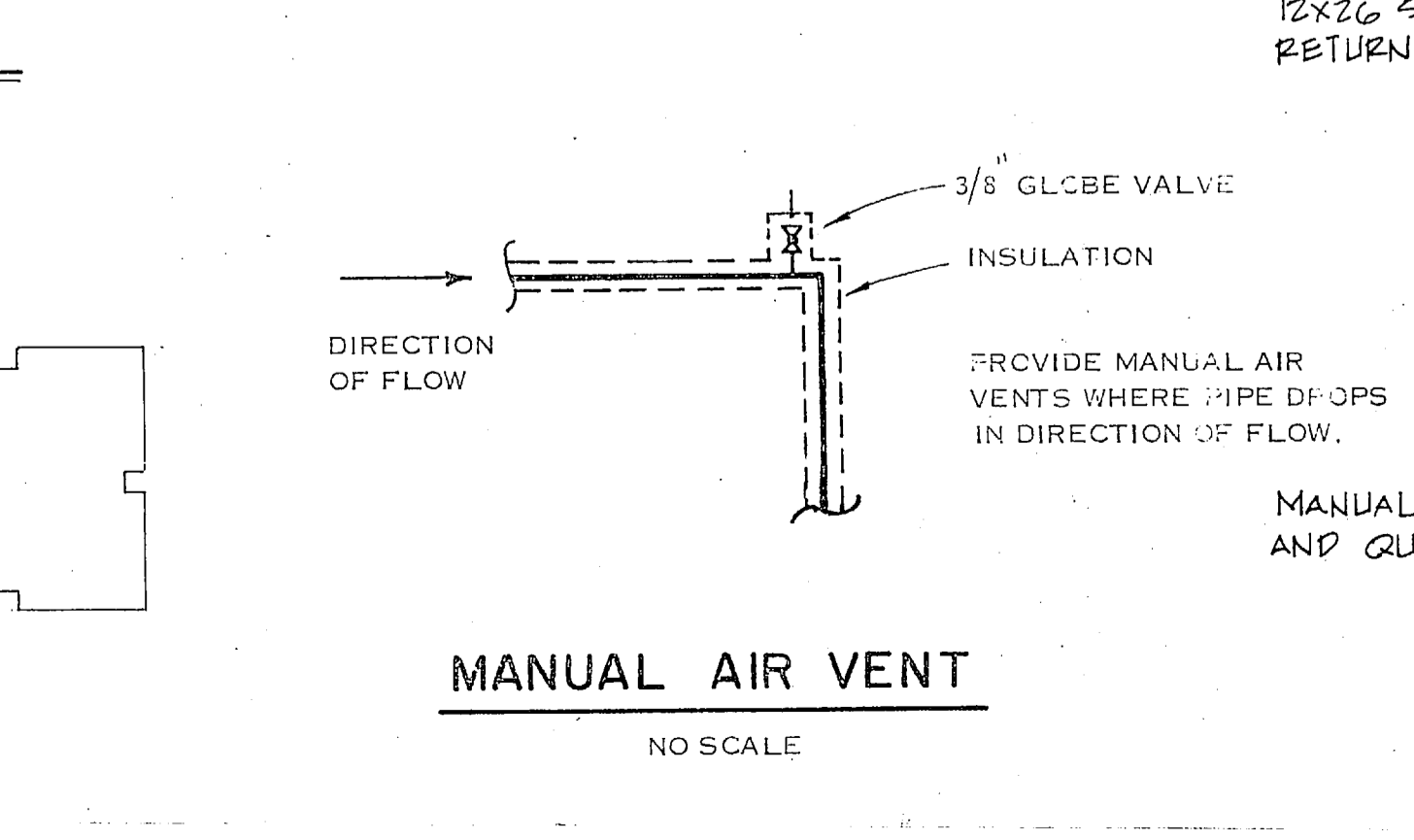
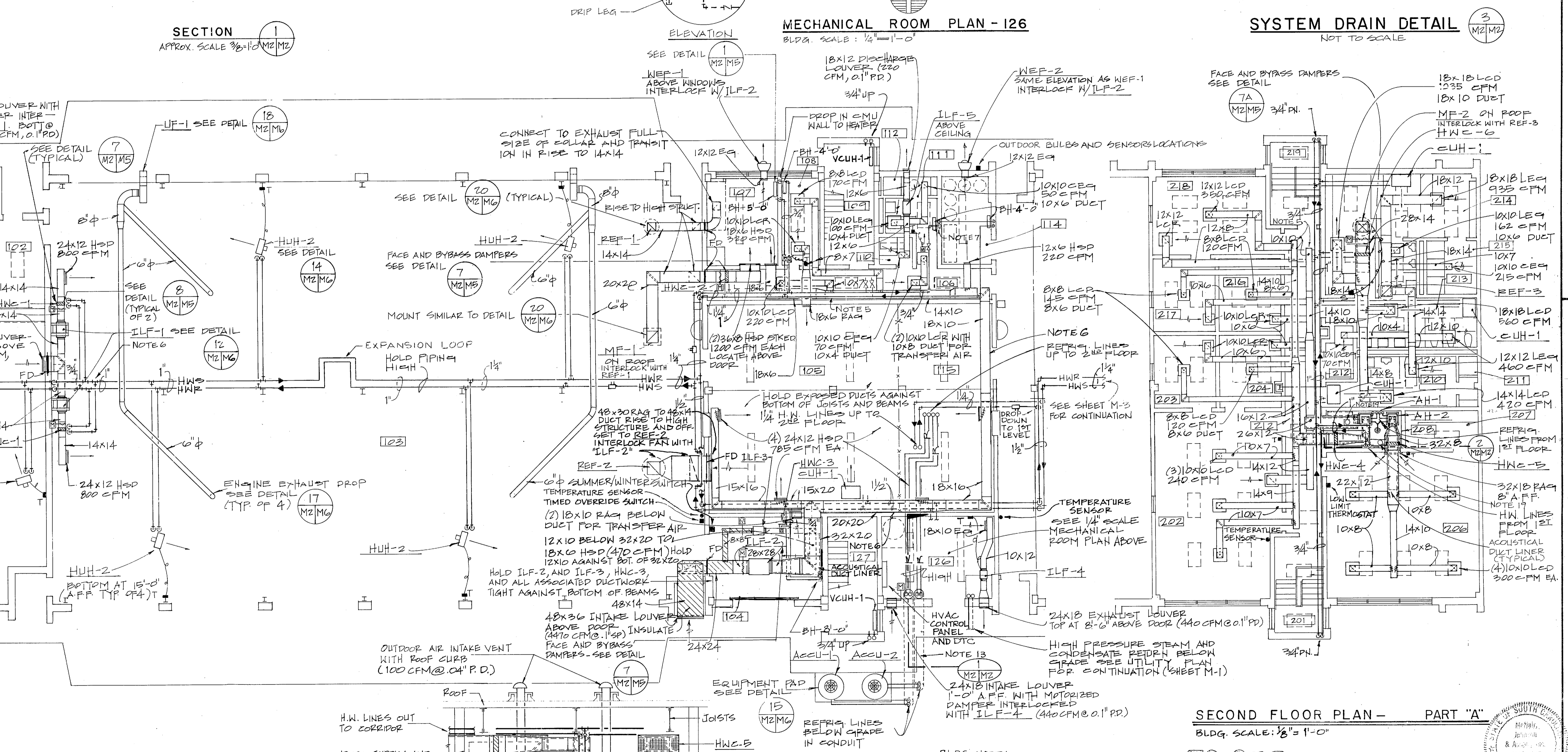
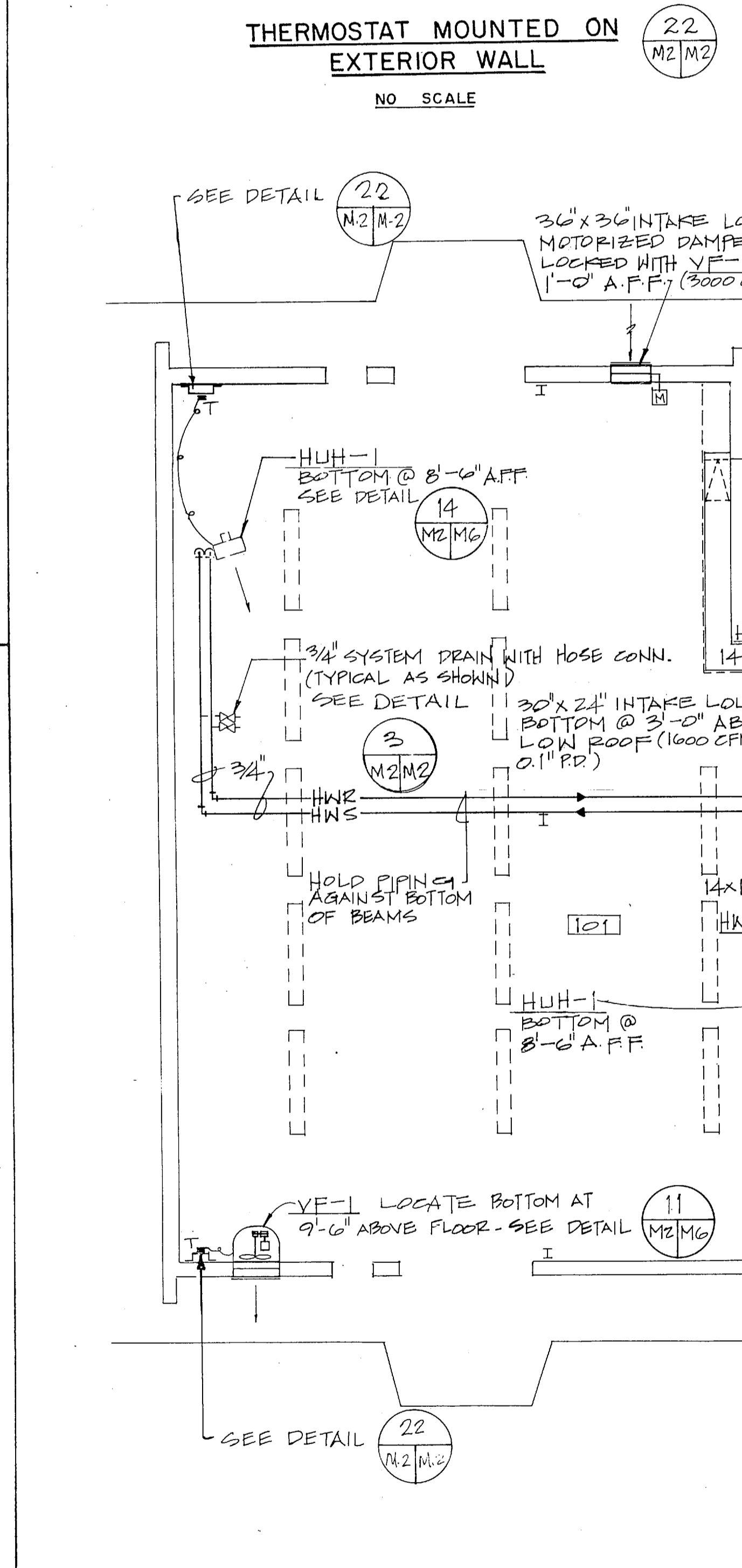
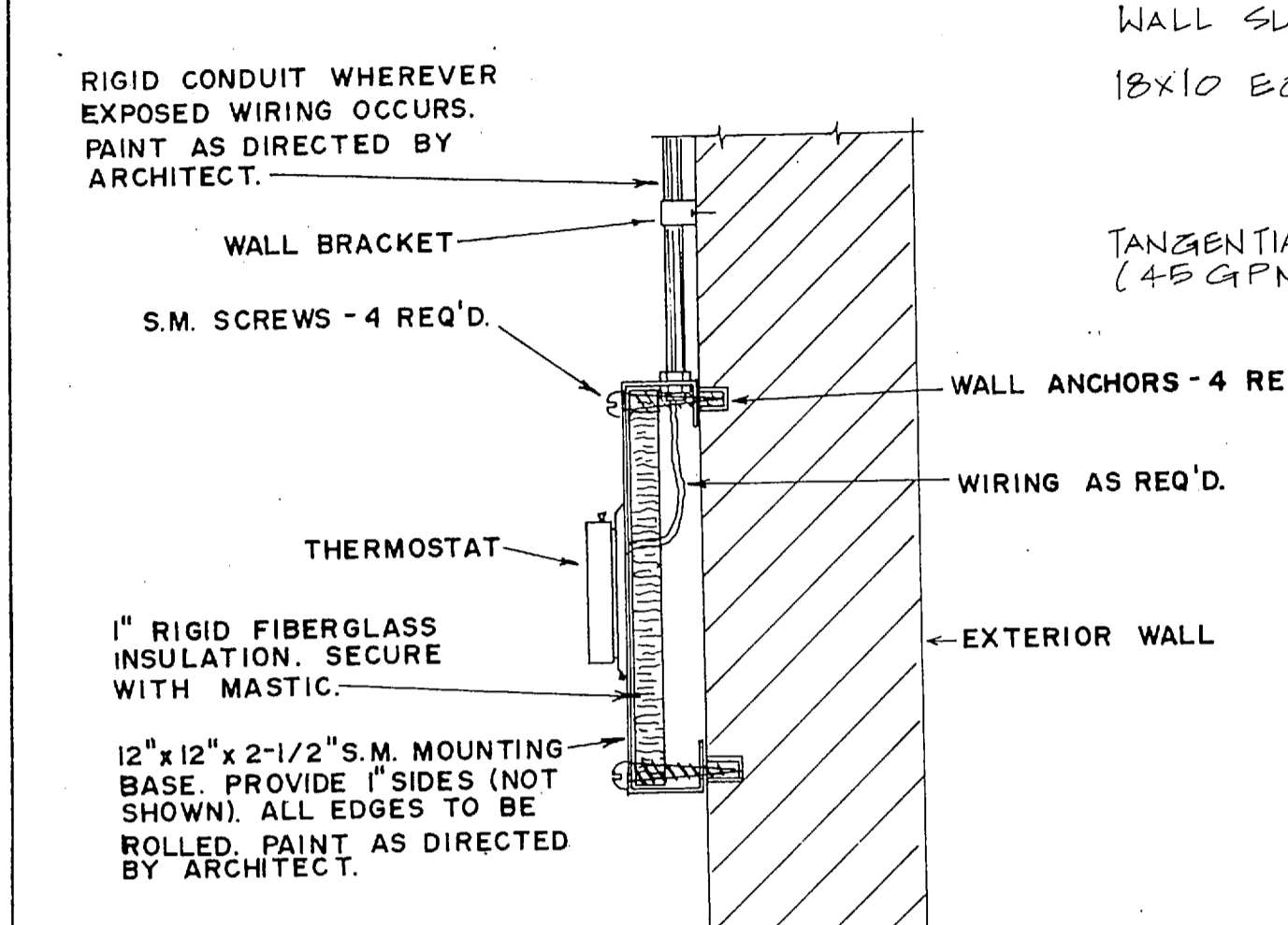
CONSULTANT	McNair, Johnson & Associates ARCHITECTS ENGINEERS PLANNERS 1508 WASHINGTON STREET P.O. BOX 84 COLUMBIA S.C. 29202	DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NAVAL STATION NORFOLK, VIRGINIA	
DESIGNED BY	DR. CARTER	CHECKED BY	CHK. MCGHEE
PROJECT MGR.	JOHNSON	ENGR.	JOHNSON
SUBMITTED BY	W. S. JOHNSON	DATE	01 JUL 89
FIRM MEMBER	PRINCIPAL	NO.	122
REV. DATE	REV. DATE	REV. DATE	REV. DATE
APPROVED:	DATE:	APPROVED:	DATE:
ACTIVITY - SATISFACTORY TO	DATE:	ACTIVITY - SATISFACTORY TO	DATE:
FOR EFD FOR COMMANDER, NAVFAC	DATE:	FOR EFD FOR COMMANDER, NAVFAC	DATE:
		SCALE: AS SHOWN	SPEC. 05-82-2270
			SHEET 37 OF 50
			EFD. DWG. NO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	AS BUILT NO CORRECTIONS	4/17/84	ELVJS



DESIGN CONDITIONS

	WINTER		SUMMER	
	INSIDE	OUTSIDE	INSIDE	OUTSIDE
REPAIR BAYS	60°F	23°F	N/A	N/A
OFFICE AREAS	68°F	23°F	78°F DB / 50°F RH	90°F DB / 79°F RH



GRAPHIC SCALES

8 4 0 4 8 12 16
SCALES 1/8" = 1'-0"

0 2 4 6 8 10
SCALE 1/4" = 1'-0"

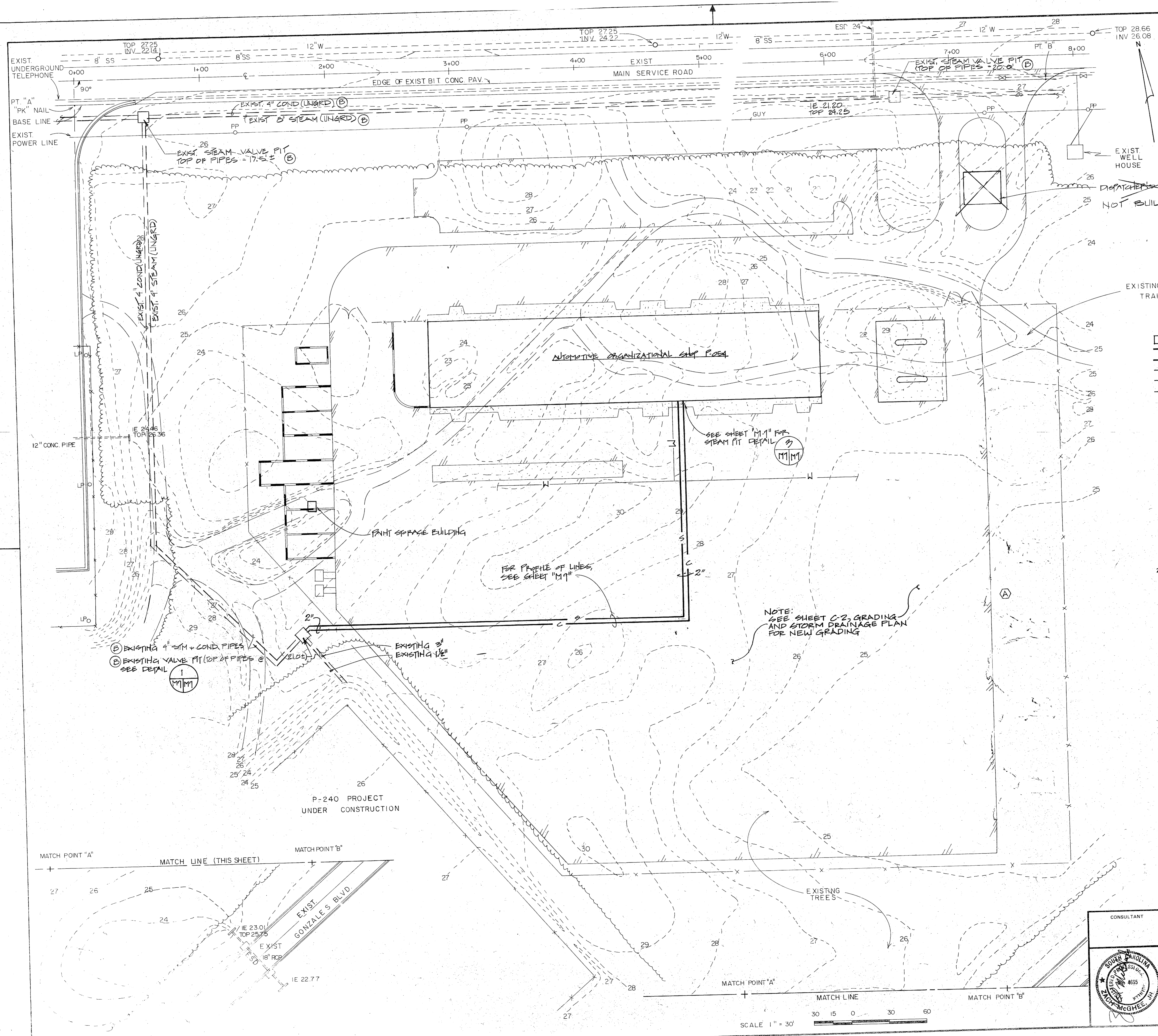
0 1 2 3 4 5 6 7
SCALE 3/16" = 1'-0"

RECORD DRAWING LETTER DATED M-2

CONSULTANT	MONAR, JOHNSON & ASSOCIATES ARCHITECTS ENGINEERS PLANNERS 1528 WASHINGTON STREET P.O. BOX 84 COLUMBIA, S.C. 29202	DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
DESIGNED BY	DR. CARTER MCGHEE	STATION	ATLANTIC DIVISION
PROJECT	MARINE CORPS BASE CAMP LEJEUNE, N.C.	NAVAL STATION	NORFOLK, VIRGINIA
SUBMITTED BY	MONAR, JOHNSON & ASSOCIATES	NAVAL STATION	MARINE CORPS BASE CAMP LEJEUNE, N.C.
FIRM NUMBER	442	NAVAL STATION	AUTOMOTIVE ORGANIZATIONAL SHOP
MEMBER	DR. CARTER MCGHEE	NAVAL STATION	PART 'A' MECHANICAL FLOOR PLAN
PRINCIPAL	DR. CARTER MCGHEE	NAVAL STATION	SIZE CODE IDENT. NO. NAVFAC DRAWING NO.
APPROVED	DR. CARTER MCGHEE	NAVAL STATION	4124885
DATE	1/28/84	NAVAL STATION	CONSTR. CONTR. NO. NS2470-82-B-2270
FOR EFD FOR COMMANDER, NAVFAC	DR. CARTER MCGHEE	NAVAL STATION	SCALE: AS SHOWN SPEC. 05-82-2270



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
(A)	ELIMINATE TANK TRUCK PARKING	12/28/85	MC
(A)	CORRECTED PER AMEND 0002	4/17/89	MC
(C)	CORRECTED PER SK-C-33-86	4/10/89	MC



UTILITY STEAM LEGEND

[Solid Line]	STRUCTURE
[Dashed Line]	NEW STEAM LINE
[Dotted Line]	NEW TUMPTED CONDENSATE RETURN LINE
[Dash-dot Line]	EXISTING STEAM LINE
[Dash-dot-dot Line]	EXISTING TUMPTED CONDENSATE RETURN LINE
[Line with 'W']	UNDERGROUND WATER LINE

- UTILITY STEAM NOTES**
1. LOCATIONS OF EXISTING AND NEW UTILITIES TO BE CONSTRUCTED AS SHOWN ON DRAWINGS ARE APPROXIMATE. EXACT LOCATIONS SHALL BE DETERMINED IN FIELD.
 2. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE INSTALLATION OF STEAM AND CONDENSATE DISTRIBUTION WITH ALL OTHER UTILITIES, DRIVES, AND WALKS.

NOTE: SEE SHEET C-2, GRADING AND STORM DRAINAGE PLAN FOR NEW GRADING

FOR PROFILE OF LINES, SEE SHEET "M-1"

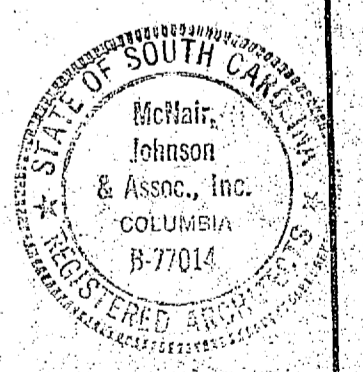
SEE SHEET "M-1" FOR STEAM FIT DETAIL

P-240 PROJECT UNDER CONSTRUCTION

MATCH POINT "A" MATCH LINE (THIS SHEET) MATCH POINT "B"

MATCH POINT "A" MATCH LINE MATCH POINT "B"

SCALE 1" = 30'



FC 255
RECORD DRAWING
LETTER DATED
M-1

CONSULTANT	MCNAIR, JOHNSON & ASSOCIATES ARCHITECTS ENGINEERS PLANNERS 1529 WASHINGTON STREET #200 BOX #4 COLUMBIA S.C. 29202	DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
DESIGNED BY	DES WILDS DR WILDS	NAVAL STATION	NORFOLK, VIRGINIA
PROJECT NO.	05-82-2270	MARINE CORPS BASE	CAMP LEJEUNE, N.C.
DATE OF SUBMITTAL	05/10/89	AUTOMOTIVE ORGANIZATIONAL SHOP	
PRINCIPAL	W. H. JOHNSON	UTILITY STEAM DISTRIBUTION PLAN	
FIRM MEMBER	W. H. JOHNSON	NAVIFAC DRAWING NO.	4124864
DATE	05/10/89	SIZE	F 80091
APPROVED	W. H. JOHNSON	CONSTR. CONTR. NO.	NG2470-82-B-2270
DATE	05/10/89	SCALE AS SHOWN	05-82-2270
FOR EFD FOR COMMANDER, NAVIFAC		SHEET 26	OF 50

