





## FUNCTIONAL ANALYSIS - VE PAYS

## SYMBOLS

## ABBREVIATIONS

## NOTES

SYMBOL	ABBREVIATION	DESCRIPTION	SYMBOL	ABBREVIATION	DESCRIPTION
		ARROW INDICATES DIRECTION OF FLOW		PG	PRESSURE GAGE
		ARROW INDICATES DIRECTION OF PIPE SLOPING DOWN		RFBP	REDUCED PRESSURE BACKFLOW PREVENTER
	AGV	ANGLE VALVE			INCREASER/DECREASER
	BV	BALL VALVE			RELIEF VALVE
		CAPPED PIPE			SOLENOID VALVE
	FCO	FLOOR CLEAN-OUT			TEE DOWN
	COTG	CLEAN-OUT TO GRADE			TEE UP
	FD	FLOOR DRAIN		TP	TRAP PRIMER
	FS	FLOOR SINK		WHA	WATER HAMMER ARRESTOR
	GV	GATE VALVE			
	(IE )	INVERT ELEVATION (BELOW 0'-0")			
		PIPE DOWN			
		PIPE UP			
		WALL CLEAN-OUT			
		UTILITY CONNECTION			
		CONTINUATION SHEET			

## PLUMBING: PIPE CALL OUTS:

DCW	COLD WATER (DOMESTIC)
DHW	HOT WATER (DOMESTIC)
ICW	INDUSTRIAL COLD WATER
IHW	INDUSTRIAL HOT WATER
V	SANITARY SEWER VENT
W	SOIL/WASTE BELOW GRADE
W	SOIL/WASTE ABOVE GRADE
SC	SPILL COLLECTION
IW	INDUSTRIAL WASTE
FSD	FIRE SPRINKLER DISCHARGE DRAIN
BA	BREATHING AIR
PA	PAINT AIR
IA	INSTRUMENT AIR
CA	COMPRESSED AIR

AD	AIR DRYER	IE	INVERT ELEVATION (REFERENCED BELOW 0'-0")
AFFF	AQUEOUS FILM FORMING FOAM	IN OR "	INCH OR INCHES
BAU	BREATHING AIR UNIT	IAU	INSTRUMENT AIR UNIT
BOP	BOTTOM OF PIPE	L	LAVATORY
CAF	COMPRESSED AIR FILTER	LBS	POUNDS
CLG	CEILING	MIN	MINIMUM
COTG	CLEANOUT TO GRADE	OD	OUTSIDE DIAMETER
CW	COLD WATER	OC	ON CENTER
CU FT	CUBIC FEET	PRV	PRESSURE REDUCING VALVE
CV	VALVE COEFFICIENT	PS	PIPE SUPPORT
DEG OR °	DEGREE	PSI	POUNDS PER SQUARE INCH
DIA	DIAMETER	ROD	REQUIRED
DRG OR DWG	DRAWING	SK	SINK
EA	EACH	SC	SPILL COLLECTION
EC	EVAPORATIVE COOLER	SH	SHOWER
ECU	EVAPORATIVE COOLING UNIT	SQ	SQUARE
EDF	ELECTRIC DRINKING FOUNTAIN	SQ FT	SQUARE FEET
ES/EW	EMERG. SHOWER/EMERG. EYEWASH	SS	SERVICE SINK
EWC	ELECTRIC WATER COOLER	TEMP	TEMPERATURE
*F	DEGREES FARENHEIT	TYP	TYPICAL
FCO	FLOOR CLEAN OUT	T	TANK
FCU	FAN COIL UNIT	TK	TANK
FD	FLOOR DRAIN	UR	URINAL
FS	FLOOR SINK	V	VENT
FT OR'	FOOT OR FEET	VTR	VENT THROUGH ROOF
GAL	GALLON	W	WASTE
GPM	GALLONS PER MINUTE	WC	WATER CLOSET
HL	HANDICAP LAVATORY	WHA	WATER HAMMER ARRESTOR
HR	HOUR	WT	WEIGHT
HSH	HANDICAP SHOWER	WTS	WATER TREATMENT SYSTEM
HWC	HANDICAP WATER CLOSET		
HVAC	HEATING, VENTILATION AND AIR CONDITIONING		

- ELEVATIONS NOT REFERENCED FROM A DATUM: (EXAMPLE FINISHED FLOOR OR GRADE) ARE REFERENCED TO A 0'-0" DATUM AT 63'-6" ABOVE THE GEODETIC DATUM OF 1929.
- DATA FOR SPILL CONTAINMENT TANK (T-4) 8000 GAL. CAPACITY, DOUBLED WALLED STI-P3 (STEEL TANK INSTITUTE STANDARD) CATHODICALLY PROTECTED (30 YEAR WARRANTY) BUILT TO UNDERWRITERS LABORATORIES STANDARDS. BLAST SURFACE PER SSPC-SP-6 AND COAT WITH STI APPROVED CORROSION RESISTANT COATING. INSTALL HEAVY DUTY DIELECTRIC BUSHINGS. INCLUDE MANHOLE, 6" INLET, 6" VENT, LEAK DETECTION, HOLD DOWN STRAPS AND CONCRETE FOUNDATION. LEAK DETECTION SHALL BE AS FOR SC PIPING SYSTEM.
- CROSS REFERENCES ARE INDICATED AS SHOWN BELOW:  
  
INDICATES: SECTION, DETAIL, OR ELEVATION  
  
DRAWING REFERENCED TO  
DRAWING REFERENCED FROM
- FOR SUPPLY AND WASTE RISER DIAGRAMS SEE DRAWING P-4.  
  
P-1 P-4 P-1 P-4
- PROVIDE DIELECTRIC INSULATING FITTINGS TO ALL UNDERGROUND METALLIC PIPING, BOTH AT TRANSITIONS TO ABOVE GROUND AND AT CONNECTIONS TO EXISTING PIPING.
- SLOPE FOR HORIZONTAL WASTE LINES TO BE 2% UNLESS INDICATED OTHERWISE.
- REFERENCE IS MADE TO EQUIPMENT SCHEDULES ON M-2 AND M-3. FOR OTHER EQUIPMENT ON "P" DRAWINGS NOT FOUND BELOW.
- HOSE REEL:   
HOSE REELS SHALL BE CEILING MOUNTED, SPRING RETURN SIZED FOR 100 FT. OF 1/2" INSIDE DIAMETER, 250 PSIG RATED, TWO BRAID REINFORCED, RUBBER AIR HOSE. REEL SHALL SUPPORT HOSE WEIGHT FROM FULLY RETRACTED TO FULLY EXTENDED WITHOUT HOSE UNREELING DUE TO HOSE WEIGHT. REEL ASSEMBLY SHALL BE OF CARBON STEEL CONSTRUCTION. SPRING RETURN SHALL BE CAPABLE OF RETRACTING THE HOSE FROM ITS FULLY EXTENDED POSITION.
- EQUIPMENT SCHEDULE: **NOTE:**  
MIL-H-18222, CLASS 2 IS FOR HIGH TEMP. 300F TO 400F.  
OK TO PROVIDE 180 F, 180 PSIG AS STATED IN SPECS PER REF #55

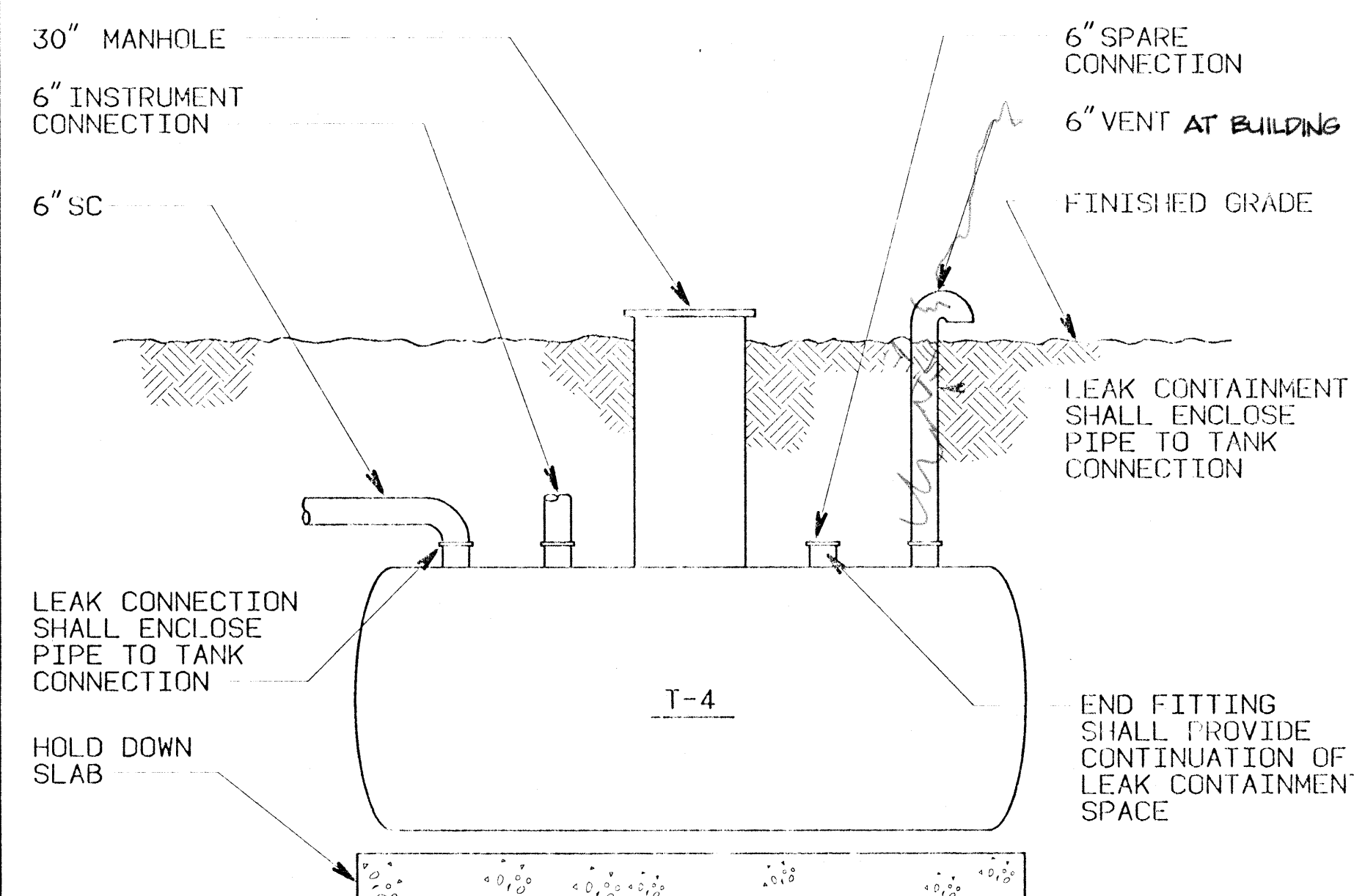
## DOMESTIC HOT WATER HEATER STORAGE TANK

SYMBOL	STORAGE (GAL)	TYPE	TEMP. RISE IN 2 1/2 HR		HEATING HOT WATER SUPPLY (°F)	HOT WATER HEAT EXCHANGER (GPM.)	TANK SIZE (APPROXIMATE)		REMARKS
			FROM (°F)	TO (°F)			DIA (IN)	LENGTH (IN)	
	380 (MIN)	HORIZONTAL INDIRECT	40	140	180	15 (MIN)	36	86	CEMENT-LINED (TYPE II) 120 VOLT CONTROL PANEL

## INDUSTRIAL HOT WATER HEATER STORAGE TANK

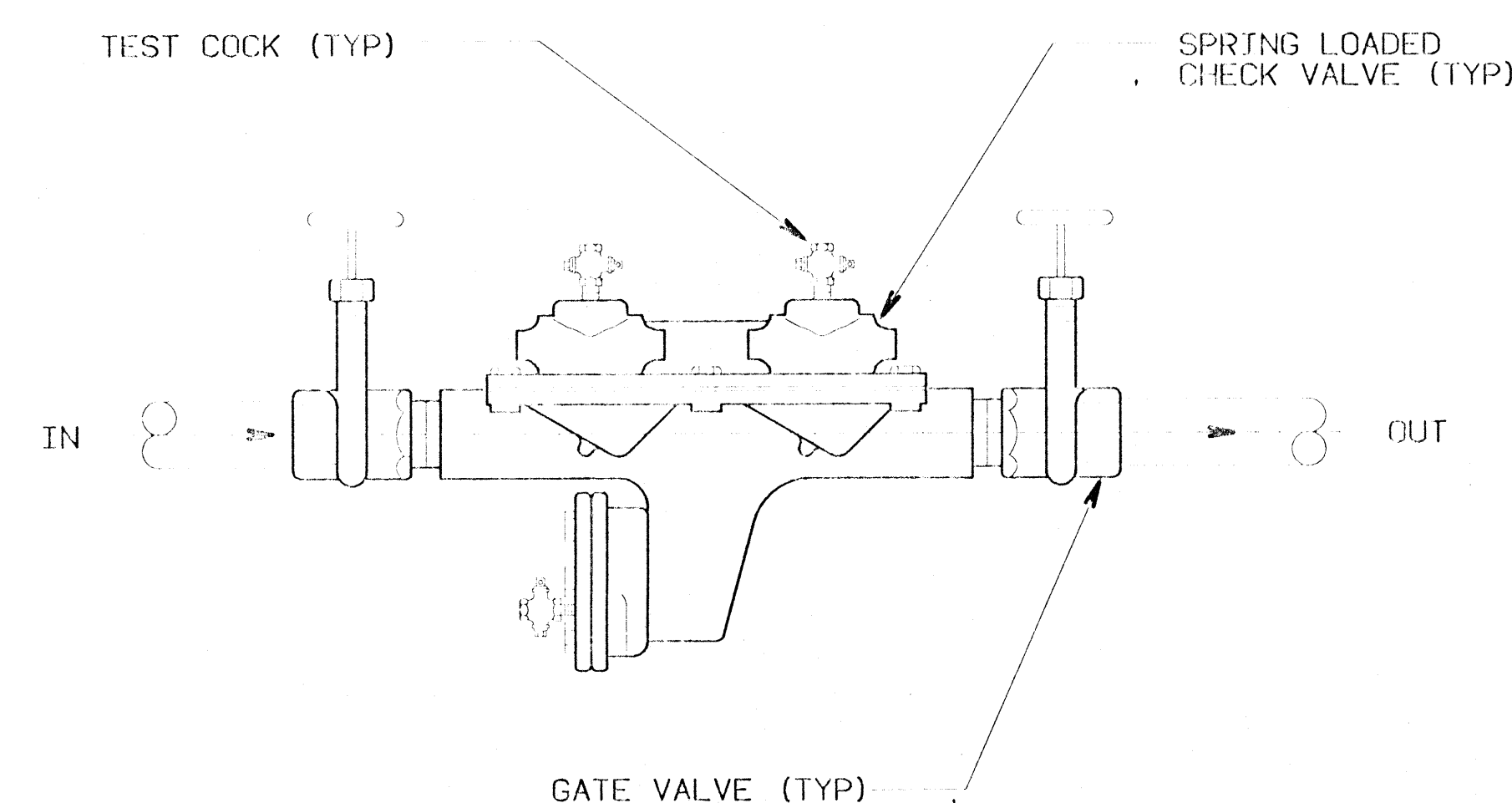
SYMBOL	STORAGE (GAL)	TYPE	TEMP. RISE IN 2 1/2 HR		ELECTRIC POWER MIN	TANK SIZE (APPROXIMATE)	
			FROM (°F)	TO (°F)		DIA (IN)	LENGTH (IN)
	350 (MIN)	HORIZONTAL ELECTRIC	40	140	45KW	42	93

T5 SHALL BE GLASS LINED AS IN SPEC SECTION 15400, PAR 2.6.4 PER REF #56



EXTEND LEAK DETECTION AND DOUBLE WALLED CONSTRUCTION TO VENT AND 6" SPARE CONNECTION. LEAK DETECTION AND CONTAINMENT SPACE SHALL ENCLOSE CONNECTIONS OF PIPING TO TANK SO THAT CONTAINMENT AND DETECTION IS COMPLETE.

TEST COCK (TYP)



PLUMBING FIXTURE SCHEDULE			
FIXTURE	SYMBOL	DRAWING REFERENCE	SPECIFICATION REF
LAVATORY	L	DWG P-4, DET 4	15400: P-3
HANDICAP LAVATORY	HL	DWG P-4, DET 4	15400: P-3A
SINK	SK	DWG P-4, DET 5	15400: P-4
ELECTRIC WATER COOLER	EWC	DWG P-4, DET 6	15400: P-7
SERVICE SINK	SS	DWG P-4, DET 7	15400: P-5
WATER CLOSET	WC	DWG P-4, DET 8	15400: P-1
HANDICAP WATER CLOSET	HWC	DWG P-4, DET 8	15400: P-1A
URINAL	UR	DWG P-4, DET 9	15400: P-2
FLOOR SINK	FS	-	15400: 2.6
FLOOR DRAIN	FD	-	15400: 2.6
SHOWER	SH	-	15400: P-6
HANDICAP SHOWER	HSH	-	15400: P-6

TANK (T-4) SPILL CONTAINMENT TANK

NO SCALE

REDUCED PRESSURE BACKFLOW PREVENTER (RFBP)

NO SCALE

PLUMBING FIXTURE SCHEDULE

NO SCALE

SAFETY PAYS


DATE	11/25/92	DESCRIPTION	MISCELLANEOUS DETAILS	BY	DA
DESIGNED BY	E. ABRAMIAN	DEPARTMENT OF THE ARMY	SACRAMENTO DISTRICT, CORPS OF ENGINEERS		
DRAWN BY	G. NAKAMOTO	SACRAMENTO, CALIFORNIA			
CHECKED BY	K. GOODWIN	MCLELLAN AIR FORCE BASE	CALIFORNIA		
		ADAL DEPOT CORROSION CONTROL FACILITY			
		NEW AIRCRAFT PAINT FACILITY			
		NOTES, SYMBOLS & ABBREVIATIONS			
DATE	9/30/92	SCALE	2" = 1'-0"	SPEC No.	6529
		FILE No.	100-25-2051		


Am-2 BF

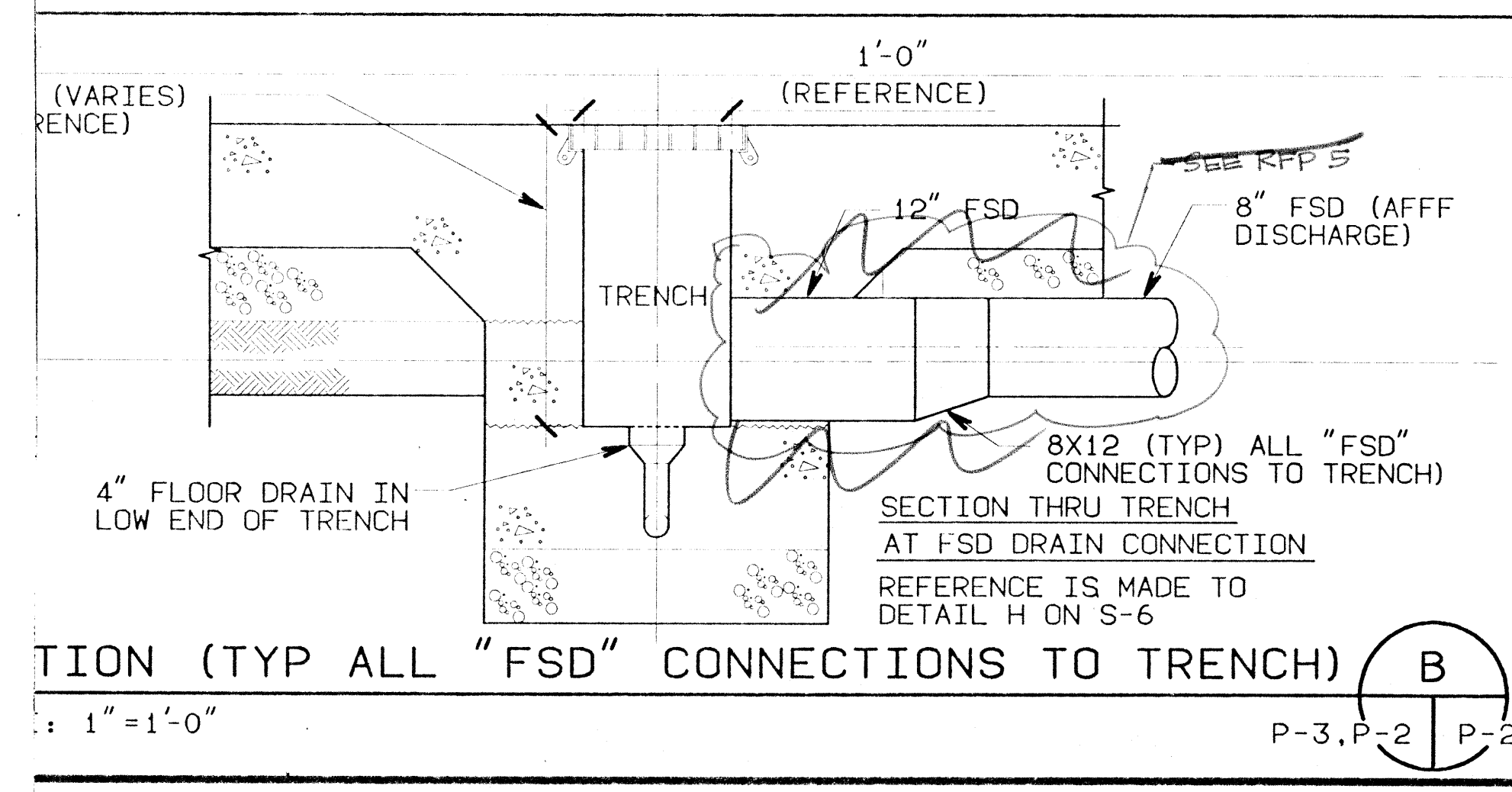
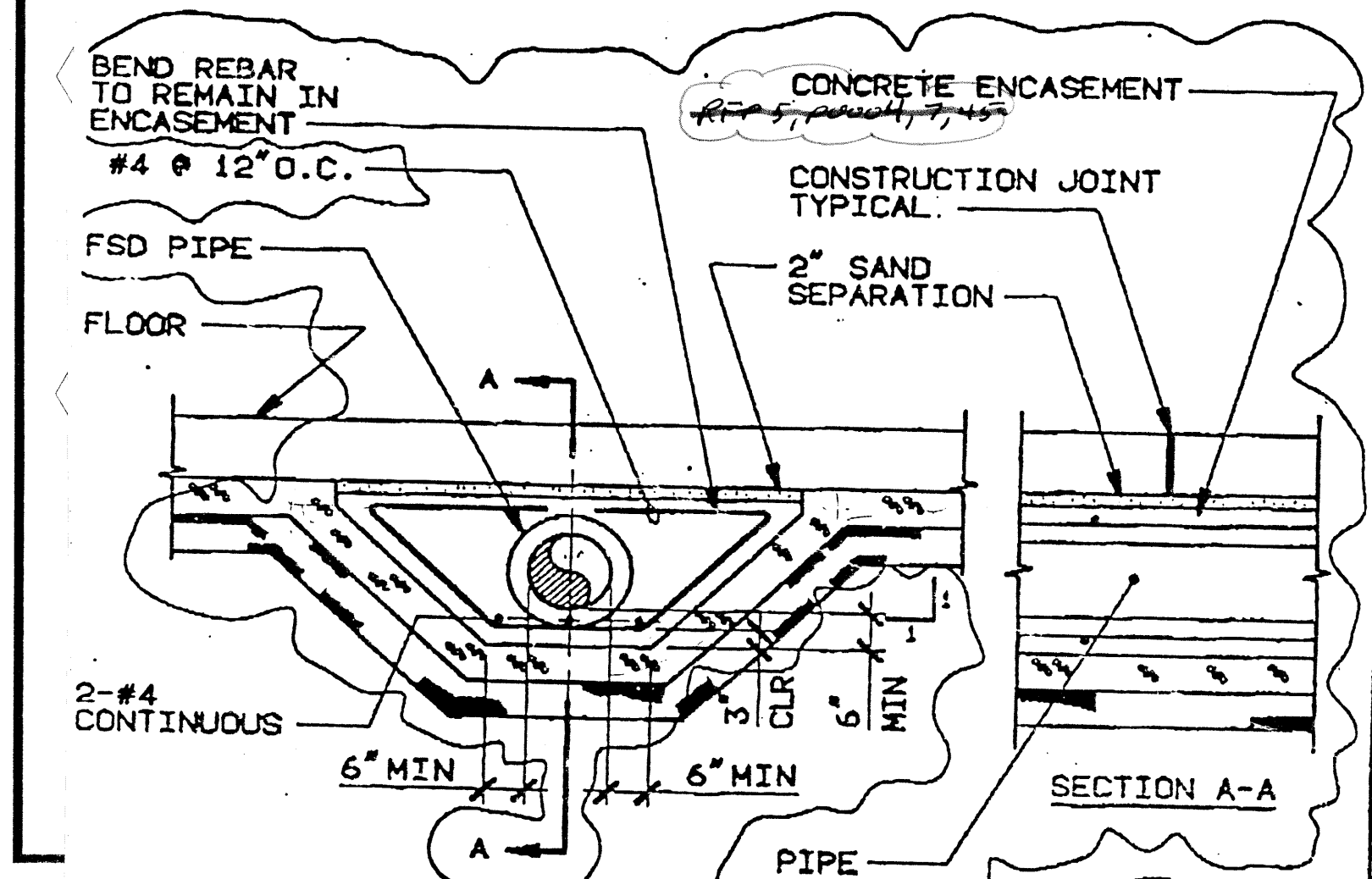
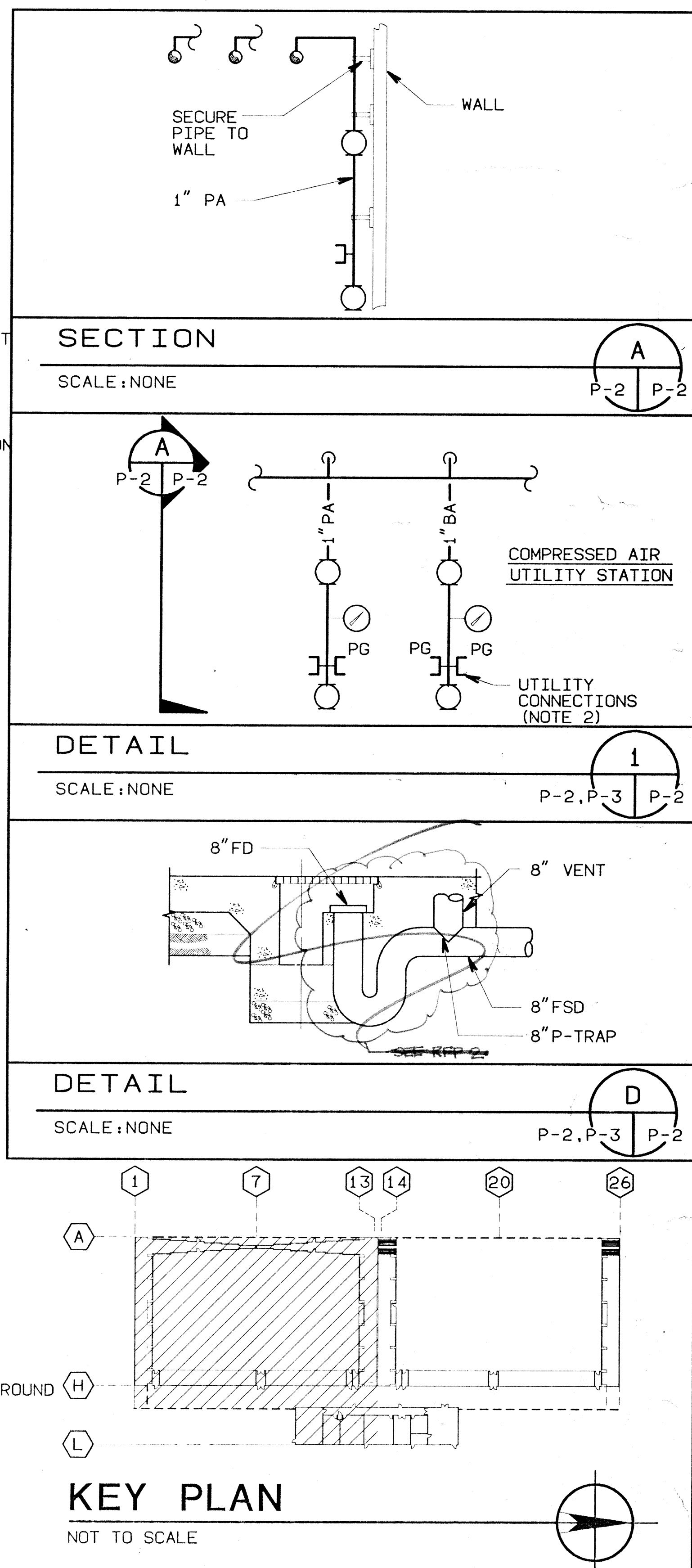




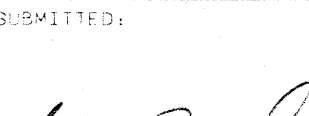
48

2. "BA" DISCONNECT SHALL BE SIZE AND TYPE TO MATCH AND CONNECT TO GOVERNMENT BREATHING AIR HOSES/MINE SAFETY APPLIANCES SIMI VALLEY, CA. FOSTER STYLE 473503. SUBMITTAL TO CONTRACTING OFFICER FOR THIS ITEM SHALL EXPLICITLY NOTE AND DOCUMENT THIS COORDINATION. <sup>2005</sup>  
"PA" CONNECTIONS SHALL BE 3" DUPLEX QUICK DISCONNECT CONNECTIONS.

3. SUPPORT PIPE ABOVE HANGAR CEILING USING TRAPEZE SUPPORT (PS-3) 10FT ON CENTER SEE 

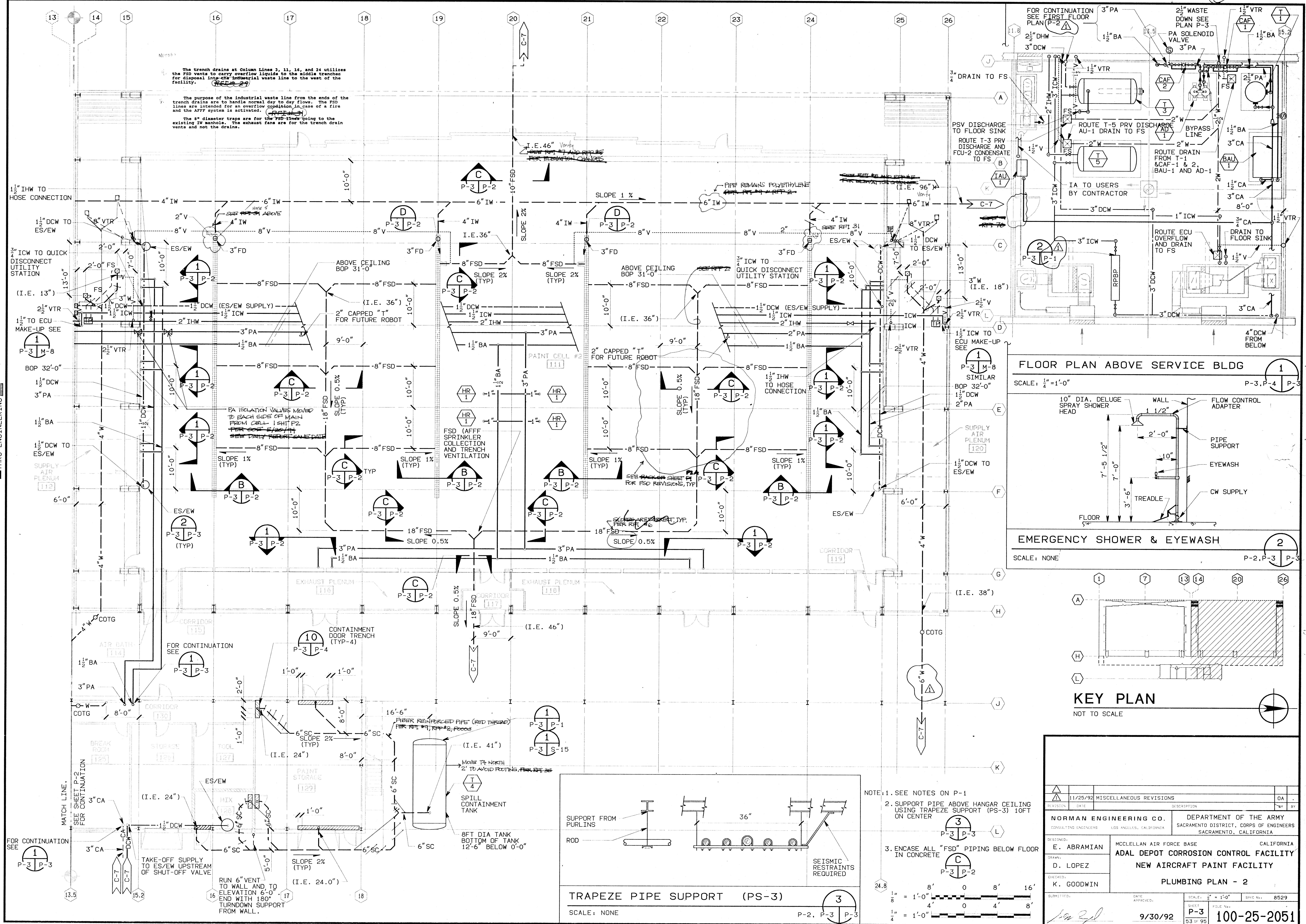
4. ENCASE ALL "FSD" PIPING BELOW FLOOR IN CONCRETE. SEE 



 	11/25/92	CHANGE 4" W TO 6"	DATE	DESCRIPTION	BY
REVISION	DATE				BY
NORMAN ENGINEERING CO.			DEPARTMENT OF THE ARMY		
CONSULTING ENGINEERS		LOS ANGELES, CALIFORNIA		SACRAMENTO DISTRICT, CORPS OF ENGINEERS	
				SACRAMENTO, CALIFORNIA	
DESIGNED:	MCLELLAN AIR FORCE BASE ADAL DEPOT CORROSION CONTROL FACILITY NEW AIRCRAFT PAINT FACILITY PLUMBING PLAN - 1		CALIFORNIA		
E. ABRAHAM					
DRAWN:					
D. LOPEZ					
CHECKED:					
K. GOODWIN					
SUBMITTED:	DATE APPROVED:	SCALE: 1" = 1'-0"	SHEET No.	8529	
 9/30/92		SHEET	P-2		
		02	OF 95		
		100-25-2051			

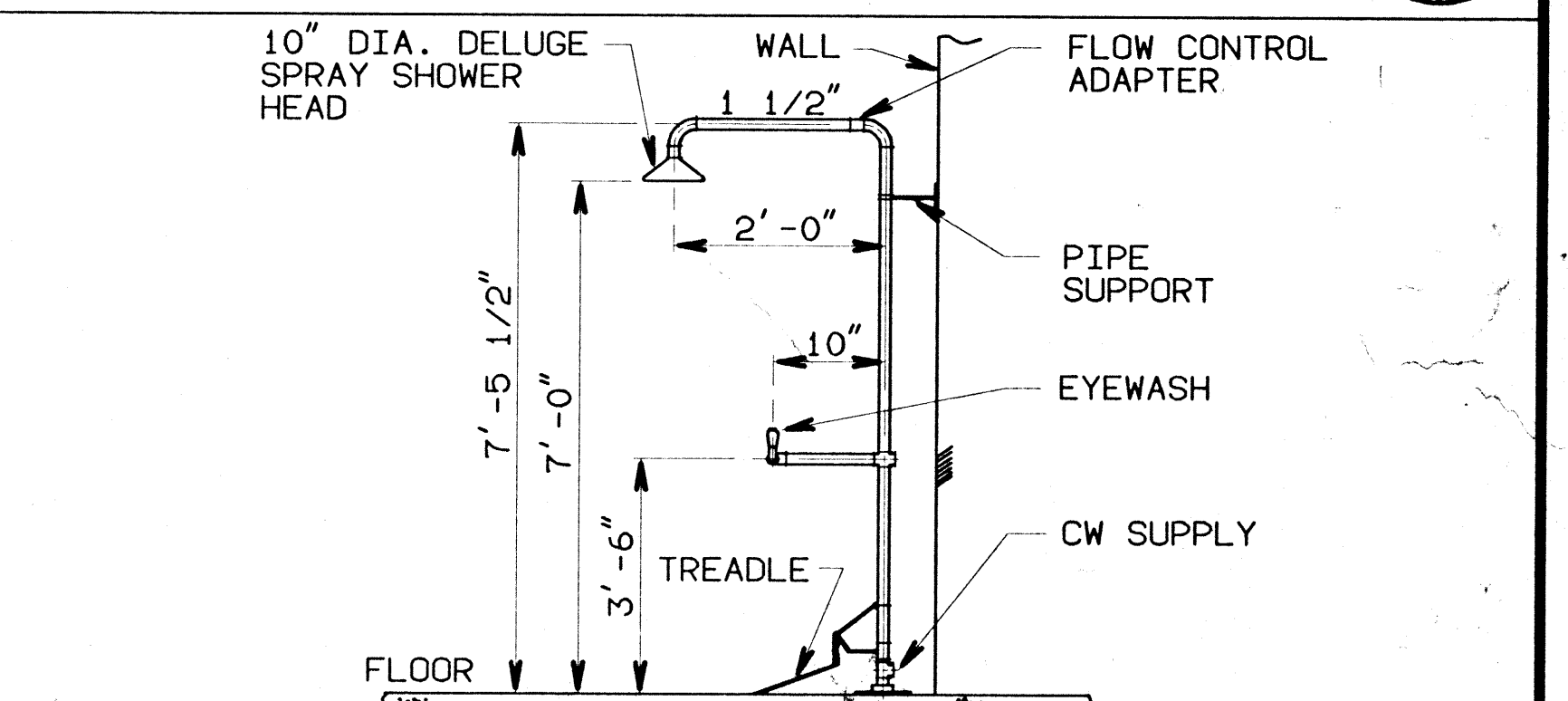


# FUNCTIONAL ANALYSIS - VE PAYS



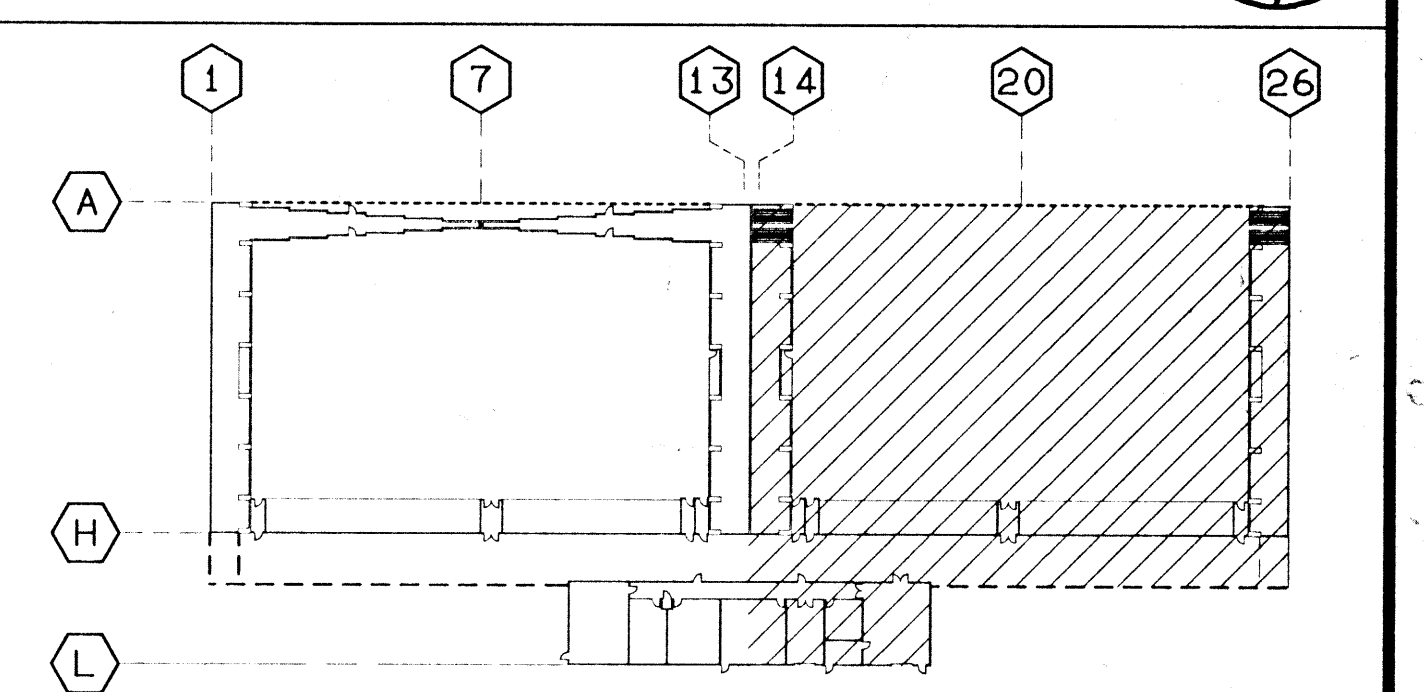
FLOOR PLAN ABOVE SERVICE BLDG

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



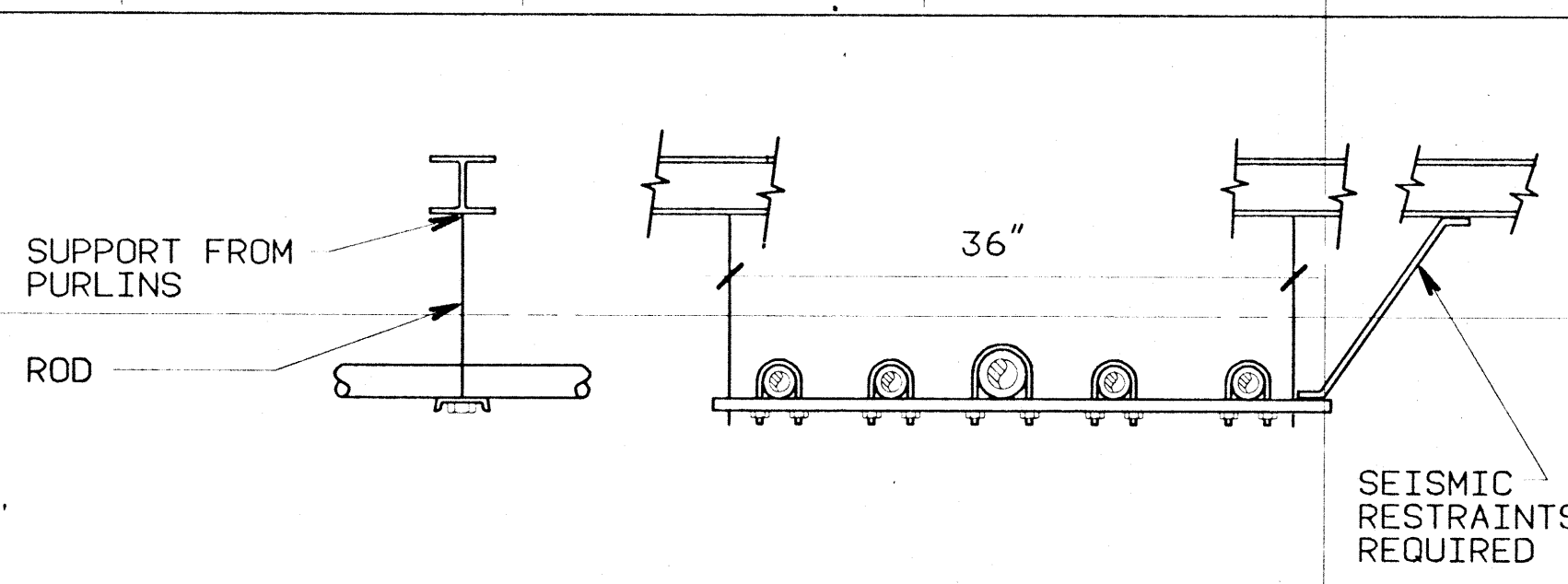
EMERGENCY SHOWER & EYEWASH

SCALE: NONE



KEY PLAN

NOT TO SCALE



TRAPEZE PIPE SUPPORT (PS-3)

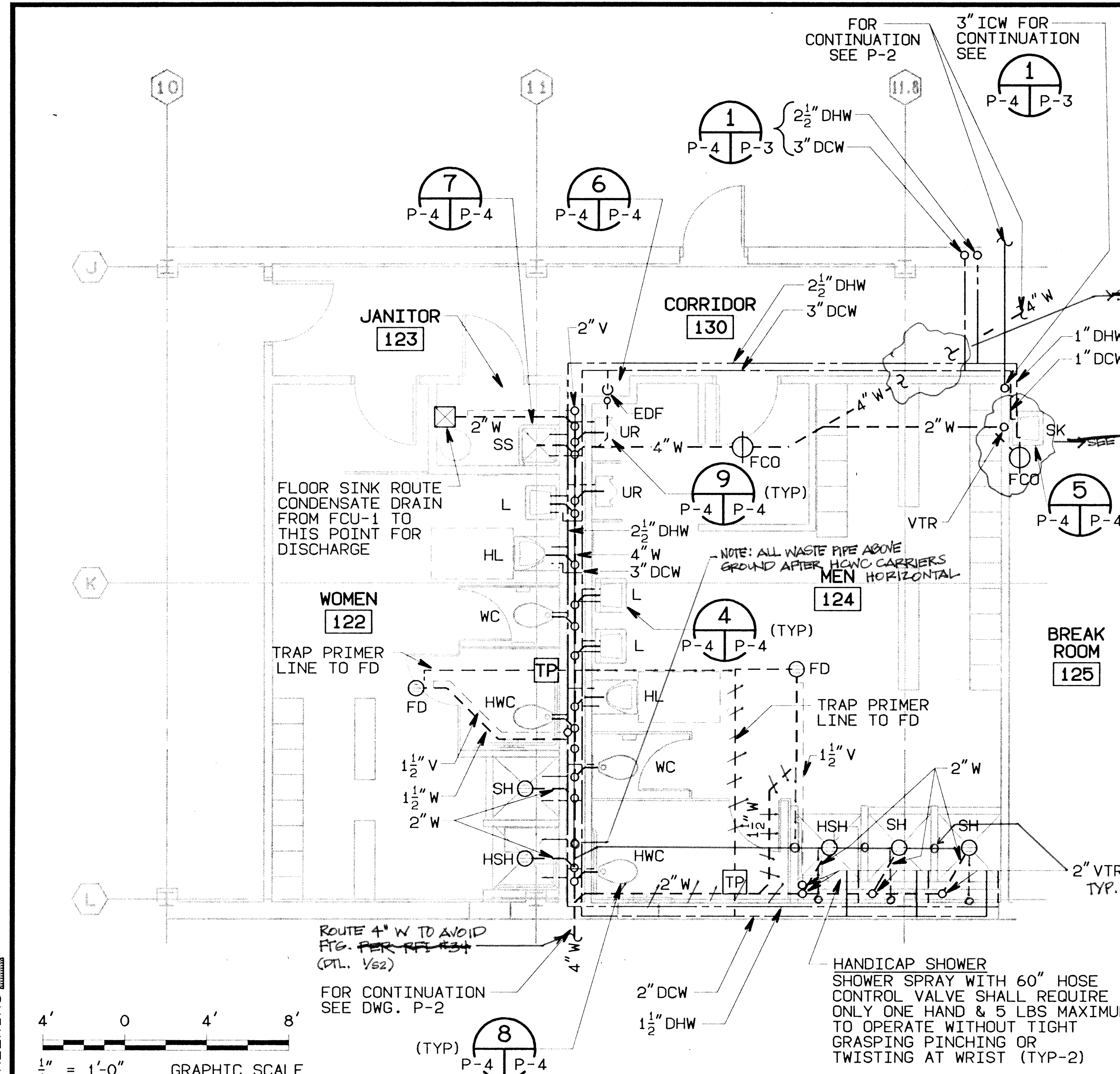
SCALE: NONE

- NOTE: 1. SEE NOTES ON P-1  
2. SUPPORT PIPE ABOVE HANGAR CEILING USING TRAPEZE SUPPORT (PS-3) 10FT ON CENTER  
3. ENCASE ALL "FSD" PIPING BELOW FLOOR IN CONCRETE

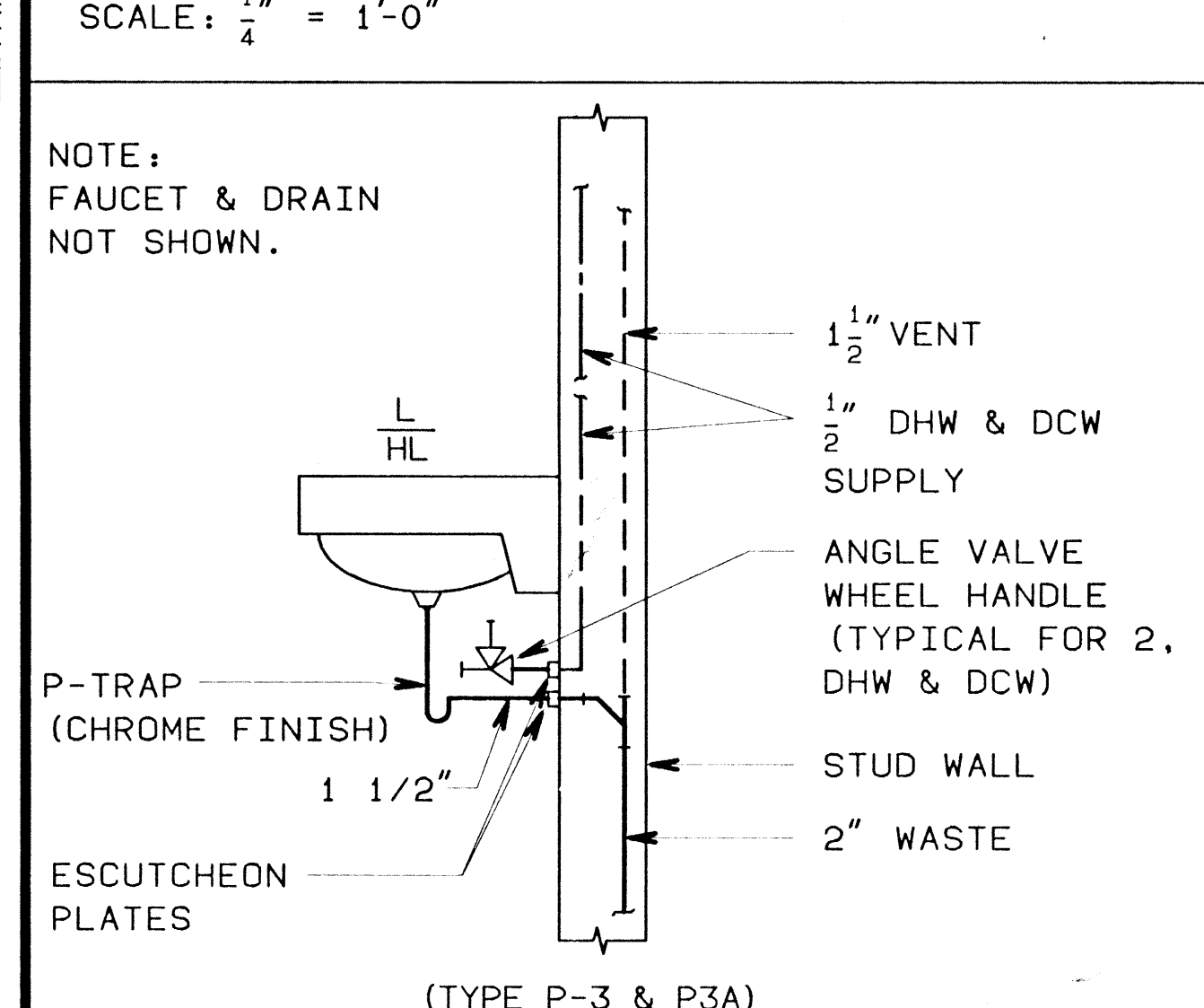
DESIGNED BY	E. ABRAMIAN	DATE	11/25/92	REVISIONS	DESCRIPTION	DATE	BY
DRAWN BY	D. LOPEZ						
CHECKED BY	K. GOODWIN						
SUBMITTED		DATE APPROVED	9/30/92	SCALE	1/4" = 1'-0"	SPEC No.	8529
				SHEET	P-3	FILE No.	100-25-2051
					53 OF 95		



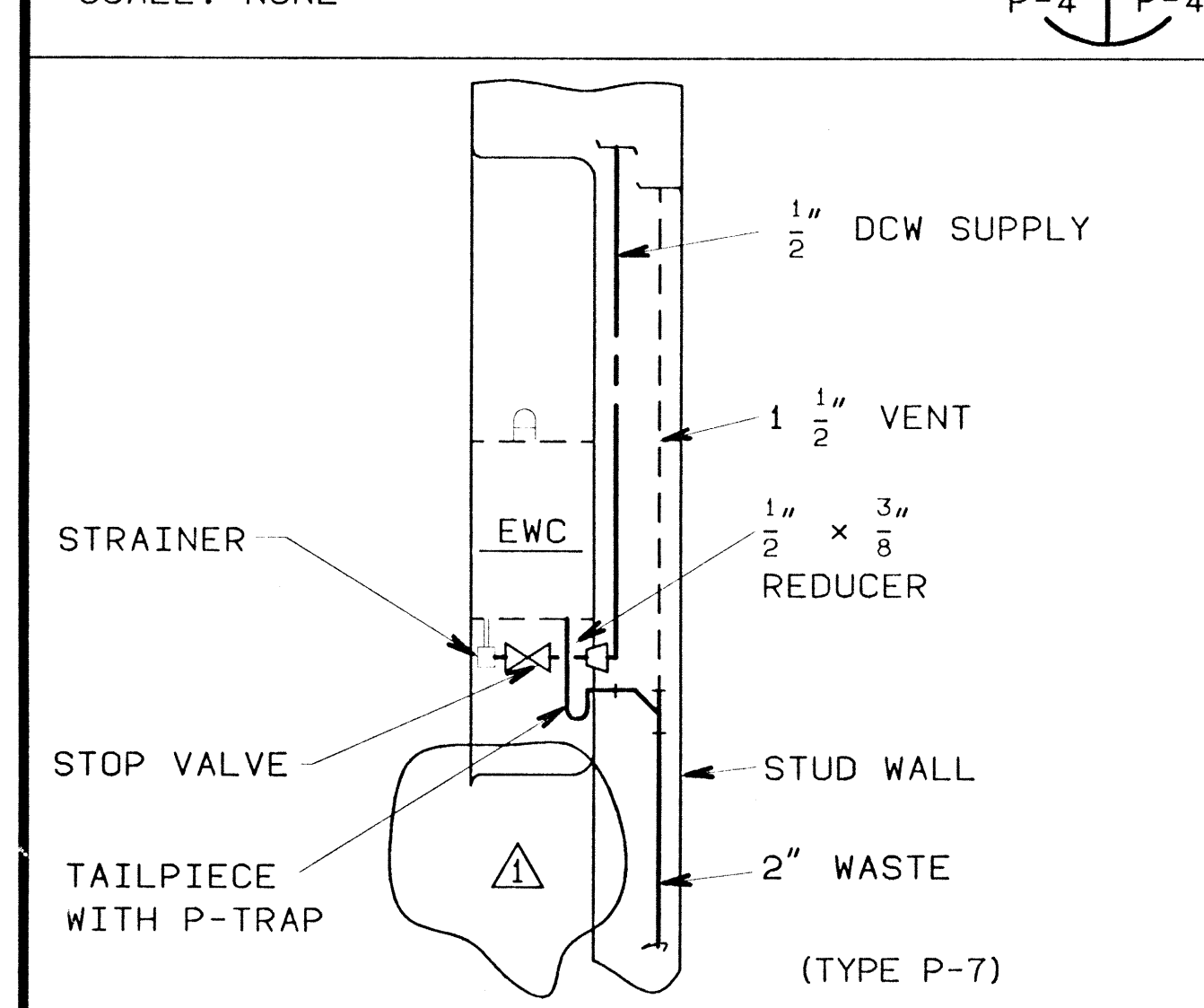
# FUNCTIONAL ANALYSIS - VE PAYS



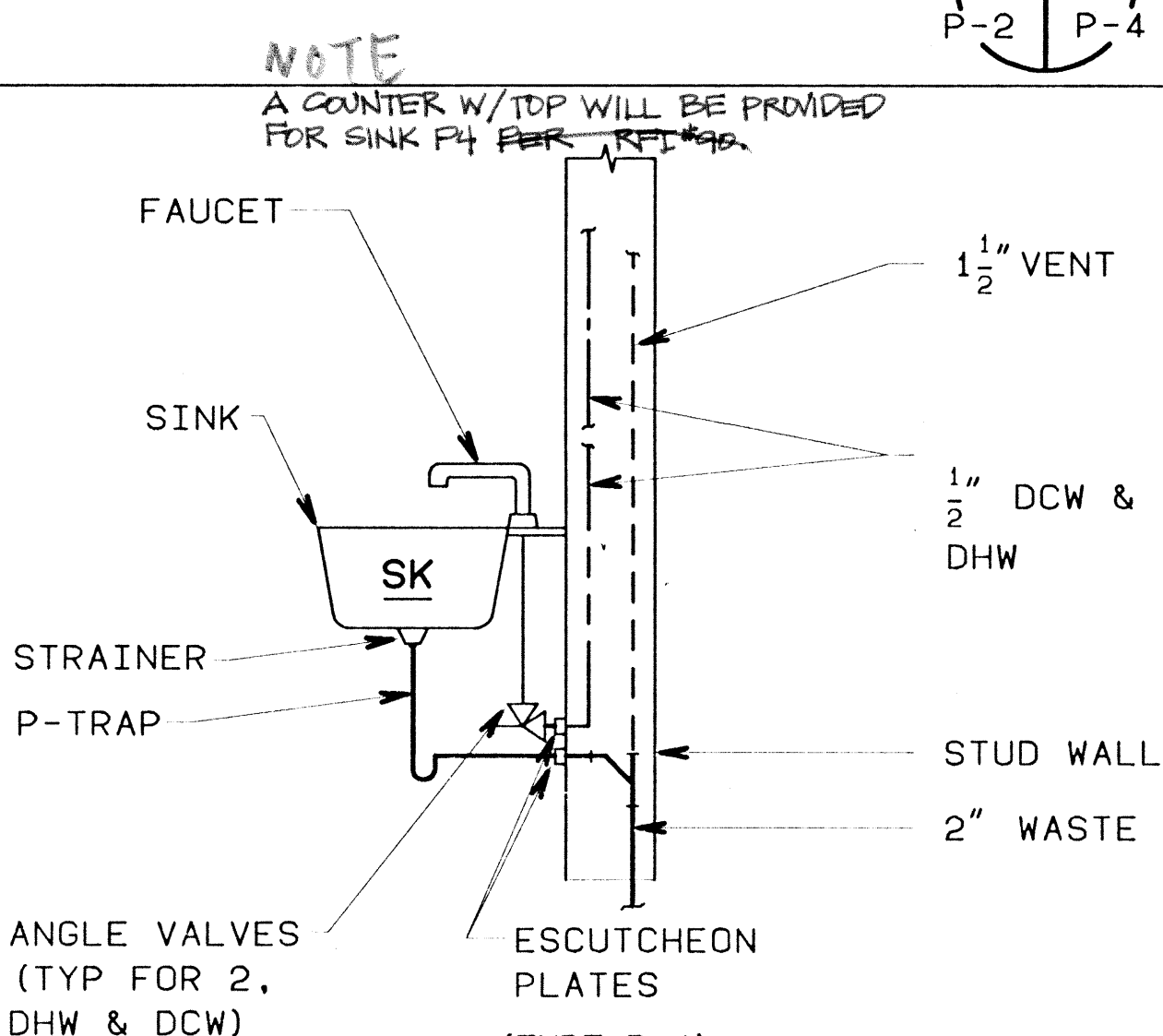
**RESTROOM PLUMBING PLAN**  
SCALE: 1/4" = 1'-0"



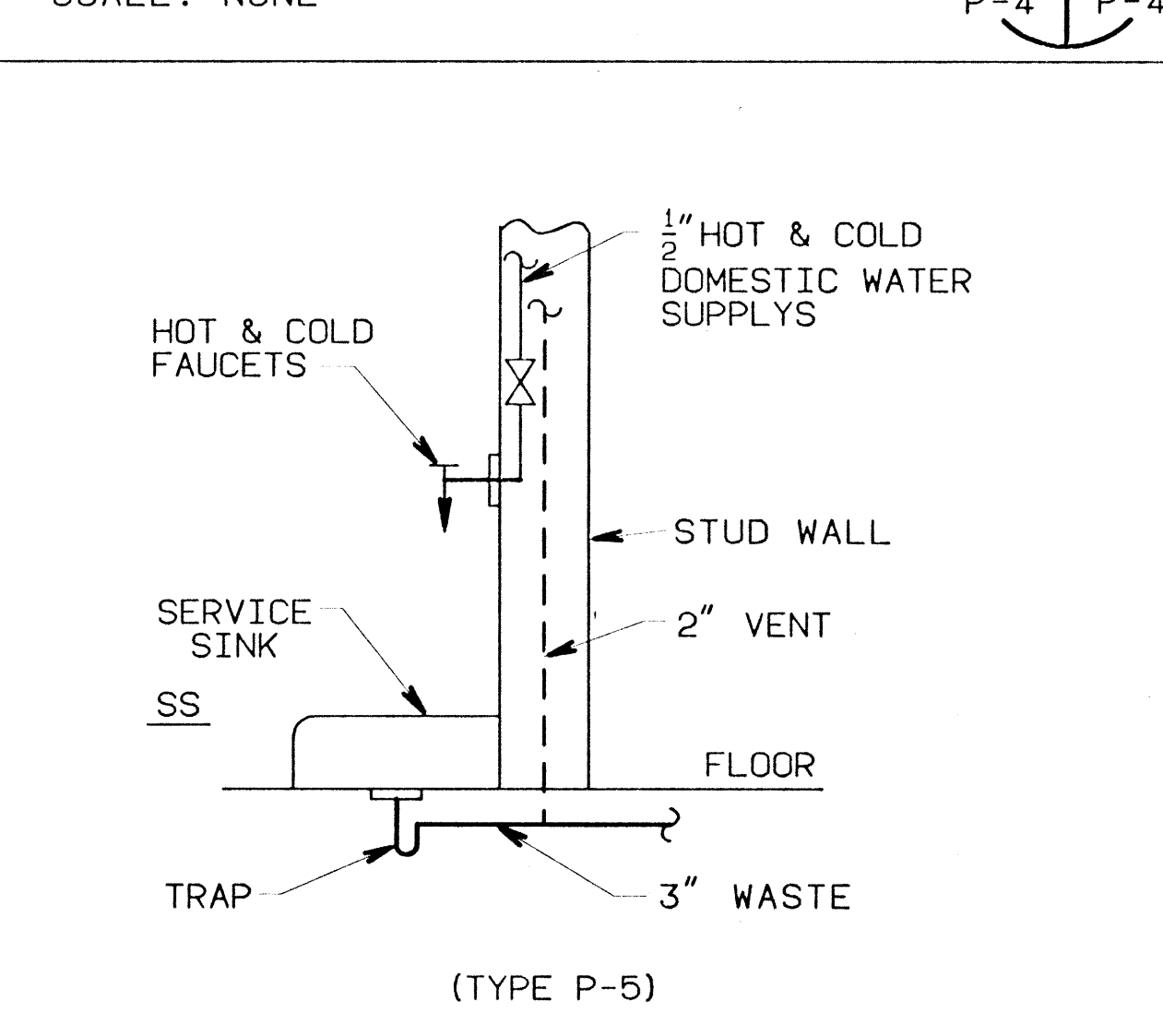
**LAVATORY INSTALLATION SCHEMATIC**  
SCALE: NONE



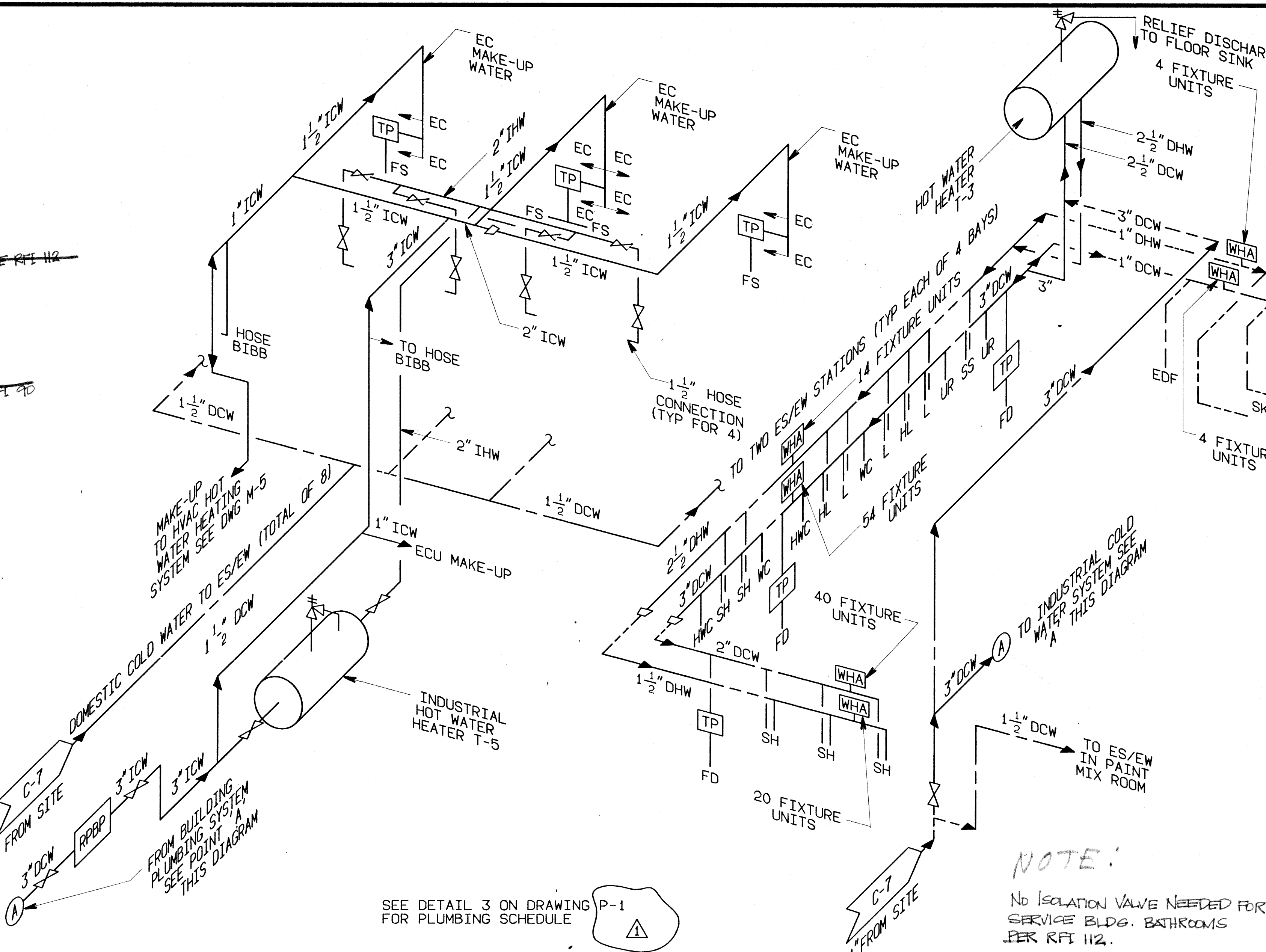
**ELECTRIC WATER COOLER INSTALLATION SCHEMATIC**  
SCALE: NONE



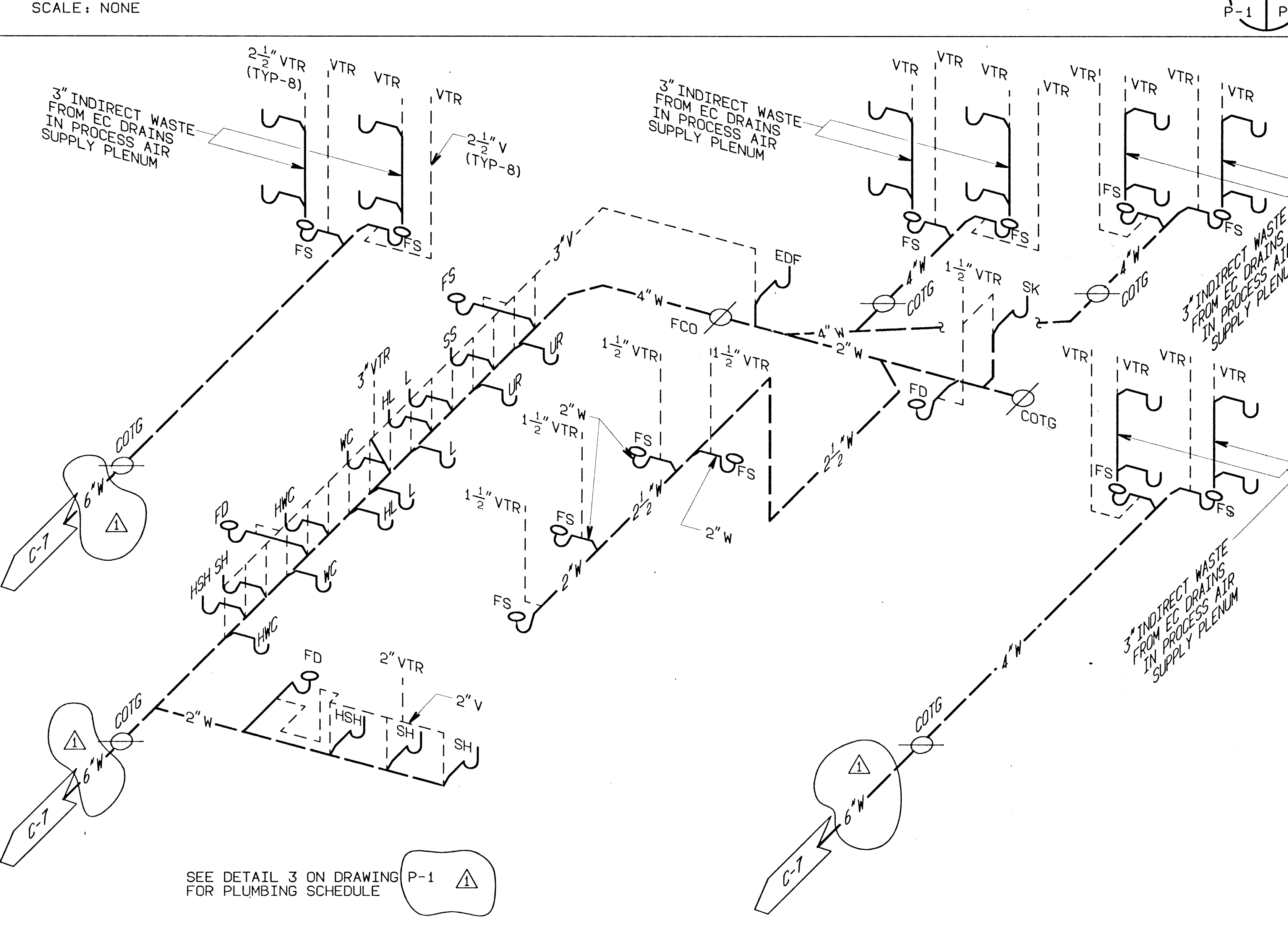
**SINK, BREAK ROOM**  
SCALE: NONE



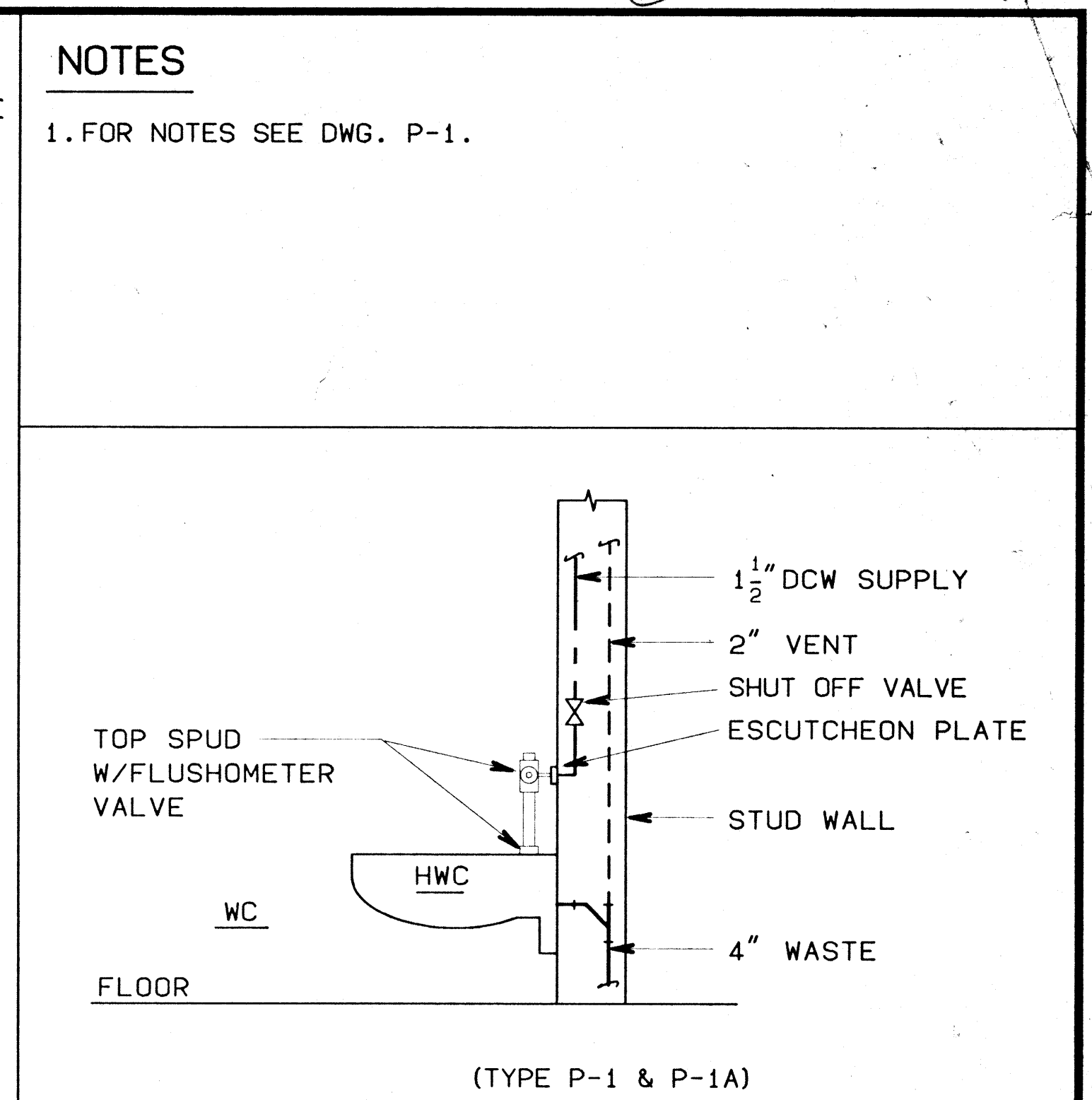
**JANITOR SINK OR SERVICE SINK INSTALLATION SCHEMATIC**  
SCALE: NONE



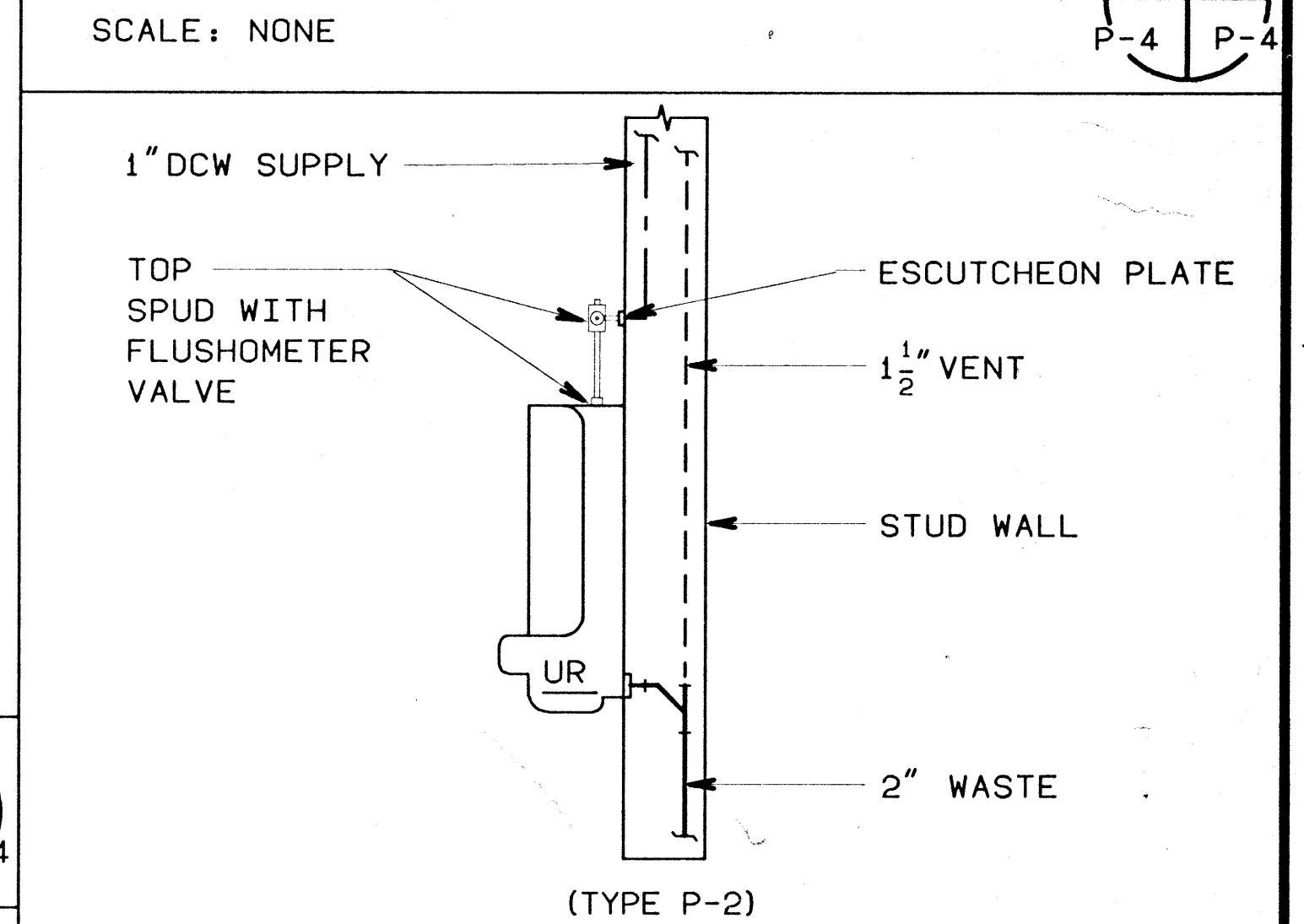
**PLUMBING SUPPLY RISER DIAGRAM**  
SCALE: NONE



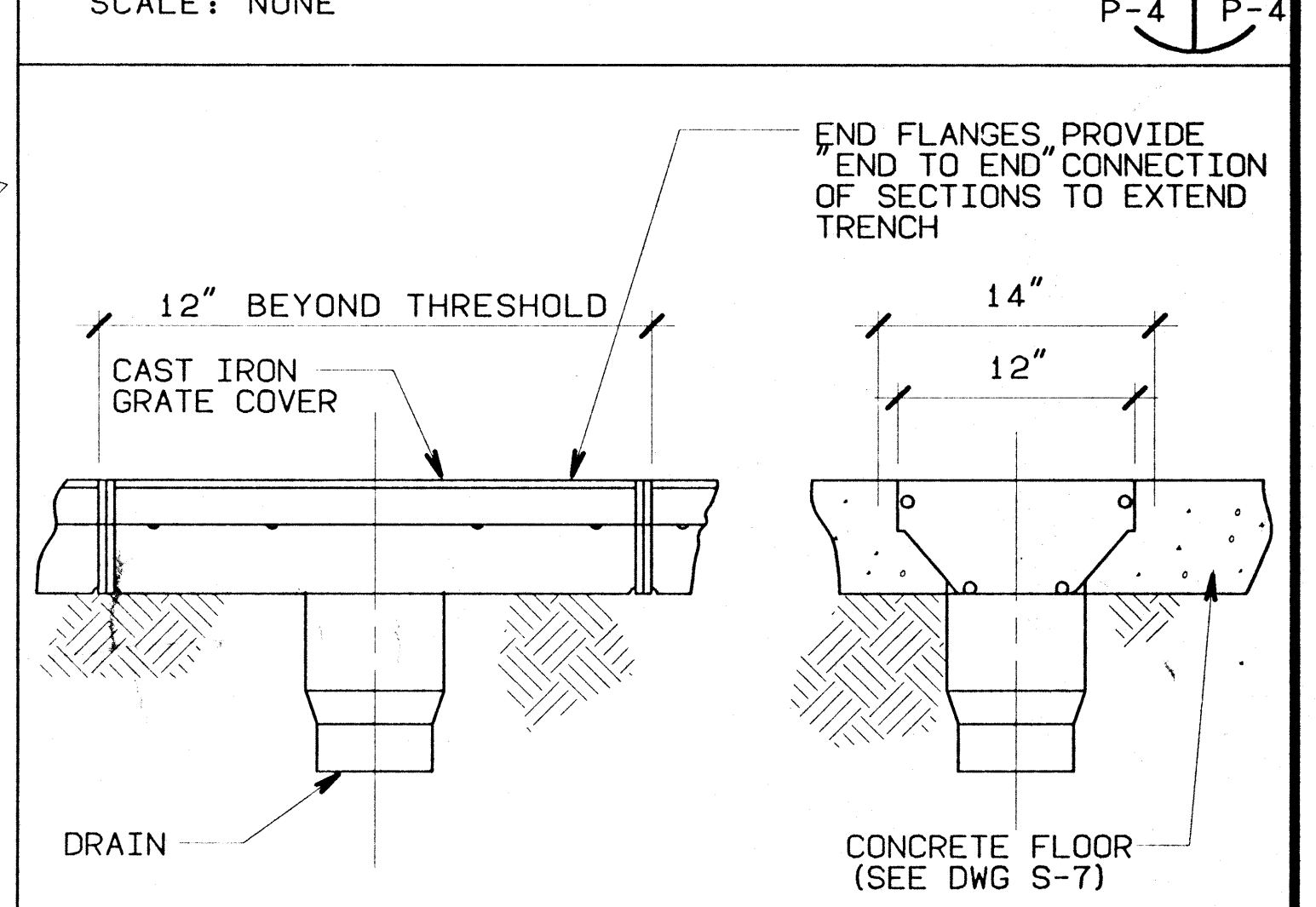
**PLUMBING WASTE RISER DIAGRAM**  
SCALE: NONE



**WATER CLOSET INSTALLATION SCHEMATIC**  
SCALE: NONE



**URINAL INSTALLATION SCHEMATIC**  
SCALE: NONE



**CONTAINMENT DOOR TRENCH**  
SCALE: NONE

REVISION	DATE	DESCRIPTION	BY	DATE
1	11/25/92	MISCELLANEOUS REVISIONS	DA	
2			BY	

<b>NORMAN ENGINEERING CO.</b> CONSULTING ENGINEERS LOS ANGELES, CALIFORNIA	DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA
DESIGNED: <b>E. ABRAMIAN</b>	MCCLELLAN AIR FORCE BASE CALIFORNIA
DRAWN: <b>D. MARTINOLI</b>	<b>ADAL DEPOT CORROSION CONTROL FACILITY</b>
CHECKED: <b>K. GOODWIN</b>	<b>EXPANDED RESTROOM PLAN, RISER DIAGRAMS AND DETAILS</b>
SUBMITTED:	SCALE: 3/4" = 1'-0" SHEET: <b>P-4</b> 54 OF 95
DATE APPROVED:	9/30/92
FILE NO.:	<b>100-25-2051</b>

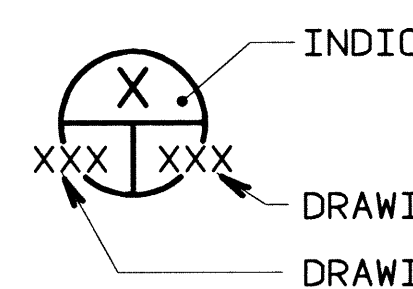


# FUNCTIONAL ANALYSIS - VE PAYS

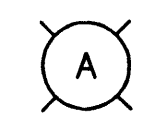
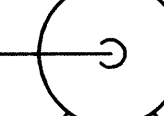


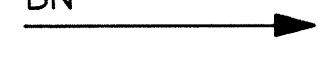
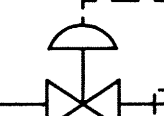

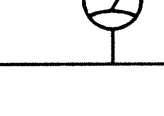
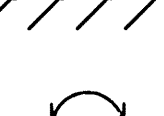
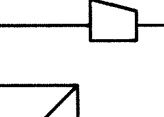
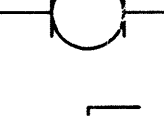
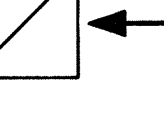
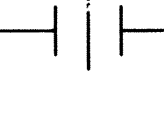

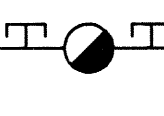
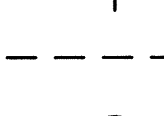

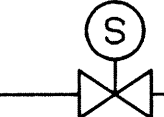
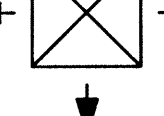
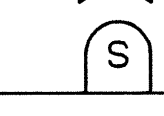
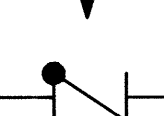


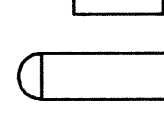
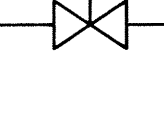
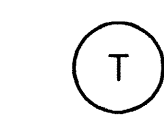
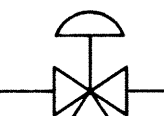
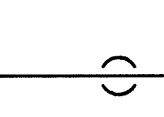
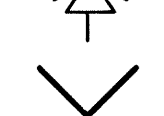
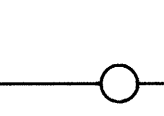

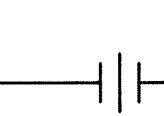
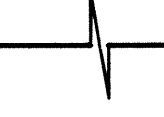
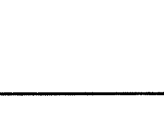
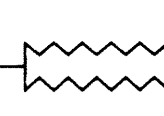

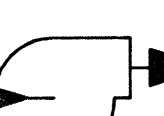
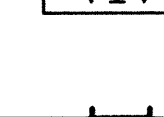

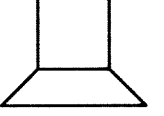
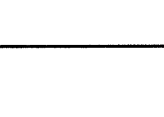

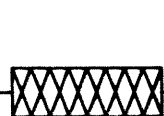


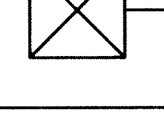
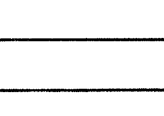
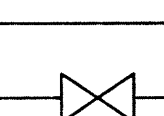
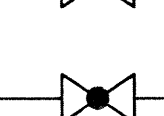


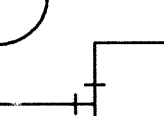

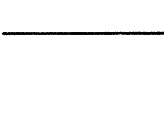
## SYMBOLS

## ABBREVIATIONS

## NOTES

- ELEVATIONS NOT REFERENCED FROM A DATUM (EXAMPLE FINISHED FLOOR OR GRADE) ARE REFERENCED TO A 0'-0" DATUM AT 63'-6" ABOVE THE GEODETIC DATUM OF 1929.
- CROSS REFERENCES ARE INDICATED AS SHOWN BELOW:  

- PROVIDE DIELECTRIC INSULATING FITTINGS TO ALL UNDERGROUND METALLIC PIPING, BOTH AT TRANSITIONS TO ABOVE GROUND AND AT CONNECTIONS TO EXISTING PIPING.

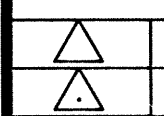
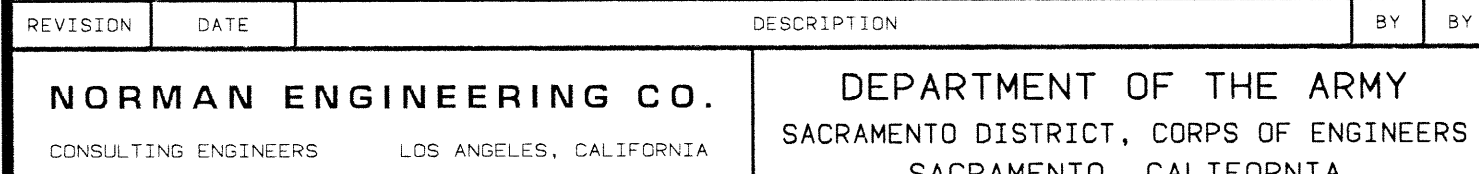
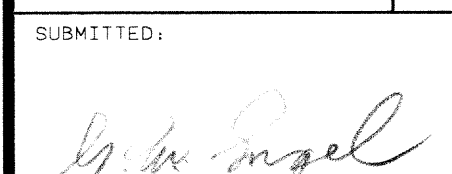
T	TANK
TA	TRANSFER AIR
TCV	TEMPERATURE CONTROL VALVE
TDH	TOTAL DYNAMIC HEAD
TE	TEMPERATURE MEASUREMENT ELEMENT (SENSOR)
TEMP	TEMPERATURE
TGA	TRANSFER GRILLE TYPE "A"
TGB	TRANSFER GRILLE TYPE "B"
TI	TEMPERATURE INDICATOR
TS	TUBE SECTION
TT	TEMPERATURE TRANSMITTER
TYP	TYPICAL
UC	UNDER CUT DOOR
UH	UNIT HEATER
VOC	VOLATILE ORGANIC COMPOUND
W	WIDTH
WB	WET BULB TEMPERATURE
WC	WATER COLUMN
WT	WEIGHT
W/	WITH
WTS	WATER TREATMENT SYSTEM
ZS	POSITION SWITCH

SYMBOL	ABBREVIATION	DESCRIPTION	SYMBOL	ABBREVIATION	DESCRIPTION
		ALARM		P	PUMP
		ARROW INDICATES DIRECTION OF FLOW		P	CHEMICAL ADDITION PUMP (TANK MOUNTED)
		ARROW INDICATES DIRECTION OF SLOPING		PRV	PRESSURE REDUCING VALVE
	AGV	ANGLE VALVE		GA	GAGE
	BDD	BACKDRAFT DAMPER			REDUCER, ECCENTRIC
	BV	BALL VALVE		RG A/B ER TG A/B	AIR GRILLE TYPE A OR B EXHAUST AIR REGISTER TRANSFER GRILLE
	BF	BUTTERFLY VALVE		RV PSV	RELIEF VALVE PRESSURE SAFETY VALVE
	CBV	CALIBRATED BALANCING VALVE WITH PRESSURE GAGE			SIGNAL TO OR FROM CONTROL SYSTEM "XXX" REFERS TO INPUT OR OUTPUT SIGNAL NUMBER
	CDA/B SR	CEILING DIFFUSER TYPE A OR B SUPPLY AIR REGISTER			SOLENOID VALVE
	CKV	CHECK VALVE			STROBE
		CONTROL VALVE, PNEUMATIC 2-WAY (DIAPHRAGM OPERATED)		T	AUTOMATIC TRAP
		CONTROL VALVE, PNEUMATIC 3-WAY (DIAPHRAGM OPERATED)		T	TANK
		DRAIN, FUNNEL			THERMOSTAT
		EXHAUST OR RETURN AIR			TEE DOWN
		EXPANSION JOINT			TEE UP
		FAN; CENTRIFUGAL			UNION
		FAN; VANEAXIAL			UTILITY CONNECTION
	FD	FIRE DAMPER		VIV	VARIABLE INLET VANES
		FLEXIBLE DUCT			"Y" STRAINER
	FC	FLEXIBLE PIPE CONNECTION			
		FLOAT VALVE			
	FS	FLOOR SINK			
		FLOW QUANTITY (AIR)			
		FLOW QUANTITY (LIQUID)			
	GV	GATE VALVE			
	GLV	GLOBE VALVE			
		INCREASER/DECREASER			
		INSTRUMENTATION XX IS IDENTIFIER (EX: TE IS A TEMPERATURE ELEMENT)			
	MAV	MANUAL AIR VENT TERMINATED WITH 1/4" GLOBE VALVE			
	VD	MANUAL VOLUME DAMPER			
		MOTORIZED DAMPER (OPPOSED BLADE)			
	NO	NUMBER			
		PIPE ANCHOR			
		PIPE DOWN OR AWAY			
		PIPE UP OR TOWARDS			

### PIPING:

BA	BA	BREATHING AIR
CA	CA	COMPRESSED AIR
CD	CD	CONDENSATE DRAIN
CP	CP	PUMPED CONDENSATE
HPS	HPS	HIGH PRESSURE STEAM SUPPLY
HWR	HWR	HOT WATER RETURN
HWS	HWS	HOT WATER SUPPLY
IA	IA	INSTRUMENT AIR
ICW	ICW	INDUSTRIAL COLD WATER
PA	PA	PAINT AIR
XXX	XXX	UNDER GROUND PIPE (XXX REFERS TO PIPE SERVICE, FOR EXAMPLE CA FOR COMPRESSED AIR)
XXX	XXX	PIPE HIDDEN FROM VIEW (XXX REFERS TO PIPE SERVICE, FOR EXAMPLE CA FOR COMPRESSED AIR)
RS	RS	REFRIGERANT SUCTION LINE
RL	RL	REFRIGERANT LIQUID LINE

AC	AIR CONDITIONING UNIT	HE	HUMIDIFICATION ELEMENT
AD	AIR DRYER	HEPA	HIGH EFFICIENCY PARTICULATE AIR FILTER
AFF	ABOVE FINISHED FLOOR	HI	HIGH
AFFF	AQUEOUS FILM FORMING FOAM	HR	HOUR
AMCA	AIR MOVEMENTS CONTROL ASSOCIATION	HS	HAND SWITCH
AI	ANALOG INPUT	HP	HORSEPOWER
AO	ANALOG OUTPUT	HPU	HEAT PUMP UNIT HVAC
ARCH	ARCHITECTURAL	HTG	HEATING
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE	HVAC	HEATING VENTILATION AND AIR CONDITIONING
AS	AIR SEPARATOR	HX	HEAT EXCHANGER
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATION AND AIR CONDITIONING ENGINEERS	HZ	HERTZ
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	IAU	INSTRUMENT AIR UNIT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	ICW	INDUSTRIAL COLD WATER
BAU	BREATHING AIR UNIT	ID	INSIDE DIAMETER
BHP	BRAKE HORSE POWER	IN	INCH
BLDG	BUILDING	KW	KILOWATTS
BOP	BOTTOM OF PIPE	L	LENGTH
BOT	BOTTOM	LAT	LEAVING AIR TEMPERATURE
BTUH	BRITISH THERMAL UNIT PER HOUR	LBS	POUND
CAF	COMPRESSED AIT FILTER	LEL	LOWER EXPLOSIVE LIMITS
CAP	CAPACITY	LO	LOW
CBV	CALIBRATED BALANCING VALVE	LWT	LEAVING WATER TEMPERATURE
CDA	CEILING DIFFUSER TYPE TYPE "A"	MAX	MAXIMUM
CDB	CEILING DIFFUSER TYPE TYPE "B"	MBH	BRITISH THERMAL UNITS PER HOUR (THOUSANDS)
CFM	CUBIC FEET PER MINUTE	MECH	MECHANICAL
COND	CONDENSATE	MD	MOTORIZED DAMPER
CONN	CONNECTION	MIN	MINIMUM
CONV	CONVENTIONAL	MU	MAKE-UP AIR UNIT
CPLG	COUPLING	NA	NOT APPLICABLE
CPU	CONDENSATE PIPING UNIT	NC	NORMALLY CLOSED
CV	VALVE COEFFICIENT	NEG	NEGATIVE
D	DEPTH	NO	NORMALLY OPEN OR NUMBER
DB	DRY BULB TEMPERATURE	OD	OUTSIDE DIAMETER
DEG OR	DEGREE	OPER	OPERATING
DIA	DIAMETER	OSA	OUTSIDE AIR
DI	DIGITAL INPUT	P	PUMP
DO	DIGITAL OUTPUT	PD	PRESSURE DROP
DL	DOOR LOUVER	PE	PRESSURE MEASUREMENT ELEMENT (SENSOR)
DN	DOWN	PH	PHASE
DRG,DWG	DRAWING	PI	PRESSURE INDICATOR
(E)	EXISTING	PL	PLATE
EA	EXHAUST AIR	PPM	PARTS PER MILLION
EAT	ENTERING AIR TEMPERATURE	PRESS	PRESSURE
ECU	AIR HANDLING UNIT WITH EVAPORATIVE COOLING SECTION	PS	PRESSURE SWITCH OR PIPE SUPPORT
EC	DIRECT EVAPORATIVE COOLER	PSI	POUNDS PER SQUARE INCH
EER	ENERGY EFFICIENCY RATIO	PSIA	POUNDS PER SQUARE INCH ABSOLUTE
EF	EXHAUST FAN	PSIG	POUNDS PER SQUARE INCH GAGE
EFF	EFFICIENT	PT	PRESSURE TRANSMITTER
ELECT	ELECTRICAL	QE	COMBUSTIBLE GAS QUANTITY SENSOR
EL,ELEV	ELEVATION	QT	CUMBUSTIBLE GAS QUANTITY TRANSMITTER
ENT	ENTERING	QTY	QUANTITY
ER	EXHAUST REGISTER	RA	RETURN AIR
EVAP	EVAPORATIVE	RF	RETURN FAN
EWT	ENTERING WATER TEMPERATURE	RGA	RETURN GRILLE TYPE "A"
EXH	EXHAUST	RGB	RETURN GRILLE TYPE "B"
F	FILTER	RH	RELATIVE HUMIDITY
*F	DEGREES FARENHEIT	RPM	REVOLUTIONS PER MINUTE
FCU	FAN COIL UNIT	SA	SUPPLY AIR
FE	FLOW MEASUREMENT ELEMENT (SENSOR)	SCFM	STANDARD CUBIC FEET PER MINUTE
FLA	FULL LOAD AMPS	SCH	SCHEDULE
FLEX	FEXIBLE DUCT	SD	SMOKE DETECTOR
FPM	FEET PER MINUTE	SEER	SEASONAL ENERGY EFFICIENCY RATIO
FSD	FIRE SPRINKLER DISCHARGE DRAIN	SF	SUPPLY FAN
FT	FOOT	SOL	SOLVENT
FT	FLOW TRANSMITTER (WHEN INCLUDED IN AN INSTRUMENT SYMBOL)	SP	STATIC PRESSURE
GAL	GALLON	SQ	SQUARE
GLV	GALVANIZED	SQ FT	SQUARE FEET
GPM	GALLONS PER MINUTE	SR	SUPPLY REGISTER
H	HEIGHT	SS	STAINLESS STEEL
HC	HEATING COIL	ST	SOUND TRAP
		STD	STANDARD
		STL	STEEL
		STRUC	STRUCTURAL

			
<b>NORMAN ENGINEERING CO.</b> CONSULTING ENGINEERS LOS ANGELES, CALIFORNIA		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	
DESIGNED BY <b>E. ABRAMIAN</b>	McCLELLAN AIR FORCE BASE ADAL DEPOT CORROSION CONTROL FACILITY NEW AIRCRAFT PAINT FACILITY		
DRAWN BY <b>G. NAKAMOTO</b>	NOTES, SYMBOLS & ABBREVIATIONS		
CHECKED BY <b>K. GOODWIN</b>	SUBMITTED BY 		
DATE <b>9/30/92</b>	SCALE <b>3/4" = 1'-0"</b>	SHEET <b>M-1</b>	FILE NO. <b>100-25-2051</b>



QC	INI	%

FUNCTION ANALYSIS - VE PAYS

GENERAL NOTES

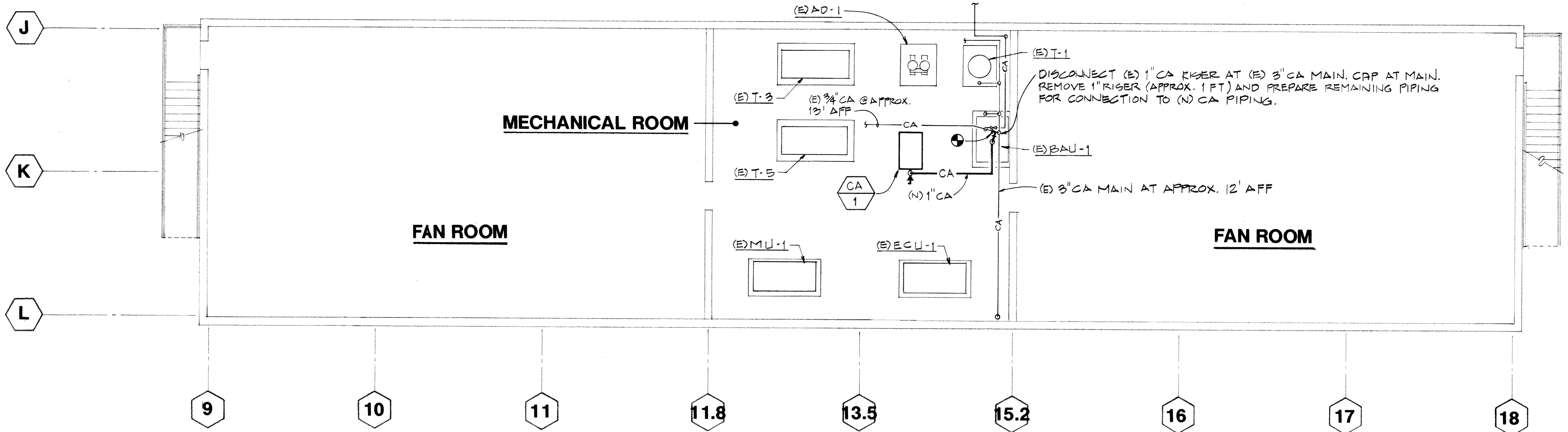
1. THE SERVICE BUILDING PLAN IS PER THE ORIGINAL DOCUMENT SET 100-25-2051, SPEC. NO. 8529, DATED 28 OCT 1992.
2. ALL EQUIPMENT MOUNTINGS AND SUPPORTS SHALL CONFORM TO THE CRITERIA AND REQUIREMENTS OF THE ORIGINAL DOCUMENT SET.
3. COORDINATE FINAL COMPRESSOR LOCATION WITH ALL EXISTING EQUIPMENT IN THE MECHANICAL ROOM.

ABBREVIATIONS

SYMBOL	DESCRIPTION
AD	AIR DRYER
BAU	BREATHER AIR UNIT
ECU	EVAPORATIVE COOLING UNIT
MU	MAKE-UP AIR UNIT
T	TANK
(E), (N)	EXISTING, NEW
CA	COMPRESSED AIR
APPROX.	APPROXIMATELY
FT	FOOT, FEET
AFF	ABOVE FINISHED FLOOR
⊙	POINT OF CONNECTION

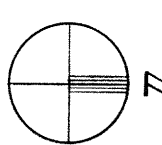
EQUIPMENT SCHEDULE

SYMBOL	DESCRIPTION
CA 1	AIR COMPRESSOR: SINGLE STAGE, HORIZONTAL, TANK MOUNTED UNIT, MINIMUM 5 GALLON RECEIVER, MINIMUM 10 - 100 PSI ADJUSTABLE PRESSURE RANGE, SUITABLE FOR FLOOR MOUNTING, MINIMUM 1/2 HP MOTOR 110V/1ϕ



SERVICE BUILDING FLOOR PLAN - 2ND FLOOR

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

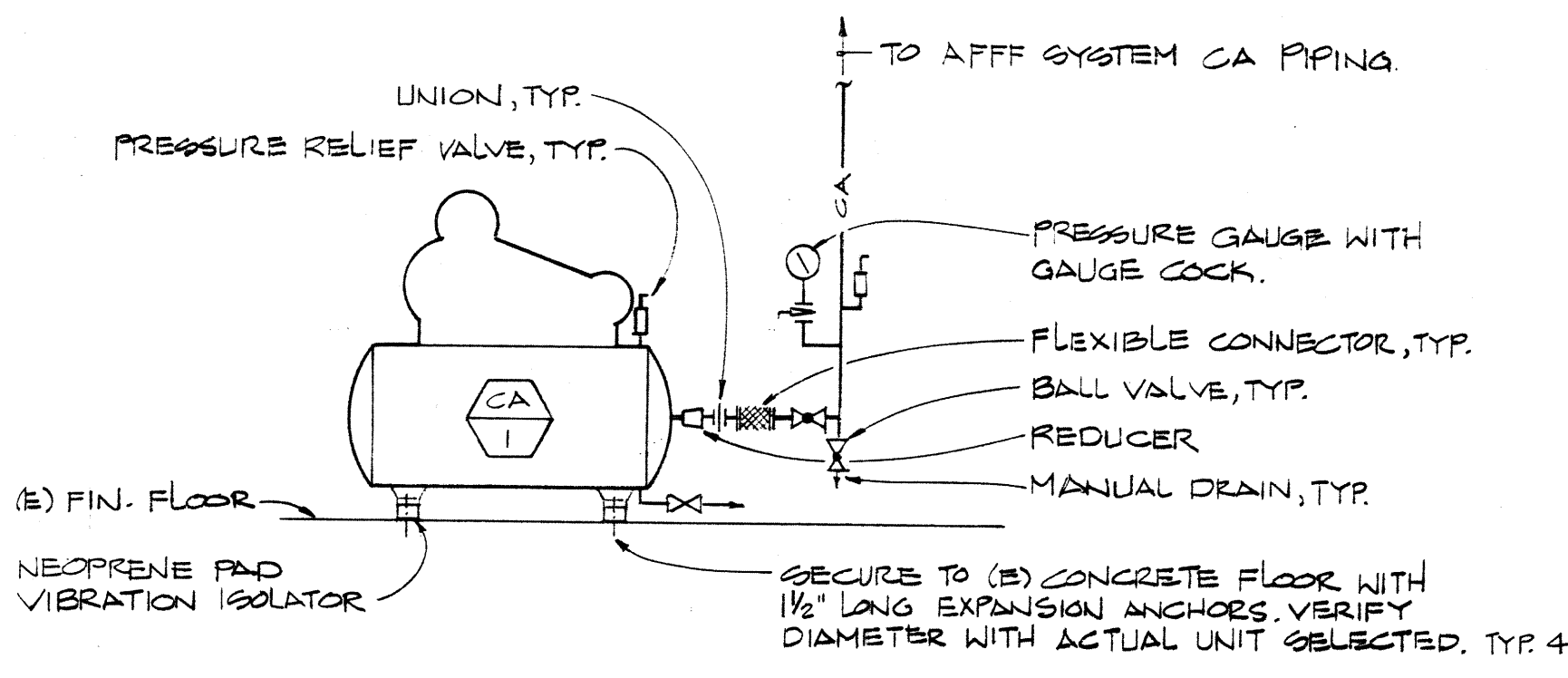


1  
M1 M1

AIR COMPRESSOR AND PIPING DETAIL

NO SCALE

2  
M1 M1



MECHANICAL SPECIFICATIONS

PART 1 - PRODUCTS

1.01 PIPING

- A. Compressed Air Pipe: Type K copper tubing, hard temper, with wrought copper fittings. Capped or plugged outlets shall be screwed brass.

1.02 VALVES AND FITTINGS

- A. Valves: Shall be DeZurik, Crane, Nibco, Kennedy, or equal. Valves shall be full line size.
- B. Ball Valves (Symbol B.V.): Bronze body, 300 psi WOG working pressure. Provide screwed or solder connection to piping system, and glass reinforced teflon seat. Ball valves may be used in lieu of gate valves and globe valves for service 2-1/2 inches or less.

Worcester 411TS for compressed air services.

C. Unions:

1. Size and Type:
- a. Copper or Brass Pipe or Tubing 2" and Smaller: 150# cast bronze ground joint, bronze-to-bronze seat with copper-to-copper end connections.

1.03 GAUGES

- A. Marsh "Quality Gage", U.S. Gage, Danton 800, or equal, with bronze bushed movement and front recalibration. Dials shall be white with black numerals, 3-1/2" dial face. Normal reading shall be at midscale. Provide a cock on each gauge connection. Supply a gauge piped across the inlet and outlet of each pump and where shown on the Drawings.

PART 2 - EXECUTION

2.01 INSTALLATION OF PIPING SYSTEMS

A. General:

1. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
2. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.

2.07 TESTS AND ADJUSTMENTS

- A. Test the installations in accordance with the following requirements and all applicable codes:

1. Notify the contracting officer at least seven days in advance of any test.
2. All piping shall be tested at completion of installation, or at other times as directed by the Contracting Officer.
3. Furnish all necessary materials, test pumps, gases, instruments and labor required for testing.
4. Isolate from the system all equipment which may be damaged by test pressure.
5. Make connections to existing systems with flanged connection. During testing of the new work, provide a slip-in plate to restrict test pressure to new systems only. Remove plate and complete connection to existing system at completion of testing.

- B. Test Schedule: No loss in pressure or visible leaks shall show after four hours at the pressures indicated.

System Tested	Test Pressure PSI	Test With
Compressed Air	200 lbs.	Air & Soap

C. Flexible Connections:

1. Flexible connections in compressed air lines; Flexonic, Anaconda or equal, metal hose, full size.

2.03 EQUIPMENT IDENTIFICATION

- A. Identify each piece of equipment with a permanently attached engraved bakelite plate, 1/2" high white letters on black background; for example, AIR COMPRESSOR 1.

2.04 PIPE IDENTIFICATION

- A. Identify each piping system and indicate the direction of flow by means of Idento Bands (Idento Metal Products Co.) or SETMARK pipe markers. Apply the markings after all painting and cleaning of the piping and insulation is completed.

2.05 ANTI-VIBRATION BASES AND HANGERS

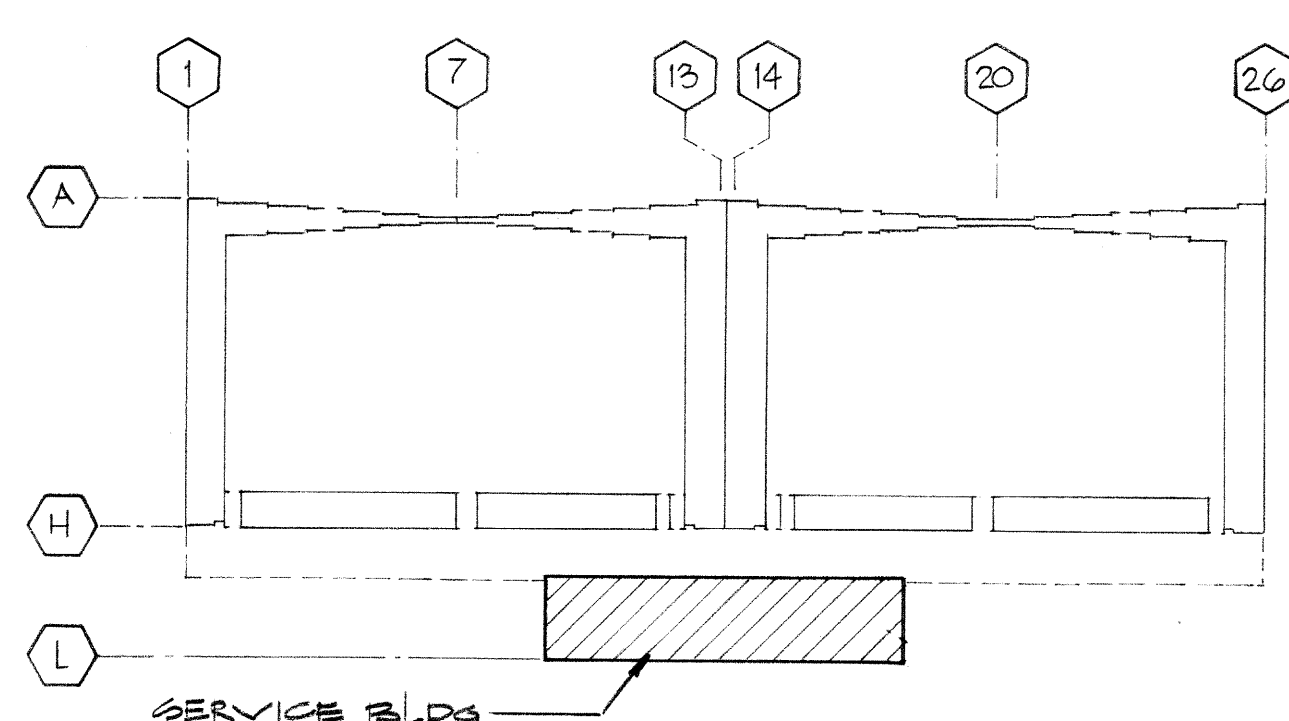
- A. All ventilating, heating, and plumbing equipment shall operate under continuous demand without objectionable vibration. Contractor shall be sure that above result is achieved. Isolate all equipment connections, including conduit, piping, drains, etc.
- B. Isolator manufacturer's submittal shall include complete design free and operating heights of neoprene or fiberglass isolators, and isolation efficiency based on lowest operating speed of equipment supported.

2.06 SPECIAL SEISMIC REQUIREMENTS

- A. Supports for all piping and ductwork shall be in accordance with SMACNA "Guidelines for Seismic Restraints of Mechanical Systems". Mechanical Contractor shall provide calculations for isolators and mounting acceptable to the reviewing authority.
- B. Expansion Anchors in Hardened Concrete:
1. Maximum Values: The allowable shear and withdrawal shall not exceed values permitted for bolts cast into concrete, as defined in Table on Drawing SO-2.
  2. Qualification Tests: The allowable shear and withdrawal load shall be based on qualification tests of at least three (3) test specimens using a factor of safety of five (5) on the average of the test values, or a factor of safety of four (4) on the lowest test value, whichever is lower. Until the test data for the various anchors can be evaluated, use not more than 80% of the allowable load listed in the ICBO Research Committee Recommendation for the specific anchor.
  3. Installation: The anchors must be installed in accordance with the requirements given in ICBO Research Committee Recommendations for the specific anchor.

2.02 PIPE JOINTS AND CONNECTIONS

- A. Cutting: Cut pipe and tubing square, remove rough edges or burrs.
- B. Copper and Brass Pipe and Tubing: Make all joints with silver brazing alloy, Sil-Fos, or equal, 1100°F melting point or greater, ASTM B-260, except that water piping 1-1/4" and smaller not buried in the ground or concrete and Type DWV plumbing piping may be made up with 95-5 tin-antimony, ASTM B-32, Grade 5A, solder. Use leadless solder for all applications. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed.



KEY PLAN  
NO SCALE

REVISION	DATE	DESCRIPTION	BY	BY
DRAWN: S. BALDRIDGE		CAPITAL ENGINEERING CONSULTANTS, INC. 7300 Folsom Boulevard, Suite 100 Sacramento, CA 95826 (916) 386-8888		
CHECKED: T. DUVAL		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
SUBMITTED: [Signature]		McLELLAN AFB ADAL CORROSION CONTROL FACILITY FIRE DEPARTMENT CORRECTIONS		
DATE APPROVED: [Signature]		CALIFORNIA		
SCALE: AS SHOWN		SHEET: M1 OF 1		
SPEC. NO. 8529A		FILE NO. 100-25-2051		



## FUNCTIONAL ANALYSIS - VE PAYS

## HEATINGS COILS, HOT WATER

SYMBOL	AIR FLOW CFM	MIN CAPACITY MBH	WATER FLOW GPM	ENTERING WATER TEMP °F	ENTERING AIR TEMP °F	LEAVING AIR TEMP °F	MAXIMUM AIR PRESSURE DROP IN WC	MAXIMUM WATER PRESSURE DROP FT WC	MAXIMUM FACE VELOCITY FPM	TYPE	CONTROL VALVE SYMBOL	REMARKS
HC 1A	23000	745	33	180	35	65	0.6	6	850	HEATING	TCV 1	SIZE= 75" X 54" EACH. 12 HTG COILS FOR EACH SUPPLY AIR PLENUM. WT=350 LBS EACH MAXIMUM.
HC 2	1755	68	4.5	180	64	100	0.5	10	800	HEATING	TCV 2	SERVING ECU-1
HC 3	1500	63	4.8	180	31	70	0.3	10	800	HEATING	TCV 3	SERVING MU-1

\* ONE 3-WAY CONTROL VALVE FOR EACH PLENUM.

## PUMPS

SYMBOL	SERVICE	CAPACITY GPM	TOTAL HEAD FT WC	TYPE	MAXIMUM RPM	PUMP MINIMUM EFFICIENCY %	MOTOR				REMARKS
							HP	VOLTAGE	PHASE	HERTZ	
P 1A	180°F WATER	800	72	END SUCTION CENTRIFUGAL	1750	80	20	460	3	60	
P 2	HOT WATER FOR SERVICE BLDG	51	71	END SUCTION CENTRIFUGAL	1750	50	3	460	3	60	

## CONVENTIONAL FANS

SYMBOL	AIR FLOW CFM	TOTAL STATIC PRESSURE IN WC	UNIT TYPE	DRIVE	NUMBER & MIN DIA OF WHEEL (S) IN	FAN MAX BHP	FAN MOTOR				MAX OPER. WT (LBS.)	REMARKS
							MAX HP	VOLTAGE	PHASE	HERTZ		
EF 2	750	0.5	CENTRIFUGAL INLINE	BELT DRIVE	(1) 10	-	1/4	120	1	60	125	PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS.
EF 3	1000	0.5	CENTRIFUGAL INLINE	BELT DRIVE	(1) 10	-	1/3	120	1	60	125	PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS.
EF 4	300	0.625	CENTRIFUGAL INLINE	BELT DRIVE	(1) 12	-	1/6	120	1	60	80	EXPOSED TO CLASS 1, DIVISION 1, GROUP D ATMOSPHERE. EXPLOSION PROOF MOTOR, BACKDRAFT DAMPER, AMCA CLASS A SPARK PROOF. PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS.
EF 5	1320	0.875	CENTRIFUGAL INLINE	BELT DRIVE	(1) 15	0.60	3/4	460	3	60	100	EXPOSED TO CLASS 1, DIVISION 1, GROUP D ATMOSPHERE. EXPLOSION PROOF MOTOR, BACKDRAFT DAMPER, AMCA CLASS A SPARK PROOF. PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS.
EF 6	1919	0.25	PROPELLER	BELT DRIVE	(1) 30	-	1/2	120	1	60	300	WITH AUTOMATIC SHUTTER AND WALL HOUSING.
EF 7	3000	2.5	CENTRIFUGAL SCROLL TYPE	BELT DRIVE	(1) 20	3	5	460	3	60	-	FAN INTERIOR - EXPOSED TO CLASS 1, DIVISION 1, GROUP D ATMOSPHERE & 130°F AIR. PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS. AMCA CLASS A SPARK PROOF.
EF 8	3000	2.5	CENTRIFUGAL SCROLL TYPE	BELT DRIVE	(1) 20	3	5	460	3	60	-	FAN INTERIOR - EXPOSED TO CLASS 1, DIVISION 1, GROUP D ATMOSPHERE & 130°F AIR. PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS. AMCA CLASS A SPARK PROOF.

## PAINT CELL AIR FILTER BANKS

SEE NOTE 4 BELOW IN AMENDMENT 0006

SYMBOL	SERVICE	TOTAL FILTER BANK CFM	TYPE	MAXIMUM FACE VELOCITY FPM	MODULE SIZE L x W x D IN	MAX INITIAL RESISTANCE IN WC	FINAL RESISTANCE IN WC	REMARKS
F 1A, 1B, 1C, 1D	SUPPLY AIR PLENUM	269400	30% EFF PLEATED	500	20X20X2	.28	.80	ASSEMBLE FILTER BANKS IN CONFIGURATION SHOWN USING INDICATED MODULE SIZE FILTERS. QUANTITY AS REQUIRED TO COVER FULL BANK AREA. FILTER HOLDING FRAMES SHALL BE BOLTED CONSTRUCTION, GALVANIZED STEEL, REINFORCED FOR 200% OF THE FINAL RESISTANCE LOAD.
F 2A, 2B, 2C, 2D	DOOR SUPPLY AIR FILTER	256800	30% EFF PLEATED	100	20X20X2	.1	.5	ASSEMBLE FILTER BANKS IN CONFIGURATION SHOWN USING INDICATED MODULE SIZE FILTERS. QUANTITY AS REQUIRED TO COVER FULL BANK AREA. FILL ENTIRE AREA OF HANGAR DOOR PANEL LESS MAN DOORS. FILTER HOLDING FRAMES SHALL BE BOLTED CONSTRUCTION, GALVANIZED STEEL, REINFORCED FOR 200% OF THE FINAL RESISTANCE LOAD.
F 3A, 3B, 3C, 3D	PAINT ARRESTOR FILTER	295600	EXPANDED PAPER	100	20X20X1	.05	.5	ASSEMBLE FILTER BANKS IN CONFIGURATION SHOWN USING INDICATED MODULE SIZE FILTERS. QUANTITY AS REQUIRED TO COVER FULL BANK AREA. FILL ENTIRE WALL AREA LESS MAN DOORS. FILTER HOLDING FRAMES SHALL BE BOLTED CONSTRUCTION, GALVANIZED STEEL, REINFORCED FOR 200% OF THE FINAL RESISTANCE LOAD.
F 4A, 4B, 4C, 4D	EXHAUST AIR FILTER	295600	30% EFF PLEATED	100	20X20X2	.1	.5	ASSEMBLE FILTER BANKS IN CONFIGURATION SHOWN USING INDICATED MODULE SIZE FILTERS. QUANTITY AS REQUIRED TO COVER FULL BANK AREA. FILL ENTIRE WALL AREA LESS MAN DOORS. FILTER HOLDING FRAMES SHALL BE BOLTED CONSTRUCTION, GALVANIZED STEEL, REINFORCED FOR 200% OF THE FINAL RESISTANCE LOAD.
F 5A, 5B, 5C, 5D	EXHAUST AIR FILTER	295600	65% EFF PLEATED	250	24X24X6	.15	1.5	ASSEMBLE FILTER BANKS IN CONFIGURATION SHOWN USING INDICATED MODULE SIZE FILTERS. QUANTITY AS REQUIRED TO COVER FULL BANK AREA. MINIMUM OF 300 24" x 24" x 6" MODULES EACH BAY. FILTER HOLDING FRAMES SHALL BE BOLTED CONSTRUCTION, GALVANIZED STEEL, REINFORCED FOR 200% OF THE FINAL RESISTANCE LOAD.
F 6A, 6B, 6C, 6D	EXHAUST AIR FILTER	295600	HEPA	250	24X24X12	-	2	ASSEMBLE FILTER BANKS IN CONFIGURATION SHOWN USING INDICATED MODULE SIZE FILTERS. QUANTITY AS REQUIRED TO COVER FULL BANK AREA. MINIMUM OF 300 24" x 24" x 12" MODULES EACH BAY. FILTER HOLDING FRAMES SHALL BE BOLTED CONSTRUCTION, GALVANIZED STEEL, REINFORCED FOR 200% OF THE FINAL RESISTANCE LOAD.

MAXIMUM VELOCITIES CAN BE EXCEEDED FOR F-106

## PROCESS FANS

SEE NOTE 3 IN AMENDMENT NO. 0006 &amp; RIGHT BELOW

SYMBOL	AIR FLOW CFM	TOTAL STATIC PRESSURE IN WC	UNIT TYPE	DRIVE	NUMBER & MIN DIA OF WHEEL (S) IN	FAN MAX BHP	FAN MOTOR				REMARKS
							MOTOR HP	VOLTAGE	PHASE	HERTZ	
SF 1A, 1B, 2A, 2B, 3A-F	80820	5.25"	VANEAXIAL	BELT DRIVE	(1) 60	100	125	480	3	60	SF-1A/B & 2A/B MOTOR & BELT DRIVES ARE EXPOSED TO 130°F CLASS 1 DIVISION 1, GROUP D ENVIRONMENT. THESE FANS REQUIRE TWO-SPEED MOTORS. FAN AIR STREAM MAY REACH 130°F. FAN OPERATION SHALL BE ADJUSTABLE TO 80% CFM SPECIFIED AT SAME PRESSURE WITH SAME MOTOR BY FIELD ADJUSTMENT OF BLADE PITCH AND BELT RATIO. SPARK PROOF AMCA TYPE "A" CONSTRUCTION IS REQUIRED. PROVIDE DIFFUSER SILENCER, PROVIDE DISCHARGE ISOLATION DAMPERS. SF 3 A/F REQUIRE VARIABLE INLET VANES. PROVIDE VIBRATION ISOLATION THROUGH USE OF SPRING MOUNTS AND SNUBBERS. OPERATING WEIGHT=6000 LBS. WITH FAN, MOTOR INLET VANES, DIFFUSER SILENCER.
EF 1A-H	88680	6.5	VANEAXIAL	BELT DRIVE	(1) 60	130	150	480	3	60	PROVIDE DISCHARGE ISOLATION DAMPERS. FAN AIR STREAM MAY RANGE TO 130°F. FAN OPERATION SHALL BE ADJUSTABLE TO 80% CFM SPECIFIED AT SAME PRESSURE WITH SAME MOTOR BY FIELD ADJUSTMENT OF BLADE PITCH AND BELT RATIO. SPARK PROOF AMCA TYPE "A" CONSTRUCTION IS REQUIRED. PROVIDE VIBRATION ISOLATION THROUGH SPRING MOUNTS AND SNUBBERS. EF-1A & H REQUIRED VARIABLE INLET VANES. OPERATING WEIGHT=7000 LBS. WITH FAN, MOTOR, INLET VANES, BOTH DIFFUSER SILENCERS. BELTS SHALL BE ISOLATED FROM THE AIR STREAM.

## MAKE-UP AIR UNITS

SYMBOL	SERVICE	AIR FLOW CFM	EXTERNAL STATIC PRESS. IN WC	TOTAL STATIC PRESS. IN WC	HEATING COIL SYMBOL	FAN TYPE	NO & MIN. SIZE OF WHEELS	TYPE OF DRIVE	MOTOR HP	MAX FAN RPM	ELECTRICAL DATA			MAX OPER. WEIGHT LBS	FILTER	REMARKS
											VOLTS	PHASE	HERTZ			
MU 1	MEN & WOMEN RESTROOM	1500	1.2	1.7	HC 3	FORWARD CURVE	(1) 9"	BELT	3/1	1340	460	3	60	450	30% EFFICIENT	PROVIDE INTERNAL OR EXTERNAL VIBRATION ISOLATION THROUGH SPRING MOUNTS & SNUBBERS FOR MOTOR & FAN WHEEL.

## STEAM TRAP AND CONDENSATE PUMPING UNIT PACKAGE


SEE NOTE 2 BELOW IN AMENDMENT 0006

SYMBOL	STEAM TRAP				CONDENSATE PUMP				REMARKS
	TYPE	QTY	ACTUAL INLET PRESSURE PSIG	DISCHARGE PRESSURE PSIG	MINIMUM CAPACITY LBS OF CONDENSATE/HR	TYPE	QTY	FLOW LB/HR	
ST 1	FLOAT & THERMOSTAT	4	90 TO 125	(60 PSIG CONDENSATE)	4 @ 9000 LB/HR EACH	NON-ELECTRIC STEAM PRESSURE (OPERATED 1100 PSI STEAM)	4	9000 EA	FOUR PUMPS AND TRAPS SHALL BE SUPPLIED ON A SKID WITH A 49 GALLON/MIN RECEIVER TANK-PIPING AND VALVES.

## EVAPORATIVE COOLER BANKS

SYMBOL	AIR FLOW CFM	ENTERING AIR TEMP °F		LEAVING AIR TEMP °F	MAX STATIC PRESSURE LOSS IN WC	WATER FLOW GPM	RECIRCULATING PUMP			MAX OPER. WEIGHT LBS	ENVELOPE SIZE APPROXIMATE	REMARKS
		DB	WB	DB			VOLTAGE	PHASE	HERTZ			
EC 1A, B 2A, B	60000	104	71	74	0.6	11	460	3	60	3000	L= 8'-9" (OVERALL) H= 14'-1 1/2" D= 2'-9"	QTY= 4 EVAP. COOLER FOR EACH BANK EXPLOSION PROOF MOTORS

## SOUND TRAP BANKS

SYMBOL	CFM	PRESSURE DROP MAX.	NOMINAL TOTAL FACE DEMENSION	NOMINAL LENGTH		MINIMUM DYNAMIC INSERTION LOSS (DECIBELS)								NOMINAL VELOCITY AT RATED INSERTION LOSS FPM	MAX. WEIGHT PER MODULE (LBS)
						OCTAVE BAND HZ									
						63	125	250	500	1000	2000	4000	8000		
<div>ST 1</div> <div>A,B,C, D,E,F, G,H,I, J,K,L</div>	80820	0.6 IN WC	9' W X 8' H	3'		9	14	24	27	25	19	16	14	-1000	<div>100</div>
<div>ST 2</div> <div>A,B,C,D E,F,G,H</div>	80820	0.6 IN WC	8' W X 8' H	5'		16	21	35	41	41	28	21	15	-1000	<div>115</div> <div></div>
"DIFFUSER SILENCER"	MATCH FAN	0.10 IN WC	MATCH FAN	5'		3	11	17	18	16	12	11	10	MATCH FAN	800

## COMPRESSED AIR FILTERS

SYMBOL	SERVICE	MINIMUM AIR FLOW SCFM	INLET PRESSURE PSI	ELEMENT MICRON PPM	MAX. AIR TEMP °F	MAX. PRESS. DROP (PSI)	REMARKS
CAF 1	PAINT AIR	360	100	1	158	2 PSI	
CAF 2	PAINT AIR	360	100	.01	158	2 PSI	

## ASME CODED TANKS

SYMBOL	SERVICE	MINIMUM CAPACITY GAL	STYLE	TYPE	ASME WORKING PRESS PSIG	REMARKS
T 1	AIR COMPRESSOR	250	NON-DIAPHRAGM	VERTICAL	200	OPER WT. = 500 LBS (NOMINAL)
T 2	HOT WATER EXPANSION	370	DIAPHRAGM	VERTICAL	150	

(NOTE: REFERENCE IS MADE TO EQUIPMENT SCHEDULES ON P-1)

Addendum No. 0006

Reading 10-006 Para 5.1.1. Delete the AMCA Type A requirements for all fans (located on Amendment Cover Sheet).

Revised Para 3.1.1. to read: "All fans (including process fans) shown or specified as spark proof AMCA Type A construction shall comply with either NFPA 33 (1989 ed., including para 5-14, 5-15, and 5-16) requirements or AMCA Type A spark-proof requirements."

Drawing Sheet 10-2: Addendum No. 0006

1. Add the following note pertinent to the entire sheet: "Unless indicated otherwise, all weights are to be assumed as maximums." 2. "Process Fan" schedule, the pump discharge pressure shall be 60 psig. 3. In the "Process Fan" schedule: a. Add the following: "SF's shall be at 5.0" static pressure and EF's shall be at 6.5" static pressure." b. The BHP's of 100 and 130 to 110 and 143 respectively. c. Delete the AMCA Type A requirements for all fans. d. Change the "Total pressure" of 5.25 and 6.5 to 5.40 maximum and 7.40 maximum, respectively. 4. In the "Paint Cell Air Filter Banks" schedule. Delete "EXPANDED PAPER" for F-3A thru D.

Revised Para 3.1.1. to read: "All fans (including process fans) shown or specified as spark proof AMCA Type A construction shall comply with either NFPA 33 (1989 ed., including para 5-14, 5-15, and 5-16) requirements or AMCA Type A spark-proof requirements."

11/25/92	MISCELLANEOUS REVISIONS	DA	
11/25/92		BY	
NORMAN ENGINEERING CO.		DEPARTMENT OF THE ARMY	
CORPORATE ENGINEERS		SACRAMENTO DISTRICT, CORPS OF ENGINEERS	
LOS ANGELES, CALIFORNIA		SACRAMENTO, CALIFORNIA	
DESIGNED BY E. ABRAMIAN	MCCLELLAN AIR FORCE BASE CALIFORNIA		
DRAWN BY D. MARTINOLI	ADAL DEPOT CORROSION CONTROL FACILITY NEW AIRCRAFT PAINT FACILITY		
CHECKED BY K. GOODWIN	EQUIPMENT SCHEDULE - 1		
DATE APPROVED 9/30/92	SCALE 1" = 1'-0"	SHEET M-2	FILE NO. 100-25-2051
DATE 9/30/92		SHEET 56 OF 95	



## FUNCTIONAL ANALYSIS - VE PAYS

## HEAT PUMP - SPLIT SYSTEM PACKAGE UNITS

SYMBOL	MINIMUM AIR FLOW CFM	EXTERNAL STATIC PRESSURE IN "WC	FAN COIL SECTION													COMPRESSOR CONDENSING SECTION				MIN UNIT SEER AT ARI CONDITIONS	MIN UNIT HSPF AT ARI CONDITIONS	FILTERS	MINIMUM OUTSIDE AIR CFM	MAX OPER. WT. (LBS.)		REMARKS
			MOTOR				EVAPORATOR						HEATING			MAX FLA	VOLT	PHASE	HERTZ					HP	FC	
			NOMINAL HP	VOLT	PHASE	HERTZ	MIN CAPACITY TOTAL BTUH	MIN CAPACITY SENSIBLE BTUH	EVAP ENT DB °F	EVAP ENT WB °F	EVAP LGV DB °F	OUTDOOR AIR TEMP. °F	MIN. CAPACITY BTUH REVERSE CYCLE	OUTDOOR AIR TEMP. °F	ELECTRIC RESISTANCE HEATER KW											
<div>FCU-1</div> <div>1</div> <div>HPU-1</div> <div>1</div>	750	0.9	1/3	208	1	60	24500	18600	82.7	66.5	57*	105	16000	47	5.6 MIN	18	208	1	60	8	6	30% EFFICIENT	140	N/A	100	FCU-1 HORIZONTAL POSITION WITH SECONDARY DRAIN PAN PROVIDE VIBRATION ISOLATION MOUNTS SUPPORT FROM BUILDING STEEL
<div>FCU-2</div> <div>2</div> <div>HPU-2</div> <div>2</div>	750	0.9	1/3	208	1	60	27800	17400	85.4	67.0	56*	105	16200	47	5.6 MIN	22.2	208	1	60	8	6	30% EFFICIENT	240	N/A	100	FCU-2 VERTICAL POSITION PROVIDE SUPPORT LEGS





## UNIT HEATERS, HOT WATER

SYMBOL	AIR FLOW CFM NOMINAL	MOUNTING HEIGHT	UNIT TYPE	MINIMUM THROW FOR HORIZONTAL DISCHARGE UNITS MINIMUM SPREAD FOR VERTICAL DISCHARGE UNITS	TYPE OF FAN	CAPACITY BTUH MIN	ENTERING WATER TEMP °F	ENTERING AIR TEMP °F	LEAVING AIR TEMP °F	GPM	WATER DROP MAX FT WC	SUPPLY FAN MOTOR				OPER. WT (LBS.)	REMARKS
												HP NOMINAL	VOLTAGE	PHASE	HERTZ		
UH-1 THRU 6	3200	BLDG 692 HIGH BAY NEAR ROOF	VERTICAL DISCHARGE	32 FT DIAMETER	PROPELLER	101,000	200	60	90	5.5	1	1/4	120	1	60	100 MAX	CLASS 1 DIVISION 1 GROUP D ENVIRONMENT
UH-7	1200	12	VERTICAL DISCHARGE	17 FT DIAMETER	PROPELLER	20,000	180	50	65	1.4	1	1/20	120	1	60	60 MAX	WITH LOUVER CONE DIFFUSER

## DIFFUSERS

SYMBOL	CFM	NECK SIZE INCHES	AIR PATTERN	TYPE	FACE SIZE INCHES	USE	REMARKS
CDA	SEE PLAN	SEE PLAN	SEE PLAN	PERFORATED PLATE	24"x24" LAY-IN	SUPPLY AIR	WITH OPPOSED BLADE DAMPER
CDB	SEE PLAN	SEE PLAN	SEE PLAN	PERFORATED PLATE	NECK SIZE PLUS 4" SURFACE MOUNT	SUPPLY AIR	WITH OPPOSED BLADE DAMPER

## SINGLE STAGE EVAPORATIVE COOLING UNIT

SYMBOL	SUPPLY FAN			EAT °F		LAT °F	OUTSIDE AIR CFM	RECIRCULATING WATER PUMP		HEATING COIL SYMBOL	FILTER	MOTOR			OPER. WT. (LBS.)	REMARKS	
	AIR FLOW CFM	EXTERNAL SP IN WC	MAX HP	DB	WB	DB		NOMINAL HP	ELECT			VOLTS	PHASE	HERTZ			
	1755	1.1	1 1/2	99	70	 73°F	90%	HTG=435 MIN. COOLING=100%	1/4	120V-1Ø		30% EFFICIENT	460	3	60	 2500 MAX	PROVIDE AUTOMATIC WATER MAKE-UP AND MANUALLY ADJUSTABLE BLEED VALVE. PROVIDE INTERNAL VIBRATION ISOLATION OF FAN AND MOTOR THROUGH SPRING MOUNTS & SNUBBERS

## INSTRUMENT AIR DRYER, FILTER &amp; CONDITIONING UNIT

SYMBOL	SIZE	ELECTRICAL				REMARKS
		VOLTS	PH	HZ	POWER	
IAU-1	BY CONTRACTOR	115	1	60	200W MAX	- SELF CONTAINED CONTROLS - REFRIGERATED DRYER (70 PSIG, 35°F DEW POINT: AT PRESSURE) - AUTOMATIC CONDENSATE DRAIN TRAP WITH MANUAL OVERRIDE - 100% 0.3 MICRON FILTER - TWO DIRT/OIL COALESCING OIL FILTERS IN PARALLEL WITH SHUT OFF VALVES AND PRESSURE REGULATOR - FILTER BOWL - 100 PSIG MAX. WORKING PRESSURE - PRESSURE REGULATOR (RELIEVING TYPE NOT ACCEPTABLE)

## HEAT EXCHANGER (HOT WATER GENERATOR)

SYMBOL	SERVICE	TYPE	CAPACITY MBH MINIMUM	STEAM			WATER			REMARKS
				FLOW LBS/HR	DESIGN PRESS PSIG	OPER PRESS PSIG	FLOW GPM	ENT °F	LWT °F	
HX-1	HOT WATER SYSTEM	SHELL & TUBE	20000	23000	150	90	1650	155	180	PROVIDE SUPPORT SADDLES OR CRADLES TO ELEVATE BOTTOM OF HX-1 12" ABOVE TOP OF CPU-1 RECEIVER TANK. PROVIDE 30% EXCESS HEAT TRANSFER AREA FOR FUTURE GROWTH

## GRILLES

SYMBOL	CFM	NECK SIZE INCHES	APPLICATION	REMARKS
RGA	SEE PLAN	SEE PLAN	RETURN AIR	PERFORATED FACE TO MATCH CDA
RGB	SEE PLAN	SEE PLAN	RETURN AIR	PERFORATED FACE TO MATCH CDB SURFACE MOUNT WITH OPPOSED BLADE DAMPER
TGA	SEE PLAN	SEE PLAN	TRANSFER AIR	PERFORATED FACE TO MATCH CDA
TGB	SEE PLAN	SEE PLAN	TRANSFER AIR	PERFORATED FACE TO MATCH CDB SURFACE MOUNT WITH OPPOSED BLADE DAMPER

## BREATHING AIR UNIT

SYMBOL	MIN CAPACITY (SCFM)	OPERATING PRESSURE (PSI)	ELECTRICAL DATA				MAX WEIGHT (LBS)	REMARKS
			VOLTS	PHASE	HERTZ	MAX LOAD KW		
BAU-1	150	150 MAX 80 MIN	208	1	60	8	1600	PROVIDE DRY CONTACTS FOR CONNECTIONS TO PROGRAMMABLE PROCESS CONTROL SYSTEM

## AIR DRYERS

SYMBOL	SERVICE	TYPE	MIN CAPACITY SCFM	INLET PRESSURE PSI	INLET TEMP °F	MAX OPER. WT. (LBS)	ELECTRICAL DATA			REMARKS
							MAX POWER	VOLTS	PHASE	
AD-1	PAINT AIR	DESSICANT	500	100	100	2200	280 (WATTS)	115	1	

## AUTOMATIC VALVES FOR TEMPERATURE CONTROL SYSTEMS

SYMBOL	SERVICE	FLOW GPM	ACTION	FAILURE POSITION CONTROLLED DEVICE	TYPE	QTY	CV	REMARKS
ICV-1A/B, 2A/B	HOT WATER AT 180°F	400	MODULATING	NO BYPASS	3-WAY	4	140	SERVING PAINT CELL HEATING COIL (HC-1A/B, 2A/B) PNEUMATIC ACTUATOR
ICV-2	HOT WATER AT 180°F	4.5	MODULATING	NO BYPASS	3-WAY	1	2.1	SERVING ECU-1 HEATING COIL HC-2 PNEUMATIC ACTUATOR
ICV-3	HOT WATER AT 180°F	4.8	MODULATING	NO BYPASS	3-WAY	1	2.2	SERVING MU-1 HEATING COIL HC-3 PNEUMATIC ACTUATOR
ICV-4	STEAM	23,000 LBS/HR	MODULATING	CLOSE	2-WAY	1	13.3	SERVING HX-1 STEAM UPSHIFT/AN PRESSURE VARIES 125 PSIG TO 115 PSIG. PNEUMATIC ACTUATOR
ICV-5	HOT WATER AT 180°F	40	TWO POSITION	CLOSE	2-WAY	1	13.6	SERVING HX-1 PNEUMATIC ACTUATOR
ICV-6	HOT WATER AT 180°F	1.4	TWO POSITION	OPEN	2-WAY	1	0.65	SERVING HX-1 PNEUMATIC ACTUATOR
ICV-7	HOT WATER AT 180°F	5.5	TWO POSITION	OPEN	2-WAY	6	2.5	CLASS 1 GROUP 1 DIVISION D HAZARDOUS LOCATION SERVING UH 1 THRU 6 PNEUMATIC ACTUATOR

## REGISTERS

SYMBOL	CFM	NECK SIZE INCHES	APPLICATION	REMARKS
SR	SEE PLAN	SEE PLAN	SUPPLY AIR	WITH OPPOSED BLADE DAMPER
ER	SEE PLAN	SEE PLAN	EXHAUST AIR	WITH OPPOSED BLADE DAMPER

## AUTOMATIC DAMPER SCHEDULE

SYMBOL	SERVICE	MAX FLOW CFM	MIN. FLOW CFM	PRESSURE DIFFERENCE (IN WC)	CONTROL ACTION	REMARKS
MD-1	EXHAUST AIR	64663	49267	8 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-2	RETURN AIR	64200	19400	6 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-3	OUTSIDE AIR	67350	3150	6 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-4	SUPPLY AIR	202050	67350	6 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-5	EC BYPASS	256800	38800	6 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-6	EC FACE DAMPER	54500	0	6 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-7	PAINT MIX & SURFACE PREP EXH./ISOLATION	1320	NA	3 0.1 MAX	MODULATE AIR FLOW	FAIL CLOSED OPPOSED BLADE PNEUMATIC ACTUATOR
MD-8	PAINT MIX & STORAGE EXHAUST	1320	NA	3 0.1 MAX	MODULATE AIR FLOW	FAIL OPEN OPPOSED BLADE PNEUMATIC ACTUATOR
MD-9	MECHANICAL ROOM VENTILATION	1919	NA	1 0.1 MAX	TWO POSITION	FAIL CLOSED PARALLEL BLADE PNEUMATIC ACTUATOR
MD-10	SUPPLY FAN	80820	NA	6 0.1 MAX	TWO POSITION	FAIL OPEN PARALLEL BLADE PNEUMATIC ACTUATOR INTERLOCK WITH FAN STARTER

\* - MINIMUM MODULATED FLOW DOES NOT INCLUDE SHUT OFF CONDITION (ZERO FLOW) UNLESS MODULATION TO ZERO FLOW IS REQUIRED

## EQUIPMENT MAXIMUM ACCEPTABLE SOUND POWER LEVELS (DECIBELS) \*

ITEMS	LOCATION	FREQUENCY (HZ)							
		63	125	250	500	1000	2000	4000	8000
PROCESS SUPPLY FANS WITHOUT VARIABLE INLET VANES SF-1 A/B, 2-A/B, 3-B-E	"IN-DUCT"	105	104	112	109	109	108	100	95
PROCESS EXHAUST FANS WITHOUT VARIABLE INLET VANES EF 1B-G	"RADIATED" THRU CASING	91	88	95	92	92	89	83	78
PROCESS SUPPLY FANS WITH VARIABLE INLET VANES SF 3 A & F	"IN-DUCT"	111	108	115	112	112	109	103	98
PROCESS EXHAUST FANS WITH VARIABLE INLET VANES EF-1 A & H	"RADIATED" THRU CASING	91	88	95	92	92	89	83	78
ECU-1 MU-1, EF2, 3, 4, 5, 6, 7, & 8	"IN-DUCT"	114	109	122	120	112	111	104	101
FCU 1 & 2	"RADIATED" THRU CASING	94	89	102	92	92	91	84	81
		A-WEIGHTED SOUND LEVEL: 80							
		A-WEIGHTED SOUND LEVEL: 70							
		A-WEIGHTED SOUND LEVEL: 45							

\* REF. 10<sup>-12</sup> WATTS

DESIGNED BY	E. ABRAMIAN	DATE	11/25/92	REVISIONS	MISCELLANEOUS REVISIONS	BY	DA
DRAWN BY	D. MARTINOLI	DATE	9/30/92	REVISIONS		BY	BT
CHECKED BY	K. GOODWIN	DATE	9/30/92	REVISIONS		BY	
NORMAN ENGINEERING CO. 1000 S. 10TH ST., SUITE 100 SACRAMENTO, CALIFORNIA 95811				DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA			
PROJECT: ADAL DEPOT CORROSION CONTROL FACILITY EQUIPMENT SCHEDULE - 2				SCALE: 1" = 1'-0" SHEET: M-3 TOTAL SHEETS: 37 OF 95 FILE NO: 100-25-2051			

SAFETY PAYS

Am-2 DF



28'

TABLE 3	SHARED SUPPLY & EXHAUST FAN STATUS
---------	------------------------------------

MODE OF THE CELLS		NUMBER OF FANS OPERATING	
		SUPPLY	EXHAUST
1	1	6	8
1 *	2 *	*	*
1 *	3 *	*	*
1	4	3	4
1	5	4	6
1	6	5	7
1	7	3	4
2 *	2 *	*	*
2 *	3 *	*	*
2	4	6	7
2 *	5 *	*	*
2 *	6 *	*	*
2	7	6	7
3 *	3 *	*	*
3	4	4	5
3	5	5	7
3	6	6	8
3	7	4	5
4	4	0	0
4	5	1	2
4	6	2	3
4	7	0	0
5	5	2	4
5	6	3	5
5	7	1	2
6	6	4	6
6	7	2	3
7	7	0	0

\* THIS CELL 1 & 2 MODE COMBINATION  
SELECTION NOT POSSIBLE.

