AIR SEPARATORS

PLAN CODE	MFGR	MODEL NO	GPM	PIPE SIZE	MAX HPD
AS-1	TACO	4CJF	41.25	2"	1.0 FT
-	-	-	-	-	-

EXPANSION TANKS

PLAN CODE	MFGR	MODEL NO	TOTAL VOLUME	ACCEPTANCE VOLUME	PRECHARGE PRESSURE
XT-1	TACO	CBX-30	8	5	12
-	-	-	-	-	-

GLYCOL MAKE-UP UNIT SCHEDULE

PLAN CODE	MFGR	MODEL NO	SERVICE	CAPACITY (GAL)	PUMP GPM	PUMP HEAD (FT)	POWER	PUMP HP	REMARKS
GFU-1	J.L. WINGERT	GL50-E1	HW	50	2.0	30	120/1/60	1/3	-

1) PUMP CUT IN IS 12 PSIG CUT OUT IS 20 PSIG. PROVIDE BALL VALVE, STRAINER CHECK VALVE, PRESSURE/LEVEL SWITCHES, RELIEF VALVE SET TO 30 PSIG CONTROL PANEL.

PUMP SCHEDULE

PLAN CODE	MFGR	MODEL NO	GPM	HEAD (FT)	RPM	HP	POWER	REMARKS
HWP-1	TACO	1611	26	23	1750	1/3	120/1/60	1)
HWP-2	TACO	1611	26	23	1750	1/3	120/1/60	1)

1) PARALLEL OPERATION

BOILER SCHEDULE

PLAN CODE	MFGR	MODEL NO	MBH INPUT	MBH OUTPUT	TYPE	MODULATION	FLUE SIZE	POWER	REMARKS
B-1	PATTERSON-KELLEY	MACH C-450	450	414	CONDENSING	FULL TO 20%	5"	120/1/60	1)

1) LISTED OUTPUT IS BASED ON ANSI Z21.3 RATING.

SUMP PUMP SCHEDULE

PLAN CODE	MFGR	MODEL NO	GPM	HEAD (FT)	RPM	HP	POWER	SUMP SIZE (DIAxDEPTH)	OUTLET	REMARKS
SP-1	ZOELLER	510-0005	20	18	1725	1/2	120/1/60	18X30	2"	1)

1) PACKAGED, SELF-CONTAINED POLYETHYLENE SUMP WITH PUMP, CHECK VALVE, AND CONTROLS.

PLUMBING FIXTURE CONNECTION SCHEDULE

MINIMUM BRANCH SIZES UNLESS INDICATED OTHERWISE ON PLANS.

ITEM	WASTE	VENT	CW	HW	REMARKS
LAVATORY	1-1/2"	1-1/2"	1/2"	1/2"	-
BAR SINK	2"	1-1/2"	1/2"	1/2"	-
MOP SINK	3"	2"	1/2"	1/2"	-
ELECTRIC WATER COOLER	1-1/2"	1-1/2"	1/2"	-	-
URINAL, FLUSH VALVE	2"	1-1/2"	3/4"	-	-
WATER CLOSET, GRAVITY TANK	3"	2"	1/2"	-	-
WATER CLOSET, FLUSH VALVE	3"	2"	1"	-	-
HOSE BIBB	-	-	3/4"	-	-
FLOOR DRAIN	3"	1-1/2"	1/2"	-	-
TRAP PRIMER VALVE	-	-	1/2"	-	SEE MFR'S RECOMMENDATIONS
TEMPERING VALVE	-	-	1/2"	3/4"	3/4" OUTLET TO FIXTURES

NOTES:
1. CW AND MINIMUM BRANCH SIZE TO 2 OR MORE FIXTURES IS 3/4".
2. REFER TO CORRESPONDING DETAILS FOR ADDITIONAL INFORMATION.
3. 4" WASTE CONNECTION FOR ALL FLOOR DRAINS IN MECHANICAL ROOMS

PLUMBING EQUIPMENT SCHEDULE

ALL EQUIPMENT SHALL BE IN ACCORDANCE WITH APPLICABLE SPECIFICATIONS AND BE OF SIZE AND TYPE INDICATED, PROVIDE LISTED PRODUCT, OR EQUAL IN PERFORMANCE AND QUALITY.

TAG	INFORMATION	
EWH	ELECTRIC WATER HEATER	
	TYPE:	17 GALLON, GLASS-LINED TANK, 18 GAL/HR RECOVERY AT 100°F RISE, ANODE ROD, 18" DIAMETER.
	MFR:	STATE LDE-17H0N6-E
	ELECTRICAL:	1650W, 120/1/60
WCO	WALL CLEANOUT	
	TYPE:	COATED CAST IRON WALL CLEANOUT WITH GAS AND WATERTIGHT TAPERED THREAD PLUG, ROUND STAINLESS STEEL COVER WITH SCREW ATTACHMENT.
	MFR:	ZURN Z1441
FCO	FLOOR CLEANOUT	
	TYPE:	COATED CAST IRON CLEANOUT WITH GAS AND WATERTIGHT TAPERED THREADED PLUG, POLISHED, SECURED NICKEL-BRONZE ACCESS COVER & FRAME, NON-SLIP FINISH, ADJUSTABLE.
	MFR:	ZURN Z1400
COTG	CLEANOUT TO GRADE	
	TYPE:	COATED CAST IRON FLOOR CLEANOUT WITH GAS AND WATERTIGHT TAPERED THREADED PLUG.
	MFR:	ZURN Z1440
TPV	TRAP PRIMER VALVE	
	TYPE:	AUTOMATIC WITH OPERATION ON 2 PSI PRESSURE DROP, WITH DISTRIBUTION UNIT AS REQUIRED.
	MFR:	ZURN Z1022
WH-1	INSTANT WATER HEATER	
	TYPE:	ELECTRIC TANKLESS WATER HEATER WITH 55°F TEMP. RISE AT 0.5 GPM.
	MFR:	EEMAX SP4208
	ELECTRICAL:	208/1/60, 4.1 KW, 19.7A
EWC-1	ELECTRIC WATER COOLER	
	TYPE:	SELF-CONTAINED, WALL HUNG, 8 GPH CAPACITY @ 90°F AMBIENT, THERMOSTAT SET TO 50°F, EASY-TOUCH CONTROLS @ FRONT.
	MFR:	ELKAY EZTL
	ELECTRICAL:	120/1/60, 325W, FLA=3.7
WS-1	WATER SOFTENER	
	TYPE:	AUTOMATIC 30,000GR/GL HARDNESS CAPACITY AT 12 GPM CONTINUOUS, 20 GPM PEAK, SINGLE TANK, ADJUSTABLE TIME CLOCK
	MFR:	CULLIGAN HI-FLO 2 FV-45B
	ELECTRICAL:	120/1/60

AIR HANDLING UNIT SCHEDULE

PLAN CODE	AHU-1
MANUFACTURER	TRANE
MODEL	MCCA-1
SIZE & ARRANGEMENT	1-THORIZ.
FAN SECTION	
NUMBER OF FANS	1
DIAMETER	18.25"
TYPE	FC
ACFM @ 3500 FT - NOTE 1	9000
ACTUAL ESP	2.0
ACTUAL TSP W/ FILTERS	3.35
RPM @ ACFM & TSP	1067
HP	10
POWER	208/3/60
IBOL. DEFLECTION	-
COOLING COIL	
TYPE	DX R-22
SIZE	UNIT
FACE VELOCITY (FPM) (MAX)	550
NO. OF ROWS/FINS PER FT.	6/86
EAT-DB/WB	82/63
LAT-DB/WB	55/54
OUTPUT-SEN/TOTAL (MBH)	221/231
AIR P.D. (INCHES H_2O)	0.45
HEATING COIL	
TYPE	HYDRONIC
SIZE	UNIT
FACE VELOCITY (FPM) (MAX)	550
NO. OF ROWS/FINS PER FT.	1/161
EWT/LWT (DEG F)	180/140
GPM	15.0
WATER P.D. (FT)	0.75
EAT-DB	45
LAT-DB	78
OUTPUT MBH	285
AIR P.D. (INCHES H_2O)	0.20
FILTER SECTION	
AIR P.D. (INCHES H_2O)	0.60
DISCHARGE BY OCTAVE BAND	
1	-
2	-
3	-
4	-
5	-
6	-
7	-
MAX. UNIT DIMENSIONS NOTE 3	

NOTE #1: ACFM IS AT 3000 FT ELEVATION, 70°F.

NOTE #2: HEATING COILS SELECTED FOR 30% PROPYLENE GLYCOL.

NOTE #3: DIMENSIONS INDICATED BY THE SIZES OF THE UNITS IN THE PLANS AND SECTIONS ARE THE APPROXIMATE MAXIMUM ALLOWED. LARGER UNITS WHICH DO NOT PROVIDE SIMILAR MAINTENANCE CLEARANCES WILL NOT BE ACCEPTABLE.

NOTE #4: ALL COILS HAVE SAME END CONNECTIONS.

AIR COOLED CONDENSING UNIT SCHEDULE

PLAN CODE	MFGR	MODEL NO	CAPACITY TONS	AMBIENT TEMP	REFRIG	NO. OF FANS	MOTOR HP (EA)	COMP. H.P.	STAGES	POWER	SUBCOOL °F	SAT. SUCTION °F	REMARKS
ACCU-1	MCQUAY	ACZ-025A	23	91	R-22	3	1.0	10 4.13	2	208/3/60	3	45	1)
-	-	-	-	-	-	-	-				-	-	-

1) PROVIDE WITH VIBRATION ISOLATORS, FACTORY MOUNTED DISCONNECT.

VARIABLE AIR VOLUME TERMINAL SCHEDULE

TAG	MFR	MODEL	INLET (IN)	MAX CFM	MIN CFM	MAX NC	COIL TYPE	COIL	WIDE OPEN APD (IWC)	NOTES
VAV-1	TRANE	VCCF	6"Ø	410	100	30	DUCT	DC-1	0.10	
VAV-2	TRANE	VCCF	6"Ø	450	100	30	DUCT	DC-2	0.10	
VAV-3	TRANE	VCCF	24x16	4200	850	30	DUCT	DC-3	0.10	
VAV-4	TRANE	VCCF	10"Ø	975	200	30	DUCT	DC-4	0.10	
VAV-5	TRANE	VCCF	12"Ø	1995	400	30	DUCT	DC-5	0.10	

NC DATA IS FOR THE 3RD OCTAVE BAND WITH CREDIT FOR 10 DB SUPPLY ATTENUATION IN LINED LOW VELOCITY DUCTS AND 6 DB CREDIT FOR 3RD OCTAVE BAND CEILING TRANSMISSION LOSS. DATA BASED ON RECTANGULAR END DISCHARGE.

GRILLES, REGISTERS & DIFFUSERS SCHEDULE

PLAN CODE	MFGR	MODEL NO	MATERIAL	FINISH	REMARKS
D-1	TITUS	TDC	STEEL	WHITE	24x24 LAY-IN
D-2	TITUS	TDC	STEEL	WHITE	SURFACE MOUNT
D-3	TITUS	TDC	STEEL	WHITE	24x24 LAY-IN
R-1	TITUS	CT-480	ALUM.	BRUSHED	FLOOR MOUNT, HEAVY DUTY
G-1	TITUS	355ZRL	STEEL	PRIMER	PAINT TO MATCH WALL - COORD. W/ G.C.
-					

INTAKE/EXHAUST WALL LOUVER SCHEDULE

PLAN CODE	MFGR	MODEL NO	SERVICE	FRAME TYPE	CFM	VEL (MAX) (FPM)	PRESSURE DROP (IWC)	MATERIAL	REMARKS
L-1	RUSKIN	ELF631	INTAKE	WALL COMPATIBLE	9,000	600	0.08	ALUMINUM	1)
-	-	-	-	-	-	-	-	-	-

1) PROVIDE WITH BIRD SCREEN, COLOR PER ARCHITECT.

FAN SCHEDULE

PLAN CODE	DUTY	MFGR	MODEL NO	DRIVE	CFM	RPM	E.S.P.	HP (kW)	POWER	TYPE	REMARKS
EF-1	EXHAUST	COOK	GC-240	DIRECT	125	N/A	0.25	(55)	120/1/60	CEILING	1)
EF-2	EXHAUST	COOK	GC-220	DIRECT	50	N/A	0.25	(30)	120/1/60	CEILING	1)
EF-3	EXHAUST	COOK	GC-140	DIRECT	100	N/A	0.25	(55)	120/1/60	CEILING	1)
EF-4	EXHAUST	COOK	GC-140	DIRECT	100	N/A	0.25	(55)	120/1/60	CEILING	1)
RF-1	RELIEF	COOK	24SQN-B	BELT	9,000	1223	1.0	5	208/3/60	IN-LINE	2) 3)

1) PROVIDE BACKDRAFT DAMPER VIBRATION ISOLATION.
2) PROVIDE MOTORIZED SHUTOFF DAMPER VIBRATION ISOLATION.
3) INCLUDES APPROX. 6% DRIVE LOSS

DUCT HEATING COIL SCHEDULE

PLAN CODE	MFGR	MODEL NO	SIZE (HxW)	VAV BOX	EAT/LAT	EWT/LWT	GPM	MAX APD	MAX HPD	REMARKS
DC-1	TRANE	T	12x12	1	55/105	180/140	1.5	0.25"	10'	
DC-2	TRANE	T	12x12	2	55/105	180/140	1.75	0.25"	10'	
DC-3	TRANE	P4	30x32	3	55/105	180/140	13	0.25"	10'	
DC-4	TRANE	T	15x18	4	55/105	180/140	3.5	0.25"	10'	
DC-5	TRANE	TT	18x26	5	55/105	180/140	6.5	0.25"	10'	

PLUMBING FIXTURE SCHEDULE

PLAN CODE	ITEM	MFGR	MODEL #	MATERIAL	FINISH	TRIM	TRIM FINISH	A.D.A.	NOTES
L-1	LAVATORY (NOTE #3)	ACORN	MERIDIAN 3782	CAST POLYESTER	2)	"J" SHAPED W/ SENSOR OPERATION	POLISHED	YES	2) 3)
WC-1	WATER CLOSET	KOHLER	HIGHLINE K-3427	VITREOUS CHINA	WHITE	N/A	N/A	YES	
FD-1	FLOOR DRAIN	ZURN	Z415	CAST IRON	COATED	TYPE "B" STRAINER	NICKEL BRONZE	N/A	TRAP PRIMER
U-1	URINAL	KOHLER	BARDON, K-4960-ET	VITREOUS CHINA	WHITE	SLOAN ROYAL FLUSHOMETER 186-0.5	CHROME	YES	
S-1	SINK	JUST	STYLIST B SL-2217-B-GR	STAINLESS STEEL	POLISHED	JUST J-9200 FAUCET, GRID DRAIN	CHROME	NO	
FS-1	FLOOR SINK	ZURN	Z1900	CAST IRON	N/A	1/2 STRAINER	N/A	NO	TRAP PRIMER
MS-1	MOP SINK	FIAT	TSBCR1100	TERRAZZO	N/A	FIAT 830-AA FAUCET	CHROME	NO	1)
WH-1	WALL HYDRANT	WOODFORD	MODEL 67	BRASS	CHROME	N/A	N/A	N/A	

NOTES:
1) PROVIDE STAINLESS STEEL WALL GUARD, STAINLESS STEEL THRESHOLD, MOP HANGER, HOSE & HOSE BRACKET.
2) COORDINATE COLOR WITH ARCHITECT.
3) COORDINATE EXACT LAYOUT & COUNTERTOP OPTIONS WITH ARCHITECT.

PLUMBING ABBREVIATIONS

ABC.	ABOVE CEILING
AFF	ABOVE FINISHED FLOOR
AV	ACID VENT
AW	ACID WASTE
BFF	BELOW FINISHED FLOOR
BG	BELOW GRADE
CA	COMPRESSED AIR
CD	CONDENSATE DRAIN
C.I.N.H.	CAST IRON NO HUB
CO	CLEANOUT
CKV	CHECK VALVE
CW	COLD WATER
CX	CONNECT TO EXISTING
(D)	PIPE DROP
DN	PIPE DROP TO NEXT LEVEL
DTL.	DETAIL
(E)	EXISTING
F	FIRE SERVICE
FCO	FLOOR CLEANOUT
FND	FOUNDATION DRAIN
GCO	GRADE CLEANOUT
HW	HOT WATER
HWC	HOT WATER CIRCULATION
IDW	INDIRECT WASTE
I.E.	INVERT ELEVATION
IRR	IRRIGATION
LPG	LIQUIFIED PETROLEUM GAS
LWCO	LOW WATER CUTOFF
MAX.	MAXIMUM
MIN.	MINIMUM
NG	NATURAL GAS
(N)	NEW
N.O.	NORMALLY OPEN (VALVE)
N.C.	NORMALLY CLOSED (VALVE)
OH	OVER HEAD
OFL	OVERFLOW RAIN LEADER
POC	POINT OF CONNECTION
(R)	PIPE RISE
RIO	ROUGH-IN ONLY
RWL	RAIN WATER LEADER
SHT.	SHEET
SCW	SOFT COLD WATER
SOC	SHUT OFF COCK (GAS)
SOV	SHUT OFF VALVE
TPL	TRAP PRIMER LINE
UG	UNDERGROUND
UP	PIPE RISE TO NEXT LEVEL
US	UNDER SLAB
UTR	UP THRU ROOF
V	VENT
VA	VALVE
VTR	VENT THRU ROOF
W	WASTE
WCO	WALL CLEANOUT

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
D	DRAIN
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
RS	REFRIGERANT SUCTION LINE
RL	REFRIGERANT LIQUID LINE
	GATE VALVE
	BALL VALVE
	BUTTERFLY VALVE
	GLOBE VALVE
	TRIPLE DUTY VALVE
	SWING CHECK VALVE
	STRAINER
	FLEX CONNECTOR
	HOSE END DRAIN VALVE
	PRESSURE REDUCING VA.
	SAFETY RELIEF VALVE
	UNION
	MOTORIZED T.C. VA/2-WAY
	MOTORIZED T.C. VA/3-WAY
	ECCENTRIC PLUG BALANCING VA.
	VALVE IN RISER
	TEE UP
	TEE DOWN
	ELBOW UP
	ELBOW DOWN
	PIPE SIZE CHANGE
	MANUAL FLOW BALANCING VALVE (CIRCUIT SETTER)
	AUTOMATIC FLOW BALANCING VALVE
	PIPE GUIDE
	PIPE ANCHOR
	PRESSURE/TEMP. TEST PLUG
T	DIAL THERMOMETER
P	PRESSURE GAUGE W/ SNUBBER
N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
C	COMMON
CO	CLEAN OUT
WCO	WALL CLEAN OUT
FCO	FLOOR CLEAN OUT
COTG	CLEANOUT TO GRADE
S=Ø.Ø/Ø4 W	PIPE SLOPE INDICATOR S=Ø.1Ø/4 EQUALS 1/4" SLOPE PER FOOT OF RUN. S=Ø.2Ø EQUALS 1/2" SLOPE PER FOOT OF RUN.

SYMBOL	DESCRIPTION
T	ELECTRIC THERMOSTAT
T	ELECTRIC THERMOSTAT W/GUARD
	ACOUSTICALLY LINED SHEET METAL DUCT
	MANUAL BALANCING DAMPER
	FLEX CONNECTOR
A.D. A.D.	ACCESS DOORS
F.D.	FIRE DAMPER
F.S.	FIRE/SMOKE DAMPER
M	MOTORIZED DAMPER
	TURNING VANE ELL
	45° LOW-LOSS TAKE-OFF FITTING W/ DAMPER & FLEX DUCT
	45° LOW-LOSS TAKE-OFF FITTING W/ DAMPER & RIGID ROUND DUCT
	90° TEE TAKE-OFF FITTING
	CONICAL 90° TEE TAKE-OFF FITTING
	45° TEE TAKE-OFF FITTING
	45°-90° TEE TAKE-OFF FITTING
SA	SUPPLY AIR DUCT (SINGLE LINE)
RA	RETURN AIR DUCT (SINGLE LINE)
EA	EXHAUST AIR DUCT (SINGLE LINE)
SD-1 (PLAN CODE) 8x8 (NECK SIZE) 200 (CFM)	DIFFUSER/REGISTER OR GRILLE THROW PATTERN SHOWN ON D-A&B.
HG	REFRIGERANT HOT GAS LINE
RS	REFRIGERANT SUCTION
RL	REFRIGERANT LIQUID
HW	DOMESTIC HOT WATER (SOFT)
HWC	DOMESTIC HOT WATER RECIRC.
W	WASTE
V	VENT
NG	NATURAL GAS
D	DRAIN
	PIPE CAP
	DASHED = PIPING BELOW FLOOR

HVAC ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
ACFM	ACTUAL CFM
AHU	AIR HANDLING UNIT
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AMP	AMPERE (AMP, AMPS)
APD	AIR PRESSURE DROP
APPROX	APPROXIMATE
BHP	BRAKE HORSEPOWER, BOILER HORSEPOWER
BTU	BRITISH THERMAL UNIT
MBH	BTU PER HOUR (THOUSAND)
CU. FT	CUBIC FEET
CU. IN	CUBIC INCH
CFM	CUBIC FEET PER MINUTE
SCFM	CFM, STANDARD CONDITIONS
DB	DECIBEL
DIA	DIAMETER
ID	DIAMETER, INSIDE
OD	DIAMETER, OUTSIDE
DBT	DRY-BULB TEMPERATURE
EAT	ENTERING AIR TEMPERATURE
E.C.	ELECTRICAL CONTRACTOR
EDR	EQUIVALENT DIRECT RADIATION
EXP	EXPANSION
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FOOT OR FEET
HZ	FREQUENCY
GA	GAGE OR GAUGE
GAL	GALLONS
G.C.	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPD	GALLONS PER DAY
HD	HEAD
HGT	HEIGHT
HP	HORSEPOWER
RH	HUMIDITY, RELATIVE
KW	KILOWATT
KWH	KILOWATT HOUR
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
LF	LINEAR FEET
MAX.	MAXIMUM
M.C.	MECHANICAL CONTRACTOR
MIN.	MINIMUM
N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NO	NUMBER
OBD	OPPOSED BLADE DAMPER
OA	OUTSIDE AIR
Ø	PHASE
1Ø	PHASE (ELECTRICAL)
LBS	POUNDS
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PD	PRESSURE DROP OR DIFFERENCE
PSIG	PSI GAUGE
R/O	RUN OUT
RH	RELATIVE HUMIDITY
RA	RETURN AIR
RPM	REVOLUTIONS PER MINUTE
SH	SENSIBLE HEAT
SPEC	SPECIFICATION
SP. VOL	SPECIFIC VOLUME
STD	STANDARD
SP	STATIC PRESSURE
SUCT	SUCTION
SA	SUPPLY AIR
TEMP	TEMPERATURE
TD	TEMPERATURE DIFFERENCE
T STAT	THERMOSTAT
TONS	TONS OF REFRIGERATION
T.C.	TEMPERATURE CONTROL
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
V	VOLT
VOL	VOLUME
VFD	VARIABLE FREQUENCY DRIVE
WPD	WATER PRESSURE DROP
W/	WITH

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UPPER MISSOURI RIVER BREAKS
NATIONAL MONUMENT INTERPRETIVE CENTER

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CENTRAL ZONE MONTANA

100% CONSTRUCTION DOCUMENTS

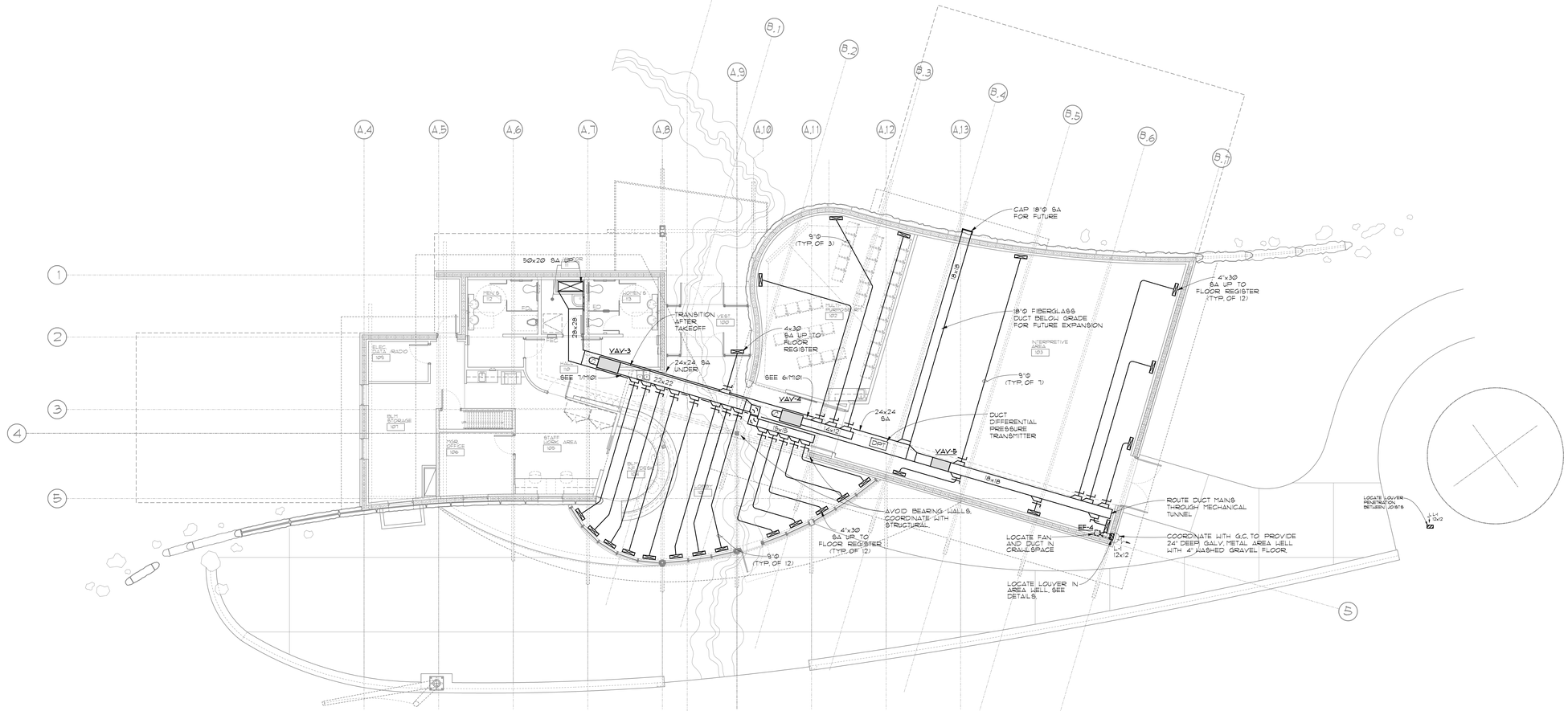
DRAWN | DATE: AUGUST 24, 2004 | SCALE: AS DRAWN

NO.	DATE	DESCRIPTION	BY

RECOMMENDED _____ ZONE ENGINEER
APPROVED _____ STATE ENGINEER
APPROVAL _____ FIELD OFFICE MANAGER
APPROVAL _____ MONUMENT MANAGER

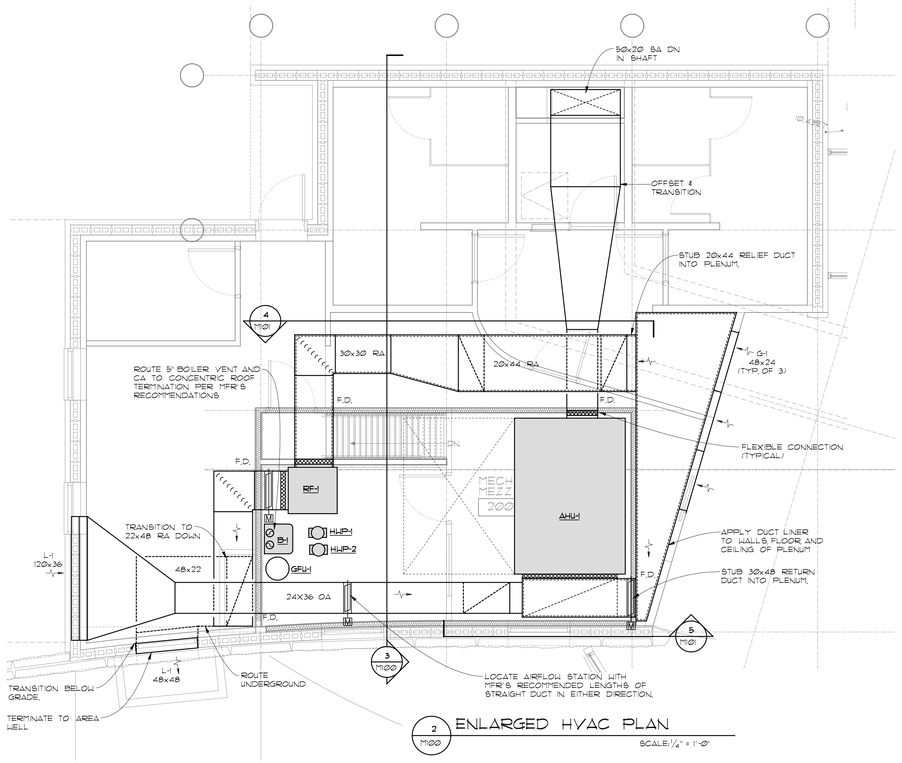
MECHANICAL LEGENDS & DIAGRAMS

SHEET M001 OF ____



1 M100 UNDER SLAB HVAC PLAN

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



2 M100 ENLARGED HVAC PLAN

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

NORTH REF.

3 M100 MECHANICAL SECTION

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

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BUREAU OF LAND MANAGEMENT

CENTRAL ZONE — MONTANA

100% CONSTRUCTION DOCUMENTS

DRAWN | DATE: AUGUST 24, 2004 | SCALE: AS DRAWN

NO.	DATE	DESCRIPTION	BY

RECOMMENDED _____ ZONE ENGINEER
APPROVED _____ STATE ENGINEER
APPROVAL _____ FIELD OFFICE MANAGER
APPROVAL _____ MONUMENT MANAGER

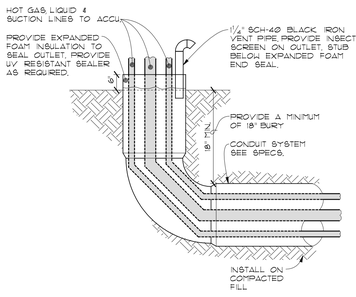
HVAC PLANS

SHEET M100 OF 49

1 M101 MAIN FLOOR HVAC PLAN

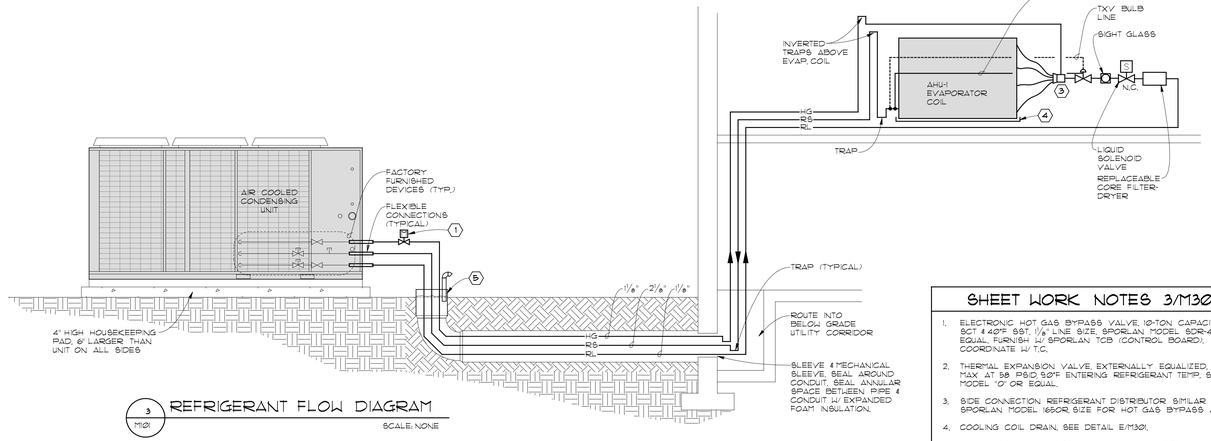
SCALE: 1/8" = 1'-0"

NORTH REF.



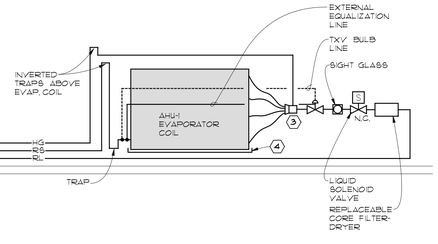
2 M101 UNDERGROUND PIPE CONDUIT DETAIL

SCALE: NONE



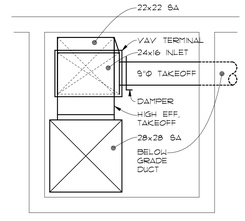
3 M101 REFRIGERANT FLOW DIAGRAM

SCALE: NONE



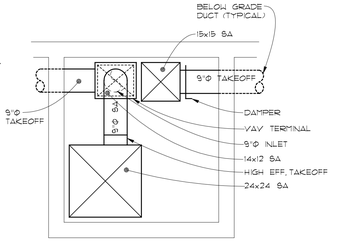
SHEET WORK NOTES 3/M301

1. ELECTRONIC HOT GAS BYPASS VALVE, 10-TON CAPACITY W/ 80°F SCT & 40°F SST, 1/8" LINE SIZE, SPORLAN MODEL SCR-4 OR EQUAL. FURNISH W/ SPORLAN TCB (CONTROL BOARD). COORDINATE W/ T.C.
2. THERMAL EXPANSION VALVE, EXTERNALLY EQUALIZED, 2.5 TON MAX AT 58 PSIG SUCTION, 80°F ENTERING REFRIGERANT TEMP, SPORLAN MODEL "O" OR EQUAL.
3. SIDE CONNECTION REFRIGERANT DISTRIBUTOR SIMILAR TO SPORLAN MODEL 1660R SIZE FOR HOT GAS BYPASS APPLICATIONS.
4. COOLING COIL DRAIN, SEE DETAIL E/M301.
5. UNDERGROUND PIPE CONDUIT, SEE DETAIL 2/M101.



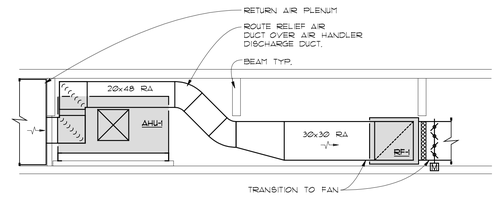
7 M101 MECHANICAL SECTION

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



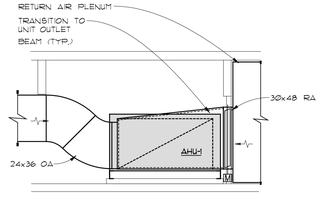
6 M101 MECHANICAL SECTION

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



4 M101 MECHANICAL SECTION

NTS



5 M101 MECHANICAL SECTION

NTS

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CENTRAL ZONE — MONTANA

100% CONSTRUCTION DOCUMENTS

DRAWN	DATE	SCALE
GJM/MSB/JRD	AUGUST 24, 2004	AS DRAWN

NO.	DATE	DESCRIPTION	BY

RECOMMENDED _____ ZONE ENGINEER

APPROVED _____ STATE ENGINEER

APPROVAL _____ FIELD OFFICE MANAGER

APPROVAL _____ MONUMENT MANAGER

MAIN FLOOR HVAC PLAN

SHEET M101 OF 49

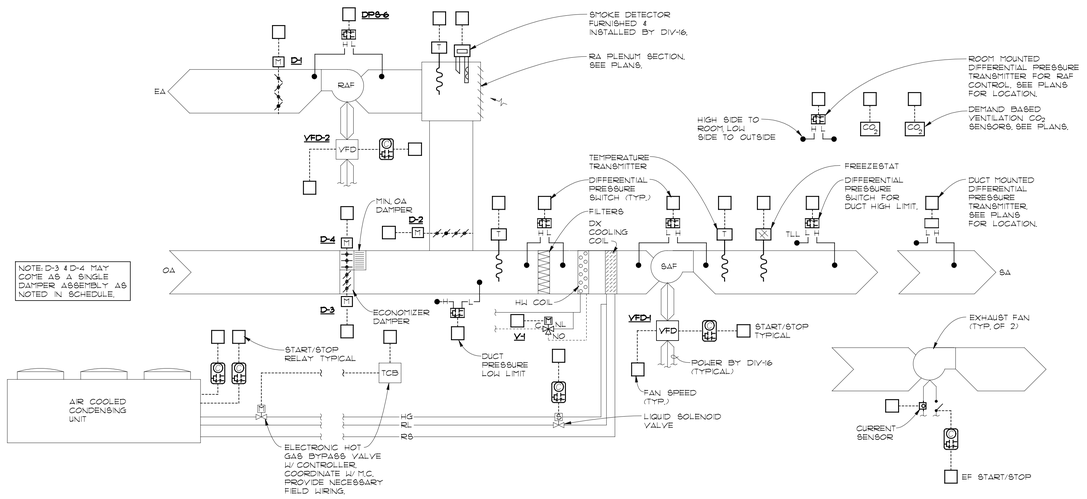
DDC TEMPERATURE CONTROL LEGEND

SD-1	SMOKE DETECTOR
D-1 N.C.	CONTROL DAMPER W/ ACTUATOR (NORMALLY CLOSED DAMPER INDICATED)
CO2-1	CARBON DIOXIDE SENSOR
R-1	CONTROL RELAY
CS-1	CURRENT-SENSING STATUS SWITCH
V-1 NC C NO	3-WAY CONTROL VALVE (NORMALLY OPEN, NORMALLY CLOSED & COMMON PORTS INDICATED)
V-1 NO	2-WAY CONTROL VALVE, (NORMALLY OPEN VALVE INDICATED)
TT-1	AVERAGING TEMPERATURE SENSOR
TT-1	OUTDOOR TEMPERATURE SENSOR (WITH SUN SHIELD)
TE-1 T	ROOM TEMPERATURE SENSOR
TE-1	WELL-MOUNTED INSERTION SENSOR
TE-1	DUCT-MOUNTED INSERTION SENSOR
TLL-1	LOW LIMIT TEMPERATURE SWITCH
TS-1	WELL-MOUNTED TEMPERATURE SWITCH
TS-1	DUCT-MOUNTED TEMPERATURE SWITCH
DPS-1 H L	DIFFERENTIAL PRESSURE SWITCH
DPT-1 H L	DIFFERENTIAL PRESSURE TRANSMITTER
HE-1	ROOM HUMIDITY SENSOR
HE-1	DUCT-MOUNTED HUMIDITY SENSOR
	EMCS CONTROL POINT
EA	EXHAUST AIR
RA	RETURN AIR
RLA	RELIEF AIR
SA	SUPPLY AIR
OA	OUTDOOR AIR
NC	NORMALLY CLOSED VALVE OR DAMPER
NO	NORMALLY OPEN VALVE OR DAMPER

T.C. COMPONENT SCHEDULE

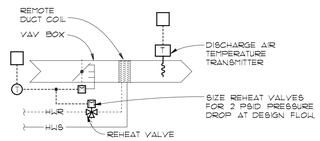
PLAN CODE	DESCRIPTION/DUTY	SPECIFICATIONS
VFD-1	SAF SPEED CONTROL	10 HP, 208-3-60 FURNISHED BY T.C. INSTALLED BY E.C.
VFD-2	RAF SPEED CONTROL	5.0 HP, 208-3-60 FURNISHED BY T.C. INSTALLED BY E.C.
D-1	RELIEF AIR DAMPER	TWO-POSITION, N.C. DUCTSIZE OPPOSED BLADE
D-2	RETURN AIR DAMPER	30"x48" MODULATING, N.O. BLADES IN VERTICAL, PARALLEL BLADE
D-3	ECONOMIZER DAMPER	24"x24" MODULATING, N.C., PARALLEL BLADE.
D-4	INTEGRAL AIRFLOW STATION & DAMPER	24"x9" N.C. W/ INTEGRAL AIRFLOW STATION, RUSKIN IAQ80, AT CONTRACTOR'S OPTION FURNISH W/ ECONOMIZER OPTION W/ D-3. FURNISH W/ AUXILLARY ACTUATOR HEATER & AIR STRAIGHTENER.
V-1	PREHEAT COIL VALVE	3-WAY MODULATING, EQUAL PERCENTAGE TYPE, N.O. TO COIL, 19.0 GPM, 3.0 PSID.

NOTE:
SEE DRAWINGS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



1 M201 AHU-1 CONTROL SCHEMATIC

SCALE: NTS



2 M201 VAV BOX CONTROL SCHEMATIC

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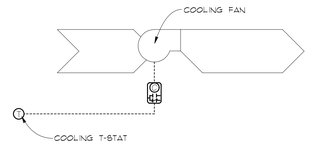
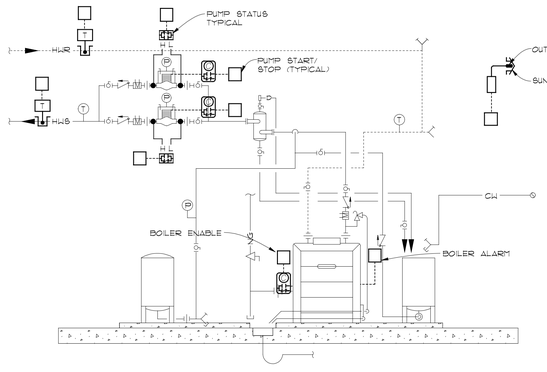


3 M201 ELECT. ROOM TC SCHEMATIC

SCALE: NTS

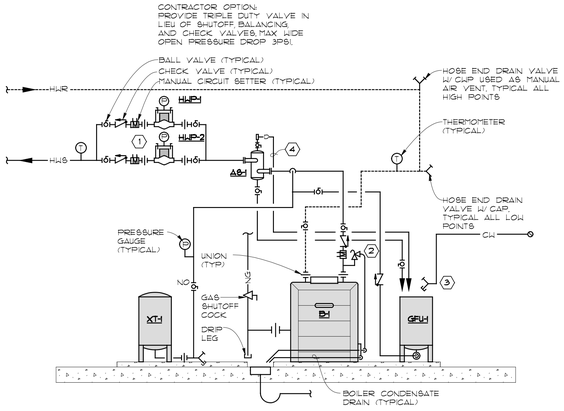


4 M201 HEATING PLANT TC SCHEMATIC

SCALE: NTS

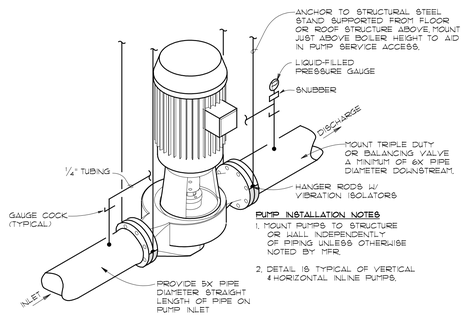
FLOW DIAGRAM WORK NOTES

1. HEATING PUMPS W/ PRESSURE GAUGE, GAUGE COCKS & SNUBBER, SEE 5/M201.
2. PRV FURNISHED W/ BOILER, PIPE AS PER MFR'S REQUIREMENTS.
3. HOSE BIB W/ INTEGRAL VACUUM BREAKER, MOUNT 6' ABOVE GFUH
4. AUTOMATIC AIR VENT, PIPE FULL SIZE TO GLYCOL FEED UNIT.



5 M201 HEATING FLOW DIAGRAM

SCALE: NTS



PUMP INSTALLATION NOTES

1. MOUNT PUMPS TO STRUCTURE OR WALL INDEPENDENTLY OF PIPING UNLESS OTHERWISE NOTED BY MFR.
2. DETAIL IS TYPICAL OF VERTICAL & HORIZONTAL INLINE PUMPS.

5 M201 INLINE PUMP DETAIL

SCALE: NTS

ENERGY MANAGEMENT CONTROL SYSTEM POINTS LIST

POINT DESCRIPTION	DIGITAL INPUT: PULSE	DIGITAL INPUT: END SWITCH	DIGITAL INPUT: AUX. CONTACT	DIGITAL INPUT: ALARM CONTACT	DIGITAL INPUT: PRESSURE SWITCH (PRESS./DIFF. PRESS.)	DIGITAL INPUT: TEMPERATURE SWITCH	DIGITAL INPUT: VOLTAGE SENSING RELAY	DIGITAL INPUT: CURRENT SENSING SWITCH	ANALOG INPUT: POSITION FEEDBACK	ANALOG INPUT: 4-20 MA INPUT	ANALOG INPUT: 0-10 VDC INPUT	ANALOG INPUT: TEMPERATURE SENSOR	ANALOG INPUT: PRESSURE SENSOR (PRESS./DIFF. PRESSURE)	ANALOG INPUT: HUMIDITY SENSOR	OUTPUT FROM EMCS: DIGITAL OUT: MOMENTARY	OUTPUT FROM EMCS: DIGITAL OUT: MAINTAINED	OUTPUT FROM EMCS: ANALOG OUT: 4-20 MA OUTPUT	OUTPUT FROM EMCS: ANALOG OUT: 0-10 VDC OUTPUT	OUTPUT FROM EMCS: CONTROL PT. ADJUST/ POSITION ADJUST: NOR BO 4-20 MA/ 0-10 VDC (CLOSED LOOP)	OUTPUT FROM EMCS: CONTROL PT. ADJUST/ POSITION ADJUST: NOR BO 4-20 MA / 0-10 VDC WITHOUT FEEDBACK (OPEN LOOP)
AHU-1 SYSTEM																				
SAF START/STOP															X					
SAF STATUS					X															
SAF SPEED CONTROL																X				
DUCT STATIC PRESSURE													X							
DISCHARGE AIR TEMPERATURE												X								
LOW TEMPERATURE LIMIT				X																
MIXED AIR TEMPERATURE												X								
RETURN AIR TEMPERATURE												X								
SUPPLY HIGH PRESSURE LIMIT				X	X															
RETURN LOW PRESSURE LIMIT				X	X															
FILTER STATUS					X															
RELIEF AIR DAMPER (D-1)																X				
RETURN AIR DAMPER (D-2)										X						X				
ECONOMIZER DAMPER (D-3)																X				
INTEGRAL AFS & DAMPER (D-4)										X						X				
PREHEAT VALVE (V-1)																X				
RAF START/STOP															X					
RAF STATUS					X															
RAF SPEED CONTROL																X				
SPACE PRESSURE													X							
CARBON DIOXIDE LEVELS (2)											X									
ACCU FIRST STAGE															X					
ACCU SECOND STAGE															X					
ELECTRONIC HOT GAS VALVE (TO TCB)																X				
SMOKE DETECTOR				X																
EF START/STOP (2)															X					
EF STATUS (2)								X												
VAV BOX																				
ZONE TEMPERATURE												X								
DISCHARGE AIR TEMPERATURE												X								
REHEAT VALVE																X				
ZONE AIR FLOW										X										
HEATING PLANT																				
BOILER ENABLE															X					
BOILER ALARM				X																
SYSTEM PUMP START/STOP (2)															X					
SYSTEM PUMP STATUS (2)					X															
HWS TEMPERATURE												X								
HWR TEMPERATURE												X								
OUTSIDE AIR TEMPERATURE												X								

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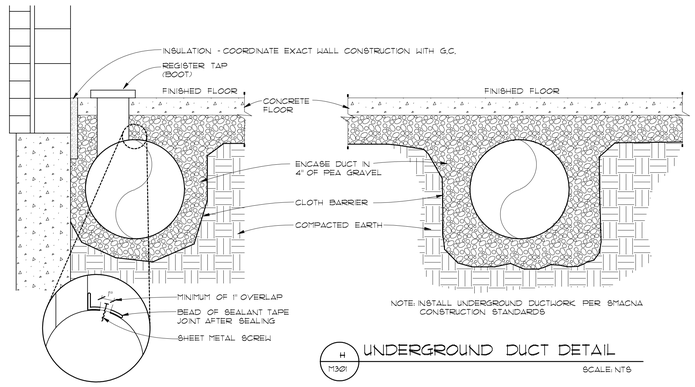
APPROVED _____ STATE ENGINEER
APPROVAL _____ FIELD OFFICE MANAGER
APPROVAL _____ MONUMENT MANAGER

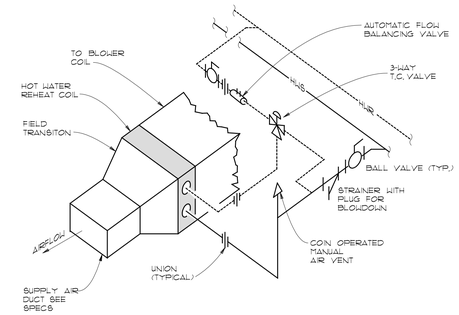
MECHANICAL CONTROLS & DIAGRAMS

SHEET M201 OF 49



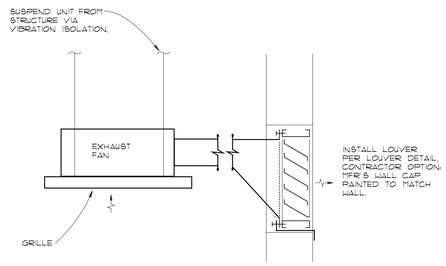
H M30I — UNDERGROUND DUCT DETAIL

SCALE: NTS



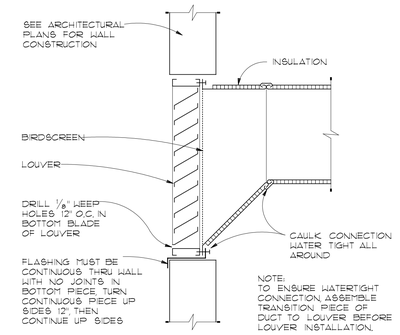
D M30I — DUCT COIL DETAIL

SCALE: NTS



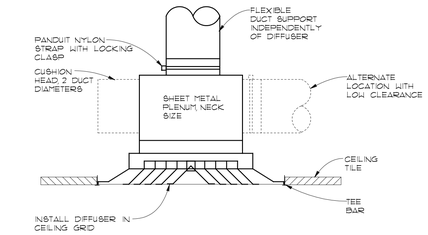
K M30I — CRAWLSPACE VENTILATION DETAIL

SCALE: NONE



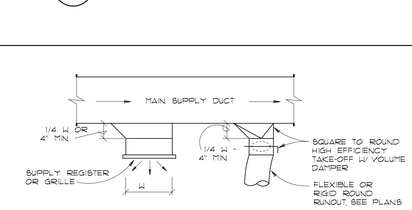
G M30I — LOUVER INSTALLATION DETAIL

SCALE: NTS

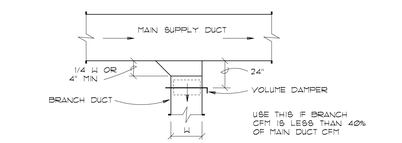


C M30I — SURFACE MOUNTED SQUARE DIFFUSER IN LAY-IN CEILING DETAIL

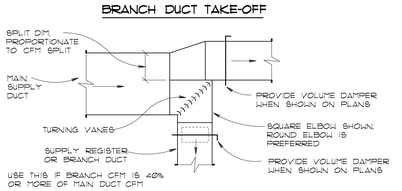
SCALE: NTS



SUPPLY REGISTER & RUNOUT TAKE-OFF

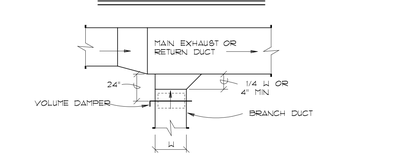


BRANCH DUCT TAKE-OFF



AIR SPLIT TYPE DUCT TAKE-OFF

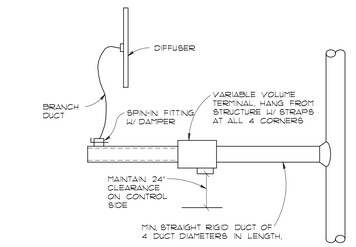
SUPPLY DUCT TAKE-OFFS



EXHAUST AND/OR RETURN BRANCH DUCT

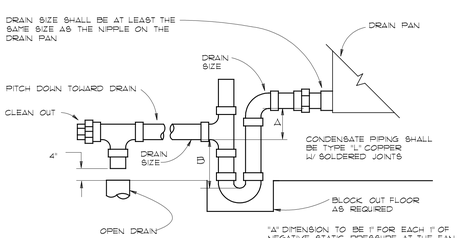
J M30I — LOW VELOCITY DUCT DETAILS

SCALE: NTS



F M30I — VAV TERMINAL INSTALLATION DETAIL

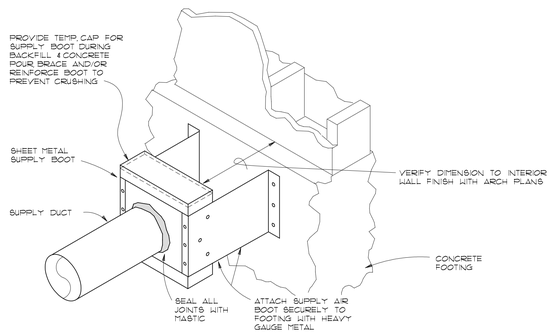
SCALE: NTS



DRAW THRU UNIT

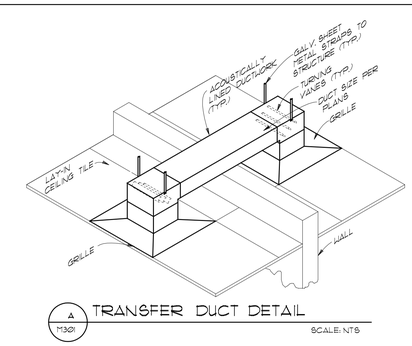
E M30I — DRAIN TRAP DETAIL

SCALE: NTS



B M30I — UNDERGROUND SUPPLY AIR BOOT DETAIL

SCALE: NTS



A M30I — TRANSFER DUCT DETAIL

SCALE: NTS

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CENTRAL ZONE — MONTANA

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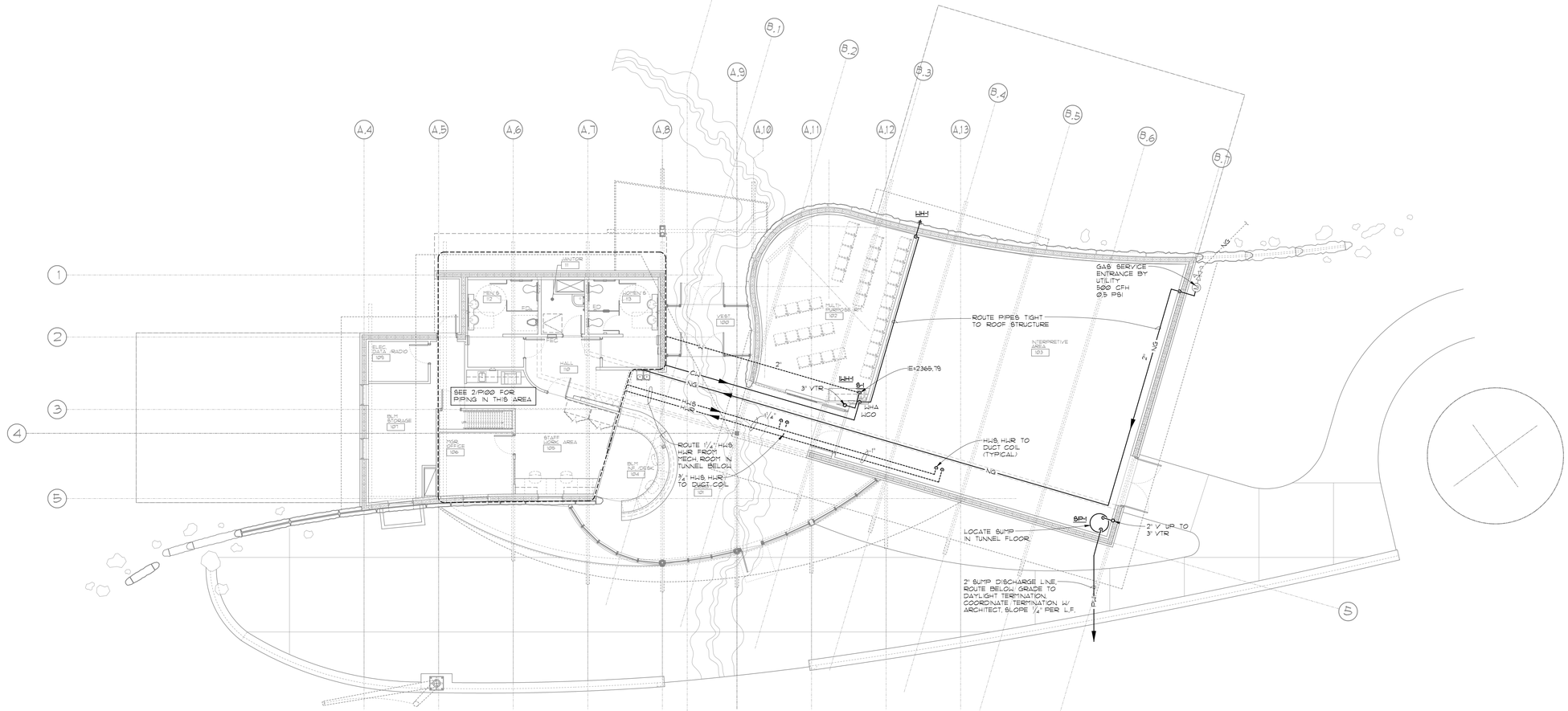
APPROVED _____ STATE ENGINEER

APPROVAL _____ FIELD OFFICE MANAGER

APPROVAL _____ MONUMENT MANAGER

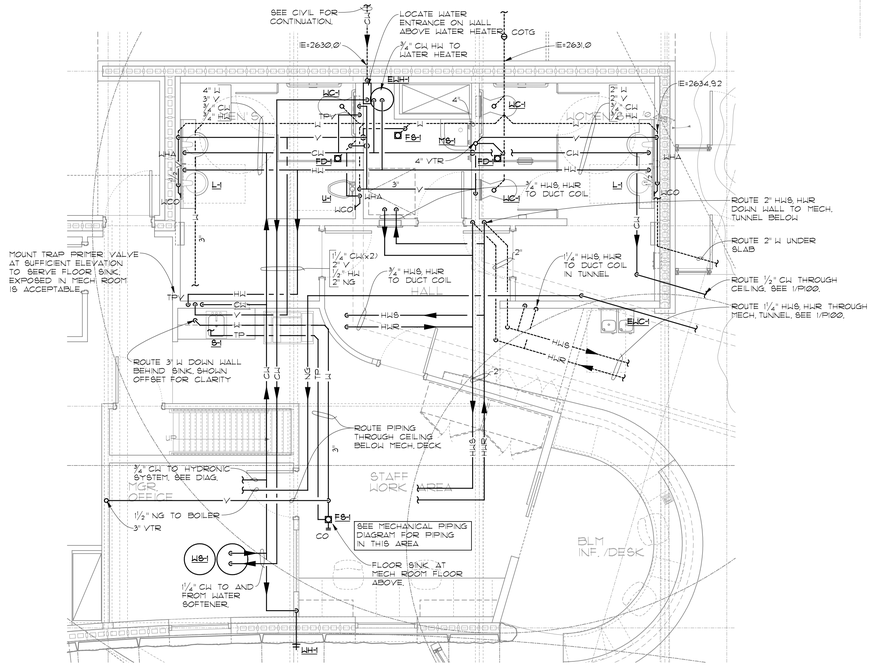
MECHANICAL DETAILS

SHEET **M301** OF 49



1 PLUMBING PLAN
P100
SCALE: 1/8" = 1'-0"

NORTH REF.



2 ENLARGED PLUMBING PLAN
P100
SCALE: 1/4" = 1'-0"

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CENTRAL ZONE — MONTANA

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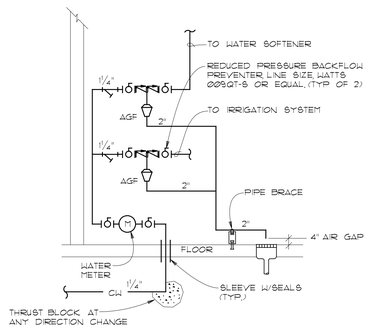
APPROVED _____ STATE ENGINEER
APPROVAL _____ FIELD OFFICE MANAGER
APPROVAL _____ MONUMENT MANAGER

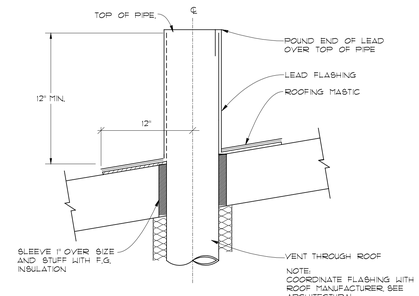
PLUMBING PLANS

SHEET P100 OF 49



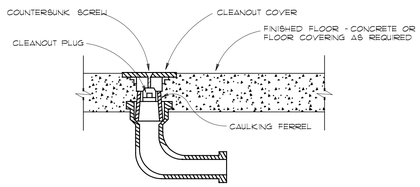
B P200 WATER SERVICE ENTRANCE

SCALE: NTS



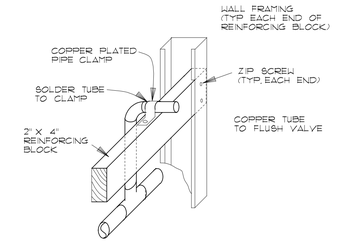
G P200 VENT THRU ROOF DETAIL

SCALE: NTS



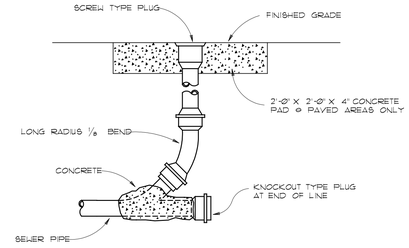
C P200 FLOOR CLEANOUT DETAIL

SCALE: NTS



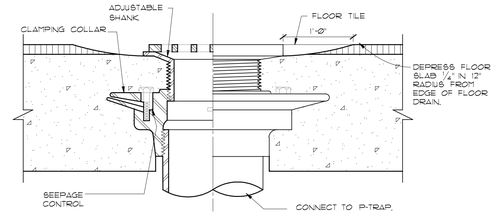
F P200 RIGID ROUGH-IN @ FLUSH VALVES

SCALE: NTS



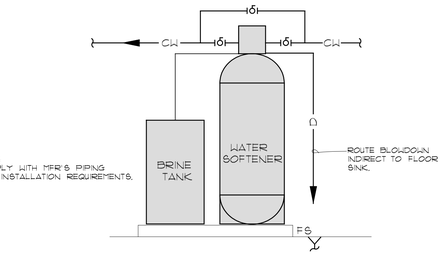
B P200 SURFACE CLEANOUT DETAIL

SCALE: NTS



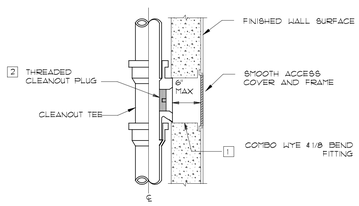
E P200 FLOOR DRAIN DETAIL

SCALE: NTS

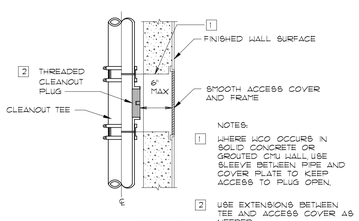


J P200 WATER SOFTENER PIPING

SCALE: NTS



HUB AND SPIGOT WITH ACCESS COVER



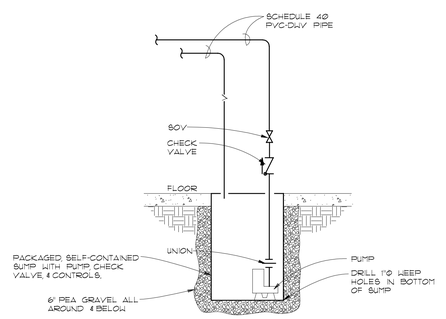
NO-HUB WITH ACCESS COVER

NOTES:

1. WHERE MCO OCCURS IN SOLID CONCRETE OR GROUTED CMU WALL, USE SLEEVE BETWEEN PIPE AND COVER PLATE TO KEEP ACCESS TO PLUG OPEN.
2. USE EXTENSIONS BETWEEN TEE AND ACCESS COVER AS NEEDED.

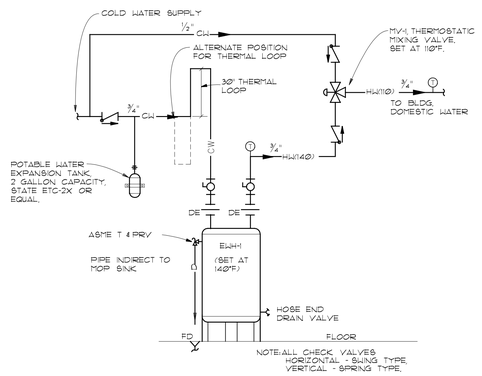
H P200 WALL CLEANOUT DETAILS

SCALE: NTS



D P200 SUMP PUMP DETAIL

SCALE: NTS



A P200 WATER HEATER DETAIL

SCALE: NTS

Kadrmas Lee & Jackson
A RLJ Solutions company
Engineers, Surveyors and Planners

CTA ARCHITECTS ENGINEERS
BILLINGS ● MISSOULA
BOISE ● GREAT FALLS
HELENA ● KALISPELL
SEATTLE ● JACKSON
BOZEMAN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

UPPER MISSOURI RIVER BREAKS
NATIONAL MONUMENT INTERPRETIVE CENTER

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CENTRAL ZONE — MONTANA

100% CONSTRUCTION DOCUMENTS

DRAWN	DATE	SCALE
	AUGUST 24, 2004	AS DRAWN

NO.	DATE	DESCRIPTION	BY

RECOMMENDED _____ ZONE ENGINEER

APPROVED _____ STATE ENGINEER

APPROVAL _____ FIELD OFFICE MANAGER

APPROVAL _____ MONUMENT MANAGER

PLUMBING DETAILS

SHEET P200 OF 49