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EXHEXHAUSTPSIAPOUNDS PER SQUARE INCH GAGEEXISTEXISTINGPSIAPOUNDS PER SQUARE INCH ABSOLUTEEXPEXPANSIONEXPANSIONEXTERING WATER TEMPERATURE, FFVTENTERING WATER TEMPERATURE, FEXTERING WATER TEMPERATURE, FFAFAREAREAFREE AREAFQFREE AREAEXTERING WATER TEMPERATURE, FFXFREE AREAEXTERING WATER TEMPERATURE, FFX	ESP	EXTERNAL STATIC PRESSURE		
EXISTEXISTINGEXPEXPANSIONEWTENTERING WATER TEMPERATURE, FFFAHRENHEITFAFREE AREAFCFLEXIBLE CONNECTION	EXH	EXHAUST	FOIG	
EXPEXPANSIONEWTENTERING WATER TEMPERATURE, FFFAHRENHEITFAFREE AREAFCFLEXIBLE CONNECTION	EXIST	EXISTING	FOIA	
EWTENTERING WATER TEMPERATURE, FFFAHRENHEITFAFREE AREAFCFLEXIBLE CONNECTION	EXP	EXPANSION		
FFAHRENHEITFAFREE AREAFCFLEXIBLE CONNECTION	EWT	ENTERING WATER TEMPERATURE, F		
FAFREE AREAFCFLEXIBLE CONNECTION	۴	FAHRENHEIT		
FC FLEXIBLE CONNECTION	FA	FREE AREA		
	FC	FLEXIBLE CONNECTION		

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= one foot

inch 4

one eighth inch = one foot 0 4 8 16

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Date

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		CENEDAL NOTES
ΟΤΥ	QUANTITY	GENERAL NUIES
RA	RELIEF/RETURN AIR	
RADP	RADIANT PANEL	1. THE HEATING CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS IN THE LOCATION OF DUCTWORK, PIPING, ETC.
REFRIG	REFRIGERANT	2. ALL DUCTWORK AND PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE UNLESS
REQD	REQUIRED	
REV	REVISION	3. DO NOT SCALE DRAWINGS - ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. NOTIFY
RF	RETURN/RELIEF FAN	ARCHITECT OF ANY DEVIATIONS FROM THE DRAWINGS.
RGC	RELIEF/RETURN GRILLE CEILING	4. THE DRAWINGS ARE DIAGRAMMATIC AND SHOW ONLY THE GENERAL ARRANGEMENTS OF ALL PIPING AND EQUIPMENT. BECAUSE OF SMALL SCALE
RGCP	RELIEF/RETURN GRILLE CEILING PREFORATED	FITTINGS, AND ACCESSORIES WHICH MAY BE REQUIRED TO AVOID EXISTING
RGW	RELIEF/RETURN GRILLE WALL	5 ALL PIPING CONDUIT DUCTWORK ETC. SHALL BE INSTALLED IN A MANNER
RH	RELATIVE HUMIDITY	WHICH WILL NOT DEFACE OR ALTER ANY AREAS. ROUTING OF THE ABOVE
RLA	RUNNING LOAD AMPS	6 ALL WORK PERFORMED ON THIS BUILDING SHALL BE IN COMPLIANCE WITH ALL
RM	ROOM	PERTIENT CODES, RULES, ORDINANCES, AND REGULATIONS OF THE LOCAL, STATE, AND NATIONAL GOVERNING AUTHORITIES.
RPM	REVOLUTIONS PER MINUTE	7. ALL WORK PERFORMED UNDER AND IN CONECTION WITH THESE DRAWINGS AND
RRC	RETURN REGISTER CEILING	SPECIFICATIONS SHALL BE IN STRICT COMPLIANCE WITH THE LATEST SAFETY AND HEALTH STANDARDS.
RRCP	RETURN REGISTER CEILING PERFORATED	8. REPORT ANY DISCREPANCIES FOUND IN THE DRAWINGS AND/OR IN THE
RRW	RETURN REGISTER WALL	SPECIFICAIONS DURING THE BIDDING PROCESS FOR CLARIFICATION BY THE ARCHITECT.
RV	RELIEF VALVE	9. HEATING CONTRACTOR SHALL PROVIDE AND INSTALL ACCESS PANELS AS
SA	SUPPLY AIR	REQUIRED FOR ACCESS TO VALVES, TRAPS, CLEAN OUTS, CONTROLS, FIRE DAMPERS, ETC. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF
SD	SMOKE DETECTOR	ACCESS PANELS WITH FINISH WORK AND ALL OTHER TRADES.
SDCL	SUPPLY DIFFUSER CEILING LINEAR	10. THE HEATING CONTRACTOR SHALL FURNISH SHOP DRAWINGS OF ANY RELOCATED PIPING, DUCTWORK, EQUIPMENT, ETC., FOR APPROVAL PRIOR TO
SDC-()	SUPPLY DIFFUSER CEILING - (THROW)	RELOCATION OF ITEM.
SDCP-()	SUPPLY DIFFUSER CEILING PERFORATED - (THROW)	11. ALL PIPING AND DUCTWORK TO BE LOCATED AND COORDINATED WITH ARCHITECTURAL PLANS. ALL PIPING AND DUCTWORK SHALL BE CONCEALED IN
SDCR	SUPPLY DIFFUSER CEILING ROUND	FINISHED AREAS.
SF	SUPPLY FAN/SQUARE FEET	12. ALL PIPE PENETRATIONS THROUGH CHASES, WALLS, OR FLOORS WHICH ARE FIRE-RATED, SHALL BE PROPERLY SEALED TO MAINTAIN FIRE PROTECTION.
SP	STATIC PRESSURE (INCHES OF WATER)	HEATING CONTRACTOR SHALL SUBMIT PROPOSED UL SYSTEM FOR REVIEW.
SPEC	SPECIFICATION	13. ALL DUCTS THAT PENETRATE CHASES, WALLS, OR FLOORS WHICH ARE FIRE-RATED, SHALL BE INSTALLED WITH FIRE DAMPERS IN ACCORDANCE WITH
SQ	SQUARE	NFPA 90A. THIS APPLIES EVEN IF THEY ARE NOT SPECIFICALLY SHOWN ON THE DRAWING.
SQFT	SQUARE FOOT	14. ANY PHYSICAL INSTALLATION MODIFICATIONS, DUE TO FIELD CONDITIONS, SHALL
STD	STANDARD	BE RESOLVED BY THE HEATING CONTRACTOR IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MECHANICAL ENGINEER.
STR	STRAINER	15. THE HEATING CONTRACTOR SHALL PAY FOR ALL FEES AND PERMITS AS
SV	SAFETY VALVE	
TCV	TEMPERATURE CONTROL VALVE	WITH ALL NEW PIPING BEING INSTALLED.
TD		17. ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN
TDV		
TEMP	TEMPERATURE	INDICATED.
TRANS		
15		
ISP	TUTAL STATIC PRESSURE	
V		
VCD	VOLUME CONTROL DAMPER (MANUAL)	
VFI	VELOCITY	
·		

ARCHITECT:





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healthcare facilities solutions

Project Number

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MECHANICAL LEGEND - MISC.							
SYMBOL	DESCRIPTION						
	SUPPLY DIFFUSER; 4-WAY THROW UNLESS NOTED OTHERWISE						
<b>-</b>	VAV BOX WITH REHEAT COIL						
<b>~</b> _\/-	AIR FLOW ARROW						
DP	DIFFERENTIAL PRESSURE SENSOR						
UC <del>~</del> √-	DOOR UNDERCUT 1" ABOVE FINISHED FLOOR						
(S) <sub>D</sub>	DUCT MOUNTED STATIC PRESSURE SENSOR						
FM	FLOW METER, DDC						
н	HUMIDISTAT, ELECTRIC						
Ps	PRESSURE SENSOR						
R	REFRIGERANT SENSOR						
SD	SMOKE DETECTOR						
SP	STATIC PRESSURE SENSOR						
Ţ	THERMOSTAT, ELECTRIC						
Т	THERMOSTAT, ELECTRONIC						
(1)	INDICATES NOTES ELSEWHERE ON DRAWING						
	CONNECTION BETWEEN NEW AND EXISTING						
	DISCONNECTION POINT						
$\underline{\land}$	REVISION NUMBER						
	DETAIL NUMBER OR SECTION LETTER						
M-501	DRAWING NUMBER WHERE DETAIL IS DRAWN						
	DETAIL NUMBER OR SECTION LETTER						
M101 M501	DRAWING NUMBER WHERE DETAIL IS DRAWN						
	DRAWING NUMBER WHERE SYMBOL IS USED						
	SECTION LETTER						
M-301	DRAWING NUMBER WHERE SHOWN						
A M101 M301							
$  \setminus \mathbb{N}$	- DRAWING NUMBER WHERE SECTION IS DRAWN						

										KIECEND	
	FCD	FLOW CONTROL DEVICE			GENERAL NOTES	MEC	HANICAL LEGEND - MISC.				DECODIDITION
IK VENT	FCU	FAN COIL UNIT	QTY RA	QUANTITY RELIEF/RETURN AIR		SYMBOL		SYMBOL	DESCRIPTION	SYMBOL	
HED FLOOR	FD		RADP	RADIANT PANEL	1. THE HEATING CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS IN THE LOCATION OF DUCTWORK, PIPING, ETC.		OTHERWISE		FLEXIBLE DUCTWORK		DUCT SECTION
3 UNIT	FLR	FLOOR	REFRIG	REFRIGERANT	2. ALL DUCTWORK AND PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE UNLESS NOTED OTHERWISE.		VAV BOX WITH REHEAT COIL	<u>∖ 12x8 </u> \	DUCT (SHOWN x HIDDEN)		RETURN/TRANSFER/RELIEF AIR RECTANGULAR DUCT SECTION
ELY	FNL	FUNNEL	REQD RFV	REQUIRED	3. DO NOT SCALE DRAWINGS - ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. NOTIFY		AIR FLOW ARROW	<u>ر</u> 12ه	ROUND DUCT (DIAMETER)		EXHAUST AIR RECTANGULAR DUCT SECTION
	FPM	FEET PER MINUTE	REV	RETURN/RELIEF FAN	ARCHITECT OF ANY DEVIATIONS FROM THE DRAWINGS.						
EMPERATURE CONTROL	FR FT	FROM FIN-TUBE/FEET	RGC	RELIEF/RETURN GRILLE CEILING	4. THE DRAWINGS ARE DIAGRAMMATIC AND SHOW ONLY THE GENERAL ARRANGEMENTS OF ALL PIPING AND EQUIPMENT. BECAUSE OF SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO SHOW OR INDICATE ALL OFFSETS,	DP	DIFFERENTIAL PRESSURE SENSOR		FLAT OVAL (SHOWN x HIDDEN)		SUPPLY/OUTDOOR/MAKE-UP AIR OVAL DUCT SECTION
	GALV	GALVANIZED	RGCP	RELIEF/RETURN GRILLE CEILING PREFORATED	FITTINGS, AND ACCESSORIES WHICH MAY BE REQUIRED TO AVOID EXISTING PIPING OR STRUCTURAL FEATURES.	UC ←√-	DOOR UNDERCUT 1" ABOVE FINISHED FLOOR		FLEXIBLE CONNECTION		RETURN/TRANSFER/RELIEF AIR OVAL DUCT SECTION
	GC	GENERAL CONTRACTOR	RGW	RELIEF/RETURN GRILLE WALL RELATIVE HUMIDITY	5. ALL PIPING, CONDUIT, DUCTWORK, ETC., SHALL BE INSTALLED IN A MANNER WHICH WILL NOT DEFACE OR ALTER ANY AREAS. ROUTING OF THE ABOVE						EXHAUST AIR OVAL DUCT SECTION
ATER TEMPERATURE	GWR		RLA	RUNNING LOAD AMPS	EQUIPMENT SHALL BE APPROVED BY THE ARCHITECT PRIOR TO INSTALLATION.	D					
COCK	GWS	GLOBE VALVE	RM	ROOM	PERTIENT CODES, RULES, ORDINANCES, AND REGULATIONS OF THE LOCAL, STATE, AND NATIONAL GOVERNING AUTHORITIES.	FM	FLOW METER, DDC		VOLUME CONTROL DAMPER	$\otimes$	SUPPLY/OUTDOOR/MAKE-UP AIR ROUND DUCT SECTION
	GPM	GALLONS PER MINUTE	RPM	REVOLUTIONS PER MINUTE	7. ALL WORK PERFORMED UNDER AND IN CONECTION WITH THESE DRAWINGS AND	н	HUMIDISTAT, ELECTRIC		DUCT TRANSITION	$\bigcirc$	RETURN/TRANSFER/RELIEF AIR ROUND DUCT SECTIO
JAMPER	GV	GATE VALVE	RRCP	RETURN REGISTER CEILING PERFORATED	AND HEALTH STANDARDS.			 			
	HC	HEATING CONTRACTOR	RRW	RETURN REGISTER WALL	8. REPORT ANY DISCREPANCIES FOUND IN THE DRAWINGS AND/OR IN THE SPECIFICAIONS DURING THE BIDDING PROCESS FOR CLARIFICATION BY THE ARCHITECT.	(P) s	PRESSURE SENSOR		MOTOR OPERATED DAMPER		
	HORIZ	HORIZONTAL	RV	RELIEF VALVE	9. HEATING CONTRACTOR SHALL PROVIDE AND INSTALL ACCESS PANELS AS	R	REFRIGERANT SENSOR		FIRE DAMPER		LOUVER IN WALL
	HP	HORSEPOWER/HEAT PUMP	SA	SUPPLY AIR	DAMPERS, ETC. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF ACCESS PANELS WITH FINISH WORK AND ALL OTHER TRADES.	SD	SMOKE DETECTOR	S			SQUARE ELBOW WITH TURNING VANES
	HR	HOUR	SDCL	SUPPLY DIFFUSER CEILING LINEAR	10. THE HEATING CONTRACTOR SHALL FURNISH SHOP DRAWINGS OF ANY				SMOKE DAMPER		
OCKWISE	HTG HUH	HEATING HORIZONTAL UNIT HEATER	SDC-()	SUPPLY DIFFUSER CEILING - (THROW)	RELOCATED FIFING, DOCTWORK, EQUIPMENT, ETC., FOR APPROVAL PRIOR TO RELOCATION OF ITEM.	(SP)	STATIC PRESSURE SENSOR		COMBINATION FIRE / SMOKE DAMPER		RADIUS ELBOW
	HVAC	HEATING VENTILATION AND AIR CONDITIONING	SDCP-()	SUPPLY DIFFUSER CEILING PERFORATED - (THROW)	11. ALL PIPING AND DUCTWORK TO BE LOCATED AND COORDINATED WITH ARCHITECTURAL PLANS. ALL PIPING AND DUCTWORK SHALL BE CONCEALED IN FINISHED AREAS		THERMOSTAT, ELECTRIC				
3110	HW	HOT WATER	SDCR	SUPPLY DIFFUSER CEILING ROUND SUPPLY FAN/SQUARE FEET	12. ALL PIPE PENETRATIONS THROUGH CHASES, WALLS, OR FLOORS WHICH ARE	ГТ	THERMOSTAT, ELECTRONIC	$\left  \frac{H}{\lambda} \right  = \nabla$	CONICAL TAKEOFF CONNECTION		RECTANGULAR BOOT CONNECTION
	HWR		SP	STATIC PRESSURE (INCHES OF WATER)	FIRE-RATED, SHALL BE PROPERLY SEALED TO MAINTAIN FIRE PROTECTION. HEATING CONTRACTOR SHALL SUBMIT PROPOSED UL SYSTEM FOR REVIEW.						
	HWS&R	HOT WATER SUPPLY	SPEC	SPECIFICATION	13. ALL DUCTS THAT PENETRATE CHASES, WALLS, OR FLOORS WHICH ARE FIRE-RATED, SHALL BE INSTALLED WITH FIRE DAMPERS IN ACCORDANCE WITH		INDICATES NOTES ELSEWHERE ON DRAWING	λ M			
۱ ۲	HZ	HERTZ	SQ	SQUARE	NFPA 90A. THIS APPLIES EVEN IF THEY ARE NOT SPECIFICALLY SHOWN ON THE DRAWING.		CONNECTION BETWEEN NEW AND EXISTING		CONICAL "T" CONNECTION		CONICAL TAKEOFF CONNECTION
<u>.</u> J	IER	INVERTED ECCENTRIC REDUCER (TOPS FLAT)	SQFT	STANDARD	14. ANY PHYSICAL INSTALLATION MODIFICATIONS, DUE TO FIELD CONDITIONS, SHALL BE RESOLVED BY THE HEATING CONTRACTOR IN ACCORDANCE WITH THE						
NC	IN		STR	STRAINER	RECOMMENDATIONS OF THE MECHANICAL ENGINEER.				STRAIGHT I CONNECTION		
२	JB	JUNCTION BOX	SV	SAFETY VALVE	NECESSARY TO COMPLETE THE INSTALLATION.	$\underline{\land}$	REVISION NUMBER				
	KEM	KITCHEN EQUIPMENT MANUFACTURER	TCV	TEMPERATURE CONTROL VALVE	16. THE HEATING CONTRACTOR SHALL COORDINATE THE LOCATION OF DUCTWORK WITH ALL NEW PIPING BEING INSTALLED.		DETAIL NUMBER OR SECTION LETTER		MECHANICA	L PIPING LE	GEND
THEATER	KHE	KITCHEN HOOD EXHAUST	TD	TRIPLE DUTY VALVE	17. ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN FURRED CHASES OR ABOVE SUSPENDED CEILING.	M-501	DRAWING NUMBER WHERE DETAIL IS DRAWN	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OLUME	KHS KW	KITCHEN HOOD UNIT	TEMP	TEMPERATURE	18. FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED.			M			
, VALVE FLOW	күн	KILOWATT HOUR	ТОТ	TOTAL		M101 M50	DETAIL NOMBER OR SECTION LETTER		3-WAY CONTROL VALVE, ELECTRIC	Η Η	PRESSURE GAUGE WITH COCK, WATER
/CLOCKWISE	LAT	LEAVING AIR TEMPERATURE, F	TRANS TS	TRANSITION TIP SPEED			DRAWING NUMBER WHERE DETAIL IS DRAWN		AIR VENT WITH COCK	Ø	PRESSURE REDUCING VALVE, WATER
rer supply	LBS	POUNDS	TSP	TOTAL STATIC PRESSURE				×	ANCHOR	<b>∳</b> 1	PRESSURE TEMPERATURE TAP
ER SYPPLY AND RETURN	LF	LINEAR FEET	TSTAT	THERMOSTAT		A	SECTION LETTER				
MPERATURE, F	LVG	LEAVING	TYP	TYPICAL		M-301			AQUA STAT	T'	RELIEF VALVE, WATER
	LWT	LEAVING WATER TEMPERATURE, F	UG V	UNDERGROUND VOLTAGE. VALVE				<b>\$</b> 1	AUTOMATIC AIR VENT	o	RISE IN PIPE
OT WATER	MAV		VCD	VOLUME CONTROL DAMPER, (MANUAL)		A		т	BALANCING COCK		SIDE CONNECTION
	мвн	MECHANICAL CONTRACTOR	VEL	VELOCITY			DRAWING NUMBER WHERE SECTION IS DRAWN				
L PRESSURE	MCC	MOTOR CONTROL CENTER	VFD						BOTTOM CONNECTION	——————————————————————————————————————	STUB UP
ATER HEATER	MECH	MECHANICAL	VOL	VOLUME VENT THROUGH ROOF				А	CONCENTRIC REDUCER		SUCTION DIFFUSER
NSION	MER	MECHANICAL EQUIPMENT ROOM	W	WIDTH				M		▶	
ST AIR	MIN	MINIMUM	W/	WITH				X			
R TEMPERATURE, F	MISC	MISCELLANEOUS	W/O					$\overrightarrow{\nabla}$	CHECK VALVE		THERMOMETER WITH SEPERABLE WELL
ICIENCY RATING	MOD	MOTOR OPERATED DAMPER	vvb WC	WATER COLUMN					CONDUCTIVITY SENSOR FOR CHEMICAL FEEDER		TRIPLE DUTY VALVE
٧	MTD		WG	WATER GAUGE							
	NC	NORMALLY CLOSED/NOISE CRITERIA	WTD	WATER TEMPERATURE DROP, F					DIFFERENTIAL PRESSURE SENSOR	l	UNION
OOP	NO	NORMALLY OPEN	ZCV	ZONE CONTROL VALVE				▶	DIRECTION OF FLOW		VALVE, SEE SPECIFICATIONS FOR TYPE
	No	NUMBER							DIRECTION OF PIPE PITCH. DOWN		VACUUM BREAKER
	NOM	NOMINAL								T	
	OA	OUTSIDE AIR							DROP IN PIPE		VALVE WITH HOSE END
APLUSION PROOF	OPNG	OPENING							ELBOW DOWN		FLOW CONTROL DEVICE
<pre>{EDUCER (BOTTOMS FLAT)</pre>	P									FM	
JISTER CEILING	PC PNL	PLUMBING CONTRACTOR								日 日	
	PRESS	PRESSURE							ECCENTRIC REDUCER		WELL
ATIC PRESSURE	PSIG	POUNDS PER SQUARE INCH GAGE							END CAP		WYE STRAINER
	PSIA	POUNDS PER SQUARE INCH ABSOLUTE								У У	
									FLANGED CONNECTION		WYE STRAINER WITH BALL VALVE
ATER TEMPERATURE, ₽									FLEXIBLE CONNECTION	0	PIPE SECTION
								<b>⊢∳∳</b> ┤	FLOW CONTROL DEVICE		PIPE DOWN
NNECTION											
								L P	FLOW SWITCH		ISOLATION VALVE STATION
									GUIDE		PIPE CONNECTION

BOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FLEXIBLE DUCTWORK		SUPPLY/OUTDOOR/MAKE-UP AIR RECTANGULAR
<u>3 Y</u>	DUCT (SHOWN x HIDDEN)		RETURN/TRANSFER/RELIEF AIR RECTANGULAR
1	ROUND DUCT (DIAMETER)		EXHAUST AIR RECTANGULAR DUCT SECTION
	FLAT OVAL (SHOWN x HIDDEN)		SUPPLY/OUTDOOR/MAKE-UP AIR OVAL DUCT SECTION
	FLEXIBLE CONNECTION		RETURN/TRANSFER/RELIEF AIR OVAL DUCT SECTION
	ACOUSTIC DUCT LINING		EXHAUST AIR OVAL DUCT SECTION
/CD			SUPPLY/OUTDOOR/MAKE-UP AIR ROUND DUCT SECTIO
X			RETURN/TRANSFER/RELIEF AIR ROUND DUCT SECTION
		$\bigcirc$	
<u> </u>			
<u> </u>	FIRE DAMPER		LOUVER IN WALL
	SMOKE DAMPER		SQUARE ELBOW WITH TURNING VANES
<u> </u>	COMBINATION FIRE / SMOKE DAMPER		RADIUS ELBOW
	CONICAL TAKEOFF CONNECTION		RECTANGULAR BOOT CONNECTION
<u> </u>			
	CONICAL "T" CONNECTION		CONICAL TAKEOFF CONNECTION
	STRAIGHT "T" CONNECTION		
	MECHANICAI	PIPING LEC	GEND
MBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	3-WAY CONTROL VALVE, ELECTRIC	H	PRESSURE GAUGE WITH COCK, WATER
	AIR VENT WITH COCK	Ø	PRESSURE REDUCING VALVE, WATER
×	ANCHOR	<b>•</b>	PRESSURE TEMPERATURE TAP
A	AQUA STAT	f	RELIEF VALVE, WATER
<b>†</b>	AUTOMATIC AIR VENT		RISE IN PIPE
Т	BALANCING COCK		SIDE CONNECTION
-0	BOTTOM CONNECTION	——————————————————————————————————————	STUB UP
	CONCENTRIC REDUCER		SUCTION DIFFUSER
	CONTROL VALVE, ELECTRIC	X	TEMPERATURE CONTROL VALVE
Ň	CHECK VALVE		THERMOMETER WITH SEPERABLE WELL
	CONDUCTIVITY SENSOR FOR CHEMICAL FEEDER		TRIPLE DUTY VALVE
DP	DIFFERENTIAL PRESSURE SENSOR		UNION
•	DIRECTION OF FLOW		VALVE, SEE SPECIFICATIONS FOR TYPE
<del>, •</del>	DIRECTION OF PIPE PITCH, DOWN		VACUUM BREAKER
	DROP IN PIPE		VALVE WITH HOSE END
	ELBOW DOWN		FLOW CONTROL DEVICE
0	ELBOW (TEE) UP	FM.	
0			WELL
Η			VV YE SI KAINER
P D	END CAP		
	END CAP FLANGED CONNECTION		WYE STRAINER WITH BALL VALVE
	END CAP FLANGED CONNECTION FLEXIBLE CONNECTION	©	WYE STRAINER WITH BALL VALVE PIPE SECTION
	END CAP FLANGED CONNECTION FLEXIBLE CONNECTION FLOW CONTROL DEVICE	C	WYE STRAINER WITH BALL VALVE PIPE SECTION PIPE DOWN
	END CAP FLANGED CONNECTION FLEXIBLE CONNECTION FLOW CONTROL DEVICE FLOW SWITCH		WYE STRAINER WITH BALL VALVE PIPE SECTION PIPE DOWN ISOLATION VALVE STATION
	END CAP FLANGED CONNECTION FLEXIBLE CONNECTION FLOW CONTROL DEVICE FLOW SWITCH GUIDE		WYE STRAINER WITH BALL VALVE PIPE SECTION PIPE DOWN ISOLATION VALVE STATION PIPE CONNECTION

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Project Number	Scale	Drawing Title	Project Title			VA Project	Number
3468 AS INDICATED		SYMBOLS AND ABBREVIATIONS	Behaviora	Behavioral Health Complex			
							34
2520 Renaissance Boulevard, Suite 110 King of Prussia, PA 19406		Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042			Drawing Number	
t: 610.270.0599 f: 610.270.0995			Date	Checked	Drawn	] <b>IV</b>	IHUU'
www.arrayhfs.com			07/27/2012	TME	DJA	Dwg. 71	of 12
6	5	7	8				9





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6

nber	Scale	Drawing Title			Project Title			VA Proj	ect Nu	mber
3468	1" = 20'-0"	SIT	E PLAN - MECHAI	NICAL	Behaviora	I Health Corr	nplex		595	5-109
								Building	Numb	er
									34	1
aissance Boulevard, Suite 110 russia, PA 19406		Approved: Project Director	Approved: Project Director		Location 1700 South Lincoln Ave. Lebanon, PA 17042				Drawing Number	
).0599 ).0995					Date	Checked	Drawn		MF	110
yhfs.com					07/27/2012	TME	DJA	Dwg.	72	of 1
6			7		8				9	





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Environmental Consultant

🗲 SSM

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9
DUCTWORK NOTES
ALL DUCTWORK SIZES NOTED ARE FREE AREA SIZES.
RADIUS ELBOWS SHALL BE PROVIDED. TURNING VAINES SHALL NOT BE PROVIDED UNLESS APPROVED BY ENGINEER.
ALL DUCT JUNCTIONS SHALL BE CONSTRUCTED OF STANDARD 45 DEGREES ENTRY BRANCHES WITH BALANCING DAMPERS DOWNSTREAM OF DUCT BRANCH ENTRY.
MAXIMUM LENGTH OF FLEXIBLE DUCTWORK IN ANY ONE SUPPLY BRANCH SHALL BE THREE (8) FEET.
NO RUN OF FLEXIBLE DUCTWORK SHALL CONTAIN MORE THAN A TOTAL OF 90 DEGREES OF TURN. INSULATED RIGID SHALL BE USED WHERE MORE THAN 90 DEGREES IS REQUIRED.
TOTAL STATIC PRESSURE NOTED IN SCHEDULES INCLUDES DUCT SYSTEM, TERMINAL UNITS, FILTERS, COILS, ETC.
CEILING DIFFUSER SIZES SHOWN ON FLOOR PLANS ARE NECK SIZES.
REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES.
PROVIDE FLEXIBLE DUCT CONNECTION BETWEEN AHU/EXH FAN AND DUCTWORK.
DUE TO THE SMALL SCALE OF THE DRAWINGS, RISERS, AND DROPS ARE NOT ALL SHOWN. PROVIDE RISERS AND DROPS FOR COORDINATION.
FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED.
THERMOSTAT LOCATIONS ONLY TO BE APPROVED AFTER FINAL FURNITURE LAYOUT IS APRROVED BY CONTRACTOR



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Project Number 3468

Project Number	Scale	Drawing Title	Project Title			VA Project I	Number
3468 1/8" = 1'-0"		BASEMENT FLOOR PLAN - PIPING	Behavioral Health Complex		mplex	595-10	
						Building Nu	mber
						,	34
2520 Renaissance Boulevard, Suite 110 King of Prussia, PA 19406		Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042			Drawing Number	
t: 610.270.0599 f: 610.270.0995			Date	Checked	Drawn	M	H2C
www.arrayhfs.com			07/27/2012	TME	DJA	Dwg. 74	of
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MECH ALL DOWNFE SHALL HAVE POINT.	ANICAL PIPING NOTED ED BRANCHES AND EQUIPMENT DRAIN COCKS INSTALLED AT LOWEST	
ALL HORIZON WITHOUT PO AUTO AIR VEI VERTICAL RIS	ITAL LINES SHALL BE RUN LEVEL CKETS. WHERE POCKETS OCCUR, NTS SHALL BE INSTALLED AT EACH SE.	
ALL UPFEED CONNECTION SHALL BE MA MAIN.	RISERS SHALL BE MADE WITH TOP IS AT MAIN. ALL DOWNFEED RISERS DE WITH BOTTOM CONNECTIONS AT	
CHANGES OF SHALL BE MA REDUCERS W	PIPE SIZES ON HORIZONTAL RUNS DE WITH INVERTED ECCENTRIC /ITH TOP OF PIPE LEVEL.	A
ARROWS ON DIRECTION O	SUPPLY AND RETURN LINES INDICATE F FLOW.	
PROVIDE VAL POINTS OF PI AT ALL HIGH UNLESS NOTI	VE WITH HOSE END ON ALL LOW PING SYSTEM AND AUTO AIR VENTS POINTS OF THE PIPING SYSTEM ED OTHERWISE.	
FOR TYPICAL CONNECTION DETAILS.	WATER AND REFRIGERANT PIPING IS TO EQUIPMENT, SEE STANDARD	
WATER PIPE COOLING COI BE COUNTER	CONNECTIONS TO AIR HEATING AND ILS SHALL BE MADE SO THERE WILL FLOW BETWEEN WATER AND AIR.	
DIELECTRIC U ON ALL CONN METALS.	JNIONS AND FLANGES SHALL BE USED IECTIONS BETWEEN DISSIMILAR	
ALL LINES NC SHALL BE CO JOISTS, OR B FURRED OR L	OTED "BELOW FLR." OR "ABV. CLG." NCEALED IN JOIST SPACE, THROUGH ETWEEN JOISTS, UNLESS CEILING IS JINES ARE BELOW SLAB ON GRADE.	В
THERMOSTAT FINAL FURNIT CONTRACTOR	F LOCATIONS ONLY APPROVED AFTER FURE LAYOUT IS APPROVED BY	
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Scale	Drawing Title	Project Title			VA Project N	lumber	
1/8" = 1'-0"	FIRST FLOOR PLAN - DUCTWORK Behaviora		havioral Health Complex			595-109	
						34	
ulevard, Suite 110 9406	Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042			Drawing Number		
		Date	Checked	Drawn		H203	
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DUCTWORK NOTES
ALL DUCTWORK SIZES NOTED ARE FREE AREA SIZES.
RADIUS ELBOWS SHALL BE PROVIDED. TURNING VAINES SHALL NOT BE PROVIDED UNLESS APPROVED BY ENGINEER.
ALL DUCT JUNCTIONS SHALL BE CONSTRUCTED OF STANDARD 45 DEGREES ENTRY BRANCHES WITH BALANCING DAMPERS DOWNSTREAM OF DUCT BRANCH ENTRY.
MAXIMUM LENGTH OF FLEXIBLE DUCTWORK IN ANY ONE SUPPLY BRANCH SHALL BE THREE (8) FEET.
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Project Number ARCHITECT: 3468 Cost Estimator Environmental Consultant 🗘 SSN International Consultants, Inc. PROFESSIONAL PROFESSIONAL TIMOTHY M. EARHART No PEOAI237-E WSYLVAN ARRAY 2520 Renaissance Boul King of Prussia, PA 194 
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Scale 1/8" = 1'-0"	Drawing Title FIRST FLOOR PLAN - PIPING Behavioral Health Complex		Drawing Title FIRST FLOOR PLAN - PIPING	Project Title Behavioral Health Complex			VA Project Nu 595 Building Numt	mbe 5-1
ulevard, Suite 110 9406	Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042			34 Drawing Number			
		Date 07/27/2012	Checked TME	Drawn DJA	Dwg. 76	<b>1</b> 2 of		
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MECH ALL DOWNFE SHALL HAVE POINT.	ED BRANCHES AND EQUIPMENT DRAIN COCKS INSTALLED AT LOWEST	
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ARROWS ON DIRECTION O	SUPPLY AND RETURN LINES INDICATE F FLOW.	
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CONNECTION DETAILS.	IS TO EQUIPMENT, SEE STANDARD	
	ILS SHALL BE MADE SO THERE WILL FLOW BETWEEN WATER AND AIR. JNIONS AND FLANGES SHALL BE USED	
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JOISTS, OR B FURRED OR I	ETWEEN JOISTS, UNLESS CEILING IS INES ARE BELOW SLAB ON GRADE. T LOCATIONS ONLY APPROVED AFTER	B
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Fax (973) 739-9710

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1 SECOND FLOOR PLAN - DUCTWORK SCALE: 1/8" = 1'-0"



Scale	Drawing Title	Project Title			VA Project N	Number
1/8" = 1'-0"	SECOND FLOOR PLAN - DUCTWORK	Behavior	al Health Cor	nplex	59	95-10
					Building Nu	mber
						34
Boulevard, Suite 110 A 19406	Approved: Project Director	Location			Drawing Number	
		1700 South Lincoln	Ave. Leband	on, PA 17042		പാറ
		Date	Checked	Drawn	]  IVI	
		07/27/2012	TME	DJA	Dwg. 77	of
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Scale	Drawing Title			Project Title				VA Project	lumber
1/8"	= 1'-0" SEC	COND FLOOR PLAN	- PIPING	Beh	navioral H	lealth Com	nplex	5	95-109
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ulevard, Suite 110 9406	Approved: Project Dir	rector		Location 1700 South Li	ncoln Av	e. Lebano	n, PA 17042	Drawing Nu	mber
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MECH ALL DOWNFE SHALL HAVE POINT.	ED BRANCHES AND EQUIPMENT DRAIN COCKS INSTALLED AT LOWEST	
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ARROWS ON DIRECTION O PROVIDE VAL	SUPPLY AND RETURN LINES INDICATE F FLOW. .VE WITH HOSE END ON ALL LOW	
POINTS OF PI AT ALL HIGH UNLESS NOTI	PING SYSTEM AND AUTO AIR VENTS POINTS OF THE PIPING SYSTEM ED OTHERWISE.	
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SHALL BE CO JOISTS, OR B FURRED OR L	NCEALED IN JOIST SPACE, THROUGH ETWEEN JOISTS, UNLESS CEILING IS JINES ARE BELOW SLAB ON GRADE.	B
THERMOSTAT FINAL FURNIT CONTRACTOR	୮ LOCATIONS ONLY APPROVED AFTER FURE LAYOUT IS APPROVED BY २	
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CONCENTRIC REDUCE	R		<ul> <li>1/4" COPPER TUBING VENT LINE</li> <li>1/4" VALVE WITH HOSE END</li> </ul>		F C F	RETURN/EXHAUST I DUCT SIZE AS INDIC LOOR PLANS. ——	DUCT BY HC ATED ON	
SUPPLY OR RETURN M	AIN		DRAIN.					•···
7 MANUAL AIR VEN	Τ			_	A			
					(			
					(10 <u>F</u>	RETURN/EXHA	UST GRILLE TYP	ICAL CONNEC
CONTROL VALVE NOTE: 1. CONTROL VALVE SHALL BE PI FACILITATE REMOVAL.	ROVIDED \	WITH ADJUSTACENT	UNIONS TO		- 1			
	F( +	CV						
	/ALVE	TCV Y PT	HEATING PANEL		F	ире ç — 🖓 –		· · · · · · · · · · · · · · · · · · ·
HWH >	ALVE	PT			II F		RIC	
INSULATION. (REFER TO SPECIFI	CATIONS).	SCHEMATIC	<u>- HOT WATER - 2-WAY</u>					ELEVATION
TYPE AND THICKNESS OR RECOR THE PANEL MANUFACTURER						TYPICAL PIPE S	SIZE CHANGE FC	RWATER
				DROP CEIL	ING OR PLASTER			
NOTES: 1. REFER TO FLOOR PLANS FOR	PANEL WI	DTH AND LOCATION	. SEE PANEL	OR PLASTE	R FRAME			
MANUFACTURER'S SPECIFICA 2. CROSS CHANNELS, CHANNEL BY PANEL MANUFACTURER.	TIONS FOI CLIPS, INS	R OPENING SIZE. SULATION AND SADD	LE BRACKETS					PLAN OR SI
3. THE PANEL OPENING SIZE, FR TO BE COORDINATED WITH TH	AMING RE IE CEILING	QUIREMENTS AND L CONTRACTOR.	OCATION ARE				12 DU NOT	CT TRANSITIC
8 HW RAD CEILING PANEL NOT TO SCALE	PIPING	DETAIL						
RECOMMENDED FOR HORIZONTAI	TAP LOCA - INSTALL/	TION ATION	HOSES HOSES RECOM FOR HO	SAME ELEV MENDED TA PRIZONTAL II	ATION P LOCATION NSTALLATION		VD BRANCH DUC	T MAIN E
MIN. UPSTREAM LENGTH OF STR PIPE IN PIPE DIAMETERS. (SEE S BELOW)	AIGHT CHEDULE	SECTION	<u>\ "A-A":</u>				13 EXHAUST NOT TO SCAL	<u>PLAN V</u> OR RETURN E
, س <del> </del>	4		••••••••••••••••••••••••••••••••••••••		— WATER FLOW MEASURIN	G DEVICE	HWR ⊱≻<	
						0 2 2 1 0 2	VALVE F HWS →→≻	
MIN. DOWNSTREAM LENGTH OF S PIPE IN PIPE DIAMETERS. (SEE S	STRAIGHT CHEDULE		" <u>A</u> "		— ANY FITTING OR VALVE		VALVE	
							NOTE TO ( CONTROL VA OR SHALL BE REMOVAL.	CONTRACTOR
	MEA	SURING	<b>DEVICE INSTA</b> GTH OF PIPE - PIPE DIAMETERS				AUXILIARY HE	EATING COIL F
	/ITH	FOR SIDE TEE	FOR VALVE or OTHER FITTING		STREAM LENGTH - PIPE IN P			
FLOW CONTROL DEVICE, AUTOMAT	1C	20	10		5			
VALVE, or INSERTION VELOCITY AVERA AND MEASURING TUBE	GING	10	5		2			
DTES: DIMENSIONS SHOWN IN SCHEDULE ARI RECOMMENDS A GREATER DIMENSION INSTALL THE WATER FLOW MEASURING THE WATER FLOW MEASURING DEVICE SHALL HAVE THE METER CONNECTIONS METER CONNECTIONS CAN BE INSTALL	E MINIMUN USE THE DEVICE S MAY BE II S LOCATE ED IN ANY	1 REQURIED. IF MAN IR RECOMMENDATIC SO THE FLOW ARRO NSTALLED IN EITHER D ON OR NEAR THE S ' POSITION WHEN IN	UFACTURER OF FURNISHED WAT ON. W IS IN THE SAME DIRECTION AS HORIZONTAL OR VERTICAL PIPE SIDE WHEN INSTALLED IN HORIZO STALLED IN VERTICAL PIPE.	TER FLOW M THE FLOW. E. UNITS REP ONTAL PIPE.	IEASURING DEVICE QUIRING REMOTE METERS SEE SECTION "A-A". THE			FI
ATER FLOW MEASURING DEV	CE INS	TALLATION DET	AIL				)% (.)N4	5trija
Scale Draw	ing Title	MECHAN	ICAL DETAILS		Project Title	ral Health Co	mnlex	VA Project Numbe
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levard, Suite 110 406	oved: Proje	ect Director			Location 1700 South Lincol	n Ave. Leban	on, PA 17042	Drawing Number
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2 - 1/2" H & C B	Y PC	
2 1/2" SPRINKLE	ER LINE BY SPRINKLER CONT.	
2 - 1 1/4" HWS 8	HWR	
COOR	DINATE EXACT	
LOCA	TION W/ ARCH	B
TRANSACTION	WINDOW	
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CK LIGHTWEIGHT C L OR CMU BLOCK	IR NORMAL WALL. FLOOR PRECAST	
, (762 mm). MAX. D ST CONCRETE UNI	IAMETER OF TS ARE USED.	
62 mm), DIAMETER, D INTO THE FLOOF	OR SMALLER, R OR WALL ASSEMBLY,	
METALLIC PIPES, C	DR TUBING MAY BE	
1ALLER), SCH. 20, (1	OR HEAVIER),	
LLER), CAST OR D	UCTILE IRON	
ETER, (OR SMALLE	R), TYPE L, (OR	
/IER), COPPER PIP	E. S PIPE INSULATION.	
THICKNESS OF MIN		
ANNULAR SPACE ROM BOTH SIDES (	AND RECESSED 1/2", DF THE WALL. WHEN NITS FORMING MATERIAL	
LOOR.		
OR OR WITH BOTH	ATERIAL TO A MIN. 1/2 , 1 SIDES OF THE WALL. RETE UNITS, SEALANT	
OF FLOOR, FLUSH 33 OR ES1399 IS US HOURS WHEN LBS	I WITH BOTH FLOOR SED RESPECTIVELY, S3 OR ES1399 IS USED	E
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of 123	Veterans Affairs	



	Scale	Drawing Title	Project Title			VA Project Nu
	1/8" = 1'-0"	MECHANICAL FLOW DIAGRAM	Behavio	oral Health Cor	mplex	598
						Building Numb
						34
ulevari 9406	d, Suite 110	Approved: Project Director	Location 1700 South Linco	In Ave. Leband	on, PA 17042	Drawing Num
			Date	Checked	Drawn	
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SYMBOL	SERVE	S CFM	OA C	FM EXT SP	CFM QUA	ANTITY FAN SIZE		SUPPLY YPE   RP	/ FAN DA <sup>-</sup> M HP (EA)	TA TOT TO BHP SF	T VFD V		IASE HZ	EAT ℉ DB WB	LAT <sup>o</sup>	F SP WB IN	CHILLE TOT SE MBH MI	D WATER NS GPM E 3H	COOLIN( EWT F L	IG COIL DAT LWT 두 WPE (FT	ΓΑ D FINS Γ) PER FT	. ROWS	FACE VEL. (FPM	EAT ℉ ) DB	LAT F DB	HOT V SP TOT GPM IN MBH	NATER HE  EWT ℉	ATING COIL	- PD FINS T) PER F	ROWS FACE	FILTER	FILT	ER DATA RV TYPE	SP (DIRTY)	NGTH H	IEIGHT	WIDTH	UNIT BASIS OF DESIGN
34-AHU-1	1ST & 2N FLOOR	ND 14,700	4,000	0 3.00	14,700	1 32	BELT PL	ENUM 1,8	00 25	20.59 6.34	4 (BY EC)	460	3 60	88.6 72.5	56.5	55.7 0.70	784.9 49	6.8 156.8	45.0	55.0 15.4	.5 132	4	538	45.5	83.2	0.25 617.7 62.9	135.0	115.1 3.4	4 96	2 538	PRE FINAL	30         8           95         14	ANGLED 4 CARTRID <sup>®</sup>	0.15 GE 0.25	251"	85"	93"	7,042 LBS JCI SOLUTION-XTI-75x75
34-AHU-2	1ST FLOC PUBLIC SPACE	OR 2820	430	1.50	2820	1 20"	BELT PL	ENUM 1,8	00 3.0	2.54 3.3	8 (BY EC)	460	3 60	83.5 69.1	55.4	54.4 0.66	131.8 88	8.1 26.3	45.0	55.0 7.3	3 132	5	542	55.0	69.5	0.09 44.5 4.5	135.0	115.0 0.2	2 132	1 542	PRE FINAL	30         7           95         14	ANGLED	0.27 GE 0.53	127"	33"	45"	1,859 LBS JCI SOLUTION-XTI-33x45

NOTES: 1. <u>34-AHU-1</u> SHALL HAVE TOP AND BOTTOM RETURN AIR CONNECTION. INSTALL STEEL GRATING IN RETURN AIR FAN SECTION FOR SERVICING.

															-																			
SYMBOL LOCATION H	HEAT PUMP	VALVE	SOURCE	LOAD			(	COOLING PE	ERFORMA	NCE									HEATING PE	ERFORMAN	CE	_				PHASE	HZ	VOLTAGE	MCA	MOP	LENGTH	WIDTH	HEIGHT	BASIS OF
	MODULES	MODULES	FLUID	FLUID	EER TON	S HEAT EXTRACTED		SOURC	E WATER			LOAD W	/ATER		COP	MBH	HEAT EXTRACTED		SOURCE WA	TER			LOAD WA	TER										DESIGN
						(MBH)	GPM	PD (FT)	EWT	LWT	GPM	PD (FT)	EWT	LWT			(MBH)	GPM	PD (FT)	EWT	LWT	GPM	PD (FT)	EWT	LWT									
34-WWHP-1 PUMP ROOM/MECH ROOM BA01	4 @ 30 TON EACH	3	15% PROP. GLYCOL	WATER	14.8 63.1	931.3	202	5.9	80.0	99.0	151.3	6.9	55.0	45.0	2.5	1009	602.8	202	5.9	40.3	32	101.6	1.6	115.0	135.0	3	60	460	256	300	172"	78-1/4"	64"	MULTISTACK VME

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				CEM		BO										Δ						BASIS OF D	FSIGN
			MIN			ВС						FV	FAT		FW/T					τοται		BASIS OF D	LSIGN
SYMBOL	LOCATION	SERVES	OCCUPIED		MAX	L (IN)	W (IN)	H (IN)	(IN)	W (IN)	H (IN)	FPM	F F	F	F	F	WPD (FT)	APD (IN)	GPM	MBH	ROWS	MANUFACTURER	MODEL
CVB-1A04	LARGE CLASSROOM 1A04	LARGE CLASSROOM 1A04	1050	580	1050	2' - 4"	2' - 7"	1' - 6"	16"	24"	18"	350	55.0	91.2	135.0	14.4	1.80	0.07	5.8	41.0	2	TITUS	DESV
CVB-1A10	COMMONS	CAFE STORAGE 1A10	65	65	65	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	98	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
CVB-1A17	CORRIDOR 1A21-1	WOMENS TOILET 1A17	185	185	185	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	278	55.0	100.1	135.0	6.1	2.00	0.06	3.0	9.0	2	TITUS	DESV
CVB-1A21-1	CORRIDOR 1A21-1	CORRIDOR 1A21-1	275	275	140	2' - 4"	1' - 7"	1' - 0"	8"	12"	10"	168	55.0	99.8	135.0	5.1	7.20	0.07	5.3	13.3	2	TITUS	DESV
CVB-1A24	CORRIDOR 1A21-1	MENS TOILET 1A24	175	175	175	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	263	55.0	100.0	135.0	6.9	1.40	0.05	2.5	8.5	2	TITUS	DESV
CVB-1A31	LARGE CLASSROOM 1A31	LARGE CLASSROOM 1A31	925	450	925	2' - 2"	2' - 3"	1' - 6"	14"	20"	18"	381	55.0	90.7	135.0	15.1	3.00	0.07	4.8	35.6	2	TITUS	DESV
CVB-1A35	OFFICE 1A35	OFFICE 1A35	65	65	65	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	98	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
CVB-1A37	LARGE CLASSROOM 1A37	LARGE CLASSROOM 1A37	1000	580	1000	2' - 4"	2' - 7"	1' - 6"	16"	24"	18"	333	55.0	91.1	135.0	15.6	1.40	0.06	5.1	38.9	2	TITUS	DESV
CVB-2A02	CORRIDOR 2A03	MENS/WOMENS TOILET 2A02/2A06	200	200	200	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	300	55.0	100.0	135.0	4.7	3.50	0.07	4.2	9.7	2	TITUS	DESV
CVB-2A03	ELEVATOR LOBBY 2A00	CORRIDOR 2A03	200	200	200	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	300	55.0	100.0	135.0	4.7	3.50	0.07	4.2	9.7	2	TITUS	DESV
CVB-2A08K	OPEN OFFICE 2A08	OFFICE 5 2A08K	65	65	65	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	98	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
VVB-1A02	OPEN COMPUTER AREA 1A02	OPEN COMPUTER AREA 1A02	625	580	1250	2' - 4"	2' - 7"	1' - 6"	16"	24"	18"	417	55.0	100.1	135.0	15.5	0.90	0.17	4.0	30.4	2	TITUS	DESV
VVB-1A08	OFFICE/CONSULT 647	OFFICE 647/1A08	90	90	160	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	240	55.0	105.5	135.0	11.1	0.20	0.02	0.9	4.9	2	TITUS	DESV
VVB-1A11	COMMONS	ELECTRICAL ROOM 1A11	65	65	200	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	300	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
VVB-1A13	CORRIDOR 1A21-1	OFFICE 1A16/1A13	70	70	160	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	240	55.0	100.0	135.0	2.5	3.50	0.01	2.8	3.4	1	TITUS	DESV
VVB-1A22	CORRIDOR 1A21-1	OFFICE 1A34/1A22	90	90	80	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	120	55.0	105.5	135.0	11.1	0.20	0.02	0.9	4.9	2	TITUS	DESV
VVB-1A32	OFFICE 1A32	OFFICE 1A32/1A33	80	80	135	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	203	55.0	108.3	135.0	10.4	0.20	0.02	0.9	4.6	2	TITUS	DESV
VVB-1A39	CORRIDOR 1A36	MED ROOM 1A39/STORAGE 1A38	160	160	315	2' - 4"	1' - 7"	1' - 0"	8"	12"	10"	378	55.0	100.2	135.0	15.9	0.40	0.09	1.0	7.8	2	TITUS	DESV
VVB-1A40	DINING AREA 1A40	DINING AREA 1A40	325	230	370	2' - 4"	1' - 9"	1' - 1"	10"	14"	13"	304	55.0	96.6	135.0	11.0	1.30	0.06	2.7	14.6	2	TITUS	DESV
VVB-1A41	DINING AREA 1A40	TRAINING KITCHEN 1A41	1400	1400	2825	2' - 1"	3' - 9"	1' - 6"	24" x 16"	38"	18"	595	55.0	95.1	135.0	20.2	2.20	0.20	6.1	60.5	2	TITUS	DESV
VVB-2A07	CORRIDOR 2A03	STAFF LOUNGE 2A07	450	325	730	2' - 4"	1' - 11"	1' - 3"	12"	16"	15"	438	55.0	99.9	135.0	10.8	3.30	0.12	4.1	21.8	2	TITUS	DESV
VVB-2A08-1	OPEN OFFICE 2A08	OPEN OFFICE 2A08	165	80	200	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	300	55.0	99.9	135.0	8.2	1.00	0.07	2.0	8.0	2	TITUS	DESV
VVB-2A08-2	OPEN OFFICE 2A08	OPEN OFFICE 2A08	165	80	350	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	525	55.0	99.9	135.0	8.2	1.00	0.07	2.0	8.0	2	TITUS	DESV
VVB-2A08A	OPEN OFFICE 2A08	OFFICE 2A08A	65	65	95	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	143	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
VVB-2A08B	OPEN OFFICE 2A08	LARGE OFFICE 2A08B/2A08D	145	145	330	2' - 4"	1' - 7"	1' - 0"	8"	12"	10"	396	55.0	101.0	135.0	16.3	0.30	0.07	0.9	7.2	2	TITUS	DESV
VVB-2A08C	OPEN OFFICE 2A08	OFFICE 2A08C/2A08E	75	75	100	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	150	55.0	109.4	135.0	10.0	0.20	0.02	0.9	4.4	2	TITUS	DESV
VVB-2A08G	OPEN OFFICE 2A08	OFFICE 2A08G/2A08I	70	70	100	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	150	55.0	100.0	135.0	2.5	3.50	0.01	2.8	3.4	1	TITUS	DESV
VVB-2A08H	OPEN OFFICE 2A08	OFFICE 2A08F/2A08H	150	150	335	2' - 4"	1' - 7"	1' - 0"	8"	12"	10"	402	55.0	100.7	135.0	16.8	0.30	0.07	0.9	7.4	2	TITUS	DESV
VVB-2A08J	OPEN OFFICE 2A08	OFFICE 2A08J/2A08L	75	75	160	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	240	55.0	109.4	135.0	10.0	0.20	0.05	0.9	4.4	2	TITUS	DESV
VVB-2A08M	OPEN OFFICE 2A08	OFFICE 2A08M/2A08O	70	70	100	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	150	55.0	100.0	135.0	2.5	3.50	0.01	2.8	3.4	1	TITUS	DESV
VVB-2A08N	OPEN OFFICE 2A08	OFFICE 2A08N/2A08P	100	80	160	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	240	55.0	104.1	135.0	12.0	0.20	0.05	0.9	5.3	2	TITUS	DESV
VVB-2A08Q	OPEN OFFICE 2A08	OFFICE 2A08Q/2A08S	75	75	100	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	150	55.0	109.4	135.0	10.0	0.20	0.02	0.9	4.4	2	TITUS	DESV
VVB-2A08T	OPEN OFFICE 2A08	OFFICE 2A08T/2A08R	80	80	90	2' - 4"	1' - 7"	1' - 0"	6"	12"	8"	135	55.0	108.3	135.0	10.4	0.20	0.08	0.9	4.6	2	TITUS	DESV
VVB-2A08U	OPEN OFFICE 2A08	OFFICE 2A08U	65	65	80	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	120	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
VVB-2A08V	OPEN OFFICE 2A08	OFFICE 2A08V	65	65	85	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	128	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1	1	TITUS	DESV
VVB-2A08W	OPEN OFFICE 2A08	OFFICE 2A08W	65	65	100	2' - 4"	1' - 7"	1' - 0"	5"	12"	8"	150	55.0	99.2	135.0	4.0	1.30	0.01	1.6	3.1		TITUS	DESV
VVB-2A09	CORRIDOR 2A03		450	325	330	2' - 4"	1' - 11"	1' - 3"	12"	16"	15"	198	55.0	99.9	135.0	10.8	3.30	0.06	4.1	21.8	2	IIIUS	DESV

									PUM	P SCHE	EDULE						
PUMP No.	TYPE FLR MTD/IN-LINE	SYSTEM	OPERATION DUTY/STAND-BY	FLUID TYPE	GPM	FEET HD	EFF %	BHP	MOTOR HP	RPM	ELEC. CHAR	EMERGENCY POWER	VARIABLE FREQ DRIVE	OPE CON	RATING DITIONS	IMPELLER SIZE	BASIS OF DESIGN
					0	48	0	0						GPM	102		
34-	SUCTION	HOT WATER	DUTY	WATER	75	48	61	1.5	3	1750	3-60-480V	NO	YES (BY EC)	FT HD	43	6.875	BELL & GOSSETT 1510 2 BC
					150	36	66.5	2.1						EFF	67.09		
	FI R MTD END				0	48	0	0	4					GPM	102	_	
34- ⊔\//₽ 2	SUCTION	HOT WATER	STAND-BY	WATER	75	48	61	1.5	3	1750	3-60-480V	NO	YES (BY EC)	FT HD	43	6.875	BELL & GOSSETT 1510 2 BC
					150	36	66.5	2.1						EFF	67.09		
	FI R MTD END	CHILLED			0	48	0	0	-					GPM	151	-	
34- CWP-1	SUCTION	WATER	DUTY	WAIER	100	46	63	1.8	3	1150	3-60-480V	NO	YES (BY EC)	FT HD	40	10.25	BELL & GOSSETT 1510 2E
0001-1					200	33	62.5	2.7			_			EFF	68.29		
	FI R MTD END	CHILLED			0	48	0	0						GPM	151	-	
34- CM/P 2	SUCTION	WATER	STAND-BY	WATER	100	46	63	1.8	3	1150	3-60-480V	NO	YES (BY EC)	FT HD	40	10.25	BELL & GOSSETT 1510 2E
000F-2					200	33	62.5	2.7						EFF	68.29		
	FI R MTD END	GEOTHERMAL		15%	0	75	0	0	-					GPM	202	-	
34- GWP 1	SUCTION	WATER	DUTY	PROP.	150	74	68	4.1	7.5	1750	3-60-480V	NO	YES (BY EC)	FT HD	68	8.5	BELL & GOSSETT 1510 2-1/2 BB
GVVF-1				GLYCOL	250	65	76	5.4						EFF	74.41		
	FI R MTD END	GEOTHERMAL		15%	0	75	0	0	4					GPM	202	4	
34- CM/D 2	SUCTION	WATER	STAND-BY	PROP.	150	74	68	4.1	7.5	1750	3-60-480V	NO	YES (BY EC)	FT HD	68	8.5	BELL & GOSSETT 1510 2-1/2 BB
GVVP-2				GLYCOL	250	65	76	5.4						EFF	74.41		

			MAX		MOTO	R DATA		<u>T WATEI</u>	R HEA	<u>FING C</u>		AIR TEMP	UNIT	BASIS OF
SYMBC	DL CFM	ESP	VELOCITY FPM	WIDTH (IN)	No AT HP	ELEC CHAR	GPM	TOTAL MBH	EWT F	LWT F	WPD FT	RISE F	WEIGH	T DESIGN
34-AC-′	1 2193	0.08	3844	84	2 @ 1/2	208-1-60	3.0	54.7	135	98.4	0.2	22.9	203LBS	BERNER VSA2084W
							1001		_					
									_					
					PAD				E					
SYMBOL	LOCATION	SERV	ES TYP	PE SYST	PAD EM FAN CFM			HEDUI PHASE	_E HZ	VC	DLTAGE	WEIGHT	CONTROL TYPE	BASIS OF DESIGN
SYMBOL 34-PF-1	LOCATION COMMONS CEILING	SERV	ES TYP	PE SYSTI CFN DLE 6,550 HIGH SF	PAD EM FAN CFM @ PEED 6,550 @ HIGH SPEE	DLE FAN	VFD F	HEDUI PHASE	_E HZ 60	VC	DLTAGE 208	WEIGHT 119 LBS	CONTROL TYPE DDC	BASIS OF DESIGN MODERNFANCO - CIRRUS - 52"
SYMBOL 34-PF-1 <u>'OTES:</u> - FAN S	LOCATION COMMONS CEILING	SERV COMMC	ES TYP DNS PADD 2' DOWN ROD.	PE SYST CFN DLE 6,550 HIGH SF	PAD EM FAN CFM @ 6,550 @ PEED HIGH SPEE	DLE FAN WATTS	VFD F	HEDUI PHASE 1	_E HZ 60		DLTAGE 208	WEIGHT 119 LBS	CONTROL TYPE DDC	BASIS OF DESIGN MODERNFANCO - CIRRUS - 52"

<u>Civil Engineer</u>	Structural Engineer	MEP Engineer
Dewberry	WZG G	H.F. LENZ COMPANY
600 Parsippany Road, Suite 301 Parsippany, NJ 07054-3715 Tel (973) 576-9683 Fax (973) 739-9710	180 W. Ridge Pike Limerick, PA 19468 Tel (214) 329-5559	1407 Scalp Avenue Johnstown, PA 15904 Tel (814) 269-9300 Fax (814) 269-9301

three quart	6"	
foot	4	
one half inch = one	0	
inch = one foot	4	
three eighths	0	
one foot	00	
ne quarter inch = d	0	
one eighth inch = one foot on	0 4 8 16	

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Date

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				RET	URN F	AN D	ATA														RE	HEAT		DIL S	SCHE	EDUL	E (HW	)			
SYMBOL	SERVES	EXT SP	CFM	QUANTITY	FAN SIZE	DRIVE	TYPE	RPM	HP (FA)	ТОТ ВНР	TOT SP	VFD	VOLTAGE	PHASE	HZ	BASIS OF		SYMBOL	SERVES	CFM	EAT F	LAT F	SP	ТОТ	HOT GPM	WATER   EWT ۴	HEATING	COIL	FINS	ROWS	FACE
24 PE 1		12	2 390	1		BELT		2 821	3	1.87	1 73	YES	460	3	60	GREENHECK TCB-2-12-30					DB	DB	IN	MBH				(FT)	PER FT	ļ	VEL. (FPM)
04 DE 0		0.05	14 700	1	20.20			1,900	20	14.06	1.70	(BY EC) YES	460	2	60			34-HC-2	AHU-2	7,000	55.0	74.5	0.12	149.0	15.1	135.0	115.0	3.3	96	1	511
34-RF-2	And-1	2.65	14,700	I	20-20		FC	1,000	20	14.90	1.73	(BY EC)	460	3	60	-	J														

## WATER-WATER HEAT PUMP SCHEDULE

SYMBOL	CFM	ESP
34-FCU-1	600	0.62
34-FCU-2	1338	0.50
NOTES:		

## 1.

SYMBOL	LOCATION	SERVES	TYPE	SYSTEM CFM	FAN CFM	RPM	STATIC PRESSURE	TIP SPEED	O.V. (FPM)	DRIVE	BHP	HP	VFD	PHASE	HZ	VOLTAGE	WEIGHT	CONTROL TYPE	BASIS OF DESIGN
34-EF-1	2ND FLOOR MECH ROOM	RESTROOMS	INLINE	1,325	1.325	1725	1.7"	6,973	-	BELT	0.9	1.0	NO	3	60	460	96 LBS	DDC	GREENHECK BSQ-100-10
34-EF-2	BASEMENT	KITCHEN	INLINE	150	150	2023	1.3"	5,926	-	BELT	0.27	1/3	NO	1	60	115	80 LBS	DDC	GREENHECK BSQ-70-3

Environmental Consultant	Cost Estimator
🔊 SSM	International Consultants, Inc.
1047 North Park Road, P.O. Box 630 Reading, PA 19610	07 221 Chestnut Street, Suite 200 Philadelphia, PA 19106

1047 North Park Road, P. Reading, PA 19610 Tel (610) 621-2000 Philadelphia, PA 19106 Tel (215) 923-8888



	SPLII	SYS	SIEN	IAIRI	HANDL	ING U	NH								Н∪р					SCH				
SYMBOL		L RL						SIS OF						-						0011				
34-SSAHU-1	259	0.15	5	9,000	I	NOTE 2		SANYO				SYMBOL	CFM	RPM	HP	ELE	CT CHAR	MBH	GPM	PD F	T FAT F	WTD F	MOUNTING HEIGHT	BASIS OF DESIGN
<u>NOTES:</u> 1. REF 2. POV	FRIGERANT WER SHALI	LINES S	SHALL BE CONTRC	E SIZED PEI	R MANUFACT FROM ACCU	URER RECO	OMMENE	DATIONS				34-HUH-1	2000	1140	1/3	1	15/60/1	36.58	4.8	0.41	104	20	FULL	STERLING - HS-132
3. EC 4. PRO 5. SEE	TO PROVID OVIDE SSAI E DRAWING	E DISCO HU WITH S FOR C	DNNECT / I INTEGR QUANTITY	AT EACH U AL CONDE /	NIT NSTATE PUM	Р						NOTES:			ON 125F		ND 60F EAT.				TED			
	A	IR C	COOL	ED C	ONDE	ISING	UNI	T SC	HEDU	LE		3. SUPF	PLY ALL UNIT	HEATERS	V/ DOUBL	LE DEFLE	ECTION LOUVE	RS.	BOTTOWIOF		IER.			
SYMBOL	CONI			IS	COMPRES	SSOR	ELECT	CHAR	SERVES	UNIT	BASIS													
OTWIDOL	QTY R	PM (	CFM	FLA Q	TY RLA EA	EA ·				WEIGHT	DESIGN			FI	NTUI	BE S	CHEDU	ILE (H	YDROI	NIC)				
34-ACCU-1	1 7	750	1,707	0.45	1 11.3	13	208/	(1/60	(2) SSAHU-1	143.3 LBS	SANYO CMH1972A	SYMBOL	BTU/LF	AVG W TEMF	EAT	TUBE SIZE	FIN SIZE	FIN PER FT	ENCLOS	URE M	IOUNTING HEIGHT	BAS DES	IS OF SIGN	
NOTES:	ACITIES BA	SED ON	I95°FAM		PERATURE							34-FT-1	200	125 F	70 F	3/4"	2-1/2" x 2-1/4"	50	CUSTO	М	SEE DWG	STEI STY	RLING LE "K"	
2. CAP 3. PRC 4. UNI	VIDE HOT ( SHALL BE	GAS BYF PROVID	PASS ON DED WITH	ALL COMP	AN I RESSOR CIR IENT (0年) CO	CUITS N TROL						34-FT-2	315	125 F	70 F	1"	5" x 2-3/4"	50	CUSTO	М	SEE DWG	STEI STY	RLING LE "K"	
5. INST	RALL WIND		S AS REC		G PAN	EL SC	HED	ULE	(HYDF	RONIC	)	NOTES: 1. SEI 2. MIN	E DRAWING I	FOR ACTIVE RATE PER	E LENGTH PIPING C	I. VIRCUIT (	INCLUDES VVE	3 BOX) SHA	LL BE 0.5 GP	M.				
SYMBOI	L PANI WIDT	EL <sup>`H,</sup> P	NO ASSES	TUBE SIZE OD	MEAN W	ATER F	TD ℉	BTU/L	F GPM/LI	F BASIS	OF DESIGN	3. MA 4. HE/ OF	XIMUM PRES ATING CAPA( 70年 NATURA	SURE DRO CITIES ARE AL CONVEC	P PER PII BASED C TION.	PING CIR )N 70℉ A	RCUIT SHALL N	OT EXCEEI URE AND A	D 6.O FT. N AVERAGE	UNHEATE	ED SURFACE T	EMPERAT	URE	
34-RADP-1	1 18		3	5/8"	125		20	128	NOTE	1 5	STERLING													
<u>NOTES:</u> 1. S 2. M 3. M	NOTES:         1.       SEE DRAWING FOR ACTIVE LENGTH AND GPM.         2.       MINIMUM FLOW RATE PER PIPING CIRCUIT (INCLUDES VVB BOX) SHALL BE 0.5 GPM.         3.       MAXIMUM PRESSURE DROP PER PIPING CIRCUIT SHALL NOT EXCEED 6.0 FT.																			ļ	FULL	Y SPRII	VKLERED	
4. H T 5. A O	<ol> <li>HEATING CAPACITIES ARE BASED ON 70° AIR TEMPERATURE AND AN AVERAGE UNHEATED SURFACE TEMPERATURE OF 70° NATURAL CONVECTION.</li> <li>ALL ACTIVE PANEL LENGTHS INDICATED ON PLANS DETERMINED BY ASSUMING SIX (6) INCHES OF INACTIVE PANE ON EACH END UNLESS INDICATED OTHERWISE.</li> </ol>								IVE PANEL							100	)% C(	DNS	STRUC		N DOC	UMENTS		
			Project	Number	Sc			Dra	awing Title					Proje	ect Title				_	\	VA Project Nur	mber		
				3400		NO 50	ALE			MECH	HANICAL SC	CHEDULES				Beha	avioral Hea	alth Cor	nplex		595	-109		





healthcare facilities solutions

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FAN COIL UNIT SCHEDULE (WATER)																						
	MOT	TOR DAT	Ā		CH	ILLED W	ATER CO	OOLING	COIL D	DATA (	3 ROW	')	CHW PIPE	HOT	WATER I	HEATING		DATA	(1 ROV	V)	HW PIPE	
PEED	WATTS	AMPS	ELEC CHAR	EAT	۴ WP	LAT F	TOTAL MBH	SENS MBH	GPM	EWT F	LWT ℉	WPD FT	BRANCH SIZE	EAT F	LAT F	TOTAL MBH	GPM	EWT ₽	LWT F	WPD	BRANCH SIZE	DESIGN
				υь	VVD	00					'								1			
LOW	466	2.8 FLA	208-1-60	75	63	53.4	18.83	14.29	3.8	45	54.9	8.51	1"				NO HEA	TING CO	NL —			ENVIRO-TEC HPP-12
LOW	914	4.4 FLA	208-1-60	75	63	56.7	33.98	27.08	6.7	45	55	9.65	1-1/4"	70	85.9	23.15	2.4	135	115.1	1.31	3/4"	ENVIRO-TEC HPP-16

FCU'S LOCATED ON FIRST FLOOR REQUIRE CONDENSATE PUMPS; SEE PLUMBING DWGS FOR CONDENSATE ROUTING

EXHAUST FAN SCHEDULE

NOTES: 1. ADJUST BELT DRIVEN FANS TO PROVIDE SYSTEM CFM. ADJUST OF COMPLETION SET OF SHEAVES AND BELTS AFTER 2. PROVIDE SECOND SET OF SHEAVES AND BELTS AFTER INITIAL BALANCING.

	CABINET UNIT HEATER SCHEDULE (WATER)													
SYMBOL	CFM	MBH	GPM	WTD F	PD FT	FAT F	HP	PHASE	HZ	VOLTAGE	RECESS	MOUNTED	DISCHARGE	BASIS OF DESIGN
34-CUH-1	630	19.2	3.0	29.8	0.63	125	1/10	1	60	115	FULL	CEILING	FRONT	STERLING - RC06
34-CUH-2	630	19.2	3.0	29.8	0.63	125	1/10	1	60	115	PARTIAL	WALL	FRONT	STERLING - RW06
34-CUH-3	335	9.4	1.5	26.6	0.16	120	1/10	1	60	115	FULL	WALL	FRONT	STERLING - RW03
34-CUH-4	630	19.2	3.0	29.8	0.63	125	1/10	1	60	115	FULL	WALL	FRONT	STERLING - RW06

NOTES: HEATING CAPACITIES BASED ON 125F EWT AND 60F EAT.
 INTEGRAL THERMOSTAT ON EACH UNIT.
 SEE DRAWINGS FOR QUANTITY.

## 

	Project Number Scale	Drawing Title	Project Title		VA Project Nur
	3468 NO SCA	LE MECHANICAL SCH	IEDULES Behavio	ral Health Complex	595
					Building Numb
					34
Y	2520 Renaissance Boulevard, Suite 110 King of Prussia, PA 19406	Approved: Project Director	Location 1700 South Lincol	n Ave. Lebanon, PA 17042	Drawing Numb
	t: 610.270.0599 f: 610.270.0995		Date	Checked Drawn	∃  M⊢
IS	www.arrayhfs.com		07/27/2012	TME DJA	Dwg. 82
	6	7	8		9

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Fax (973) 739-9710

Date

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THE HEATING SHALL BE ENABLED WHENEVER:

AND THE ECONOMIZER IS DISABLED.

AND THE HEATING IS ACTIVE.

AND COOLING IS NOT ACTIVE.

AND THE SUPPLY FAN STATUS IS ON.

THE HEATING COIL VALVE SHALL OPEN FOR FREEZE PROTECTION WHENEVER: MIXED AIR TEMPERATURE DROPS FROM 45<sup>c</sup> TO 40<sup>c</sup> (ADJ. )

### CHILLED WATER COOLING SYSTEM:

THE COOLING SHALL BE ENABLED WHENEVER:

OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).

AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT. AND THE SUPPLY FAN STATUS IS ON.

AND THE HEATING IS NOT ACTIVE.

THE CONTROLLER SHALL MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN THE MINIMUM OUTSIDE AIR POSITION WHENEVER OCCUPIED.

OUTSIDE AIR TEMPERATURE IS LESS THAN 55<sup>°</sup>F (ADJ.).

• AND THE OUTSIDE AIR ENTHALPY IS LESS THAN 25 BTU/LB (ADJ.).

 AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE. AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.

• AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:

MIXED AIR TEMPERATURE DROPS FROM 55°F TO 45°F (ADJ .)

OR ON LOSS OF SUPPLY FAN STATUS.

THE OUTSIDE AND RELIEF AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE, THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

THE CONTROLLER SHALL MEASURE THE RETURN AIR HUMIDITY AND OVERRIDE THE COOLING SEQUENCE WHEN RETURN AIR

HUMIDITY IS ABOVE 65% RH (ADJ.). UPON ACTIVATION OF THE DEHUMIDIFICATION CYCLE, THE OUTSIDE AIR DAMPER SHALL BE REPOSITIONED TO ITS MINIMUM SCHEDULE POSITION AND THE CHILLED WATER VALVE AND COIL SHALL BE COMMANDED TO ITS FULL OPERATING POSITION. INDIVIDUAL SPACE TEMPERATURES SHALL BE MAINTAINED BY INDEPENDENT OPERATION OF THE ASSOCIATED VAV BOX AND COIL. THE DEHUMIDIFICATION MODE SHALL REMAIN IN OPERATION UNTIL THE RETURN AIR HUMIDITY IS AT OR BELOW 55% RH (ADJ) AT WHICH TIME THE DEHUMIDIFICATION MODE SHALL BE DEACTIVATED AND NORMAL OPERATION BE USED. DEHUMIDIFICATION SHALL BE ENABLED WHENEVER THE SUPPLY FAN STATUS IS ON. THE DDC CONTROLLER SHALL ENABLE THE HEATING HOT WATER PUMPS TO ALLOW THE INDIVIDUAL ROOM VAV BOX REHEAT COILS TO OPERATE AND MAINTAIN SPACE TEMPERATURE AND PREVENT OVER COOLING.

### PRE/AFTER FILTER DIFFERENTIAL PRESSURE MONITOR:

PRE/AFTER FILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

### ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90F (ADJ.).

THE CONTROLLER SHALL MONITOR THE RETURN AIR HUMIDITY AND USE AS REQUIRED FOR ECONOMIZER CONTROL OR HUMIDITY

ALARMS SHALL BE PROVIDED AS FOLLOWS: HIGH RETURN AIR HUMIDITY: IF THE RETURN AIR HUMIDITY IS GREATER THAN 65% (ADJ.).

### **RETURN AIR TEMPERATURE:**

ALARMS SHALL BE PROVIDED AS FOLLOWS: HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).

• LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

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 HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120F (ADJ.). LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45<sup>c</sup> (ADJ.)

4 34-AHU-2 CONTROL DIAGRAM ✓ NOT TO SCALE

# 34-AHU-2 SEQUENCE OF OPERATION

RUN CONDITIONS - SCHEDULED: 34-AHU-2 SHALL BE CAPABLE OF UTILIZING A TIME SCHEDULE, WARM-UP, COOL-DOWN, UNOCCUPIED, AND OPTIMAL START MODES. BUT WILL BE PROGRAMMED TO OPERATE CONTINUOUSLY IN THE OCCUPIED MODE. THE FOLLOWING MODES OF OPERATION SHALL APPLY TO ALL UNITS:

WARM-UP MODE: RETURN AIR SENSOR SHALL MODULATE THE HOT WATER COIL CONTROL VALVE OPEN TO THE COIL TO ACHIEVE ZONE SENSORS SETPOINT (ADJ.). MECHANICAL COOLING SHALL BE DISABLED. COOL-DOWN MODE:

WHEN INDEXED TO THE COOL-DOWN MODE BY THE BAS SYSTEM, THE UNIT SUPPLY AIR FAN SHALL RUN CONTINUOUSLY. MECHANICAL COOL-DOWN: WHEN THE O.A.T. IS ABOVE 55 DEGF (ADJ.), THE OUTDOOR AIR DAMPER SHALL BE CLOSED AND THE RETURN AIR DAMPER SHALL BE OPENED AND THE SUPPLY AIR TEMPERATURE SENSOR SHALL CONTROL CHILLED WATER VALVE TO ACHIEVE ZONE SENSOR SETPOINT. COOLING SHALL NOT BE ENABLED UNTIL THE OUTDOOR AIR TEMPERATURE RISES ABOVE 55 DEGREES F. (ADJ.).

## OCCUPIED CYCLE:

AND THE MODULATING OUTDOOR AIR DAMPER SHALL OPEN TO THEIR SCHEDULED MINIMUM POSITION. WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 50 DEGF (ADJ.), AND THERE IS A CALL FOR HEAT, THE BAS SHALL OPEN THE HOT WATER HEATING COIL CONTROL VALVE TO THE HEATING COIL AND TO MAINTAIN SUPPLY AIR TEMPERATURE. ONCE THE TEMPERATURE HAS BEEN SATISFIED AND THERE IS NO LONGER A CALL FOR HEAT, THE HEATING COIL VALVE SHALL CLOSE ON A RISE IN SUPPLY AIR TEMPERATURE ABOVE SETPOINT (ADJ.)

SAT (RANGE) OAT 20 DEGF & LOWER 67 DEGF (65 DEGF -70 DEGF) 65 DEGF & ABOVE

### ON A RISE IN OUTDOOR AIR TEMPERATURE, THE O.A. DAMPER SHALL BE POSITIONED TO SCHEDULED MINIMUM O.A. POSITION, THE RETURN AIR DAMPERS SHALL POSITION ACCORDINGLY, AND THE CHILLED WATER VALVE SHALL MODULATE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT

THE SUPPLY AIR TEMPERATURE SHALL BE RESET TO MAINTAIN THE ZONE TEMPERATURE SENSOR SETPOINT. THE ZONE TEMPERATURE SETPOINT SHALL BE SET BY THE BAS.

## UNOCCUPIED CYCLE:

WHEN INDEXED TO THE UNOCCUPIED COOLING MODE BY THE BAS SYSTEM, THE OUTDOOR AIR DAMPER SHALL BE CLOSED, THE RETURN AIR DAMPER SHALL BE OPEN AND THE UNIT FANS SHALL BE STOPPED. ON A NEED FOR UNOCCUPIED COOLING TO MAINTAIN ELEVATED TEMPERATURE SETPOINT OF 78 DEGREES F. (ADJ.), THE UNIT WILL BE PLACED INTO A "COOL DOWN" MODE OF OPERATION. THE HEATING COIL CONTROL VALVE SHALL BE FULLY CLOSED TO THE HEATING COIL. WHEN ALL AREAS ARE SATISFIED, THE UNIT SHALL BE DE-ENERGIZED. ON A NEED FOR UNOCCUPIED HEATING TO MAINTAIN REDUCED TEMPERATURE SETPOINT OF 68 DEGREES F. (ADJ.), THE UNIT WILL BE PLACED INTO A "WARM UP" MODE OF OPERATION. MECHANICAL COOLING SHALL BE DISABLED. WHEN ALL AREAS ARE SATISFIED, THE UNIT SHALL BE DE-ENERGIZED. THE BAS SYSTEM SHALL PROVIDE OVERRIDE TO THE ZONE BY OPERATOR INITIATION OR INDIVIDUAL ZONE THERMOSTAT OVERIDES. ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.). LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

### ZONE OPTIMAL START THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD. FREEZE PROTECTION:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON ACTIVATION OF A FREEZESTAT SUPPLY AIR SMOKE DETECTION: THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON ACTIVATION OF A SUPPLY AIR SMOKE DETECTOR.

# <u>SUPPLY FAN:</u>

1.5"). THE DUCT STATIC PRESSURE WILL RESET THE VFD TO MAINTAIN SETPOINT. ALARMS SHALL BE PROVIDED AS FOLLOWS: SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

## RETURN FAN

PRESSURE (5% TO 10% ADJ.) IN THE SPACE. ALARMS SHALL BE PROVIDED AS FOLLOWS:

RETURN FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. RETURN FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON. RETURN FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

Project Number 3468





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Cost Estimator

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### WHEN INDEXED TO THE WARM-UP MODE BY THE BAS SYSTEM, THE UNIT SUPPLY AIR FAN SHALL RUN CONTINUOUSLY, THE OUTDOOR AIR DAMPER SHALL BE CLOSED, THE RETURN AIR DAMPER SHALL BE OPENED, AND THE

### WHEN INDEXED TO THE OCCUPIED MODE BY THE BAS SYSTEM, THE UNIT SUPPLY FAN SHALL RUN CONTINUOUSLY

### ZONE THERMOSTAT SETPOINT 67 DEGF (65 DEGF -70 DEGF) 68 DEGF (ADJ)

75 DEGF (ADJ)

THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME. THE SUPPLY FAN VFD SHALL RECEIVE A CONTROL SIGNAL FROM THE AHU DDC CONTROL PANEL TO START AFTER THE RETURN AIR DAMPER IS PROVEN OPEN BY THE END SWITCHES. UPON UNIT START UP, THE SUPPLY FAN WILL SOFT START TO MAINTAIN STATIC PRESSURE 2/3 OF THE WAY DOWN THE MEDIUM PRESSURE DUCTWORK (ACTUAL STATIC PRESSURE TO BE DETERMINED AT TIME OF BALANCING, BUT NO GREATER THAN

SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

THE RETURN FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS AND SHALL TRACK THE SUPPLY FAN, TO MAINTAIN POSITVE

### PREHEATING COIL VALVE:

OR THE FREEZESTAT IS ON.

THE PREHEATING SHALL BE ENABLED WHENEVER: OUTSIDE AIR TEMPERATURE IS LESS THAN 50F (ADJ.). AND THE HEATING IS ACTIVE. AND COOLING IS NOT ACTIVE. AND THE SUPPLY FAN STATUS IS ON. THE HEATING COIL VALVE SHALL OPEN FOR FREEZE PROTECTION WHENEVER: MIXED AIR TEMPERATURE DROPS FROM 45°F TO 40°F (ADJ.)

### CHILLED WATER COOLING SYSTEM:

THE COOLING SHALL BE ENABLED WHENEVER: OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.). AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT AND THE SUPPLY FAN STATUS IS ON. AND THE HEATING IS NOT ACTIVE.

## **DEHUMIDIFICATION**

THE CONTROLLER SHALL MEASURE THE RETURN AIR HUMIDITY AND OVERRIDE THE COOLING SEQUENCE WHEN RETURN AIR HUMIDITY IS ABOVE 65% RH (ADJ.). UPON ACTIVATION OF THE DEHUMIDIFICATION CYCLE, THE OUTSIDE AIR DAMPER SHALL BE REPOSITIONED TO ITS MINIMUM SCHEDULE POSITION AND THE CHILLED WATER VALVE AND COIL SHALL BE COMMANDED TO ITS FULL OPERATING POSITION. THE DEHUMIDIFICATION MODE SHALL REMAIN IN OPERATION UNTIL THE RETURN AIR HUMIDITY IS AT OR BELOW 55% RH (ADJ) AT WHICH TIME THE DEHUMIDIFICATION MODE SHALL BE DEACTIVATED AND NORMAL OPERATION REUSED. DEHUMIDIFICATION SHALL BE ENABLED WHENEVER THE SUPPLY FAN STATUS IS ON. THE REHEAT COIL SHALL BE ENABLED TO MAINTAIN LEAVING AIR TEMPERATURE.

### HEATING COIL VALVE:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN ITS HEAT/LAT THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEGF (ADJ) AND THE ZONE TEMPERATURE IS BELOW SETPOINT
- AND THE SUPPLY FAN SATUS IS ON

### PRE/AFTER FILTER DIFFERENTIAL PRESSURE MONITOR: ALARMS SHALL BE PROVIDED AS FOLLOWS:

 PRE/AFTER FILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.). MIXED AIR TEMPERATURE: ALARMS SHALL BE PROVIDED AS FOLLOWS:

 HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90F (ADJ.). LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

## **RETURN AIR HUMIDITY:**

THE CONTROLLER SHALL MONITOR THE RETURN AIR HUMIDITY AND USE AS REQUIRED FOR HUMIDITY CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS: HIGH RETURN AIR HUMIDITY: IF THE RETURN AIR HUMIDITY IS GREATER THAN 65% (ADJ.). **RETURN AIR TEMPERATURE:** 

### ALARMS SHALL BE PROVIDED AS FOLLOWS:

 HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90F (ADJ.). LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45<sup>c</sup>F (ADJ.). SUPPLY AIR TEMPERATURE:

THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS: HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.). • LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.)

### PADDLE FANS IN COMMONS AREA: PADDLE FANS SHALL BE DISABLED WHEN AHU-2 IS IN OPERATION.

RELIEF AIR IN COMMONS AREA (ABOVE FIREPLACE): THE MODULATING MOTOR OPERATED DAMPER SHALL BE CLOSED WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 70 DEG F (ADJ.). THE MODULATING MOTOR OPERATED DAMPER SHALL MODULATE OPEN WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 70 DEG F (ADJ.).

Drawing Title	Project Title			VA Project Nur			
MECHANICAL ATC DIAGRAMS	Behavior	al Health Co	mplex	595			
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Approved: Project Director	Location 1700 South Lincolr	Drawing Numb					
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	Drawing Title MECHANICAL ATC DIAGRAMS Approved: Project Director	Drawing Title       Project Title         MECHANICAL ATC DIAGRAMS       Behavior         Approved: Project Director       Location         1700 South Lincoln       Date         07/27/2012       07/27/2012	Drawing Title       Project Title         MECHANICAL ATC DIAGRAMS       Behavioral Health Construction         Approved: Project Director       Location         1700 South Lincoln Ave. Leband         Date       Checked         07/27/2012       TME	Drawing Title       Project Title         MECHANICAL ATC DIAGRAMS       Behavioral Health Complex         Approved: Project Director       Location         1700 South Lincoln Ave. Lebanon, PA 17042         Date       Checked         07/27/2012       TME         DJA			













HEATING PADIANT PANELS: SEQUENCE OF CONTROL OCCUPIED CYCLE: THE ROOM THERMOSTAT SHALL MODULATE THE HEATING CONTROL VALVE V-1 TO MAINTAIN ROOM TEMPERATURE.

UNOCCUPIED CYCLE/NIGHT SETBACK: THE ROOM THERMOSTAT SHALL MODULATE THE HEATING CONTROL VALVE V-1 TO MAINTAIN A REDUCED UNOCCUPIED ROOM TEMPERATURE.

CONSULTANTS:	
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<u>Civil Engineer</u>	Structural Engineer	MEP En		
Dewberry	WZG G	FIE		
600 Parsippany Road, Suite 301 Parsippany, NJ 07054-3715 Tel (973) 576-9683 Fax (973) 739-9710	180 W. Ridge Pike Limerick, PA 19468 Tel (214) 329-5559	1407 Sc Johnstov Tel (81) Fax (81)		

calp Avenue own, PA 15904 14) 269-9300 14) 269-9301

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### VARIABLE AIR VOLUME BOX W/ AND W/O RADIANT PANEL SEQUENCE OF **OPERATION**

NOTE: CONSTANT VOLUME BOXES SHALL BE CONTROLLED SIMILAR TO VVB'S EXCEPT THAT THE SUPPLY AIR VOLUME REMAINS

### CONSTANT AND NO ADJUSTMENT OF THE DAMPER IS PERFORMED. MAXIMUM AND MINIMUM AIR VOLUMES ARE THE SAME.

RUN CONDITIONS -OCCUPANCY SENSOR: THE UNIT SHALL OPERATE IN AN UNOCCUPIED MODE WHEN ASSOCIATED OCCUPANCY SENSOR SENSES THE ROOM IS UNOCCUPIED, EXCEPT DURING SCHEDULED OCCUPIED PERIODS SUCH AS LUNCH. OTHERWISE THE UNIT SHALL OPERATE IN THE OCCUPIED MODE:

### OCCUPIED MODE: THE UNIT SHALL MAINTAIN A 75°F (ADJ.) COOLING SETPOINT

A 68°F (ADJ.) HEATING SETPOINT UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN

### A 85<sup>°</sup>F (ADJ.) COOLING SETPOINT. A 55<sup>°</sup>F (ADJ.) HEATING SETPOINT

ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.)

### ZONE SETPOINT ADJUST:

(ADJ.).

ROOM:

Zone Temp

Zone Setpoint

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Heating Mod Schedule

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THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR WITHIN A USER DEFINABLE TEMPERATURE RANGE TO BE ADJ. THROUGH THE BAS.

### ZONE UNOCCUPIED OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN

OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

### **REVERSING VARIABLE VOLUME TERMINAL UNIT - FLOW CONTROL:**

THE UNIT SHALL MAINTAIN ZONE SETPOINTS BY CONTROLLING THE AIRFLOW THROUGH ONE OF THE FOLLOWING. A 30 SECOND TIME DELAY SHALL BE PROVIDED TO PREVENT EXCESSIVE MODULATION CAUSED BY OPENING AND CLOSING THE DOOR TO THE ISOLATION OCCUPIED:

### WHEN ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM OCCUPIED AIRFLOW (ADJ.) AND THE MAXIMUM COOLING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED.

• WHEN THE ZONE TEMPERATURE IS BETWEEN THE COOLING SETPOINT AND THE HEATING SETPOINT, THE ZONE DAMPER SHALL MAINTAIN THE MINIMUM REQUIRED ZONE VENTILATION (ADJ.). • WHEN ZONE TEMPERATURE IS LESS THAN ITS HEATING SETPOINT, THE CONTROLLER SHALL ENABLE HEATING TO MAINTAIN THE ZONE TEMPERATURE AT ITS HEATING SETPOINT. ADDITIONALLY, IF WARM AIR IS AVAILABLE FROM THE AHU, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM OCCUPIED AIRFLOW (ADJ.) AND THE MAXIMUM HEATING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED.

UNOCCUPIED: WHEN THE ZONE IS UNOCCUPIED THE ZONE DAMPER SHALL CONTROL TO ITS MINIMUM UNOCCUPIED AIRFLOW (ADJ.). • WHEN THE ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM UNOCCUPIED AIRFLOW (ADJ.) AND THE MAXIMUM COOLING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED. WHEN ZONE TEMPERATURE IS LESS THAN ITS UNOCCUPIED HEATING SETPOINT, THE CONTROLLER SHALL ENABLE HEATING TO MAINTAIN THE ZONE TEMPERATURE AT THE SETPOINT. ADDITIONALLY, IF WARM AIR IS AVAILABLE FROM THE

AHU, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM UNOCCUPIED AIRFLOW (ADJ.) AND THE AUXILIARY HEATING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED. **REHEATING COIL VALVE:** 

### THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE REHEATING COIL VALVE OPEN ON DROPPING TEMPERATURE TO MAINTAIN ITS HEATING SETPOINT.

DISCHARGE AIR TEMPERATURE: THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS: HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 120F (ADJ.). LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40°F (ADJ.).

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NOTE: PROVIDE ANY ADDITIONAL POINTS REQUIRED FOR SEQUENCES OF OPERATION

### TYPICAL FOR EACH ROOM SERVED BY SPLIT SYSTEM



RADIANT HEATING PANEL





NOT TO SCALE **GENERAL EXHAUST FANS (EF-1) SEQUENCES OF OPERATION** 1. RUN CONDITIONS: FAN SHALL RUN CONTINUOUSLY

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<u>... FAN STATUS:</u> THE CONTROLLER SHALL MONITOR THE FAN STATUS. ALARMS SHALL BE PROVIDED AS FOLLOWS: FAN FAILURE: COMMAND ON, BUT THE STATUS IS OFF. FAN IN HAND: COMMAND OFF, BUT THE STATUS IS ON.

3



# **ARCHITECT:**



# RRAY

### 2520 Renaissance Bo King of Prussia, PA 194

healthcare facilities solutions

NOT TO SCALE

Project Number

3468

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BO - GWP 2 Start/Stop AO - GWP 2 VFD Speed



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Scale	Drawing Title	Project Title			VA Project Nur
As indicated	MECHANICAL ATC DIAGRAMS	Behavio	ral Health Co	mplex	595
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ulevard, Suite 110 9406	Approved: Project Director	Location 1700 South Lincol	n Ave. Leban	on, PA 17042	Drawing Numb
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# THE TWO CHILLED WATER PUMPS SHALL OPERATE IN A

• ON FAILURE OF THE DUTY PUMP, THE STAND-BY PUMP SHALL RUN AND THE DUTY PUMP SHALL TURN OFF. THE DESIGNATED DUTY PUMP SHALL ROTATE UPON ONE OF

# • RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

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![](_page_13_Picture_87.jpeg)

![](_page_14_Figure_0.jpeg)

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# CONSULTANTS:

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2

<u>Civil Engineer</u>	Structural Engineer								
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2

# 

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![](_page_14_Figure_8.jpeg)

NOT TO SCALE

![](_page_14_Figure_11.jpeg)

![](_page_14_Figure_12.jpeg)

CONVECTIVE/FIN TUBE HEATER CONTROL DIAGRAM

### **CONVECTIVE / FIN TUBE HEATER**

 <u>RUN CONDITIONS - CONTINUOUS:</u> THE UNIT SHALL RUN CONTINUOUSLY AND SHALL MAINTAIN A HEATING SET POINT OF 70<sup>+</sup> (ADJ.). WHEN THE OA IS BELOW 55 DEGF (ADJ.)
 ALARMS SHALL BE PROVIDED AS FOLLOWS:

LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A
USER DEFINABLE AMOUNT (ADJ.)

- <u>HEATING COIL VALVE:</u> THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND OPEN THE HEATING COIL VALVE TO MAINTAIN ITS HEATING SETPOINT.
- THE HEATING SHALL BE ENABLED WHENEVER:
- AND SUPPLY WATER TEMPERATURE IS GREATER THAN 100<sup>+</sup>
  AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
- OUTSIDE AIR TEMPERATURE IS LESS THAN 55°F (ADJ.).

	HAR	DWAR	e poir	NTS	SOFTWARE POINTS					GRAPHIC • •
POINT NAME	AI	AO	BI	во	AV	BV	SCHED	TREND	ALARM	GRAPHIC
ZONE TEMP	•							•		•
VALVE		•						•		•
HEATING SETPOINT								•		•
LOW ZONE TEMP									•	

NOTE: PROVIDE ANY ADDITIONAL POINTS REQUIRED FOR SEQUENCES OF OPERATION

![](_page_14_Figure_23.jpeg)

13 AIR CURTAIN CONTROL DIAGRAM NOT TO SCALE

### AIR CURTAIN

. <u>RUN CONDITIONS - CONTINUOUS:</u> THE UNIT SHALL RUN CONTINUOUSLY AND SHALL MAINTAIN A HEATING SET POINT OF 70<sup>°</sup>F (ADJ.). WHEN THE OA IS BELOW 55 DEGF (ADJ.)

THE UNIT SHALL RUN IN ADDITION TO ABOVE WHENEVER THE EXTERIOR DOOR IS COMMANDED OPEN, VIA DOOR SWITCH ALARMS SHALL BE PROVIDED AS FOLLOWS:

- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.)
- 2. <u>HEATING COIL VALVE:</u> THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND OPEN THE HEATING COIL VALVE

### TO MAINTAIN ITS HEATING SETPOINT.

- THE HEATING SHALL BE ENABLED WHENEVER:AND SUPPLY WATER TEMPERATURE IS GREATER THAN 100<sup>+</sup>
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.

• AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 55<sup>°</sup>F (ADJ.).

• AND THE FAN IS ON

3. <u>FAN:</u> THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.

	HAR	DWAR		NTS		SC	FTWARE	POINTS		
POINT NAME	AI	AO	BI	во	AV	BV	SCHED	TREND	ALARM	GRAPHIC
ZONE TEMP	•							•		•
VALVE		•						•		•
HEATING SETPOINT								•		•
LOW ZONE TEMP									•	

NOTE: PROVIDE ANY ADDITIONAL POINTS REQUIRED FOR SEQUENCES OF OPERATION

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![](_page_14_Figure_39.jpeg)

- 9. <u>FAN STATUS:</u> THE CONTROLLER SHALL MONITOR THE FAN STATUS.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

	HAI	HARDWARE POINTS					SOFTWARE POINTS					
POINT NAME	AI	AO	BI	во	AV	BV	SCHED	TREND	ALARM	GRAPHI		
ZONE TEMP	•							•		•		
ZONE SETPOINT ADJUST	•									•		
FILTER DIFF PRESSURE	•							•		•		
DISCHARGE AIR TEMP	•							•		•		
SUPPLY WATER TEMP	•							•		•		
VALVE		•						•		•		
ZONE OVERRIDE			•					•		•		
FAN STATUS			•					•		•		
FAN START/STOP				•				•		•		
SCHEDULE							•					
HEATING SETPOINT								•		•		
COOLING SETPOINT								•		•		
HIGH ZONE TEMP									•			
LOW ZONE TEMP									•			
FILTER CHANGE REQUIRED									•			
HIGH DISCHARGE AIR TEMP									•			
LOW DISCHARGE AIR TEMP									•			
FAN FAILURE									•			
FAN IN HAND									•			

mber	Scale	Drawing Title	Project Title			VA Project N	lumber	
3468	1/8" = 1'-0"	MECHANICAL ATC DIAGRAMS	Behavio	Behavioral Health Complex			595-109	
naissance Boulevard, Suite 110 Prussia, PA 19406 0.0599 0.0995							Building Number 34	
		Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042			Drawing Number		
			Date	Checked	Drawn	MH/0		
ayhfs.com			07/27/2012	SDA	DJA	Dwg. 85	of 12	
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BI - Heat Pump	Module 1 Cooling Status	
BI - Heat Pump BI - Heat Pump	Module 1 Heating Status Module 1 Fault Module 1 Leaving Load Temp	
BI - Heat Pump BI - Heat Pump	Module 2 Cooling Status Module 2 Heating Status	
BI - Heat Pump AI - Heat Pump	Module 2 Fault Module 2 Leaving Load Temp	
BI - Heat Pump BI - Heat Pump	Module 3 Cooling Status Module 3 Heating Status Module 3 Foult	
AI - Heat Pump BI - Heat Pump	Module 3 Fault Module 3 Leaving Load Temp Module 4 Cooling Status	A
BI - Heat Pump BI - Heat Pump	Module 4 Heating Status Module 4 Fault	
AI - Heat Pump BI - Heat Pump	Module 4 Leaving Load Temp Module 5 Cooling Status	
BI - Heat Pump BI - Heat Pump	Module 5 Heating Status Module 5 Fault	
AI - Heat Pump BI - Heat Pump	Module 5 Leaving Load Temp Module 6 Cooling Status	
BI - Heat Pump BI - Heat Pump	Module 6 Heating Status Module 6 Fault	
AI - Heat Pump AI - System Ente	Module 6 Leaving Temp	
AI - System Lea AI - System Ente	ering Hot Water Temp	
AI - System Edu AI - System Ente	ering Source/Sink Water Temp ving Source/Sink Water Temp	
		B
LL MONITOR THE W LARM WHENEVER	/ATER LEVEL IN THE SUMP PIT THE WATER LEVEL REACHES	
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PUMP UPON A FAI OW SETPOINT. SE	L IN SYSTEM STATIC FILL EE FLOW DIAGRAM. STATUS AND SHALL ISSUE AN	
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LL MONITOR THE V	VATER LEVEL IN THE SUMP PIT	
LARM WHENEVER	THE WATER LEVEL REACHES	
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![](_page_15_Figure_0.jpeg)

	Scale		Project little			VA Project Nu
As indicated Ulevard, Suite 110		MECHANICAL ISOMETRICS AND SECTIONS	Behavio	595		
				Building Numb		
						34
		Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042			Drawing Numb
			Date	Checked	Drawn	
			07/27/2012	TME	DJA	Dwg. 86

![](_page_15_Figure_12.jpeg)

![](_page_16_Figure_0.jpeg)

1

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3	4	F

![](_page_16_Figure_10.jpeg)

6

![](_page_16_Figure_11.jpeg)

2 EXHAUST CAP - EXTERIOR ISOMETRIC NOT TO SCALE

ARCHITECT:

![](_page_16_Picture_14.jpeg)

![](_page_16_Picture_15.jpeg)

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Project Number

3468

![](_page_16_Picture_18.jpeg)

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![](_page_16_Picture_20.jpeg)

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![](_page_16_Figure_29.jpeg)

mber	Scale	Drawing Title		Project Title			VA Project Nu
3468 1/4" = 1'-0" naissance Boulevard, Suite 110 Prussia, PA 19406 0.0599 0.0995		MECHANICAL ISOMETRICS AND SECTIONS	Behavioral	595			
				Building Numb			
					Drawing Numb		
		Approved: Project Director	Location 1700 South Lincoln Ave. Lebanon, PA 17042				
				Date	Checked	Drawn	
ayhfs.com				07/27/2012	SDA	DJA	Dwg. 87
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