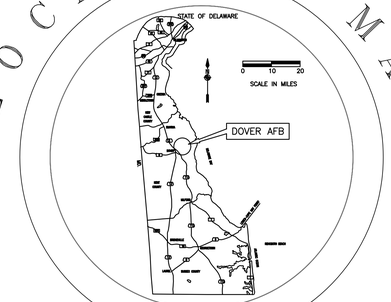
DOVER AIR FORCE BASE
DELAWARE
HTHW PLANT DECENTRALIZATION TASK 'D'

436th CIVIL ENGINEER SQUADRON
INTEGRITY SERVICE EXCELLENCE

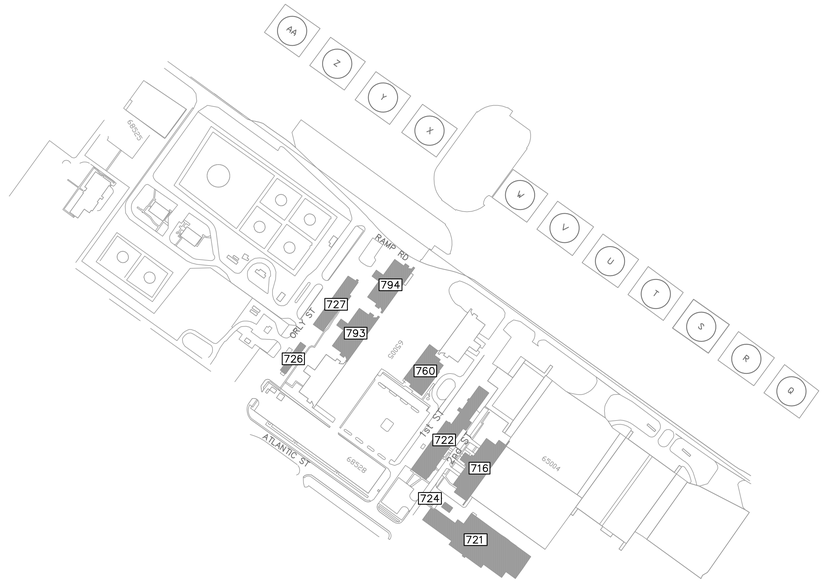
LOCATION MAP



BUILDINGS

716
721
722
724
726
727
760
793
794

DRAWING INDEX



VICINITY MAP
N.T.S.

NORTH

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

PROGRAMS FLIGHT CHIEF	CIVIL ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	N.T.S.	B. RUFF	S. SIMON

100% DESIGN

USING AGENCY	SAFETY	BIO ENVIRONMENTAL ENG	CORROSION ENG	FIRE CHIEF	CONSTRUCTION MGT.	BASE COMMUNICATIONS	SECURITY POLICE	ENVIRONMENTAL	PROTECTIVE COATING	OPERATIONS	PROJECT ENG
FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME	FIRST & LAST NAME PRINT NAME

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

COVER SHEET

W-5023
SHT 1 OF 63
G001.1

GAS-FIRED AIR ROTATION UNIT SCHEDULE

TAG	LOCATION		TYPE	INLET GAS PRESS.	GAS TRAIN	FAN SECTION				HEATING SECTION				MOTOR			FILTERS			FLUE CONN.	ACCESSORIES				MAKE	MODEL	REMARKS
	DWG	ROOM				No	CFM	OA	ESP (in.)	EAT °F	LAT °F	MBH IN	MBH OUT	HP	RPM	VOLTAGE	QTY.	SIZE	THICKNESS		REMOTE CONT. PNL.	MIX. BOX	SMOKE DETECTOR *	DISCONNECT *			
HV-1	M716.2	WAREHOUSE	VERTICAL	7" W.C.	FM	1	15,500	3,100	1.7	58	95	775	620	10	839	208V-3PH	16 4	20x16 20x20	2" 2"	10"	YES	YES	YES	YES	RAPID	8500-125	
HV-2	M716.2	WAREHOUSE	VERTICAL	7" W.C.	FM	1	15,500	3,100	1.7	58	95	775	620	10	839	208V-3PH	16 4	20x16 20x20	2" 2"	10"	YES	YES	YES	YES	RAPID	8500-125	

* FACTORY INSTALLED AND WIRED

GAS-FIRED UNIT HEATER SCHEDULE

TAG	LOCATION		TYPE	MBH IN	MBH OUT	GAS PRESS.	CFM	MOTOR			FLUE SIZE	TSTAT	POWER VENTER	MAKE	MODEL	REMARKS
	DWG	ROOM						HP	RPM	VOLTAGE						
UH-1	M716.2	LATRINE	PROPELLER	45	36	7"-14" w.c.	800	1/30	1050	115/1/60	4"ø	YES	YES	TRANE	GTND-004	ADJUSTABLE HORIZONTAL AND VERTICAL LOUVERS

LEGEND AND SYMBOLS

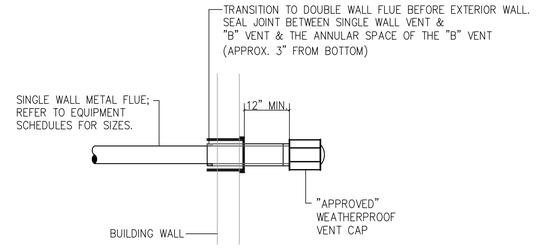
HTWS	HIGH TEMPERATURE HOT WATER SUPPLY		BALL VALVE
HTWR	HIGH TEMPERATURE HOT WATER RETURN		GATE VALVE
NG (2 psi)	NATURAL GAS PIPING (2 psi)		GAS VALVE
(E)XXX	EXISTING PIPING		UNION
A.F.F.	ABOVE FINISHED FLOOR		
N.A.	NOT APPLICABLE		
O.A.	OUTSIDE AIR		
H.W.	HEATING WATER		
H.T.H.W.	HIGH TEMPERATURE HEATING WATER		
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		

GAS-FIRED HEATING & VENTILATION UNIT CONTROL SEQUENCE

1. UNIT OPERATES WITH FACTORY CONTROLS. UNIT'S DISCHARGE TEMPERATURE SHALL BE MODULATED (10:1 TURNDOWN) WITH SPACE MOUNTED ROOM TEMPERATURE SENSOR TO MAINTAIN SPACE SETPOINT TEMPERATURE.
2. A REMOTE MOUNTED UNIT CONTROL PANEL CONTAINS A SUMMER/OFF/WINTER SWITCH, SUPPLY FAN AND BURNER OPERATION INDICATING LIGHTS AND A FLAME FAILURE LIGHT. TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE 120V AND 24V WIRING FROM MAKE-UP AIR UNIT TO REMOTE PANEL IN SEPARATE CONDUITS.
3. THE UNIT'S AUTOMATIC OUTSIDE AIR DAMPER SHALL CLOSE WHEN UNIT IS NOT RUNNING.
4. THE UNIT'S AUTOMATIC OUTSIDE AIR DAMPER SHALL CLOSE AND THE UNIT SHALL SHUT DOWN WHEN THE DISCHARGE AIR TEMPERATURE FALLS BELOW 40° F (ADJUSTABLE). PROVIDE HIGH AND LOW LIMIT DISCHARGE AIR THERMOSTATS.
5. FACTORY MOUNTED SMOKE DETECTOR SHALL DE-ENERGIZE THE UNIT UPON THE DETECTION OF SMOKE.
6. THE TEMPERATURE CONTROL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY SENSORS, CONTROL DEVICES, WIRING, ETC. TO ACHIEVE THE CONTROL SEQUENCE.

GAS-FIRED UNIT HEATER CONTROL SEQUENCE

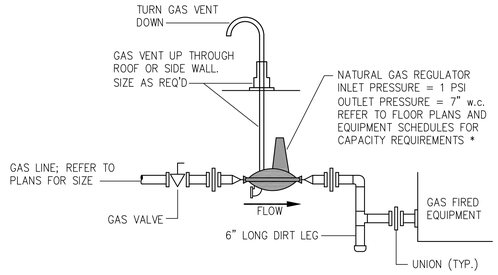
1. ON A CALL FOR HEAT FROM THE SPACE MOUNTED THERMOSTAT, THE UNIT HEATER SHALL FIRE AND OPERATE OFF ITS PACKAGED CONTROLS TO ACHIEVE SPACE TEMPERATURE SET POINT.
2. ONCE SPACE TEMPERATURE SET POINT IS ACHIEVED, THE UNIT SHALL SHUT DOWN.



TYPE "B" SIDEWALL FLUE INSTALLATION DETAIL

NO SCALE

* INSTALLATION SHALL BE IN COMPLIANCE w/ MANUFACTURER'S RECOMMENDATIONS.

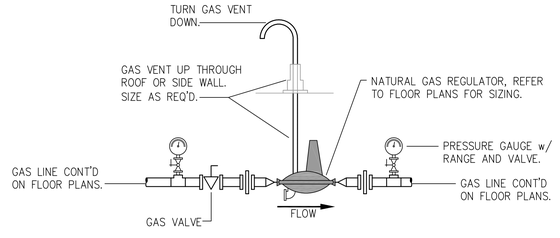


* 2 PSI NATURAL GAS SYSTEM SIZED w/ A 1 PSI PRESSURE DROP.

TYPICAL GAS REGULATOR AND CONNECTION DETAIL

NO SCALE

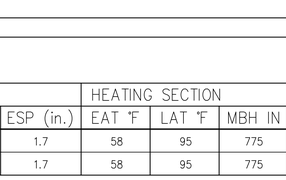
NOTE: REQUIRED FOR ALL HV-1 AND UH-1 INSTALLATIONS



REFER TO FLOOR PLANS FOR GAS LINE SIZE AND PRESSURE.

TYPICAL GAS REGULATOR DETAIL

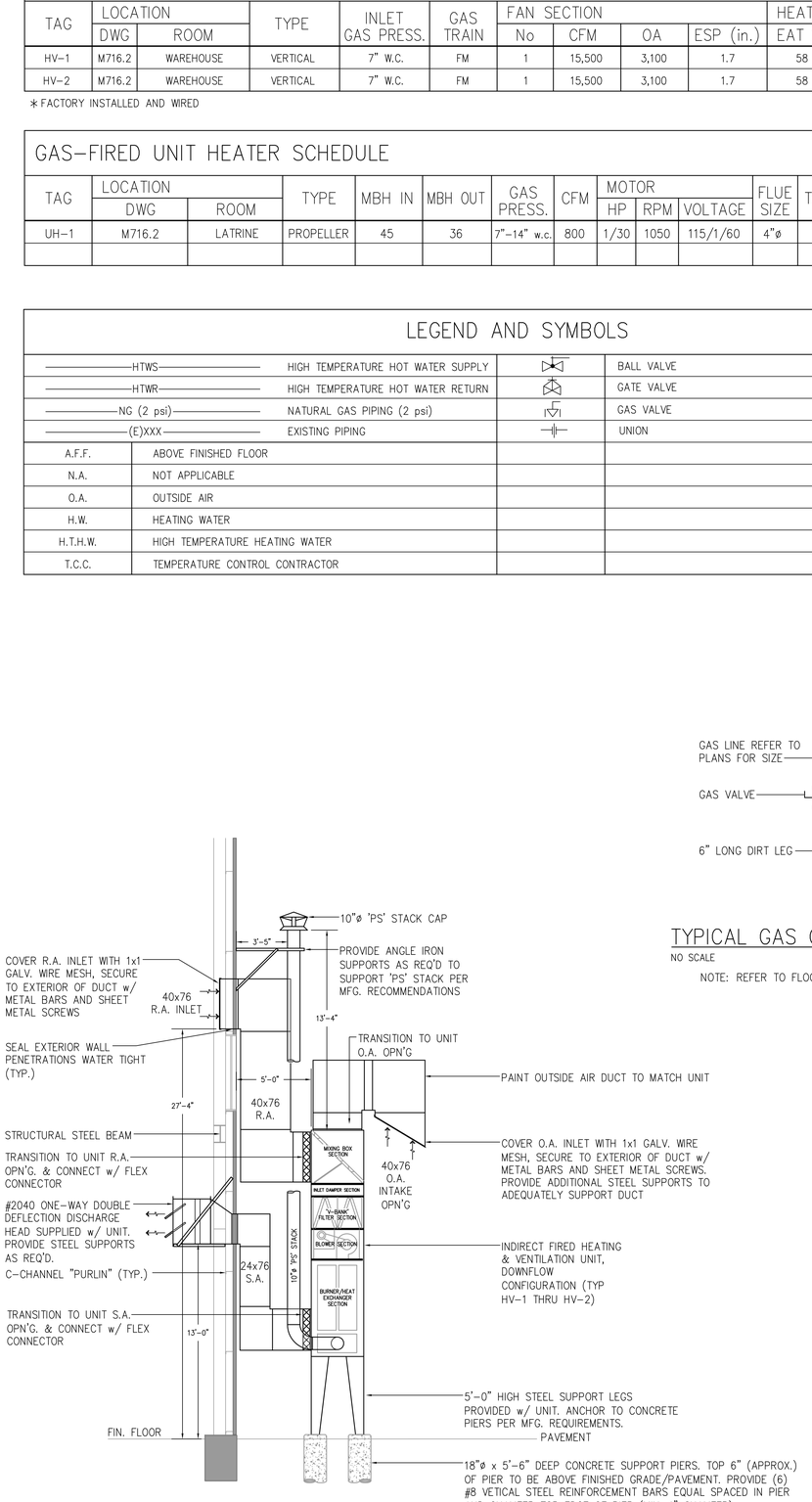
NO SCALE



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE



VERTICAL HEATING & VENTILATION UNIT DETAIL

0 2' 4' 8'

1/4" = 1'-0"

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH x 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES. AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

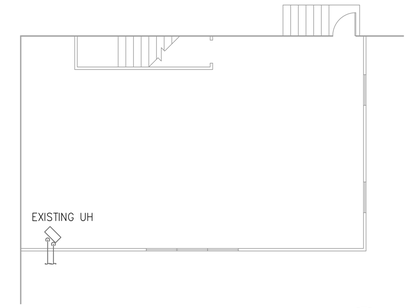
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	A. CRAFT	S. SIMON

BLDG 716
LEGEND, NOTES & DETAILS

W-5023
SHT 16 OF 63
M716.1



MEZZANINE PLAN WEST– HVAC

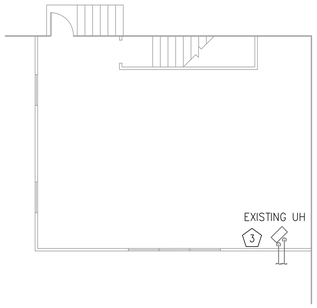
0 4' 8' 16'

1/8" = 1'–0"

NORTH

DRAWING REFERENCE NOTES

1. EXISTING HTWS/HTWR PIPING TO BE ABANDONED IN PLACE.
2. EXISTING AIR HANDLING UNIT TO BE ABANDONED IN PLACE. DEACTIVATE AUTOMATIC CONTROLS AND FAN MOTOR POWER.
3. EXISITNG UNIT HEATER TO BE ABANDONED IN PLACE. DEACTIVATE AUTOMATIC CONTROLS AND FAN MOTOR POWER.

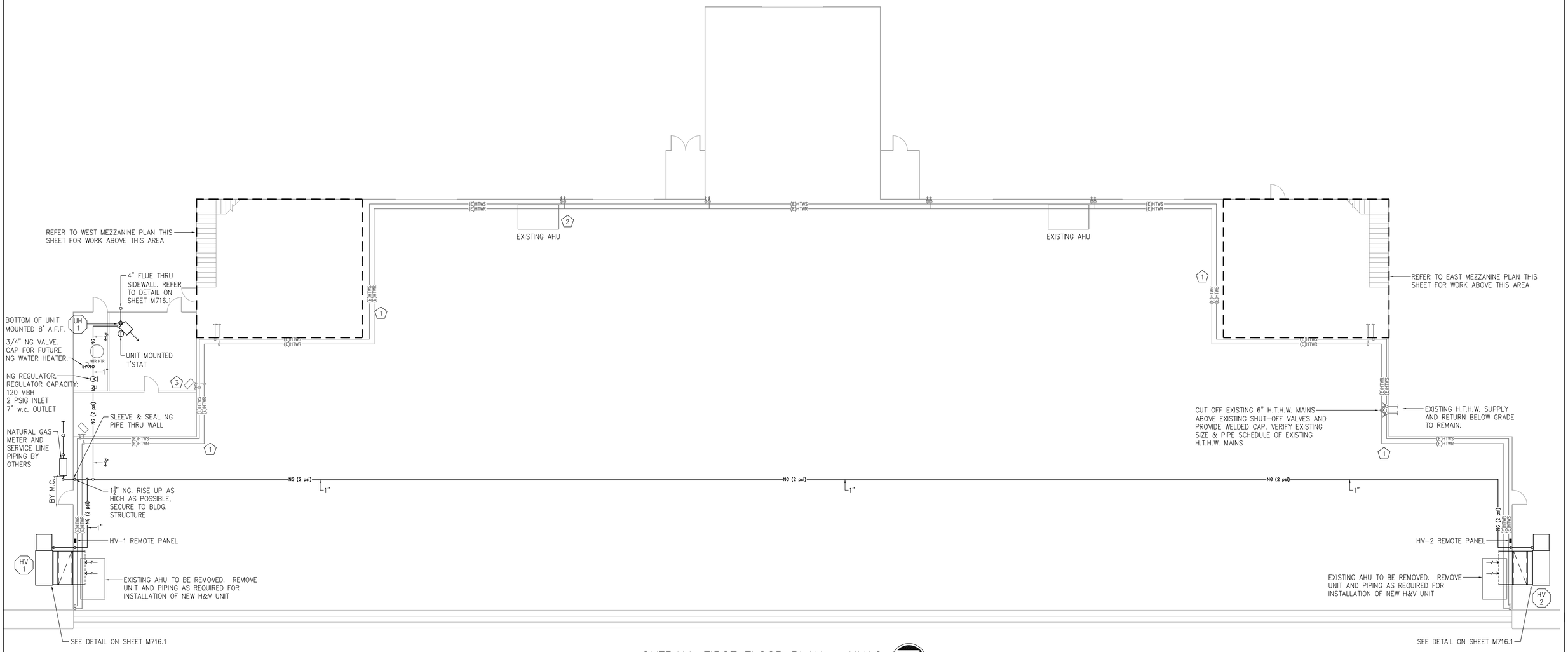


MEZZANINE PLAN EAST– HVAC

0 4' 8' 16'

1/8" = 1'–0"

NORTH



OVERALL FIRST FLOOR PLAN – HVAC

0 4' 8' 16'

1/8" = 1'–0"

NORTH

100% DESIGN

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'–0"	A. CRAFT	S. SIMON

BLDG 716
OVERALL FIRST FLOOR PLAN

W–5023

SHT 17 OF 63

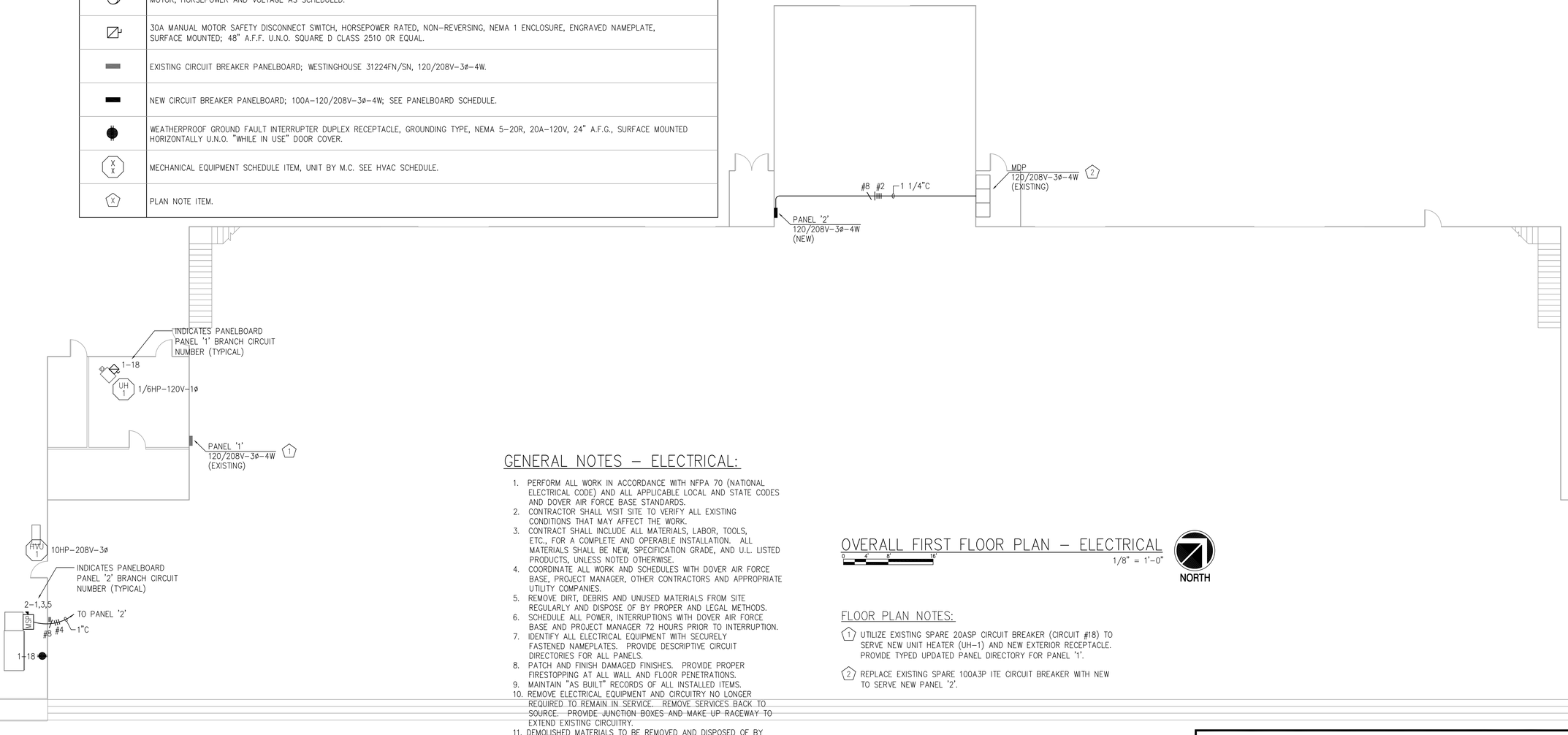
M716.2

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——|——	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——|// ——	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←——	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
MSP	EXTERIOR PACKAGED MOTOR STARTER PANEL FURNISHED WITH EQUIPMENT, BUILT-IN SAFETY DISCONNECT. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; WESTINGHOUSE 31224FN/SN, 120/208V-3ø-4W.
	NEW CIRCUIT BREAKER PANELBOARD; 100A-120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
	WEATHERPROOF GROUND FAULT INTERRUPTER DUPLEX RECEPTACLE, GROUNDING TYPE, NEMA 5-20R, 20A-120V, 24" A.F.G., SURFACE MOUNTED HORIZONTALLY U.N.O. "WHILE IN USE" DOOR COVER.
XX	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.

PANEL: '2' — **LOCATION: BUILDING 716**

NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	AIR ROTATION UNIT WEST (HVU#1)	60A3P	3864			1	2	3864					
				3864		3	4		3864		60A3P	AIR ROTATION UNIT EAST (HVU#1)	
					3864	5	6			3864			
	SPARE	20ASP				7	8	180			20ASP	RECEP – (HVU#1 EAST)	
	SPARE	20ASP				9	10				20ASP	SPARE	
	–	SPACE				11	12				SPACE	–	
	–	SPACE				13	14				SPACE	–	
	–	SPACE				15	16				SPACE	–	
	–	SPACE				17	18				SPACE	–	
	–	SPACE				19	20				SPACE	–	
	–	SPACE				21	22				SPACE	–	
	–	SPACE				23	24				SPACE	–	
	–	SPACE				25	26				SPACE	–	
	–	SPACE				27	28				SPACE	–	
	–	SPACE				29	30				SPACE	–	
	SUB-TOTAL PER ø		3864			øA	4044				TOTAL PER ø		7908
				3864		øB			3864				7728
					3864	øC				3864			7728
	MOUNTING	SURFACE									TOTAL CONNECTED (VA)		23364
	LUGS OR CIRCUIT BREAKER	100A M.L.O.									TOTAL CONNECTED (AMPS)		64.9
	BUS RATING (AMPERES) & TYPE	100A – CU									FEEDER: 4#2 & 1#8G-1 1/4"C		
	VOLTAGE	120/208V-3ø-4W									OPTIONS:		



GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

OVERALL FIRST FLOOR PLAN – ELECTRICAL

0 4' 8' 16'

1/8" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. UTILIZE EXISTING SPARE 20ASP CIRCUIT BREAKER (CIRCUIT #18) TO SERVE NEW UNIT HEATER (UH-1) AND NEW EXTERIOR RECEPTACLE. PROVIDE TYPED UPDATED PANEL DIRECTORY FOR PANEL '1'.
2. REPLACE EXISTING SPARE 100A3P ITE CIRCUIT BREAKER WITH NEW TO SERVE NEW PANEL '2'.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 716
MECH ROOM
ELECTRICAL

W-5023

SHT 51 OF 63

E716.1

EXISTING AIR HANDLING UNIT SCHEDULE

TAG	LOCATION		FAN SECTION		HEATING SECTION (NEW LOW TEMP HEATING WATER COIL)												MAKE	REMARKS
	DWG	ROOM	CFM	OA	EAT °F	LAT °F	EWT °F	LWT °F	MBH	GPM	WPD	APD	P.G.	ROWS	FIN LENGTH	FIN HEIGHT	CASING LENGTH/HEIGHT	
HV-1	M721.7	NW EXTERIOR	42,000	42,000	10	140	180	140	5,922	312	17.4 FT	1.40 in. w.c.	✳	6	APPROX. 125"	APPROX. 57"	APPROX. 135"/ APPROX. 60"	TRANE	✳✳
HV-2	M721.7	NW EXTERIOR	42,000	42,000	10	140	180	140	5,922	312	17.4 FT	1.40 in. w.c.	✳	6	APPROX. 125"	APPROX. 57"	APPROX. 135"/ APPROX. 60"	TRANE	✳✳
HV-3	M721.7	NW EXTERIOR	42,000	42,000	10	140	180	140	5,922	312	17.4 FT	1.40 in. w.c.	✳	6	APPROX. 125"	APPROX. 57"	APPROX. 135"/ APPROX. 60"	TRANE	✳✳
HV-1A	M721.7	MEZZANINE	22,500	22,500	10	140	180	140	3,172	167	17.8 FT	1.09 in. w.c.	✳	6	APPROX. 84"	APPROX. 51"	APPROX. 94"/ APPROX. 60"	TRANE	✳✳
AC-1	M721.7	MEZZANINE	5,150	5,150	10	75	180	140	364	20	1.07 FT	0.26 in. w.c.	✳	2	APPROX. 48"	APPROX. 27"	APPROX. 56"/ APPROX. 31"	TRANE	✳✳

✳ SYSTEM CONTAINS PROPYLENE GLYCOL. CONCENTRATION TO MAINTAIN MINIMUM 10 DEG. F. FREEZE PROTECTION.

✳✳ PROVIDE NEW HEATING COIL TO FIT IN EXISTING UNIT CABINET.

GAS-FIRED/OIL FIRED HOT WATER BOILER SCHEDULE

TAG	LOCATION		MBH IN	MBH OUT	EWT °F	LWT °F	GPM	WATER PD (FT)	P.G.	OPER. PRESS.	GAS PRESS.	OIL TYPE	OIL GPH	MOTOR HP	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL			MAKE	BURNER MODEL	MODEL	REMARKS
	DWG	ROOM																	VOLTAGE	AMP	MOP				
B-1	M721.3	MECH ROOM 01	1,500	1,440	140	180	71	- -	✳	60 PSI	4"-10.5" w.c.	- -	- -	- -	MODULATING	4:1	8"ø	8"ø	120/1/60	26	(2)15	RAYPAK	- -	H7-1505	✳✳
B-2	M721.3	MECH ROOM 01	1,500	1,440	140	180	71	- -	✳	60 PSI	4"-10.5" w.c.	- -	- -	- -	MODULATING	4:1	8"ø	8"ø	120/1/60	26	(2)15	RAYPAK	- -	H7-1505	✳✳
B-3	M721.6	MECH ROOM 25	1,999	1,919	140	180	95	- -	✳	60 PSI	4"-10.5" w.c.	- -	- -	- -	MODULATING	4:1	8"ø	8"ø	120/1/60	35	(2)20	RAYPAK	- -	H7-2005	✳✳
B-4	M721.6	MECH ROOM 25	1,999	1,919	140	180	95	- -	✳	60 PSI	4"-10.5" w.c.	- -	- -	- -	MODULATING	4:1	8"ø	8"ø	120/1/60	35	(2)20	RAYPAK	- -	H7-2005	✳✳
B-5	M721.6	MECH ROOM 25	1,999	1,919	140	180	95	- -	✳	60 PSI	4"-10.5" w.c.	- -	- -	- -	MODULATING	4:1	8"ø	8"ø	120/1/60	35	(2)20	RAYPAK	- -	H7-2005	✳✳
B-6	M721.6	MECH ROOM 25	8,000	6,400	140	180	320	2.0	✳	60 PSI	1 PSI	#2	57.1	7 1/2	MODULATING	4:1	20"ø	- -	460/3/60	- -	- -	BRYAN	CR5-G/0	RV800-W	DUAL FUEL BURNER
B-7	M721.6	MECH ROOM 25	8,000	6,400	140	180	320	2.0	✳	60 PSI	1 PSI	#2	57.1	7 1/2	MODULATING	4:1	20"ø	- -	460/3/60	- -	- -	BRYAN	CR5-G/0	RV800-W	DUAL FUEL BURNER

✳ SYSTEM CONTAINS PROPYLENE GLYCOL. BOILER MANUFACTURER TO CONFIRM COMPATIBILITY OF BOILER HEAT EXCHANGER WITH EXISTING GLYCOL SOLUTION.

✳✳ PROVIDE WITH INTEGRAL BOILER WATER CIRCULATION PUMP.

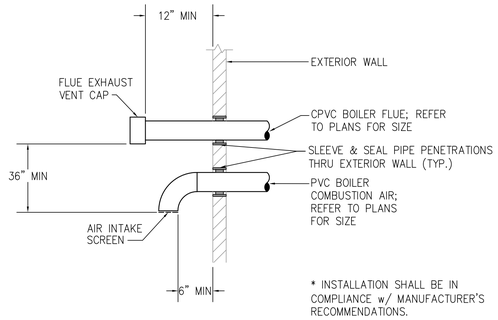
PUMP SCHEDULE

TAG	LOCATION		SERVICE	TYPE	GPM	P.G.	HEAD (ft.)	EFF.	IMPELLER	SUCTION SIZE	DISCHARGE SIZE	MOTOR			MAKE	SERIES	MODEL	REMARKS
	DWG	ROOM										HP	RPM	VOLTAGE				
HWP-1	M721.3	MECH ROOM 01	HEATING WATER	IN-LINE	160	✳	30	69.55%	6.125"	3.00"	3.00"	3	1750	208/3/60	BELL & GOSSETT	80	3x3x7B	
HWP-2	M721.3	MECH ROOM 01	HEATING WATER	IN-LINE	160	✳	30	69.55%	6.125"	3.00"	3.00"	3	1750	208/3/60	BELL & GOSSETT	80	3x3x7B	
CP-1	M721.6	MECH ROOM 25	HEATING WATER	IN-LINE	320	✳	20	65.26%	5.375"	5.00"	5.00"	3	1750	460/3/60	BELL & GOSSETT	80	5x5x7	
CP-2	M721.6	MECH ROOM 25	HEATING WATER	IN-LINE	320	✳	20	65.26%	5.375"	5.00"	5.00"	3	1750	460/3/60	BELL & GOSSETT	80	5x5x7	
HWP-3	M721.6	MECH ROOM 25	HEATING WATER	BASE MOUNTED	525	✳	100	79.38%	10.75"	5.00"	4.00"	25	1750	460/3/60	BELL & GOSSETT	1510	4E	PROVIDE INVERTER RATED MOTOR
HWP-4	M721.6	MECH ROOM 25	HEATING WATER	BASE MOUNTED	525	✳	100	79.38%	10.75"	5.00"	4.00"	25	1750	460/3/60	BELL & GOSSETT	1510	4E	PROVIDE INVERTER RATED MOTOR
HWP-5	M721.6	MECH ROOM 25	HEATING WATER	BASE MOUNTED	525	✳	100	79.38%	10.75"	5.00"	4.00"	25	1750	460/3/60	BELL & GOSSETT	1510	4E	PROVIDE INVERTER RATED MOTOR

✳ SYSTEM CONTAINS PROPYLENE GLYCOL. CONCENTRATION TO MAINTAIN MINIMUM 10 DEG. F. FREEZE PROTECTION.

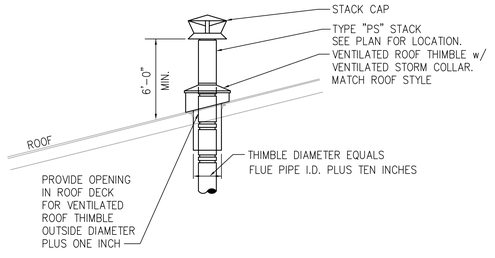
GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES, AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.



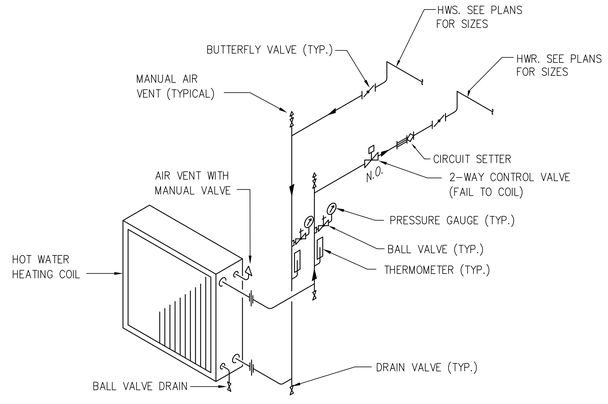
CONDENSING BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE



PS STACK DETAIL

NO SCALE



AIR HANDLING UNIT HOT WATER HEATING COIL PIPING DETAIL

NO SCALE

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road
Maumee, Ohio 43537
Phone: (419) 893-3141
Fax: (419) 893-0687
MDA #08046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED		APPROVED		APPROVED	
CHIEF ENGINEER		CHIEF ENGINEER		COMMANDER	
DATE: 8/27/10	PROJECT #: FJXT091076E2	SCALE: FULL	DRAWN BY: B. RUFF		DESIGNED BY: C. GOSHE

BLDG 721
SCHEDULES & DETAILS-HVAC

W-5023

SHT 18 OF 63

M721.1

HEATING PLANT CONTROL SEQUENCE

1. THE SYSTEM HEATING WATER LOOP PUMP RUNS CONTINUOUSLY. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). ON AN ADDITIONAL CALL FOR HEAT, ADDITIONAL BOILER RECIRCULATION PUMPS ARE STARTED AND THE BOILERS FIRE AND OUTPUT IS MODULATED TO MAINTAIN HOT WATER LOOP TEMPERATURE. REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH CONDENSING BOILERS WITH A FACTORY INSTALLED FLOW SWITCH. FLOW WILL BE PROVEN THROUGH DUAL FUEL BOILERS WITH A FIELD INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. DURING OCCUPIED HOURS THE HOT WATER LOOP TEMPERATURE SHALL BE 180 DEG. F TO PROVIDE FOR HV UNIT CURING. DURING UNOCCUPIED HOURS THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS. DUAL FUEL BOILER MIXING VALVES SHALL BE MODULATED TO MAINTAIN MINIMUM 140 DEG. F. RETURN WATER TEMPERATURE ENTERING BOILER.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER LOOP PUMPS ARE (2) PRIMARY AND (1) STANDBY. THE BAS WILL START THE STANDBY PUMP IF ONE OF THE PRIMARY PUMPS FAIL. PROVIDE AUTOMATIC LEAD/LAG CONTROL THROUGH THE BAS WITH WEEKLY ROTATION TO REVERSE ORDER OF PUMP OPERATION AND MAINTAIN EVEN RUN TIMES.

10. THE HEATING WATER LOOP PUMPS VARIABLE FREQUENCY DRIVES ARE MODULATED IN PARALLEL TO MAINTAIN SYSTEM DIFFERENTIAL PRESSURE SETPOINT. IF SYSTEM PRESSURE RISES ABOVE SETPOINT THE PUMP SPEED IS REDUCED UNTIL SETPOINT IS REACHED. IF PUMP SPEED HAS REACHED MINIMUM SETPOINT THE BYPASS VALVE IS MODULATED OPEN TO MAINTAIN SYSTEM PRESSURE. IF SYSTEM PRESSURE DROPS BELOW SETPOINT THE BYPASS VALVE IS MODULATED CLOSED AND THE PUMP SPEED IS INCREASED.

11. THE CONDENSING BOILERS SHALL BE LEAD BOILERS WHENEVER HOT WATER RETURN TEMPERATURE (HT-2) IS BELOW 140 DEG. F. PROVIDE AUTOMATIC LEAD/LAG ROTATION WITH WEEKLY ROTATION TO PROVIDE EVEN RUN TIME WHENEVER HOT WATER RETURN TEMPERATURE (HT-2) IS OVER 140 DEG. F.

12. PROVIDE INTERLOCK BETWEEN DUAL FUEL BOILERS AND COMBUSTION AIR FANS AND ITS ASSOCIATED MOTORIZED DAMPER. BOILERS SHALL NOT START UNTIL PROOF OF DAMPER OPENING.

13. CHANGEOVER FROM NATURAL GAS TO FUEL OIL ON DUAL FUEL BOILERS SHALL BE MANUAL. BOILER OPERATION TO BE SIMILAR IN BOTH MODES.

14. WHEN DUAL FUEL BOILERS ARE OPERATING IN FUEL OIL MODE, THE TRANSFER OIL PUMPS SHALL BE STARTED PRIOR TO BOILER FIRING TO ENSURE PROPER OIL FLOW TO BURNER.

15. ALARMS SHALL INCLUDE:
    A. PUMP FAILURE (EACH PUMP).
    B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
    C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
    D. BOILER FAILURE.
    E. LOW WATER RETURN TEMPERATURE (HT-4 & 6) (130 DEG. F. ADJ.)
    F. VFD FAULT (EACH PUMP)
    G. LOW GLYCOL LEVEL

16. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

HOT WATER UNIT HEATER CONTROL SEQUENCE

1. ON A CALL FOR HEAT FROM THE SPACE MOUNTED THERMOSTAT, THE UNIT HEATER CONTROL VALVE SHALL OPEN AND THE FAN SHALL CYCLE AS REQUIRED TO ACHIEVE SPACE TEMPERATURE SET POINT.

2. ONCE SPACE TEMPERATURE SET POINT IS ACHIEVED, THE CONTROL VALVES SHALL CLOSE AND THE UNIT FAN SHALL SHUT DOWN.

SUMMER VENTILATION SEQUENCE

1. MECHANICAL ROOM EXHAUST FAN (EF-1) TO CYCLE ON/OFF TO MAINTAIN ROOM THERMOSTAT SETPOINT.

2. INTERLOCK VENTILATION INTAKE AND EXHAUST DAMPER WITH EXHAUST FAN OPERATION.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE (EACH)		X					
BOILER ENABLE (EACH)			X			X	
BOILER MODULATION (EACH)	X						
BOILER ALARM STATUS (EACH)				X		X	
BOILER RECIRC PUMP START/STOP (EACH)			X				✳
BOILER B-6 & B-7 WATER FLOW				X		X	
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			
BOILER B-6 & B-7 MIXING VALVE	X						
BOILER B-6 & B-7 RETURN WATER TEMPERATURE		X					
COMBUSTION AIR INTAKE DAMPER (EACH)			X				
COMBUSTION AIR INTAKE DAMPER POSITION (EACH)				X			
COMBUSTION AIR FAN START/STOP (EACH)			X				
TRANSFER OIL PUMP START/STOP			X				
VFD PUMP CONTROL (EACH)	X		X				
VFD FEEDBACK SIGNAL (EACH)		X					
VFD RUNNING (EACH)				X			
VFD FAULT (EACH)				X		X	
HEATING SYSTEM DIFFERENTIAL PRESSURE		X					
HEATING SYSTEM BYPASS VALVE - CONTROL	X						
HEATING SYSTEM BYPASS VALVE - POSITION		X					
GLYCOL FILL SYSTEM LOW LEVEL				X		X	
BUILDING SCHEDULE					X		

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL FOR CONDENSING BOILER.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
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Maumee, Ohio 43537
Phone: (419) 893-3141
Fax: (419) 893-0687
MDA #06046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 721
BOILER DETAILS
RM 25 - HVAC

W-5023
SHT 27 OF 63
M721.10

HOT WATER UNIT HEATER SCHEDULE

TAG	LOCATION DWG	LOCATION ROOM	TYPE	CFM	EWT °F	LWT °F	MBH	P.G.	GPM	WTR PD (ft.)	VOLTAGE	HP	MAKE	MODEL	REMARKS
UH-1	M721.7	AIR COMPRESSOR ROOM	PROPELLER	210	180	160	6.8	*	0.8	0.80	115/1/60	16W	TRANE	S-A08	PROVIDE EXPLOSION PROOF MOTOR
UH-2	M721.7	PAINT BOOTH AREA	PROPELLER	1,000	180	160	52.3	*	5.3	0.23	115/1/60	1/20	TRANE	S-72	PROVIDE LINE VOLTAGE THERMOSTAT WITH UNIT. THERMOSTAT TO HAVE POSITIVE OFF.
UH-3	M721.6	MECH ROOM 25	PROPELLER	3,500	180	160	174	*	17.4	1.06	115/1/60	1/2	TRANE	S-240	PROVIDE LINE VOLTAGE THERMOSTAT WITH UNIT. THERMOSTAT TO HAVE POSITIVE OFF.

* SYSTEM CONTAINS PROPYLENE GLYCOL. CONCENTRATION TO MAINTAIN MINIMUM 10 DEG. F. FREEZE PROTECTION.

FAN SCHEDULE

TAG	LOCATION DWG	LOCATION SERVING	TYPE	CFM	SP (in.)	MOTOR HP	MOTOR RPM	MOTOR VOLTAGE	DRIVE	FAN RPM	SONES	ACCESSORIES CURB	ACCESSORIES SCREEN	ACCESSORIES CONTROL	ACCESSORIES DISC	ACCESSORIES B/D DMPR	OPER. WT. (lbs.)	MAKE	MODEL	REMARKS
CAF-1	M721.6	MECH ROOM 25	INLINE CENTRIFUGAL	6,670	0.375	1	1725	460/3/60	BELT	467	11.7	N.A.	N.A.	W/ B-6	YES	N.A.	600	GREENHECK	BSQ-300-10	*
CAF-2	M721.6	MECH ROOM 25	INLINE CENTRIFUGAL	6,670	0.375	1	1725	460/3/60	BELT	467	11.7	N.A.	N.A.	W/ B-7	YES	N.A.	600	GREENHECK	BSQ-300-10	*
EF-1	M721.6	MECH ROOM 25	INLINE CENTRIFUGAL	2,000	0.375	1/2	1725	120/1/60	BELT	1,218	12.3	N.A.	N.A.	T-STAT	YES	N.A.	120	GREENHECK	BSQ-140-5	**

* PROVIDE OUTLET GUARD, MOTOR GUARD, AND SPRING VIBRATION HANGERS. ** PROVIDE INLET GUARD, MOTOR GUARD, AND SPRING VIBRATION HANGERS.

LOUVER SCHEDULE

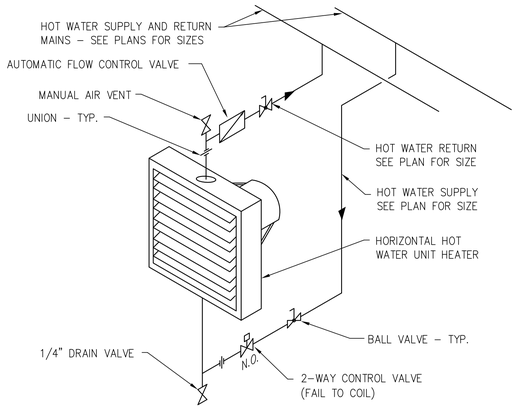
TAG	LOCATION DWG	LOCATION ROOM	SERVICE	TYPE	CFM	MIN. FREE AREA (sq. ft)	VELOCITY (FPM)	SP (in.)	SIZE WIDTH	SIZE HEIGHT	SIZE DEPTH	SCREEN TYPE	SCREEN LOCATION	FINISH	MAKE	MODEL	REMARKS
L-1	M721.6	MECH ROOM 25	COMBUSTION/VENT	DRAINABLE BLADE	8,670	8.83	980	0.15	6'-0"	3'-0"	6"	BIRD	INTERIOR	KYNAR	GREENHECK	ESD-603	COLOR TO MATCH BUILDING EXTERIOR
L-2	M721.6	MECH ROOM 25	VENTILATION	DRAINABLE BLADE	2,000	2.57	780	0.10	3'-0"	2'-0"	6"	BIRD	INTERIOR	KYNAR	GREENHECK	ESD-603	COLOR TO MATCH BUILDING EXTERIOR
L-3	M721.6	MECH ROOM 25	VENTILATION	DRAINABLE BLADE	- -	15.71	- -	- -	4'-0"	7'-0"	6"	BIRD	INTERIOR	KYNAR	GREENHECK	ESD-603	COLOR TO MATCH BUILDING EXTERIOR

LEGEND AND SYMBOLS

——HWS——	HEATING WATER SUPPLY
——HWR——	HEATING WATER RETURN
——HTWS——	HIGH TEMPERATURE HOT WATER SUPPLY
——HTWR——	HIGH TEMPERATURE HOT WATER RETURN
——CD——	CONDENSATE DRAIN
——NG——	NATURAL GAS PIPING (7"-14" w.c.)
——(E)XXX——	EXISTING PIPING (w/ SERVICE)
——►	DIRECTION OF FLOW

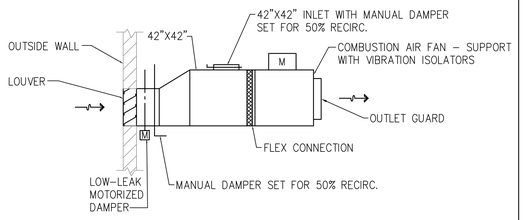
A.F.F.	ABOVE FINISHED FLOOR
N.A.	NOT APPLICABLE
G.C.	GENERAL CONTRACTOR
E.C.	ELECTRICAL CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
T.C.C.	TEMPERATURE CONTROL CONTRACTOR

	BALL VALVE
	CHECK VALVE (NON SLAM)
	GATE VALVE
	BUTTERFLY VALVE
	CIRCUIT SETTER (FLOW AS INDICATED)
	PRESSURE GAUGE (w/ RANGE)
	THERMOMETER (w/ RANGE)
	UNION
	"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
	RELIEF VALVE
	2-WAY CONTROL VALVE
	3-WAY MIXING VALVE
CS	CURRENT SWITCH
T	TEMPERATURE SENSOR
	FLOW SWITCH (FS)
	FLANGE
	TRIPLE DUTY VALVE
T	LINE VOLTAGE THERMOSTAT
	POINT OF CONNECTION
	POINT OF DISCONNECT



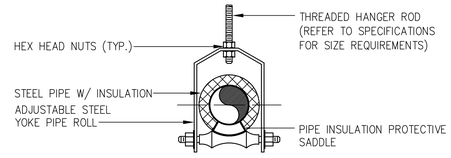
HOT WATER UNIT HEATER PIPING DETAIL

NO SCALE



COMBUSTION AIR FAN DETAIL

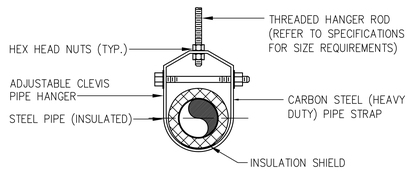
NO SCALE



STEEL YOKE PIPE ROLL HANGER DETAIL

NO SCALE

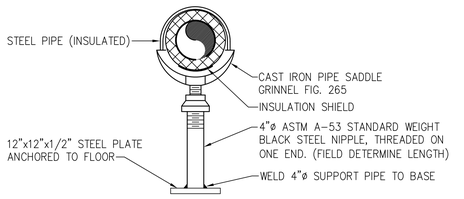
NOTES: 1. UTILIZE ROLL HANGER FOR ALL HEATING WATER PIPING 3 INCH DIAMETER AND LARGER.
2. UTILIZE ADJUSTABLE CLEVIS HANGER FOR PIPING 2 1/2 INCH DIAMETER AND SMALLER.



ADJUSTABLE CLEVIS PIPE HANGER DETAIL

NO SCALE

NOTES: 1. OVERSIZE CLEVIS HANGER AS REQUIRED TO ALLOW FOR INSULATING PIPING WITHIN HANGER.
2. UTILIZE ROLL HANGERS FOR ALL HEATING WATER PIPING 3 INCH DIAMETER AND LARGER.
3. PROVIDE PIPE INSULATION PROTECTIVE SHIELD FOR INSULATED PIPE.



FLOOR MOUNTED PIPE SUPPORT DETAIL

NO SCALE

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

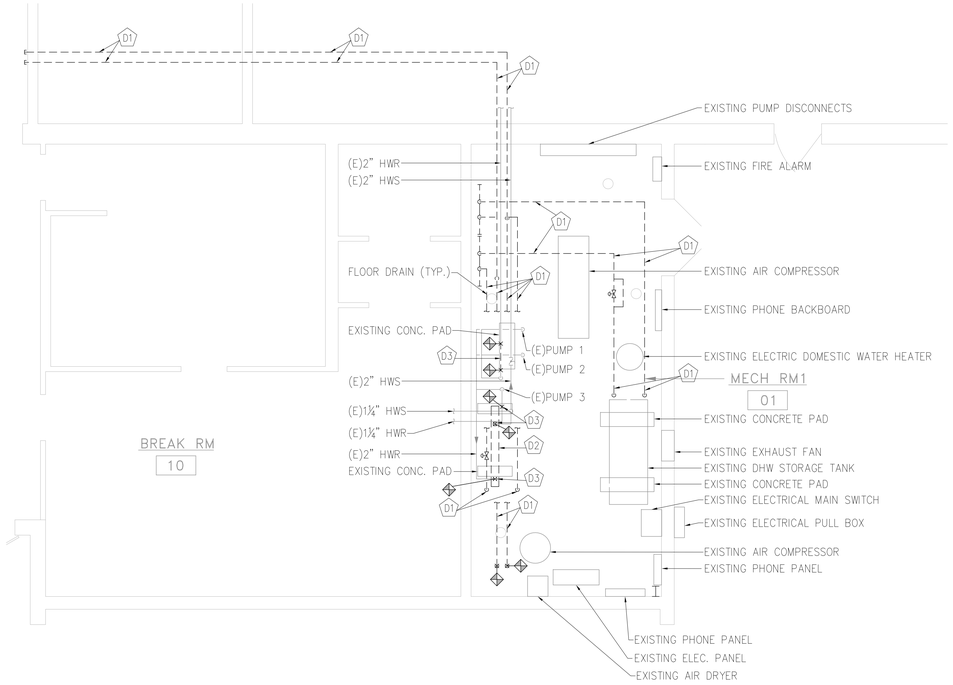
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 721
LEGEND
& DETAILS-HVAC

W-5023
SHT 19 OF 63
M721.2



ENLARGED MECHANICAL ROOM 01 – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

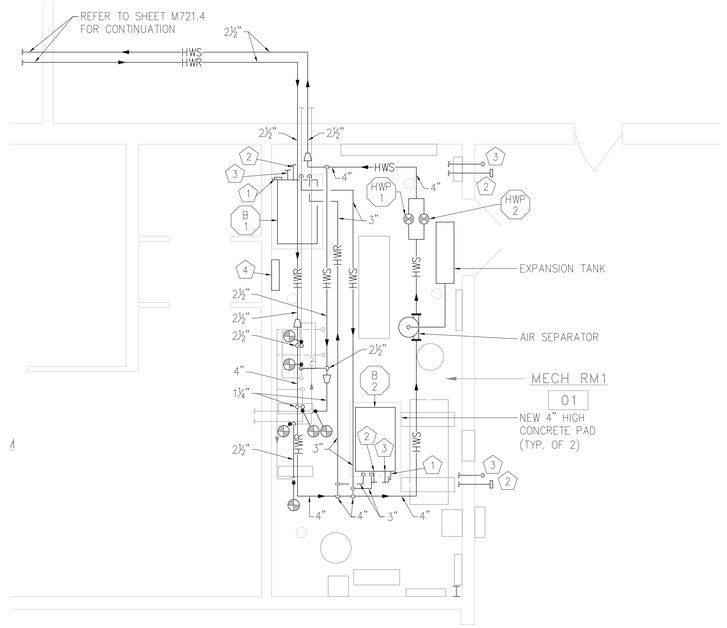
NORTH

ROOM 01 DEMOLITION NOTES

D1 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO SHUT-OFF VALVES AS INDICATED AND INSTALL BLIND FLANGES AND SEAL WATER TIGHT.

D2 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

D3 REMOVE EXISTING HWS AND HWR PIPING, HANGERS, VALVES, ETC. AS INDICATED.



ENLARGED MECHANICAL ROOM 01 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

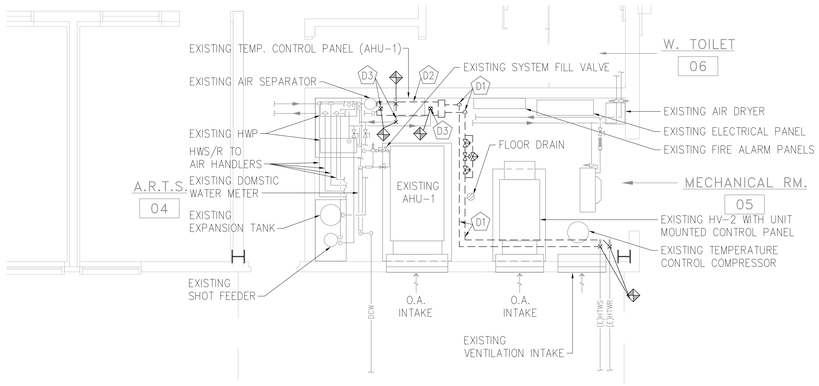
ROOM 01 REFERENCE NOTES

1 CONDENSATE PIPING TO BE ROUTED TO NEAREST FLOOR DRAIN. REFER TO FLOW DIAGRAM ON SHEET M721.8 FOR PIPING AND ROUTING REQUIREMENTS.

2 8" CPVC FLUE OUT SIDEWALL. REFER TO DETAIL ON SHEET M721.1.

3 8" PVC COMBUSTION AIR INTAKE OUT SIDEWALL. REFER TO DETAIL ON SHEET M721.1.

4 NEW TRANE "MP-581" AND "BCU" PANELS.



ENLARGED MECHANICAL ROOM 05 – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

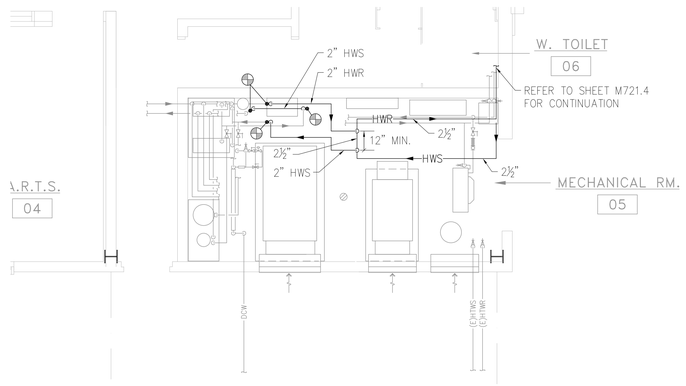
NORTH

ROOM 05 DEMOLITION NOTES

D1 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO SHUT-OFF VALVES AS INDICATED AND PROVIDE WELD CAPS AT VALVES.

D2 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

D3 REMOVE EXISTING HWS AND HWR PIPING, HANGERS, VALVES, ETC. AS INDICATED.



ENLARGED MECHANICAL ROOM 05 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

100% DESIGN

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Maumee, Ohio 43537
Phone: (419) 893-3141
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MDA #0946

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

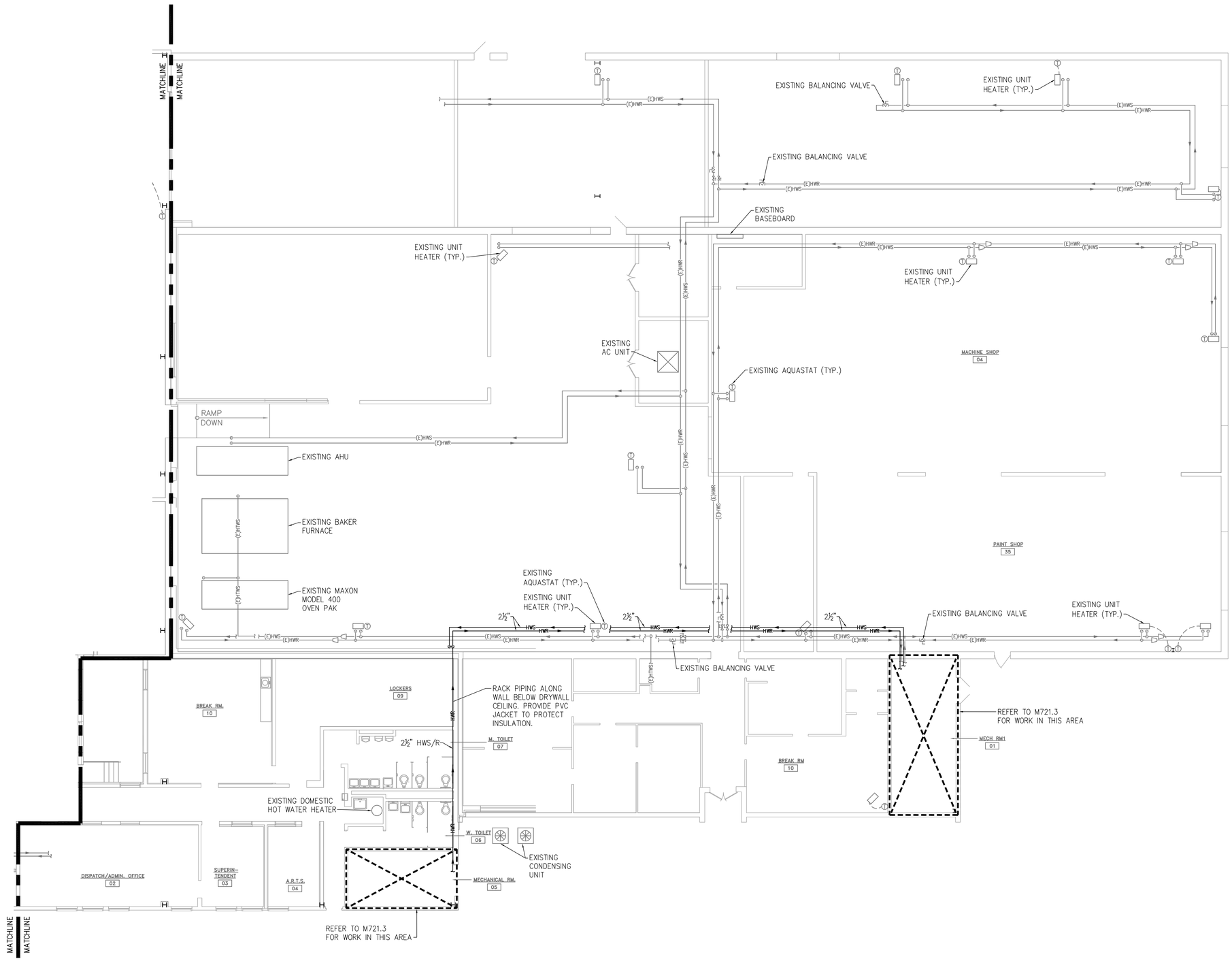
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 721
MECH ROOM
01/05 HVAC

W-5023

SHT 20 OF 63

M721.3



PARTIAL FLOOR PLAN (EAST BUILDING) – MECHANICAL

1/8" = 1'-0"

NORTH

100% DESIGN

mda engineering, inc.
Mechanical
Electrical and
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Maumee, Ohio 43537
Phone: (419) 893-3141
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MDA #08046

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

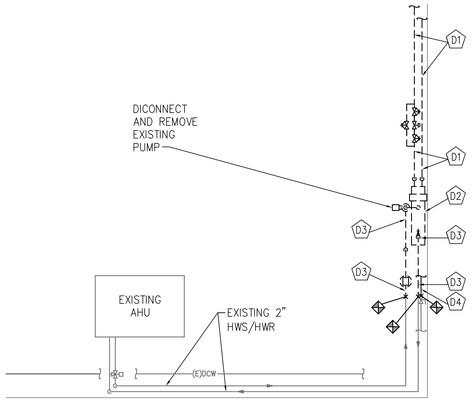
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'-0"	B. RUFF	C. GOSHE

BLDG 721
EAST FLOOR
PLAN – HVAC

W-5023

SHT 21 OF 63

M721.4



MEZZANINE PLAN DEMOLITION NOTES

(D1) REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC.

(D2) REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

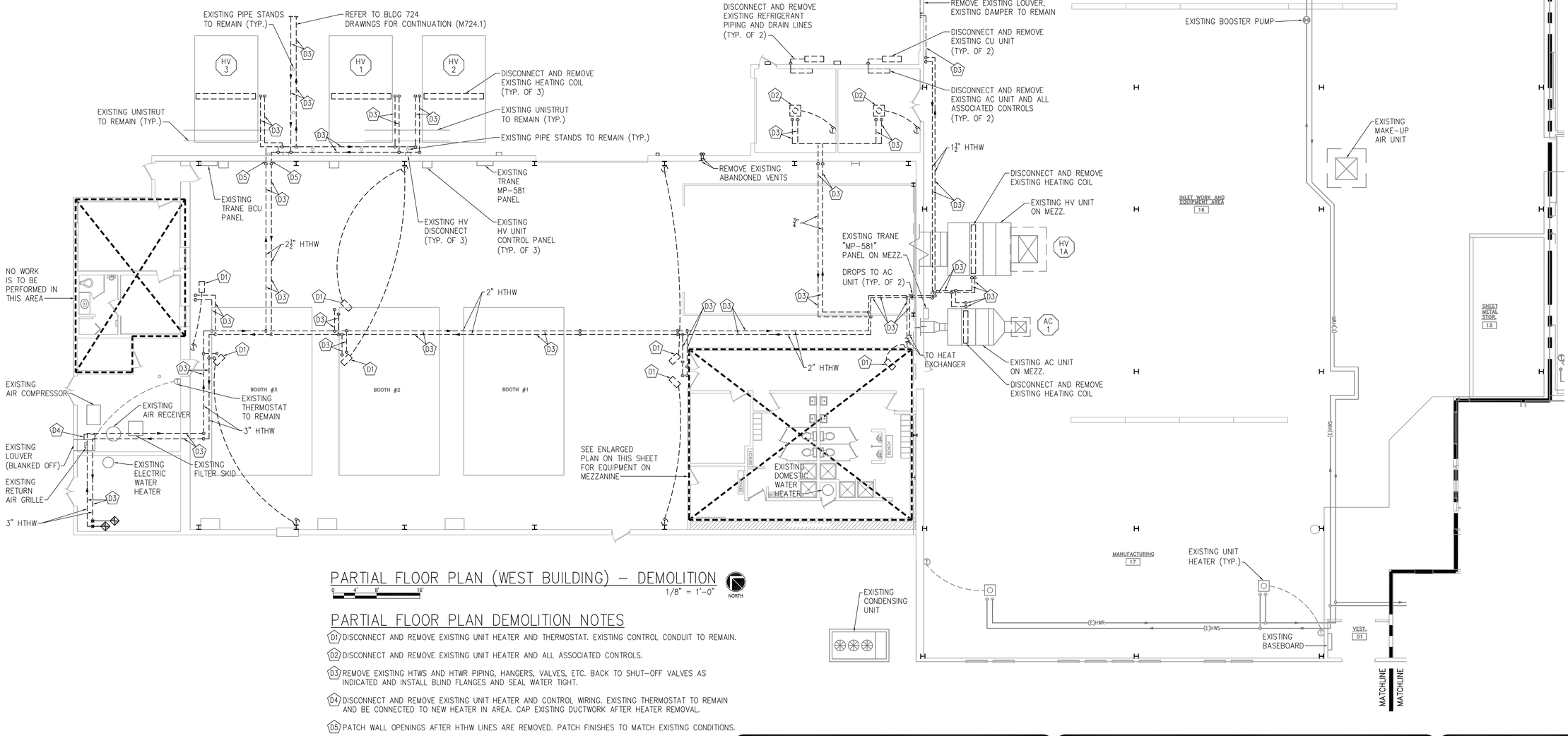
(D3) REMOVE EXISTING HWS AND HWR PIPING, HANGERS, VALVES, ETC. AS INDICATED.

(D4) DISCONNECT AND REMOVE EXISTING DCW BACK TO ¾" SHUTOFF VALVE AND CAP.

MEZZANINE PLAN – DEMOLITION

0 2' 4' 8' 1/4" = 1'-0"

NORTH



PARTIAL FLOOR PLAN (WEST BUILDING) – DEMOLITION

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

NORTH

PARTIAL FLOOR PLAN DEMOLITION NOTES

(D1) DISCONNECT AND REMOVE EXISTING UNIT HEATER AND THERMOSTAT. EXISTING CONTROL CONDUIT TO REMAIN.

(D2) DISCONNECT AND REMOVE EXISTING UNIT HEATER AND ALL ASSOCIATED CONTROLS.

(D3) REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO SHUT-OFF VALVES AS INDICATED AND INSTALL BLIND FLANGES AND SEAL WATER TIGHT.

(D4) DISCONNECT AND REMOVE EXISTING UNIT HEATER AND CONTROL WIRING. EXISTING THERMOSTAT TO REMAIN AND BE CONNECTED TO NEW HEATER IN AREA. CAP EXISTING DUCTWORK AFTER HEATER REMOVAL.

(D5) PATCH WALL OPENINGS AFTER HTHW LINES ARE REMOVED. PATCH FINISHES TO MATCH EXISTING CONDITIONS.

100% DESIGN

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MDA #09046

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	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

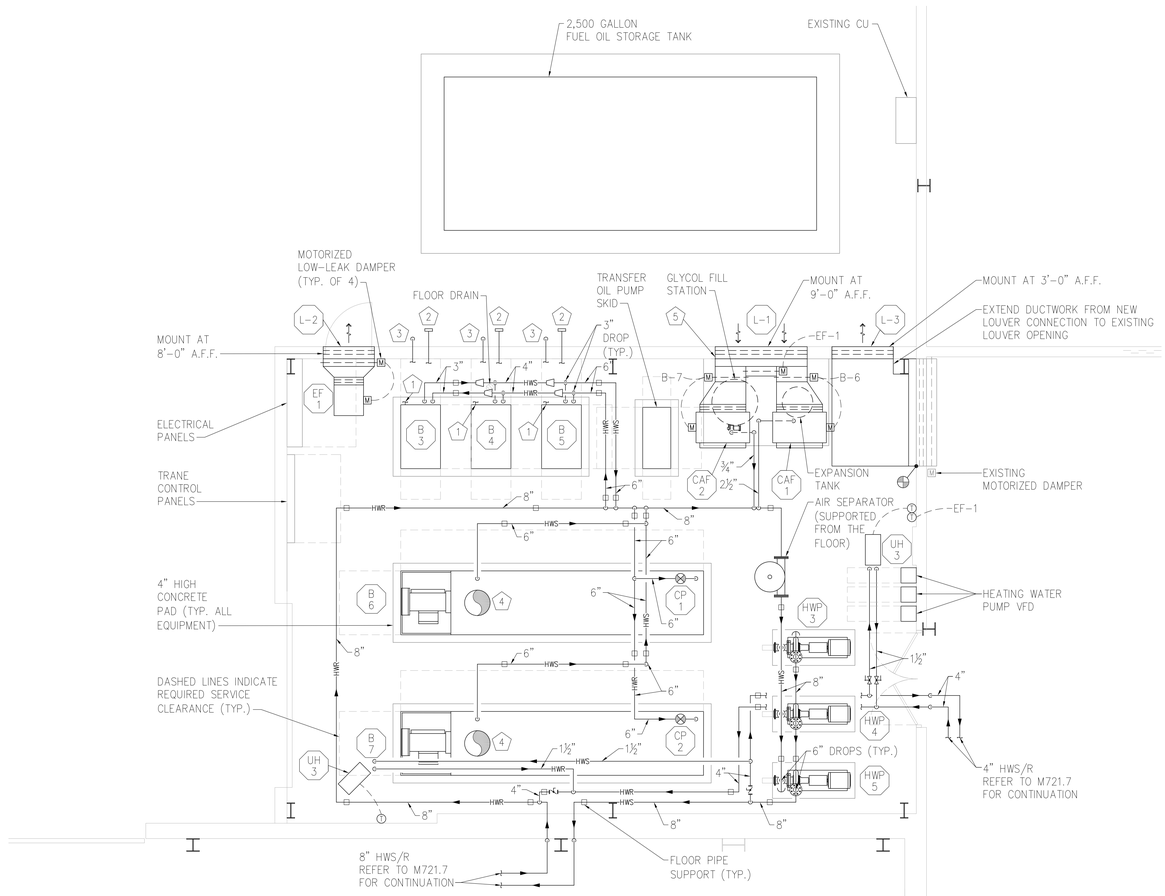
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'-0"	B. RUFF	C. GOSHE

BLDG 721
WEST DEMO
PLAN – HVAC

W-5023
SHT 22 OF 63
M721.5



ENLARGED MECHANICAL ROOM 25 – MECHANICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

NOTE:

1. THE BOILER SYSTEM WAS SIZED TO ALLOW A MAXIMUM OF TWO HV UNITS TO BE IN CURING (140°F LAT) MODE AT WINTER OUTDOOR DESIGN CONDITIONS. THE REMAINING HV UNITS MUST BE SET TO PROVIDE A MAXIMUM 72°F LAT.

DRAWING REFERENCE NOTES

1. CONDENSATE PIPING TO BE ROUTED TO NEAREST FLOOR DRAIN. REFER TO FLOW DIAGRAM ON SHEET M721.10 FOR PIPING AND ROUTING REQUIREMENTS.
2. 8" CPVC FLUE FROM CONDENSING BOILERS (B-3, B-4, AND B-5) AND OUT SIDEWALL. LOCATE AT MINIMUM 10'-0" AWAY FROM L-1. REFER TO DETAIL ON SHEET M721.1.
3. 8" PVC COMBUSTION AIR INTAKE FROM CONDENSING BOILERS (B-3, B-4, AND B-5) AND OUT SIDEWALL. REFER TO DETAIL ON SHEET M721.1.
4. 20" "PS" STACK UP THROUGH ROOF. REFER TO DETAIL ON SHEET M721.1.
5. PROVIDE 6" DEEP PLENUM BOX BEHIND LOUVER WITH (3) TAPS OFF BACK. PROVIDE (2) 2'-0" x 3'-0" TAPS WITH MOTORIZED DAMPER AND MANUAL BALANCING DAMPER FOR COMBUSTION AIR FAN CONNECTION. PROVIDE (1) 2'-0" x 3'-0" TAP WITH MOTORIZED DAMPER FOR VENTILATION AIR INTAKE.

100% DESIGN

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Fax: (419) 893-0687
MDA #2046

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

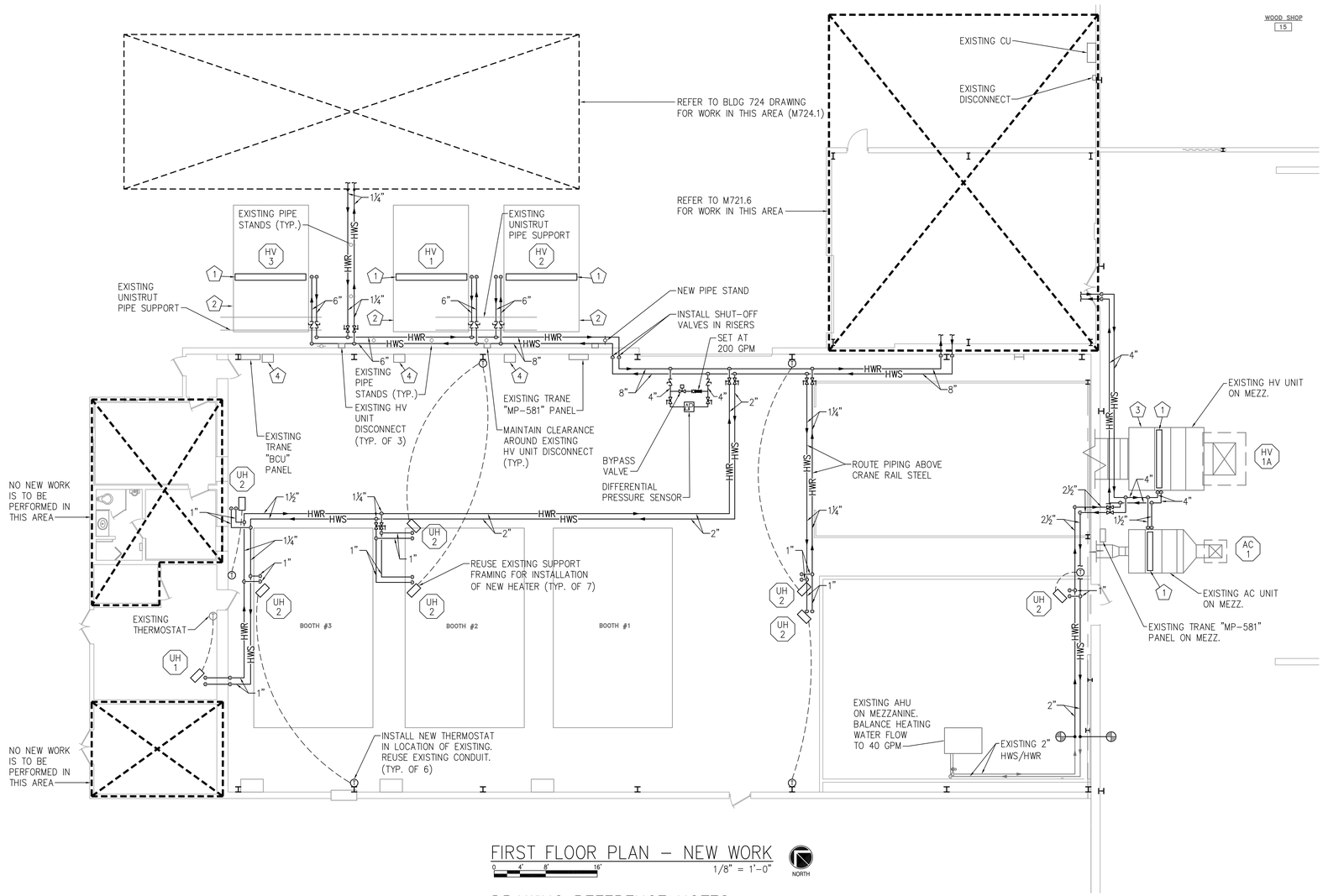
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 721
MECH ROOM
HVAC

W-5023

SHT 23 OF 63

M721.6



FIRST FLOOR PLAN – NEW WORK

0 4' 8' 16' 1/8" = 1'-0" NORTH

NOTE:

1. THE BOILER SYSTEM WAS SIZED TO ALLOW A MAXIMUM OF TWO HV UNITS TO BE IN CURING (140°F LAT) MODE AT WINTER OUTDOOR DESIGN CONDITIONS. THE REMAINING HV UNITS MUST BE SET TO PROVIDE A MAXIMUM 72°F LAT.

DRAWING REFERENCE NOTES

1. INSTALL NEW HEATING WATER COIL IN EXISTING UNIT CABINET. PROVIDE NEW/ADDITIONAL BASE RAILS, COIL CASING CAP, BLANK-OFF PANELS, ETC. AS REQUIRED TO ENSURE PROPER AIRFLOW ACROSS NEW COIL.
2. RESHEAVE FANS AS REQUIRED TO ACCOMMODATE ADDITIONAL COIL PRESSURE DROP AND REPLACE EXISTING 25 HP MOTOR WITH NEW 50 HP PREMIUM EFFICIENT MOTOR. CONTRACTOR TO VERIFY EXISTING AIRFLOW AND TSP OF UNIT PRIOR TO MODIFICATION. PROVIDE INFORMATION TO ORNL DESIGNATED REPRESENTATIVE FOR REVIEW.
3. RESHEAVE FANS AS REQUIRED TO ACCOMMODATE ADDITIONAL COIL PRESSURE DROP AND REPLACE EXISTING 10 HP MOTOR WITH NEW 30 HP PREMIUM EFFICIENT MOTOR. CONTRACTOR TO VERIFY EXISTING AIRFLOW AND TSP OF UNIT PRIOR TO MODIFICATION. PROVIDE INFORMATION TO ORNL DESIGNATED REPRESENTATIVE FOR REVIEW.
4. UPGRADE EXISTING HV UNIT CONTROL PANEL WITH LIKE COMPONENTS RATED FOR NEW SUPPLY FAN MOTOR INCLUDING VFD. COORDINATE WITH ELECTRICAL CONTRACTOR FOR REWIRING OF PANEL.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
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MDA #09046

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'-0"	B. RUFF	C. GOSHE

BLDG 721
NEW FLOOR PLAN – HVAC

W-5023
SHT 24 OF 63
M721.7

HEATING PLANT CONTROL SEQUENCES

1. THE SYSTEM LOOP PUMPS RUN CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE OR CALL FOR BUILDING REHEAT. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B-1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. ON ADDITIONAL CALL FOR HEAT, BOILER (B-2) IS STAGED ON. BOILERS OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED. PROVIDE AUTOMATIC LEAD/LAG CONTROL THROUGH THE BAS WITH WEEKLY ROTATION TO REVERSE ORDER OF FIRING TO MAINTAIN EVEN RUN TIMES.

3. FLOW WILL BE PROVEN THROUGH EACH BOILER SEPARATELY WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER LOOP PUMPS (HWP-1 AND HWP-2, PUMP-1 AND PUMP-2, P-1 AND P-1A) ARE PRIMARY AND STANDBY AND ARE NOT TO RUN SIMULTANEOUSLY. THE BAS WILL START THE STANDBY PUMP IF THE PRIMARY PUMP FAILS. PROVIDE AUTOMATIC LEAD/LAG CONTROL THROUGH THE BAS WITH WEEKLY ROTATION TO REVERSE ORDER OF PUMP OPERATION AND MAINTAIN EVEN RUN TIMES.

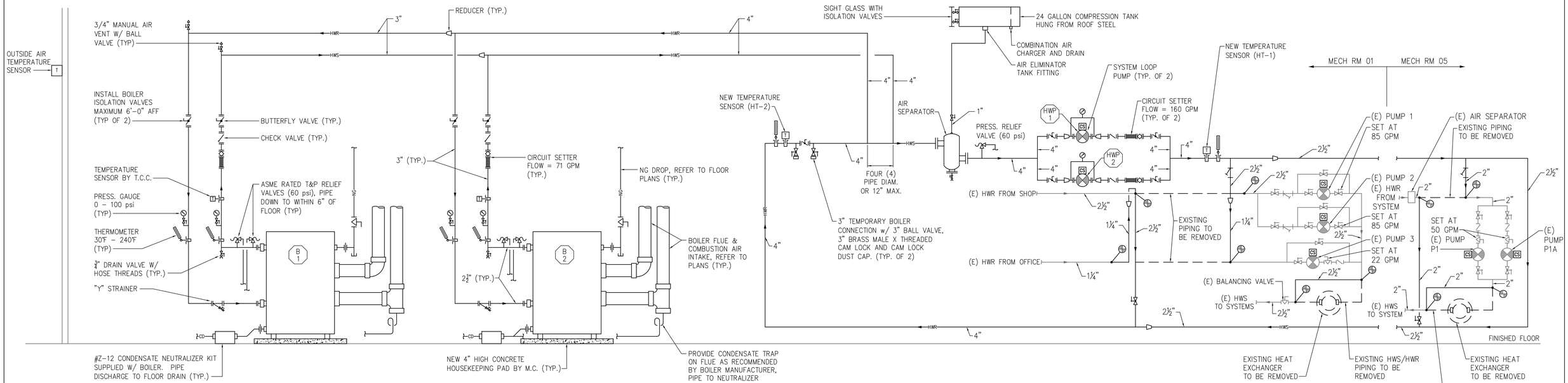
10. ALARMS SHALL INCLUDE:
    - A. PUMP FAILURE (EACH PUMP).
    - B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
    - C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
    - D. BOILER FAILURE.

11. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE (EACH)		X					
BOILER ENABLE (EACH)			X			X	
BOILER MODULATION (EACH)	X						
BOILER ALARM STATUS (EACH)				X		X	
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM - MECH ROOM 01/05

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

6. REPLENISH SYSTEM WITH PROPYLENE GLYCOL TO MAINTAIN FREEZE PROTECTION TO 10 DEG F.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road
Maumee, Ohio 43537
Phone: (419) 893-3141
Fax: (419) 893-0687
MDA #0946

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

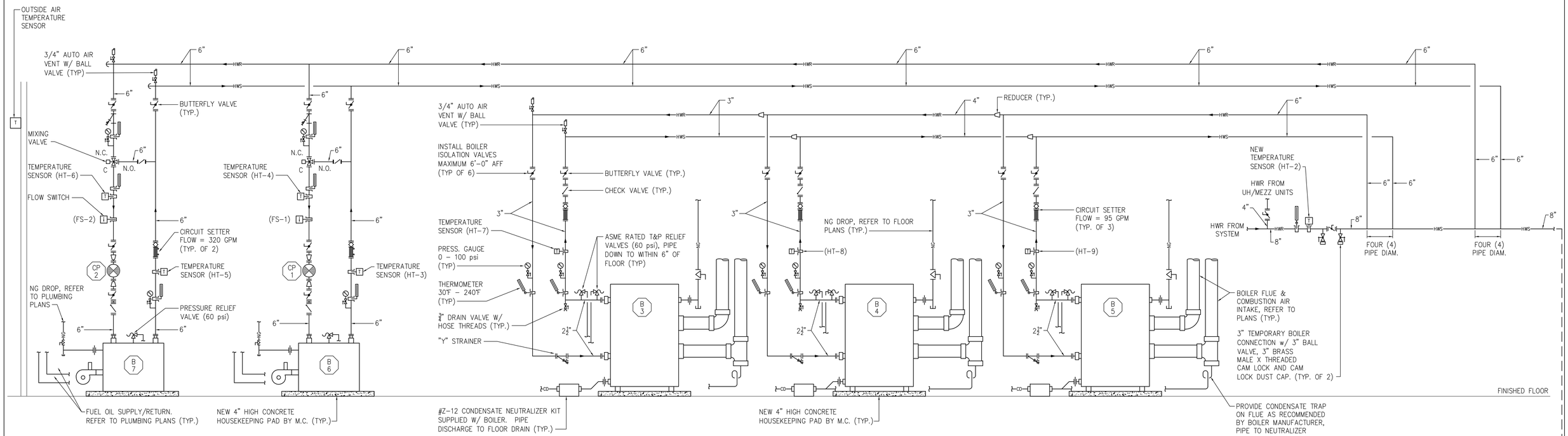
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

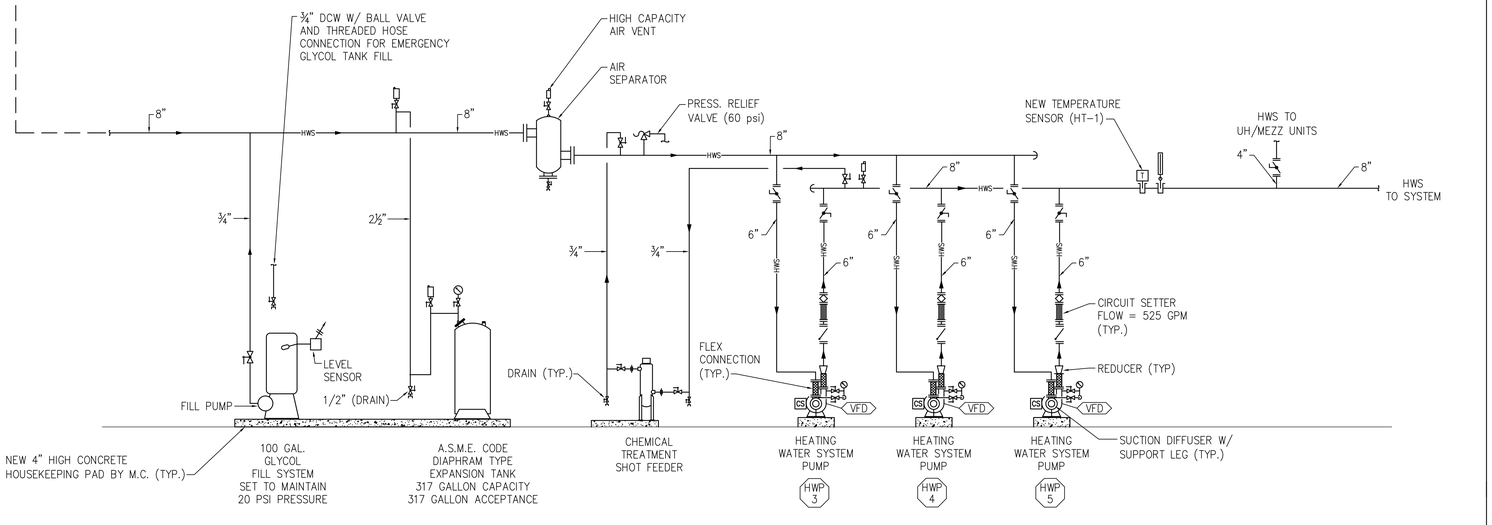
SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 721
BOILER DETAILS
RM 01/05-HVAC

W-5023 | SHT 25 OF 63 | M721.8





HOT WATER HEATING SYSTEM FLOW DIAGRAM

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.
2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.
3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.
4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.
5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.
6. FILL SYSTEM WITH PROPYLENE GLYCOL TO MAINTAIN FREEZE PROTECTION TO 10 DEG F.

NOTE:

1. THE BOILER SYSTEM WAS SIZED TO ALLOW A MAXIMUM OF TWO HV UNITS TO BE IN CURING (140°F LAT) MODE AT WINTER OUTDOOR DESIGN CONDITIONS. THE REMAINING HV UNITS MUST BE SET TO PROVIDE A MAXIMUM 72°F LAT.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #06046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

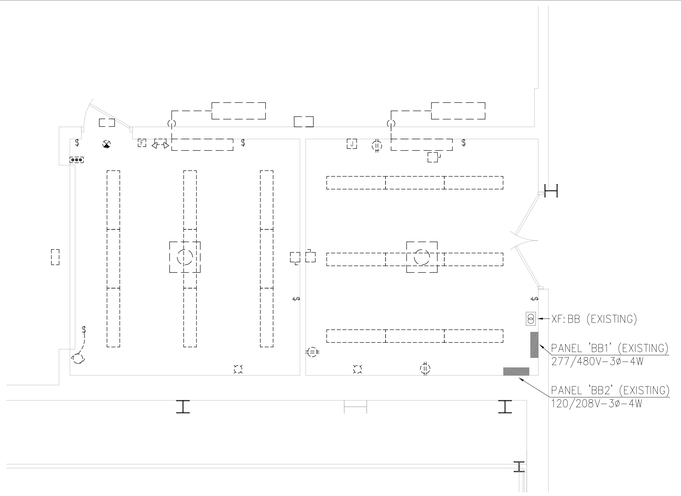
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 721
BOILER DETAILS
RM 25 - HVAC

W-5023
SHT 26 OF 63
M721.9

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
MSP	PACKAGED MOTOR STARTER PANEL FURNISHED WITH EQUIPMENT, BUILT-IN SAFETY DISCONNECT. WIRING TO LINE TERMINALS BY E.C.
VFD	VARIABLE FREQUENCY DRIVE (VFD) FURNISHED BY M.C., BUILT-IN SAFETY DISCONNECT. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	30A MANUAL MOTOR STARTER SWITCH, HORSEPOWER RATED WITH OVERLOADS, PILOT LIGHTED, NEMA 1 ENCLOSURE ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	COMBINATION MAGNETIC MOTOR STARTER, NEMA SIZE 1, THREE-PHASE, FVNR, NEMA 1 ENCLOSURE, FUSED AT 20 AMPS, HORSEPOWER RATED, FUSED CONTROL TRANSFORMER, H-O-A MAINTAINED SELECTOR SWITCH, P.T.T. PILOT LIGHT.
30	30A, 600V, 3 POLE HEAVY DUTY INDOOR NON-FUSED SAFETY DISCONNECT, NEMA 1 ENCLOSURE.
100	100A, 600V, 3 POLE HEAVY DUTY OUTDOOR NON-FUSED SAFETY DISCONNECT, NEMA 3R ENCLOSURE.
	EXISTING CIRCUIT BREAKER PANELBOARD; CHALLENGER PM2, 120/208V-3ø-4W.
	CIRCUIT BREAKER PANELBOARD; 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
	45KVA DRY TYPE DISTRIBUTION TRANSFORMER, 480V PRIMARY, 208Y/120 SECONDARY, 150°C. MOUNT ON WALL ABOVE PANEL 'A1'. SUPPORT TO WALL AND TO STRUCTURE ABOVE.
	DUPLEX RECEPTACLE, GROUNDING TYPE, NEMA 5-20R, 20A-120V, 48" A.F.F., SURFACE MOUNTED.
3 $	3-WAY WALL SWITCH, 20A-120/277V, SURFACE MOUNTED U.N.O.; M.H. 48" A.F.F.
FA	FIRE ALARM SYSTEM COMBINATION VISUAL SIGNAL AND AUDIBLE HORN, CLEAR LENS; M.H. 80" A.F.F. U.N.O., 'WP' INDICATES WEATHERPROOF CONNECT TO EXISTING SYSTEM.
MNS	MASS NOTIFICATION SYSTEM VISUAL SIGNAL AND AUDIBLE SPEAKER, AMBER LENS; M.H. 80" A.F.F. U.N.O., 'WP' INDICATES WEATHERPROOF CONNECT TO EXISTING SYSTEM.
	EMERGENCY EXIT SIGN, 120/277V, THERMOPLASTIC BLACK HOUSING, RED LETTERS, LED LAMPS, NO LAMP HEADS, SINGLE FACE, UNIVERSAL MOUNTING, HIGH-OUTPUT LEAD-CALCIUM BATTERY, 90 MIN. OPERATION, WITH OUTPUT CAPACITY FOR REMOTE HEAD, TEST SWITCH AND AC-ON INDICATOR. CONNECT TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING. LITHONIA #LHQM-S-R-HO-RO OR EQUAL.
	REMOTE WEATHERPROOF EMERGENCY EGRESS LIGHT, 12W SEALED BEAM HALOGEN, TAN, POWERED FROM EXIT SIGN OR EMERGENCY UNIT AS INDICATED. LITHONIA #ELA-TN OR EQUAL.
F1	1'x4' SURFACE INDUSTRIAL LIGHT FIXTURE WITH 2-32W T8 4100'K FLUORESCENT LAMPS WITH WIRE GUARD. LITHONIA #2EJA-2-32-MVOLT-WG OR EQUAL.
F1X	1'x4' SURFACE INDUSTRIAL LIGHT FIXTURE WITH 2-32W T8 4100'K FLUORESCENT LAMPS, 90-MINUTE BATTERY BACK-UP AND WIRE GUARD. (SWITCHED OPERATION) WIRE ENTIRE FIXTURE TO LOCAL LIGHTING CIRCUIT FOR NORMAL OPERATION AND EMERGENCY OPERATION UPON LOSS OF POWER. LITHONIA #2EJA-2-32-MVOLT-WG-EL OR EQUAL.
XX	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



FIRST FLOOR PLAN – MECHANICAL ROOM 25 – DEMOLITION

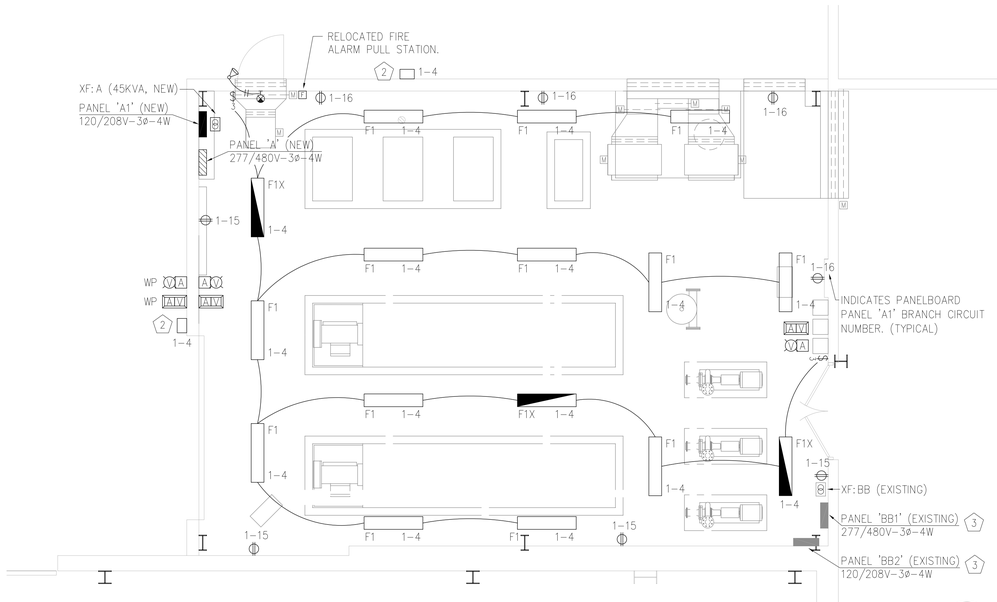
0 2' 4' 8'

1/4" = 1'-0"

NORTH

GENERAL NOTES – DEMOLITION:

1. DISCONNECT AND REMOVE ALL DEVICES, FIXTURES, JUNCTION BOXES, ETC. SHOWN WITH A DARK DASHED LINE WITHIN THE AREA OF PROPOSED DEMOLITION WORK.
2. THE INTENT OF THIS PROJECT IS TO REMOVE ALL EQUIPMENT, WIRING, RACEWAY, ETC. NO LONGER IN SERVICE AND NOT REQUIRED FOR THE ULTIMATE INSTALLATION WITHIN THE CONFINES OF THE PROPOSED WORK. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE SITE.



FIRST FLOOR PLAN – NEW MECHANICAL ROOM 25 – LIGHTING AND POWER (1)

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

(1) E.C. TO COORDINATE FINAL LIGHT FIXTURE LOCATION WITH M.C.

(2) EXISTING PHOTOCELL CONTROLLED EXTERIOR LIGHT TO BE RELOCATED ON TO NEW EXTERIOR WALL. CLEAN AND RE-LAMP. (2 TOTAL)

(3) PROVIDE NEW TYPED UPDATED PANEL DIRECTORY.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 721
MECH ROOM
LIGHTING & POWER

W-5023

SHT 52 OF 63

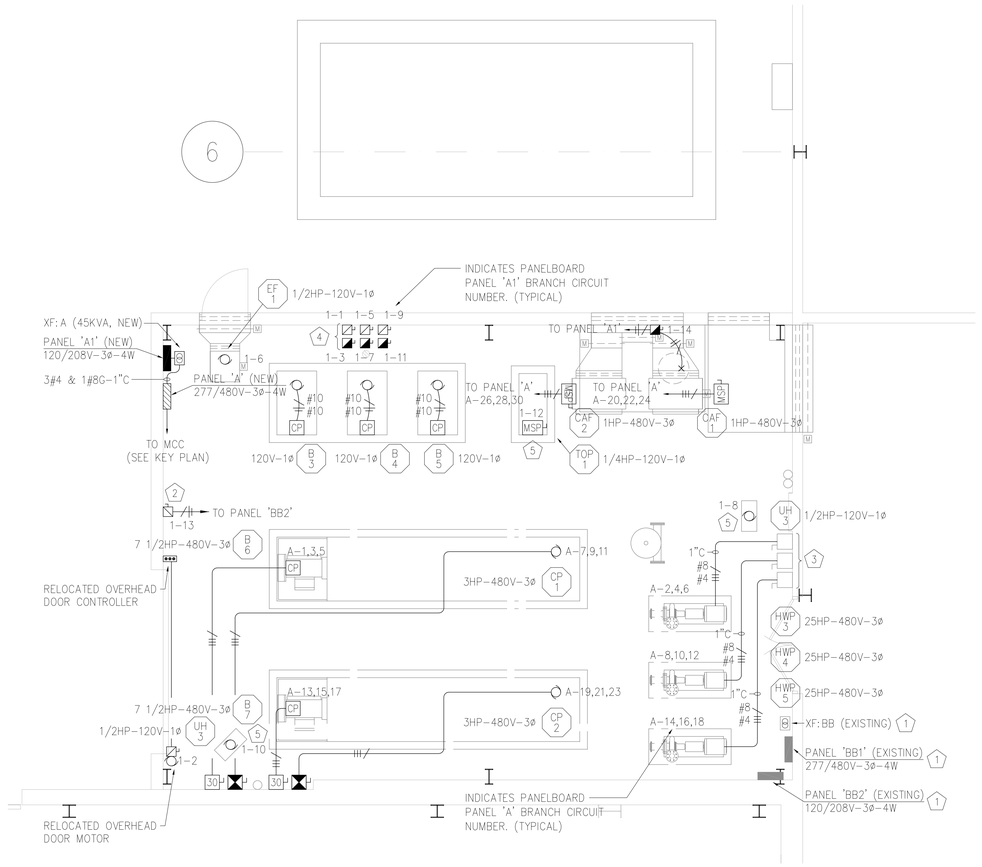
E721.1

PANEL: 'A1' (NEW)							LOCATION: MECHANICAL ROOM 25						
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	HEATER (B-3)	30ASP	2520			1	2	1000			20ASP	OVERHEAD DOOR	
	HEATER PUMP (B-3)	30ASP		1680		3	4		928		20ASP	LIGHTS	
	HEATER (B-4)	30ASP			2520	5	6			1176	20ASP	EXHAUST FAN (EF-1)	
	HEATER PUMP (B-4)	30ASP	1680			7	8	1176			20ASP	UNIT HEATER EAST (UH-3)	
	HEATER (B-5)	30ASP		2520		9	10		1176		20ASP	UNIT HEATER WEST (UH-3)	
	HEATER PUMP (B-5)	30ASP			1680	11	12			800	20ASP	TRANSFER OIL PUMP (TOP-1)	
	TRANE PANEL	20ASP	500			13	14	864			20ASP	GLYCOL PUMP	
1.	RECEPTACLES	20ASP		720		15	16		720		20ASP	RECEPTACLES	1.
	SPARE	20ASP				17	18				20ASP	SPARE	
	SPARE	20ASP				19	20				20ASP	SPARE	
	SPARE	20ASP				21	22				20ASP	SPARE	
	SPARE	20ASP				23	24				20ASP	SPARE	
	–	SPACE				25	26				SPACE	–	
	–	SPACE				27	28				SPACE	–	
	–	SPACE				29	30				SPACE	–	
SUB-TOTAL PER ø			4700			øA		3040			TOTAL PER ø		7740
				4920		øB			2824				7744
					4200	øC				1976			6176
MOUNTING		SURFACE									TOTAL CONNECTED (VA)		21660
LUGS OR CIRCUIT BREAKER		125A M.C.B.									TOTAL CONNECTED (AMPS)		60.1
BUS RATING (AMPERES) & TYPE		150A – CU									FEEDER: 4#1/0 & 1#6G-2"C		
VOLTAGE		120/208V-3ø-4W									OPTIONS:		

PANEL: 'A' (NEW)							LOCATION: MECHANICAL ROOM 25						
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	BOILER #6 (B-6)	20A3P	3050			1	2	9418			70A3P	HOT WATER PUMP #3 (HWP-3)	
				3050		3	4		9418				
					3050	5	6			9418			
	RECIRC PUMP #1 (CP-1)	15A3P	1330			7	8	9418			70A3P	HOT WATER PUMP #4 (HWP-4)	
				1330		9	10		9418				
					1330	11	12			9418			
	BOILER #7 (B-7)	20A3P	3050			13	14	9418			70A3P	HOT WATER PUMP #5 (HWP-5)	
				3050		15	16		9418				
					3050	17	18			9418			
	RECIRC PUMP #2 (CP-2)	15A3P	1330			19	20	582			15A3P	COMBUSTION AIR FAN #1 (CAF-1)	
				1330		21	22		582				
					1330	23	24			582			
	SPARE	15A3P				25	26	582			15A3P	COMBUSTION AIR FAN #2 (CAF-2)	
						27	28		582				
						29	30			582			
	SPARE	20A3P				31	32	6740					
						33	34		7744		70A3P	XF: A	
						35	36			6176			
	–	SPACE				37	38				SPACE	–	
	–	SPACE				39	40				SPACE	–	
	–	SPACE				41	42				SPACE	–	
SUB-TOTAL PER ø			8760			øA		36158			TOTAL PER ø		44918
				8760		øB			37162				45922
					8760	øC				35594			44354
MOUNTING		SURFACE									TOTAL CONNECTED (VA)		135194
LUGS OR CIRCUIT BREAKER		250A M.L.O.									TOTAL CONNECTED (AMPS)		162.6
BUS RATING (AMPERES) & TYPE		250A – CU									FEEDER: 4#3/0 & 1#6G-2"C		
VOLTAGE		277/480V-3ø-4W									OPTIONS:		

PANELBOARD SCHEDULE NOTES:

1. GFCI CIRCUIT BREAKER.



FIRST FLOOR PLAN – NEW MECHANICAL ROOM 25 – ELECTRICAL

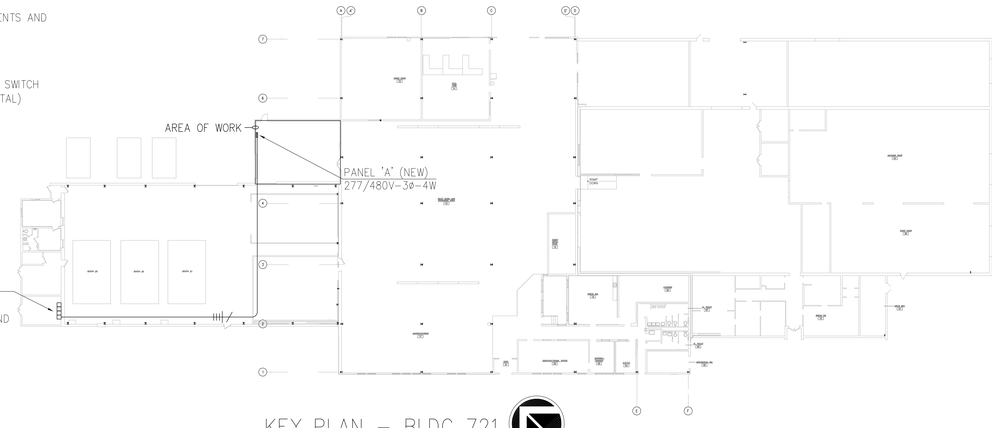
0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. EXISTING PANELS AND TRANSFORMER TO REMAIN.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.
3. PROVIDE 3#4 & 1#8G-1"C FROM PANEL 'A' TO VFD (BY M.C.). (3 TOTAL)
4. PROVIDE 2#10 & 1#10G-3/4"C FROM PANEL 'BB2' TO SAFETY DISCONNECT SWITCH AND FROM SAFETY DISCONNECT SWITCH TO BOILER CONTROL PANEL. (6 TOTAL)
5. PROVIDE 2#12 & 1#12G-3/4"C TO NEW PANEL 'A1'.



KEY PLAN – BLDG 721

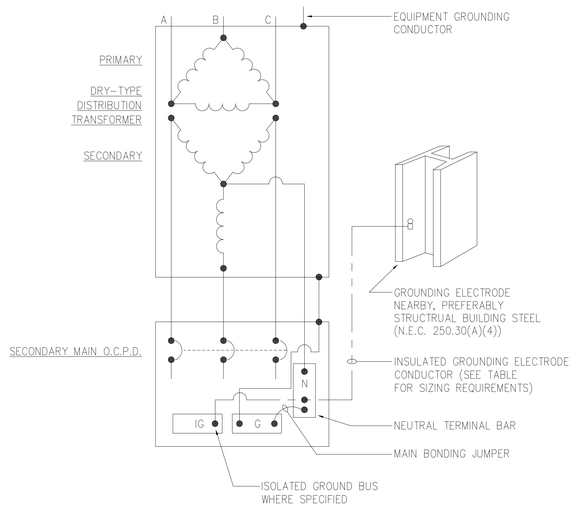
0 5 10 20 30 feet

1/30" = 1'-0"

NORTH

GROUNDING ELECTRODE CONDUCTOR SIZING REFERENCE N.E.C. TABLE 250.66	
SIZE OF TRANSFORMER SECONDARY PHASE CONDUCTORS (AWG)	REQUIRED INSULATED GROUNDING ELECTRODE CONDUCTOR (AWG)
2 OR SMALLER	8
1 OR 1/0	6
2/0 OR 3/0	4
OVER 3/0 THROUGH 350KCMIL	2
OVER 350KCMIL THROUGH 600KCMIL	1/0

NOTE: TABLE IS BASED ON COPPER CONDUCTORS ONLY



GROUNDING ARRANGEMENT FOR A SEPARATELY DERIVED SYSTEM (N.E.C. EXHIBIT 250.14)

NO SCALE

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-0141 Fax: (419) 893-0687
MDA #0946

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

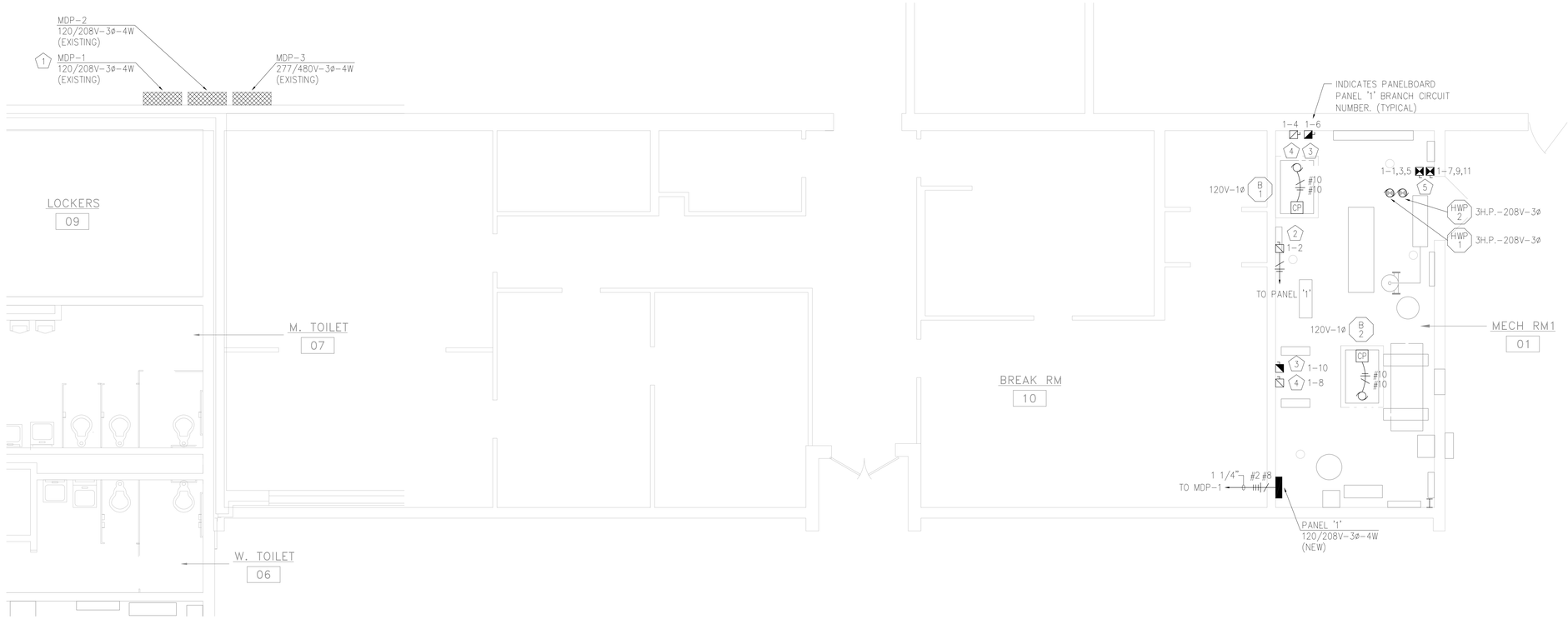
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT09107GE2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 721
MECH ROOM
ELECTRICAL

W-5023

SHT 53 OF 63

E721.2



PANEL: '1' (NEW)							LOCATION: MECHANICAL ROOM 01						
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	HOT WATER PUMP #1 (HWP-1)	20A3P	1320			1	2	500			20ASP	TRANE PANEL	
				1320		3	4		1320		15ASP	HEATER (B-1)	
					1320	5	6			1656	25ASP	HEATER PUMP (B-1)	
	HOT WATER PUMP #2 (HWP-2)	20A3P	1320			7	8	1320			15ASP	HEATER (B-2)	
				1320		9	10		1656		25ASP	HEATER PUMP (B-2)	
					1320	11	12				20ASP	SPARE	
	SPARE	20ASP				13	14				20ASP	SPARE	
	SPARE	20ASP				15	16				20ASP	SPARE	
	SPARE	20ASP				17	18				20ASP	SPARE	
	–	SPACE				19	20				SPACE	–	
	–	SPACE				21	22				SPACE	–	
	–	SPACE				23	24				SPACE	–	
	–	SPACE				25	26				SPACE	–	
	–	SPACE				27	28				SPACE	–	
	–	SPACE				29	30				SPACE	–	
SUB-TOTAL PER ø			2640			øA		1820			TOTAL PER ø		4460
				2640		øB			2976				5616
					2640	øC				1656			4296
MOUNTING		SURFACE									TOTAL CONNECTED (VA)		14372
LUGS OR CIRCUIT BREAKER		100A M.L.O.									TOTAL CONNECTED (AMPS)		39.9
BUS RATING (AMPERES) & TYPE		100A – CU									FEEDER: 4#2 & 1#8G-1 1/4"C		
VOLTAGE		120/208V-3ø-4W									OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

FIRST FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. FURNISH AND INSTALL ONE (1) NEW 100A3P CIRCUIT BREAKER IN EXISTING PANEL SPACE. PROVIDE EMBOSSED PLASTIC LAMINATE LABEL FOR NEW CIRCUIT BREAKER IN MDP-1 WESTINGHOUSE PRL4 PANELBOARD.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.
3. FURNISH AND INSTALL 2#10 & 1#10G-3/4"C TO NEW 25ASP CIRCUIT BREAKER IN PANEL '1' AND TO NEW HEATER PUMP. (2 TOTAL)
4. FURNISH AND INSTALL 2#12 & 1#12G-3/4"C TO NEW 15ASP CIRCUIT BREAKER IN PANEL '1' AND TO NEW HEATER. (2 TOTAL)
5. FURNISH AND INSTALL 3#12 & 1#12G-3/4"C TO NEW 20A3P CIRCUIT BREAKER IN PANEL '1' AND TO NEW HOT WATER PUMP. (2 TOTAL)

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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MDA #0946

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

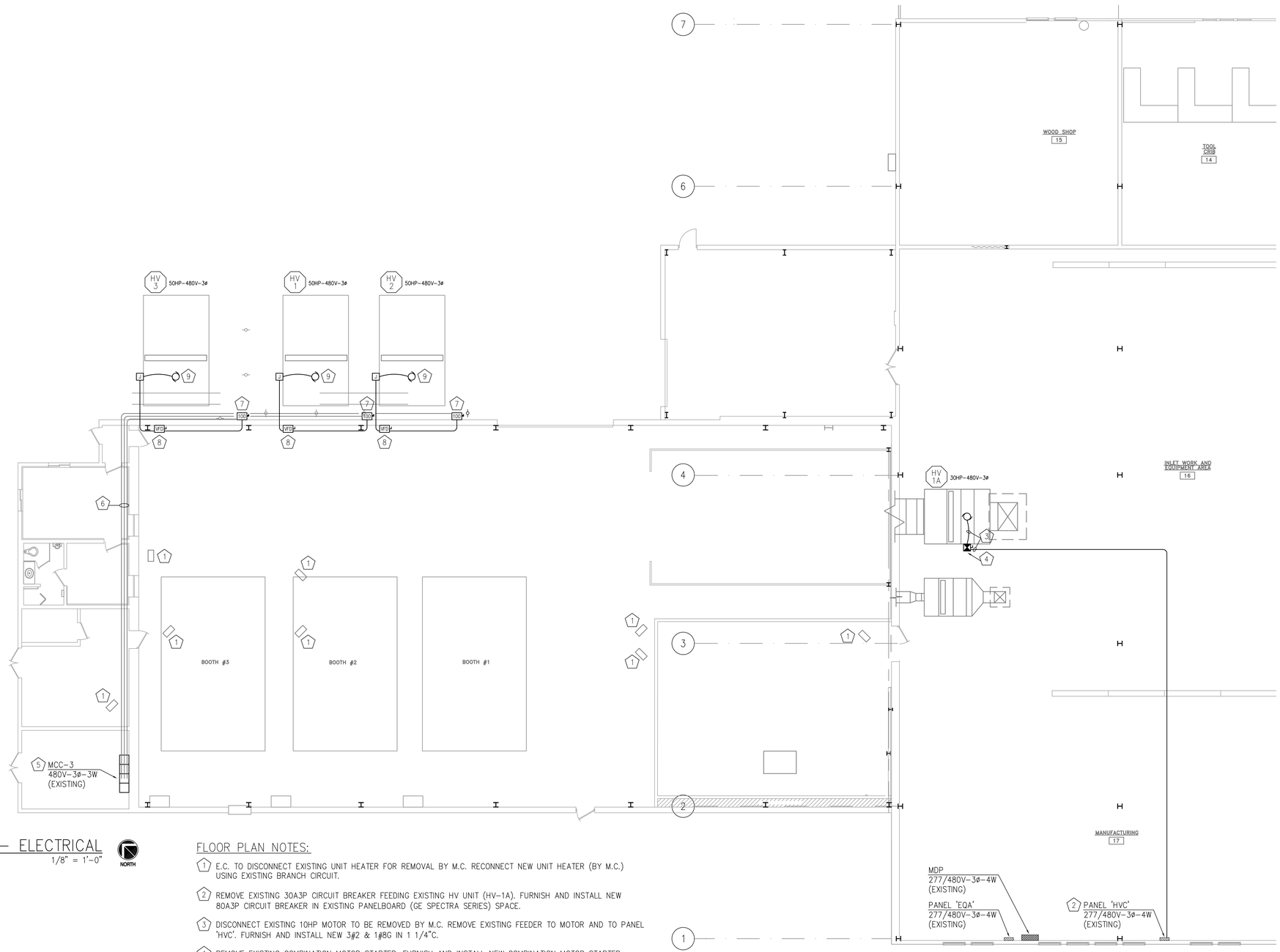
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 721
MECH ROOM 01
ELECTRICAL

W-5023 | SHT 54 OF 63 | E721.3



FIRST FLOOR PLAN – ELECTRICAL

0 4' 8' 16'

1/8" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. E.C. TO DISCONNECT EXISTING UNIT HEATER FOR REMOVAL BY M.C. RECONNECT NEW UNIT HEATER (BY M.C.) USING EXISTING BRANCH CIRCUIT.
2. REMOVE EXISTING 30A3P CIRCUIT BREAKER FEEDING EXISTING HV UNIT (HV-1A). FURNISH AND INSTALL NEW 80A3P CIRCUIT BREAKER IN EXISTING PANELBOARD (GE SPECTRA SERIES) SPACE.
3. DISCONNECT EXISTING 10HP MOTOR TO BE REMOVED BY M.C. REMOVE EXISTING FEEDER TO MOTOR AND TO PANEL 'HVC'. FURNISH AND INSTALL NEW 3#2 & 1#8G IN 1 1/4"C.
4. REMOVE EXISTING COMBINATION MOTOR STARTER. FURNISH AND INSTALL NEW COMBINATION MOTOR STARTER, NEMA SIZE 3 WITH 60AMP FUSES, HAND-OFF-AUTO AND REQUIRED AUXILIARY CONTACTS.
5. REMOVE EXISTING 60A CIRCUIT BREAKERS FEEDING EXISTING HV UNITS (HV-1, HV-2 & HV-3). FURNISH AND INSTALL NEW 100A CIRCUIT BREAKERS IN EXISTING MCC-3 (CUTLER HAMMER FREEDOM 2100 SERIES) SPACE.
6. REMOVE EXISTING CONDUCTORS FROM EXISTING SAFETY DISCONNECT BACK TO MCC-3 FEEDING HV UNITS (HV-1, HV-2 & HV-3). FURNISH AND INSTALL NEW 3#2 & 1#8G IN EXISTING 1 1/4"C FROM NEW 100A CIRCUIT BREAKER TO NEW 100A SAFETY DISCONNECT. (TYPICAL FOR 3 HV UNITS)
7. REMOVE EXISTING SAFETY DISCONNECT SWITCH. FURNISH AND INSTALL NEW 100A SAFETY DISCONNECT SWITCH. FURNISH AND INSTALL 3#2 & 1#8G-1 1/4"C TO NEW VFD (BY M.C.).
8. REMOVE EXISTING VFD. INSTALL NEW VFD, FURNISHED BY M.C. FURNISH AND INSTALL 3#2 & 1#8G IN 1 1/4"C TO JUNCTION BOX MOUNTED ON HV UNIT. VFD START-UP SERVOCES BY M.C.
9. DISCONNECT EXISTING 25HP MOTOR TO BE REMOVED BY M.C. FURNISH AND INSTALL NEW 3#2 & 1#8G IN 1 1/4"C FROM JUNCTION BOX MOUNTED ON HV UNIT TO NEW 50HP MOTOR (BY M.C.).

100% DESIGN

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MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 721
WEST PLAN
ELECTRICAL

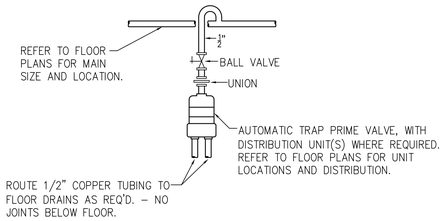
W-5023

SHT 55 OF 63

E721.4

LEGEND AND SYMBOLS

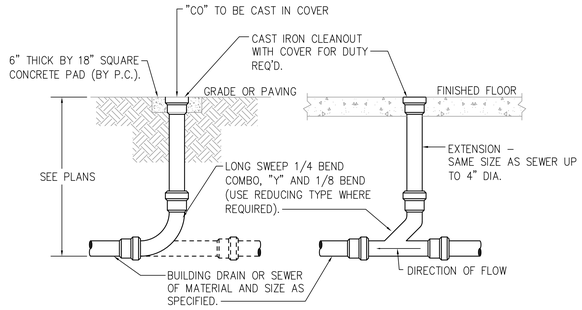
DCW	DOMESTIC COLD WATER PIPING – ABOVE GROUND		PIPE REDUCER
NG (2 psi)	NATURAL GAS PIPING (2 psi)	CO	CLEANOUT
NG	NATURAL GAS PIPING (7" –14" w.c.)	FD	FLOOR DRAIN
FOS	FUEL OIL SUPPLY PIPING	V	VENT
FOR	FUEL OIL RETURN PIPING	VTR	VENT THROUGH ROOF
FP	FIRE PROTECTION PIPING		BALL VALVE
SAN	SANITARY WASTE PIPING – BELOW GROUND		GAS VALVE
	SANITARY VENT PIPING		HOSE BIBB
IW	INDUSTRIAL WASTE PIPING – BELOW GROUND		UNION
ST	STORM PIPING – ABOVE GROUND	ATP	AUTOMATIC TRAP PRIMER
(E)XXX	EXISTING PIPING w/ SERVICE		"Y" STRAINER
	FLOW DIRECTION		CHECK VALVE
			PRESSURE GAUGE w/ RANGE
			TEMPERATURE AND PRESSURE RELIEF VALVE
			ANTI SIPHON VALVE
			AUTOMATIC SHUT–OFF VALVE
			POINT OF CONNECTION
			POINT OF DISCONNECT



AUTOMATIC TRAP PRIMER DETAIL

NO SCALE

NOTE: TRAP PRIMERS SHALL BE LOCATED ABOVE LAY–IN CEILINGS OR UNFINISHED AREAS ONLY.

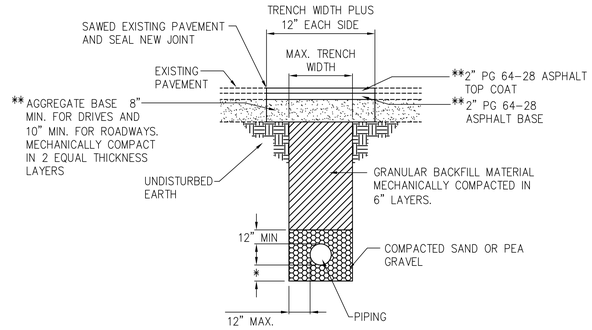


EXTERIOR GRADE CLEANOUT
(HEAVY TRAFFIC AREA)

INTERIOR FLOOR CLEANOUT
NOTE: FOR CARPETED AREAS USE CLEANOUT WITH CHROME PLATED CARPET MARKER.

DETAIL OF CLEANOUTS

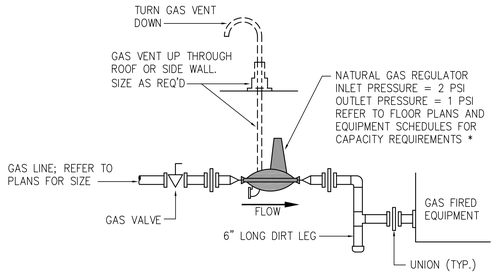
NO SCALE



TRENCH DETAIL IN ASPHALT PAVEMENT

NO SCALE

* INDICATES 4" MINIMUM TYPICAL (6" IN ROCK)
** INDICATES MINIMUM THICKNESS FOR AGGREGATE BASE AND ASPHALT PAVEMENT. REQUIRED THICKNESS SHALL NOT BE LESS THAN EXISTING AGGREGATE BASE THICKNESS AND EXISTING ASPHALT PAVEMENT THICKNESS.

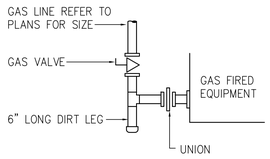


GAS REGULATOR AND CONNECTION DETAIL – BOILERS 6 & 7

NO SCALE

GENERAL NOTES (PLUMBING):

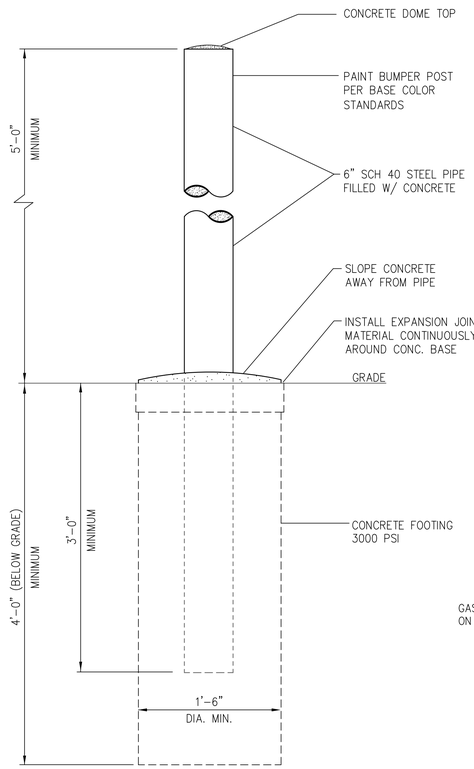
1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. ALL WORK SHALL FOLLOW THE 2006 INTERNATIONAL PLUMBING CODE AND ALL APPROPRIATE DOVER AIR FORCE BASE STANDARDS.
5. ALL WORK CONTAINED WITHIN THE PLUMBING DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
6. ALL PIPING PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH WALL FIRE RATING.
7. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
8. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN PLUMBING SYSTEMS, INTO THE DOVER AFB SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AIR FORCE BASE, MR. LEE DI SALVO, 302–677–6840.
9. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING DOMESTIC WATER, SANITARY AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.



GAS CONNECTION DETAIL – BOILERS 1–5

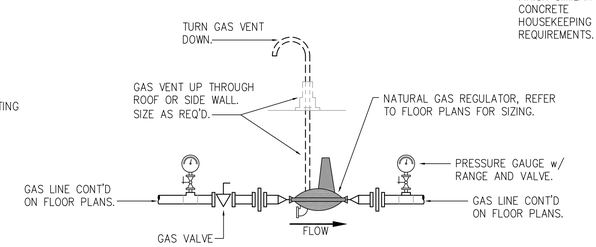
NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE



BOLLARD POST DETAIL

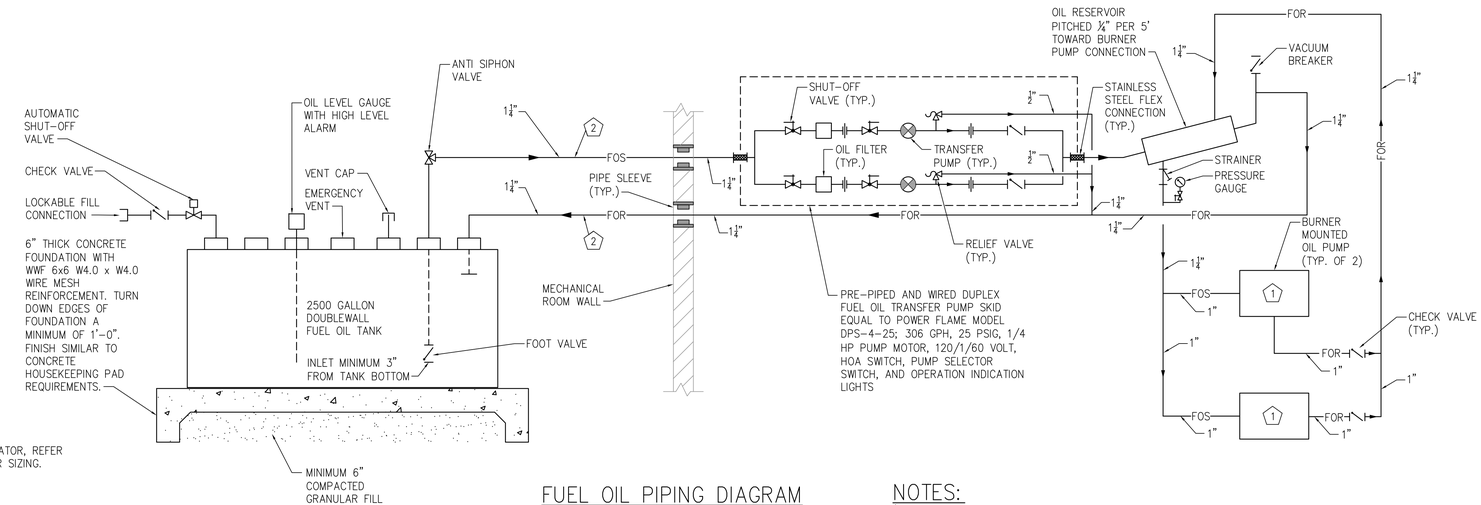
NO SCALE



REFER TO FLOOR PLANS FOR GAS LINE SIZE AND PRESSURE.

TYPICAL GAS REGULATOR DETAIL – BOILERS 3–5

NO SCALE



FUEL OIL PIPING DIAGRAM

NO SCALE

NOTE:
DOVER AFB SHALL BE RESPONSIBLE FOR FILLING OF OIL TANKS FOR COMMISSIONING AS WELL AS FINAL TOP OFF OF TANKS AT PROJECT TURN OVER. THIS CONTRACTOR TO COORDINATE SCHEDULING OF FUEL OIL DELIVERY WITH DOVER AFB.

NOTES:

1. OIL PUMP SUPPLIED WITH BOILER. FIELD VERIFY CONFIGURATION AND CONNECTION REQUIREMENTS WITH BOILER MANUFACTURER.
2. PAINT ALL EXTERIOR PIPING WITH 1 COAT OF PRIMER AND 2 COATS OF ENAMEL PAINT.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #29946

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

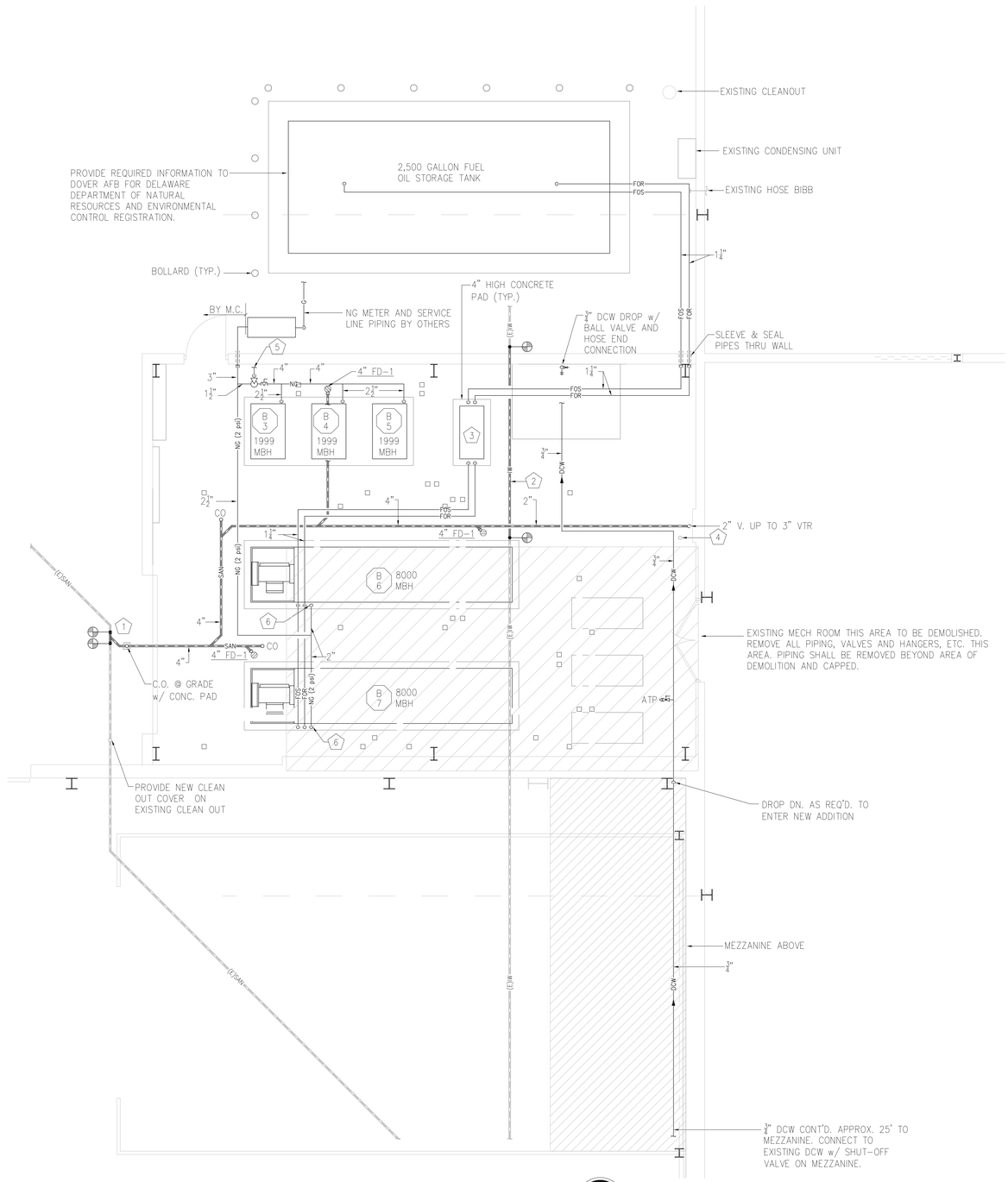
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 721
LEGEND, NOTES & DETAILS – PLBG

W–5023

SHT 10 OF 63

P721.1



ENLARGED MECHANICAL ROOM 25 – PLUMBING

0 2' 4' 8"

1/4" = 1'-0"

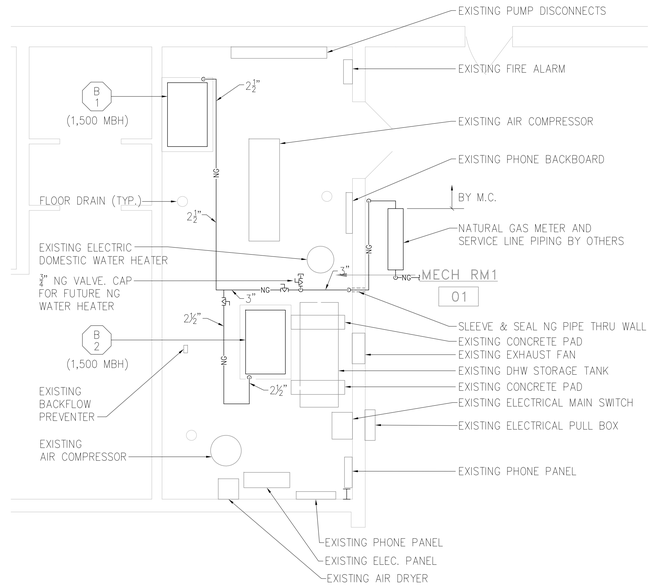
NORTH

DRAWING REFERENCE NOTES

1. CONNECT NEW SAN TO EXISTING SAN THIS AREA. FIELD VERIFY EXACT LOCATION & INVERT.
2. REPLACE EXISTING 6" INDUSTRIAL WASTE PIPING WITH NEW 6" SCHEDULE 40 PVC PIPE FOR NEW MECHANICAL ROOM CONSTRUCTION.
3. FUEL OIL PUMP SKID.
4. EXISTING STORM DROP TO BE REMOVED AND CAPPED BELOW FINISHED FLOOR OF NEW ADDITION.
5. NG REGULATOR: 2 PSIG INLET – 7" w.c. OUTLET; SET FOR 5997 MBH. PIPE VENT TO EXTERIOR A MINIMUM 10'-0" FROM AIR INTAKES.
6. NG DROP TO BOILER w/ REGULATOR. REFER TO DETAIL ON SHEET P721.1.

PLUMBING SPECIALTIES, FLOOR DRAINS SCHEDULE

DESCRIPTION	SYMBOL		DCW	DHW	WASTE	VENT	SPECIFICATIONS
Floor Cleanout	○	CO	---	---	Refer to Dwg's.	---	Zurn #ZN-1400 "Level-Trol" Adjustable Floor Cleanout with Dura-Coated cast iron body with gas and water-tight ABS tapered, thread plug, and scoriated polished nickel-bronze cover and plate adjustable to finished floor.
Floor Drain	⊕	FD-1	---	---	4"	---	Zurn Model #ZN-415-B-P floor drain with coated cast-iron body, bottom outlet, combination invertible membrane clamp and adjustable collar, 6" round polished nickel bronze strainer and trap primer connection.

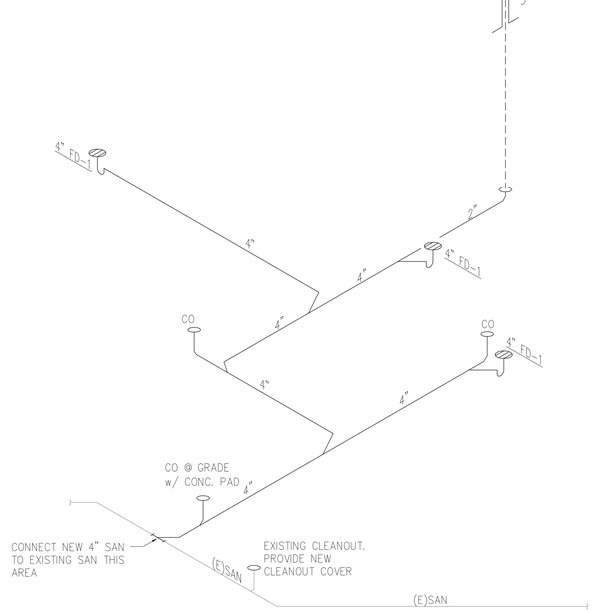


ENLARGED MECHANICAL ROOM 01 – PLUMBING

0 2' 4' 8"

1/4" = 1'-0"

NORTH



SANITARY WASTE AND VENT ISOMETRIC

NO SCALE

100% DESIGN

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Mechanical Electrical and Telecommunications Engineers
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MDA #06046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT09107GE2	1/4" = 1'-0"	A. CRAFT	S. SIMON

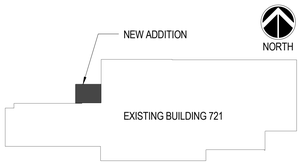
BLDG 721
MECH ROOM
01/25 PLUMBING

W-5023

SHT 11 OF 63

P721.2

KEY PLAN



FLOOR PLAN NOTES

1. INDICATES NEW WALLS. 8" WALL GIRT W/ METAL SIDING AT EXTERIOR AND METAL LINER PANEL AT INTERIOR.

2. EXISTING OVERHEAD DOOR TO BE REMOVED AND REINSTALLED IN NEW ADDITION. FIELD VERIFY HEIGHT & WIDTH.

3. EXISTING PERSONNEL DOOR TO BE REMOVED FROM EXISTING MECHANICAL ROOM AND REINSTALLED IN NEW ADDITION. RE-USE EXISTING HARDWARE. NOTIFY ORNL DESIGNATED REPRESENTATIVE OF ANY DEFICIENCIES IN EXISTING EQUIPMENT.

4. EXISTING DOORS TO REMAIN.

5. INDICATES LIMITS OF EXISTING MECHANICAL ROOM CONCRETE SLAB. SLAB IS TO REMAIN EXCEPT WHERE DEMOLITION IS REQUIRED FOR NEW FOOTINGS OR UTILITIES. SEE STRUCTURAL AND MECHANICAL DRAWINGS.

6. NEW CONC. RAMP WITH FLARED SIDES. SLOPE TO BE 1:12. SEE DETAIL 9/A721.2.

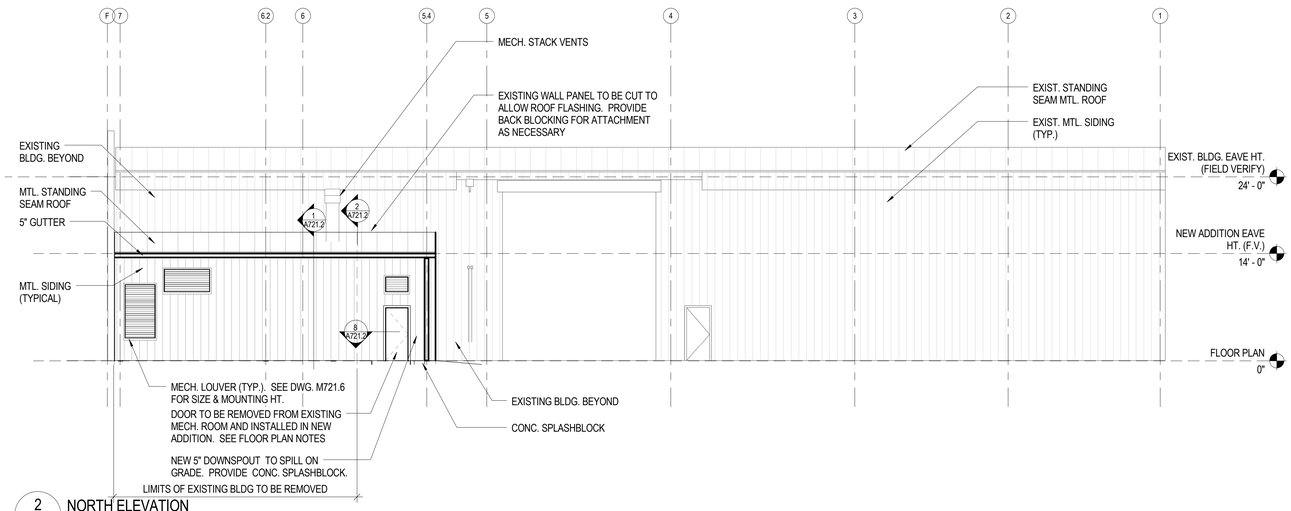
7. MECHANICAL LOUVERS. SEE M721.6 FOR SIZE AND MOUNTING HTS.

8. 5'-0" x 5'-0" CONCRETE STOOP. SEE DETAIL 10/A721.2

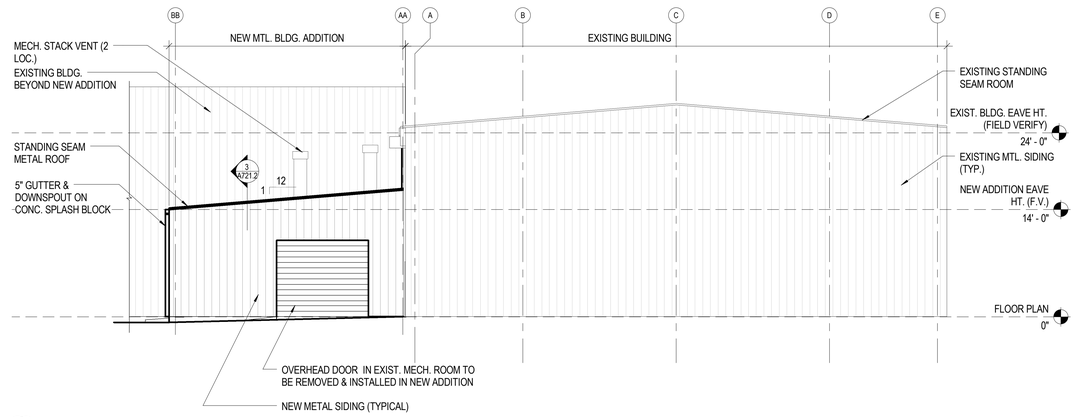
9. CONCRETE SPLASHBLOCK AT DOWNSPOUTS (TYPICAL)

10. EXISTING ASPHALT TO BE CUT AND DISPOSED OF AS REQUIRED FOR NEW CONSTRUCTION AND UTILITIES. PATCH CUT AREAS OR AREAS DAMAGED AS A RESULT OF IMPLEMENTATION ACTIVITY TO MATCH EXISTING ASPHALT. PROVIDE MIN. 2% POSITIVE SLOPE AWAY FROM ADDITION.

1 A721.1 FLOOR PLAN
1/4" = 1'-0"



2 A721.1 NORTH ELEVATION
1/8" = 1'-0"



3 A721.1 WEST ELEVATION
1/8" = 1'-0"

100% DESIGN

benefield · richters
architecture planning landscape architecture
516 union avenue
knoxville, tn 37902
865.637.7009

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	GC	GR
	18Jun10	ISSUED FOR 95% REVIEW	GC	GR

UPA PROJECTS

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

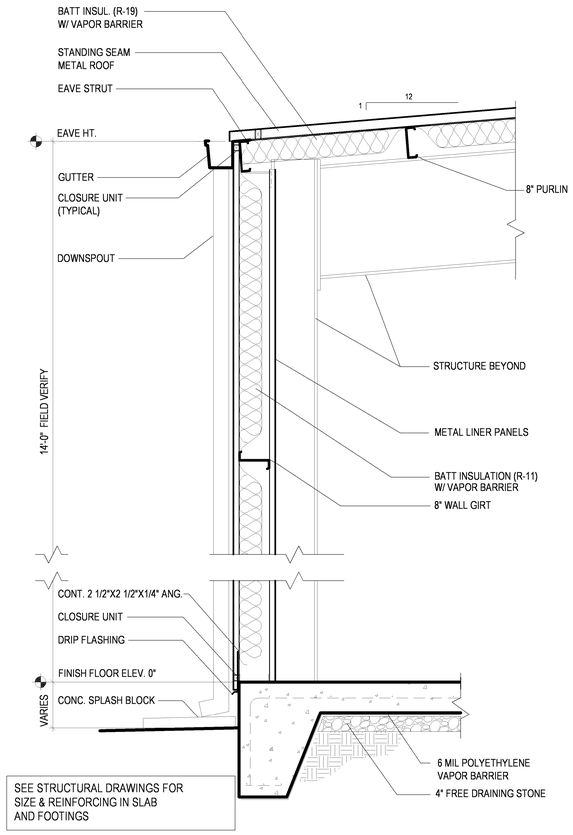
SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED	G. CAMPBELL	G. RICHTERS

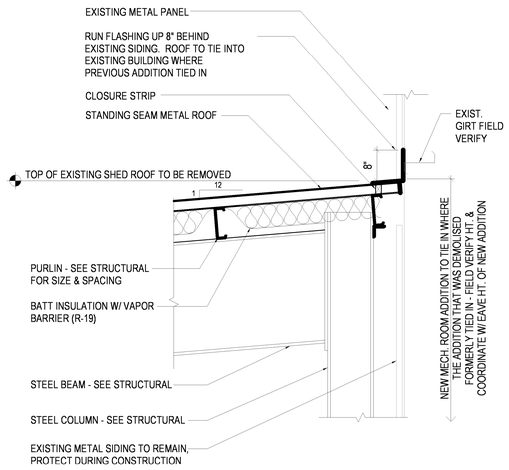
BLDG 721
FIRST FLOOR PLAN

W-5023
SHT. 7 OF 63

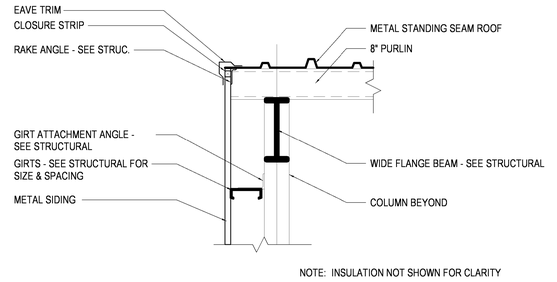
A721.1



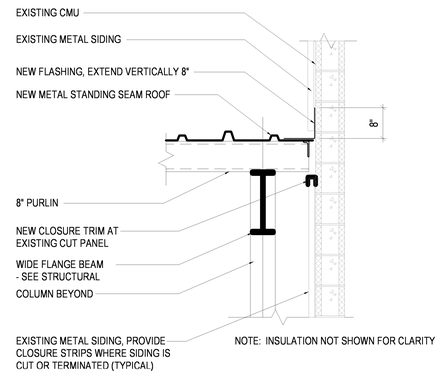
1 WALL SECTION
A721.2 3/4" = 1'-0"



2 DETAIL SECTION
A721.2 3/4" = 1'-0"



3 RAKE DETAIL
A721.2 3/4" = 1'-0"



4 RAKE DETAIL AT EXISTING
A721.2 3/4" = 1'-0"

5 PLAN DETAIL AT CORNER
A721.2 3/4" = 1'-0"

6 OVERHEAD DOOR DETAIL
A721.2 1 1/2" = 1'-0"

7 OVERHEAD DOOR JAMB
A721.2 1 1/2" = 1'-0"

8 DOOR HEAD & JAMB
A721.2 1 1/2" = 1'-0"

9 RAMP DETAIL
A721.2 1 1/2" = 1'-0"

10 STOOP DETAIL
A721.2 3/4" = 1'-0"

100% DESIGN

benefield · richters
architecture planning landscape architecture
516 union avenue
knoxville, tn 37902
865.637.7009

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION		
	18Jun10	ISSUED FOR 95% REVIEW	GC	GR

MCR #00045

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

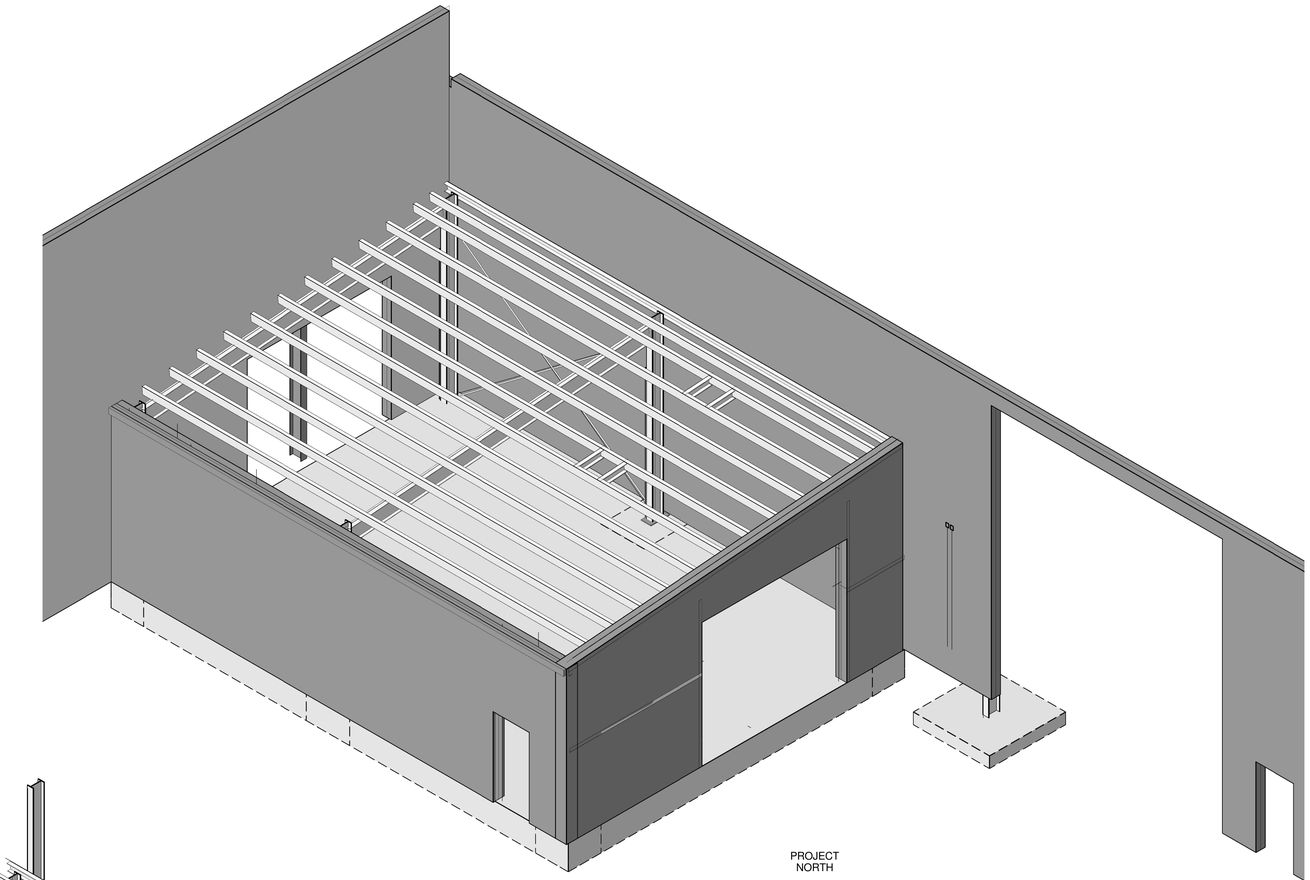
HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED	G. CAMPBELL	G. RICHTERS

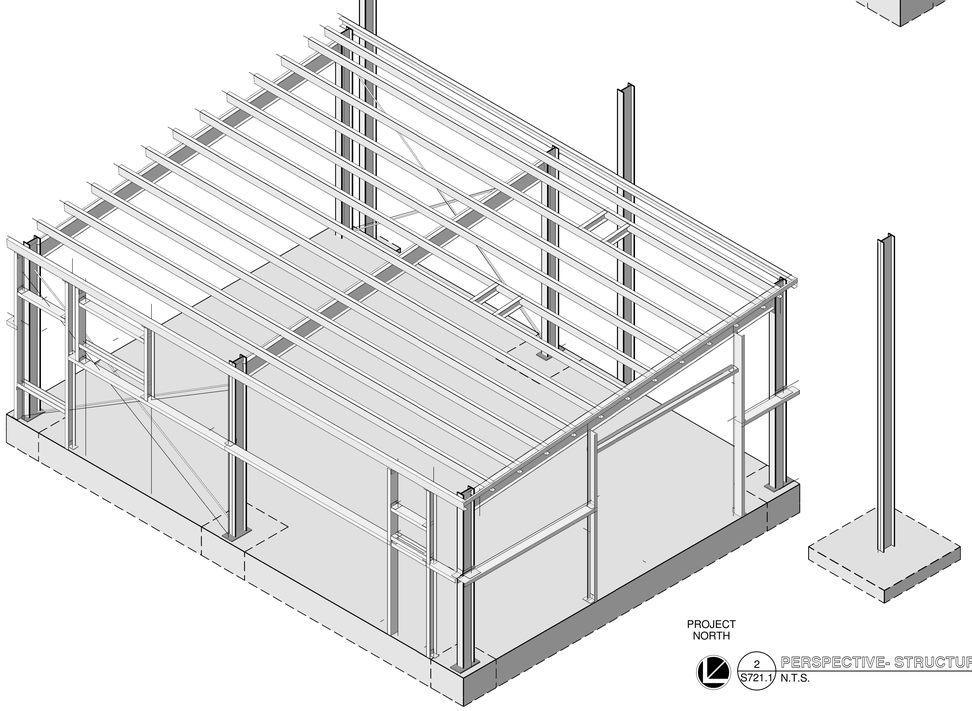
BLDG 721
WALL SECTIONS
& DETAILS

W-5023
SHT. 8 OF 63
A721.2



PROJECT NORTH

3 S721.1/ PERSPECTIVE- WALLS AND STRUCTURE N.T.S.



PROJECT NORTH

2 S721.1/ PERSPECTIVE- STRUCTURE N.T.S.

GENERAL NOTES:

BUILDING CODE: 2006 INTERNATIONAL BUILDING CODE
OCCUPANCY CATEGORY II

LIVE LOAD: SLAB ON GRADE= 200 PSF
ROOF= 20 PSF

DEAD LOAD:
ROOFING= 5 PSF

SNOW LOAD:
GROUND SNOW LOAD, Pg= 25 PSF
FLAT ROOF SNOWLOAD, Pf= 23.1 PSF
EXPOSURE FACTOR, Ce= 1.2
THERMAL FACTOR, Ct= 1.1
IMPORTANCE FACTOR, Is= 1.0

SEISMIC DESIGN DATA:
1. IMPORTANCE FACTOR Ie= 1.0
2. Ss= 0.16g
3. S1= 0.05g
4. SITE CLASS= D
5. Sds= 0.171g
6. Sd1= 0.08g
7. SEISMIC DESIGN CATEGORY= B
8. BASIC SEISMIC FORCE RESISTING SYSTEM:ORDINARY MOMENT FRAME R=3.5
ORDINARY CONCENTRICALLY BRACED FRAME R=3.25
9. Cs= 0.05
10. DESIGN BASE SHEAR= 0.6 Kips
11. ANALYSIS PROCEDURE= EQUIVALENT LATERAL FORCE PROCEDURE

WIND DESIGN DATA:

BASIC WIND SPEED= 95 MPH

MAIN WIND FORCE RESISTING SYSTEM:

HORIZONTAL LOADS:
WALL
A = 14.4 PSF
C = 9.5 PSF

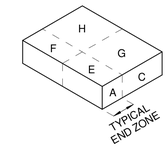
VERTICAL LOADS:
WINDWARD ROOF
E = 17.3 PSF UPLIFT
G = 12.0 PSF UPLIFT

LEEWARD ROOF
F =9.8 PSF UPLIFT
H = 7.6 PSF UPLIFT

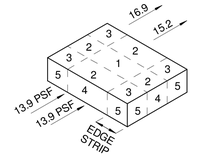
COMPONENTS AND CLADDING LOADS:
ROOF
ZONE 1= 5.3 PSF OR 14.9 PSF UPLIFT
ZONE 2= 5.3 PSF OR 17.7 PSF UPLIFT
ZONE 3= 5.3 PSF OR 17.7 PSF UPLIFT

EDGE STRIP = 3'-1"
END ZONE= 6'-2"
EXPOSURE= B
IMPORTANCE FACTOR Iw= 1.0

MAIN WIND FORCE RESISTING SYSTEM



COMPONENTS AND CLADDING



ASSUMED ALLOWABLE SOIL BEARING CAPACITY= 2,000 PSF
*ALL FOOTINGS MUST REST ON UNDISTURBED SOIL OR ENGINEERED COMPACTED FILL.

MAXIMUM ALLOWABLE BUILDING LATERAL DEFLECTIONS= H/200.
GIRTS WIND LOAD= L/180
PURLIN LINE LOAD= L/180
GIRDERS LIVE LOAD= L/180

SEE SPECIFICATIONS TO COMPLIMENT NOTES ON STRUCTURAL DRAWINGS.

Abbreviations:

A.F.F.	ABOVE FINISHED FLOOR
B.F.F.	BELOW FINISHED FLOOR
B.O.C.	BOTTOM OF CONCRETE
B.O.S.	BOTTOM OF STEEL
BP	BASE PLATE
C.J.	CONSTRUCTION JOINT
EQ	EQUAL
F.F.	FINISH FLOOR
F.F.E.	FINISH FLOOR ELEVATION
G.B.	GIRDER BEARING ELEVATION
LDH	LONG DIMENSION HORIZONTAL
LDV	LONG DIMENSION VERTICAL
M.O.	MASONRY OPENING
O.O.	OUT OF (DIMENSIONALLY)
R.T.U.	ROOF TOP UNIT
S.C.J.	SAWCUT CONTRACTION JOINT
S.S.T.	SIMPSON STRONG-TIE
T.O.C.	TOP OF CONCRETE
T.O.F.	TOP OF FOOTING
T.O.M.	TOP OF MASONRY
T.O.S.	TOP OF STEEL
T.O.W.	TOP OF WALL
WCJ	WALL CONTROL JOINT

100% DESIGN

MALLIA ENGINEERING COMPANY
1827 WHITE AVENUE, KNOXVILLE, TN 37916
TEL: (865) 637-3224 / FAX: (865) 521-9165
EMAIL ADDRESS: MALLIAENG.BIZ
FILE: 10055rvt DATE: 09-02-2010

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION		
	18Jun10	ISSUED FOR 95% REVIEW		

DATA PERTAINS

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

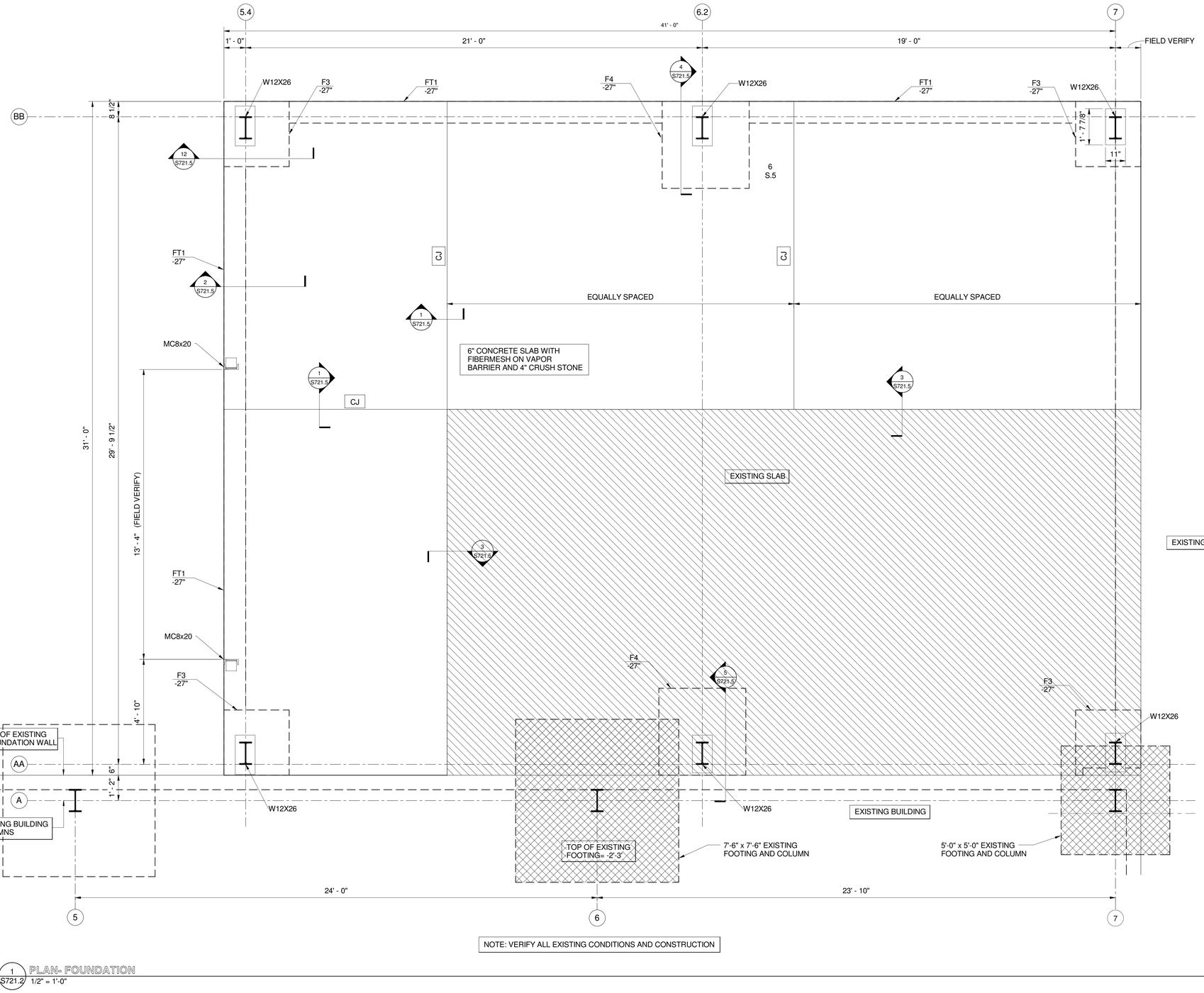
SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED		

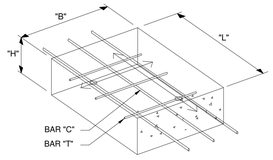
BUILDING 721
NOTES AND PERSPECTIVES

W-5023 S721.1

SHT. 2 OF 63



1 S721.2 PLAN- FOUNDATION
1/2" = 1'-0"



TS= THICKENED SLAB
FT= TURNDOWN FOOTING
FC= CONTINUOUS FOOTING

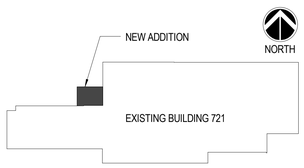
FOOTING SCHEDULE

FOOTING MARK
BOTTOM OF FOOTING TO TOP OF FINISHED FLOOR

FOOTING MARK	FOOTING DIMENSIONS			FOOTING REINFORCEMENT	
	L	B	H	BAR "C"	BAR "T"
FT1	CONT.	1'-0"	2'-3"	(4)#4 VERTICAL DISTRIBUTION	#4 "L" BAR AT 48" O.C.
F3	3'-0"	3'-0"	2'-3"	(3)#5 x 2'-6" BOTTOM	(3)#5 x 2'-6" BOTTOM
F4	4'-0"	4'-0"	2'-3"	(4)#5 x 3'-6" BOTTOM	(4)#5 x 3'-6" BOTTOM

2 S.2 SCHEDULE- FOOTING
N.T.S.

KEY PLAN



100% DESIGN

MALLI ENGINEERING COMPANY
1827 WHITE AVENUE, KNOXVILLE, TN 37916
TEL: (865) 637-3224 / FAX: (865) 521-9165
EMAIL ADDRESS: MALLIAENG.BIZ
FILE: 10055rvt
DATE: 09-02-2010

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION		
	18Jun10	ISSUED FOR 95% REVIEW		

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

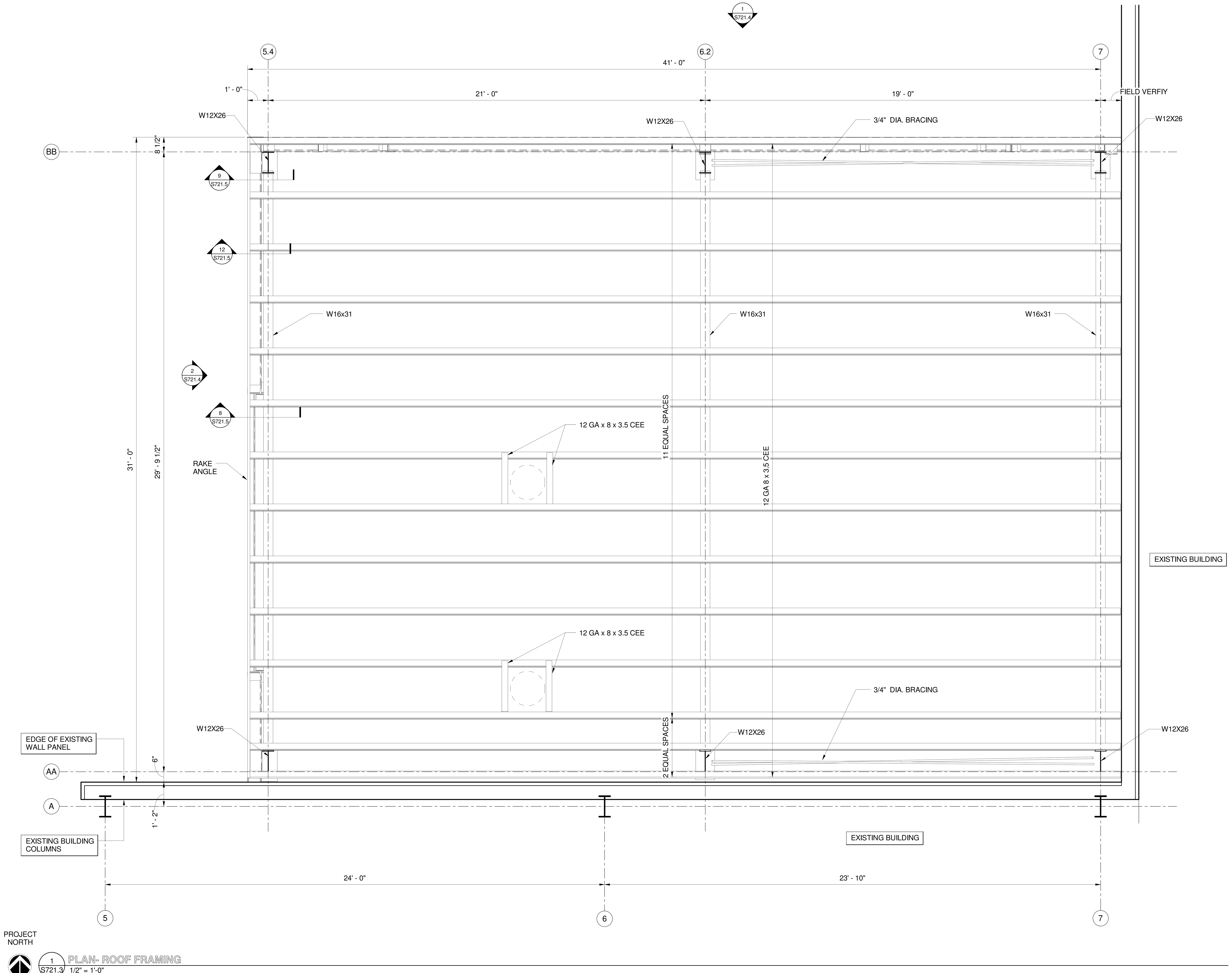
HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

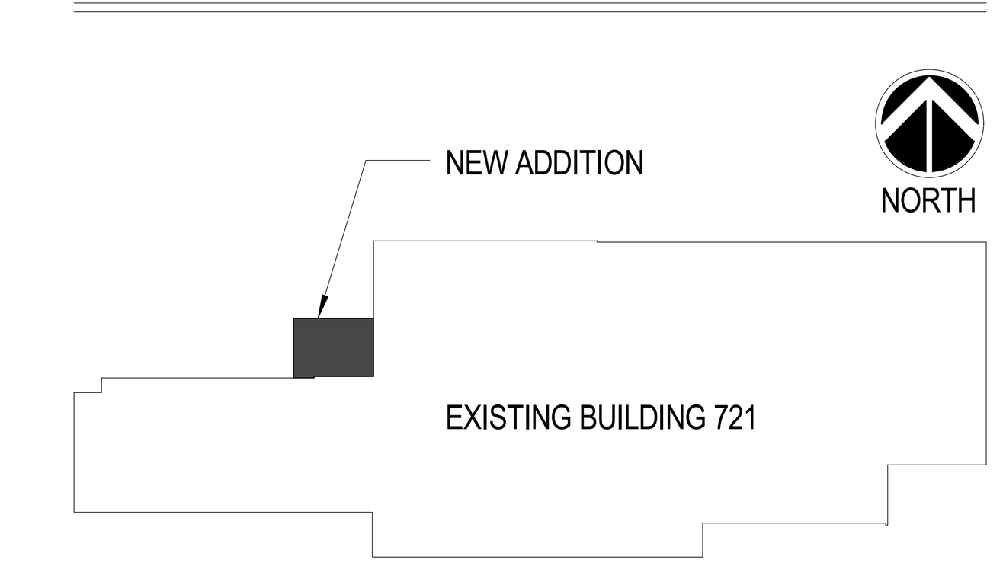
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED		

BUILDING 721
FOUNDATION
PLAN

W-5023
SHT. 3 OF 63
S721.2



KEY PLAN



NOTE: VERIFY ALL EXISTING CONDITIONS AND CONSTRUCTION

100% DESIGN

MALLIA ENGINEERING COMPANY
1827 WHITE AVENUE, KNOXVILLE, TN 37916
TEL: (865) 637-3224 / FAX: (865) 521-9165
EMAIL ADDRESS: MALLIAENG.BIZ
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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

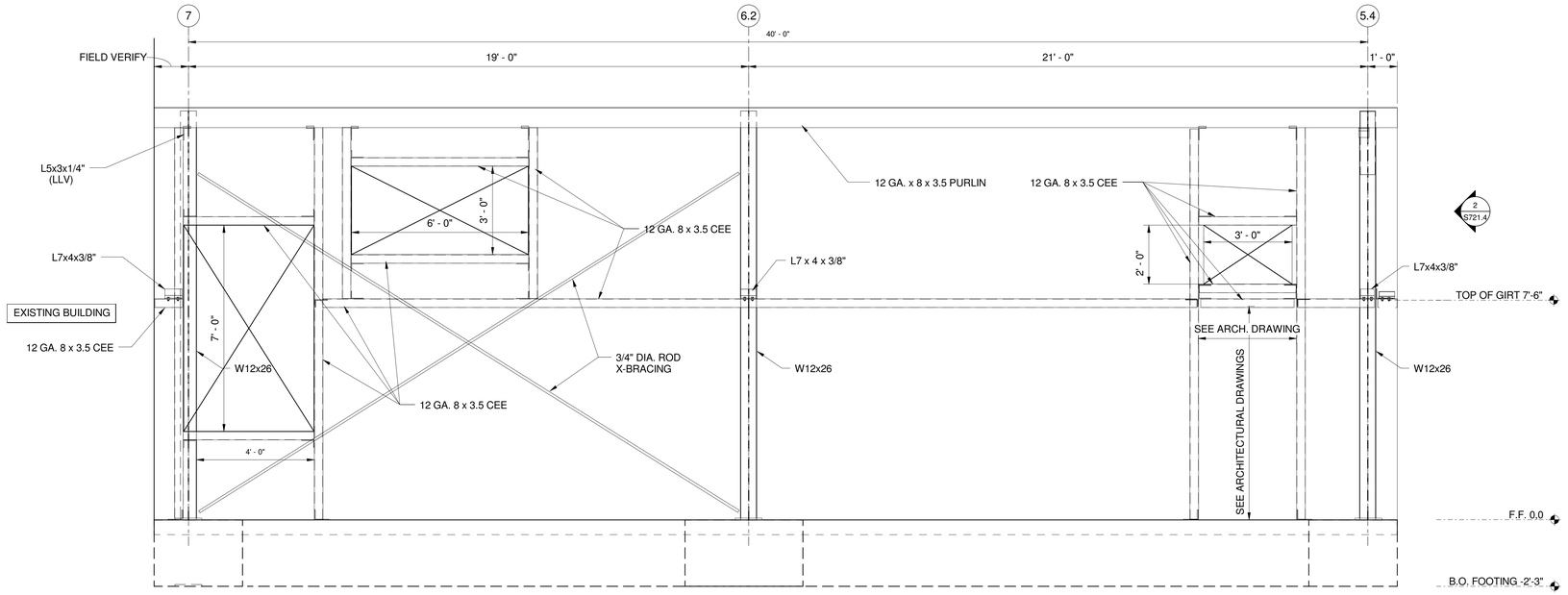
HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

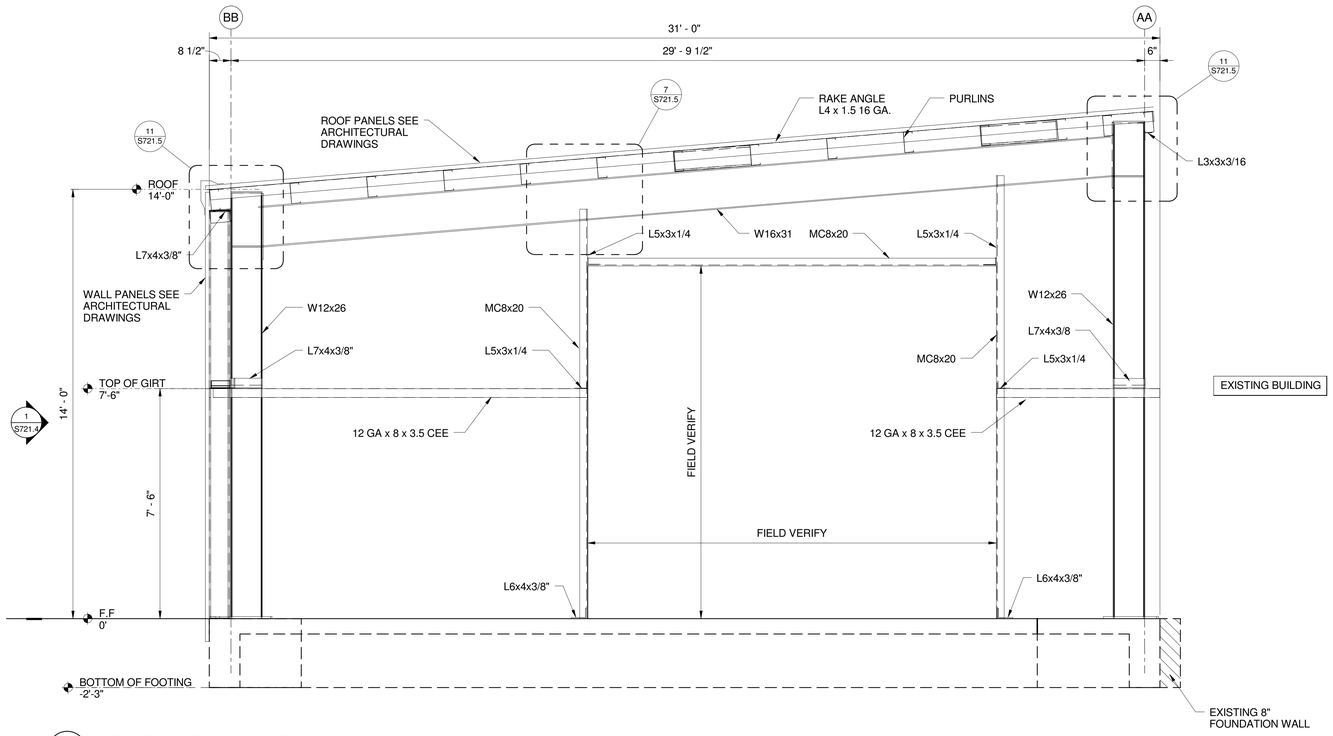
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED		

BUILDING 721
ROOF PLAN

W-5023
S721.3
SHT. 4 OF 63



1 S721.4 **PROJECT NORTH ELEVATION**
1/2" = 1'-0"



2 S721.4 **PROJECT WEST ELEVATION**
1/2" = 1'-0"

100% DESIGN

MALLI ENGINEERING COMPANY
1827 WHITE AVENUE, KNOXVILLE, TN 37916
TEL: (865) 637-3224 / FAX: (865) 521-9165
EMAIL ADDRESS: MALLIAENG.BIZ
FILE: 10055rvt
DATE: 09-02-2010

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION		
	18Jun10	ISSUED FOR 95% REVIEW		

MSA #10055

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

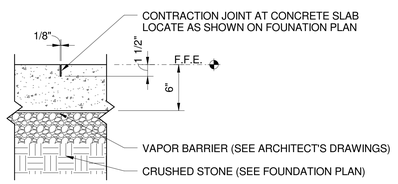
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED		

BUILDING 721
SECTIONS

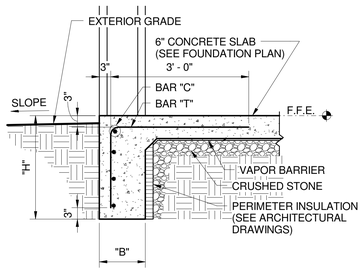
W-5023

SHT. 5 OF 63

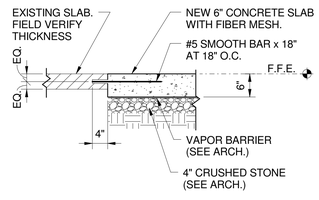
S721.4



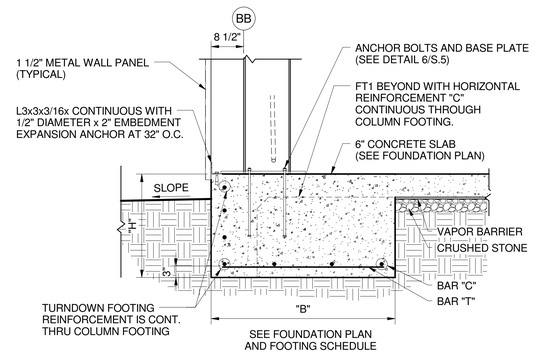
1 S721.5 **DETAIL- SAWCUT CONTRACTION JOINT (C.J.)**
1 1/2" = 1'-0"



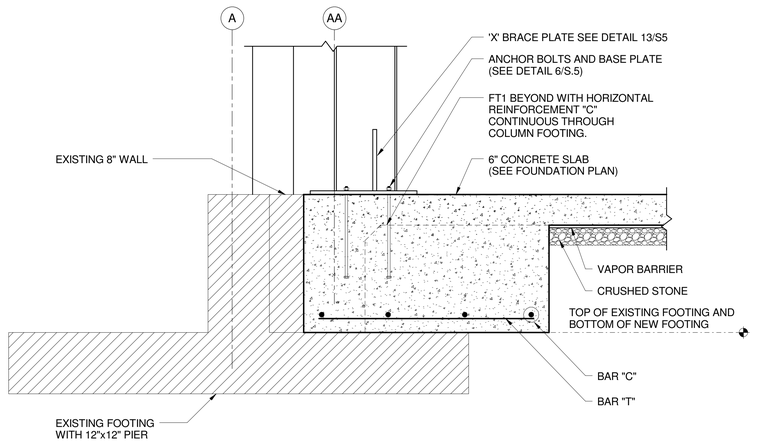
2 S721.5 **DETAIL- FLOOR SLAB TURNDOWN**
3/4" = 1'-0"



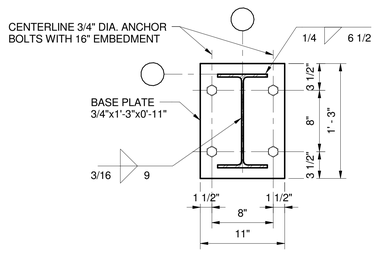
3 S721.5 **DETAIL- NEW TO EXISTING SLAB**
3/4" = 1'-0"



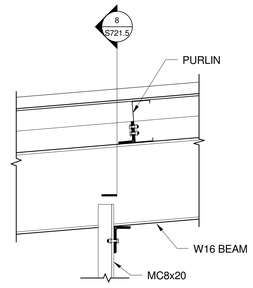
4 S721.5 **DETAIL- COLUMN FOOTING (TYP.)**
3/4" = 1'-0"



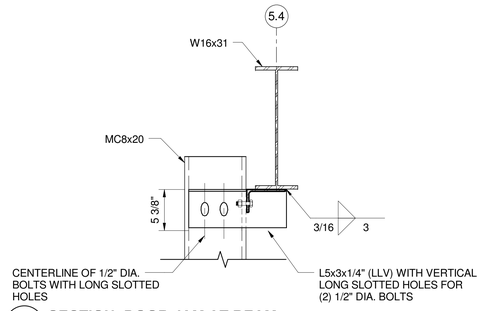
5 S721.5 **DETAIL- NEW COLUMN AT EXISTING BUILDING**
1" = 1'-0"



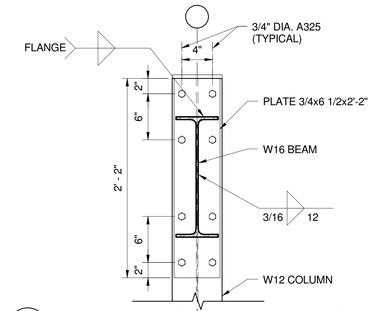
6 S721.5 **DETAIL- BASE PLATE**
1 1/2" = 1'-0"



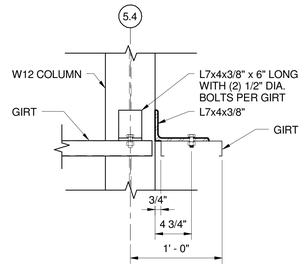
7 S721.5 **VIEW- DOOR JAM AT BEAM**
1" = 1'-0"



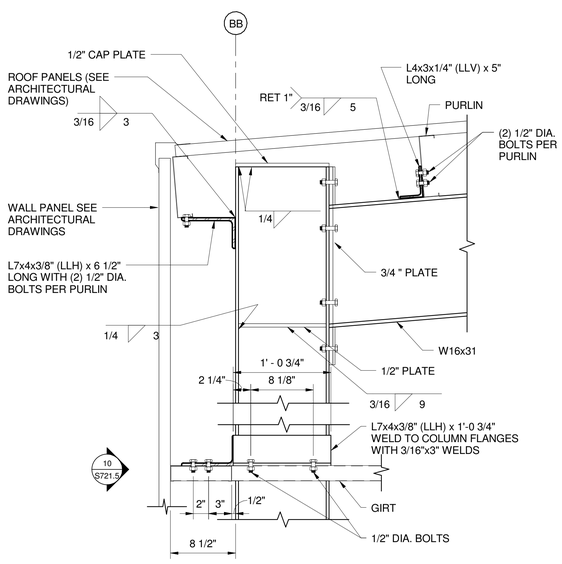
8 S721.5 **SECTION- DOOR JAM AT BEAM**
1 1/2" = 1'-0"

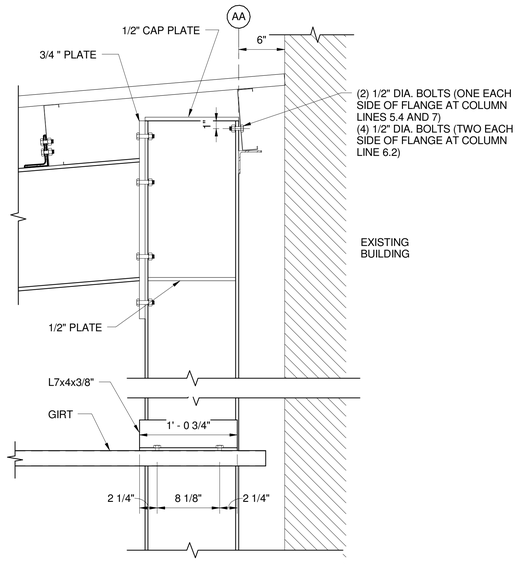


9 S721.5 **DETAIL- BEAM TO COLUMN CONNECTION**
1 1/2" = 1'-0"

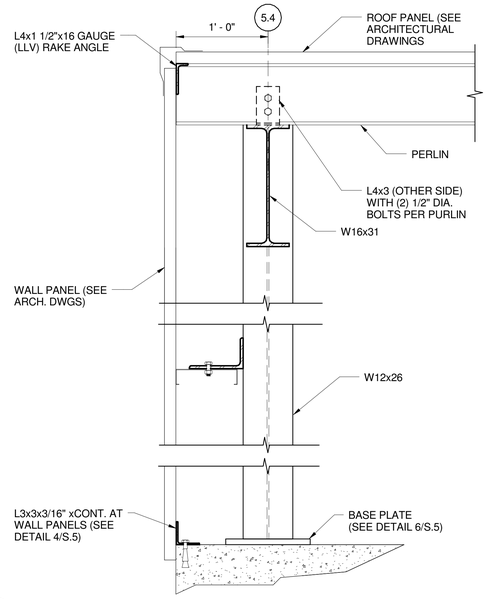


10 S721.5 **DETAIL- GIRT TO COLUMN CONNECTION**
1 1/2" = 1'-0"

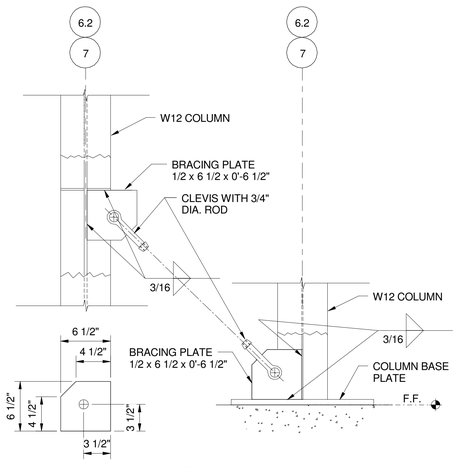




11 S721.5 **SECTION- BEAM TO COLUMN CONNECTION**
1 1/2" = 1'-0"



12 S721.5 **BEAM TO PERLIN CONNECTION**
1 1/2" = 1'-0"



BRACING PLATE 1/2 x 6 1/2 x 0'-6 1/2"

13 S721.5 **DETAIL- BRACING RODS**
1 1/2" = 1'-0"

100% DESIGN

MALLI ENGINEERING COMPANY
1827 WHITE AVENUE, KNOXVILLE, TN 37916
TEL: (865) 637-3224 / FAX: (865) 521-9165
EMAIL ADDRESS: MALLIAENG.BIZ
FILE: 10055rvt
DATE: 09-02-2010

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION		
	18Jun10	ISSUED FOR 95% REVIEW		

DATE PLOTTED:

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	AS NOTED		

BUILDING 721
DETAILS

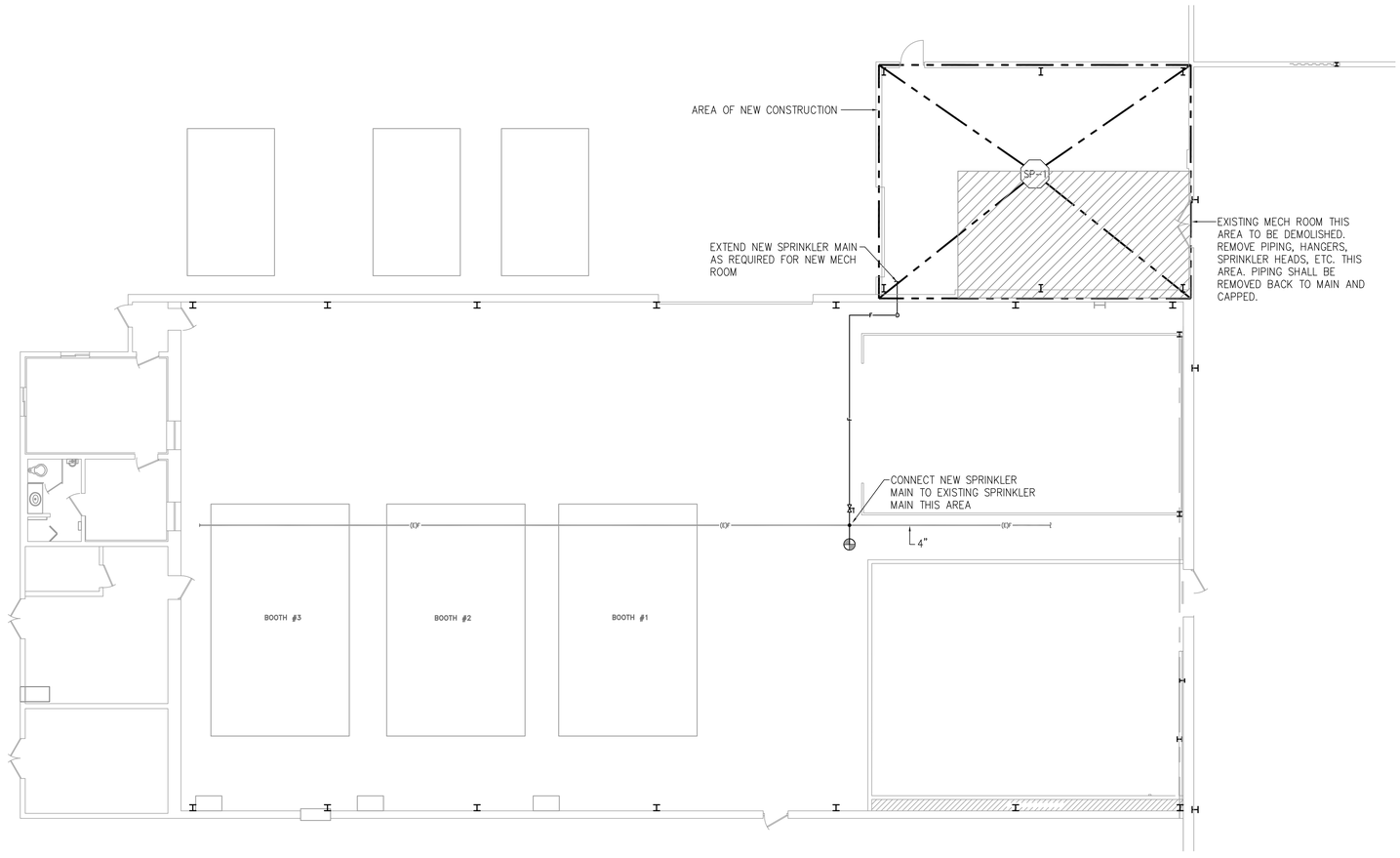
W-5023

S721.5

SHT. 6 OF 63

SPRINKLER HEAD SCHEDULE

TAG	DESCRIPTION	CEILING	HAZARD DESIGN	DESIGN DENSITY GPM	DESIGN DENSITY SQ. FT.	DURATION of SUPPLY	HOSE ALLOWANCE	HEAD TYPE	TEMPERATURE RATING	FINISH	REMARKS
SP-1	MECHANICAL ROOM	NO	ORDINARY 1	.15	3000	60 min	500 gpm	UPRIGHT	ORDINARY (155°F)	BRASS	EXISTING BUILDING PRESENTLY SPRINKLED



PARTIAL FLOOR PLAN – FIRE PROTECTION

0 4' 8' 16'

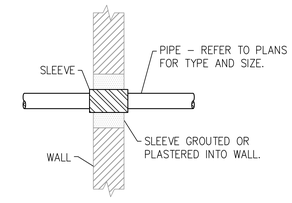
1/8" = 1'-0"

NORTH

FIRE PROTECTION GENERAL NOTES:

1. PERFORM ALL WORK IN ACCORDANCE WITH ALL APPLICABLE UFC STANDARDS, AIR FORCE STANDARDS, & 2006 . INTERNATIONAL BUILDING CODE.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. STORE MATERIALS WHERE DIRECTED. PROTECT STORED MATERIALS AND INSTALLED WORK FROM DAMAGE. REPAIR ALL DAMAGE.
6. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
7. SCHEDULE ALL FIRE PROTECTION SYSTEM INTERRUPTIONS WITH THE ORNL DESIGNATED REPRESENTATIVE AND OTHER CONTRACTORS 72 HOURS PRIOR TO INTERRUPTION.
8. PATCH AND FINISH CONSTRUCTION DAMAGED DURING THE COURSE OF FIRE PROTECTION SYSTEM INSTALLATION. PROVIDE SEALS & FIRE STOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. PERFORM TESTING AND MAKE FINAL ADJUSTMENTS TO VERIFY PROPER PERFORMANCE OF ALL SYSTEMS AND EQUIPMENT.
10. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS AND PROVIDE TO CONSTRUCTION MANAGER AT PROJECT COMPLETION.

NOTE: THESE NOTES ARE GENERAL IN NATURE. SPECIFIC MEANS, METHODS AND MATERIALS ARE DETAILED IN THE SPECIFICATIONS AND CONTRACTOR IS DIRECTED TO THOROUGHLY REVIEW THE FULL SPECIFICATION. CONTRACT SPECIFICATIONS SHALL GOVERN IN CASE OF CONFLICT.



PIPE THRU WALL DETAIL

NO SCALE

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road
Maumee, Ohio 43537
Phone: (419) 893-3141
Fax: (419) 893-0687
MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/8" = 1'-0"	A. CRAFT	S. SIMON

BLDG 721
FLOOR PLAN
FIRE PROTECTION

W-5023

SHT 9 OF 63

F721.1

GAS-FIRED HOT WATER BOILER SCHEDULE

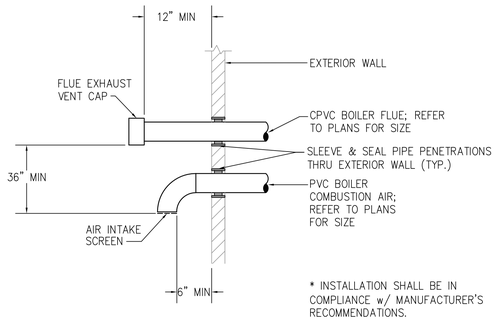
TAG	LOCATION DWG	LOCATION ROOM	MBH IN	MBH OUT	EWT °F	LWT °F	GPM	P.G.	OPER. PRESS.	GAS PRESS.	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL VOLTAGE	ELECTRICAL AMP	ELECTRICAL MOP	MAKE	MODEL	REMARKS
B-1	M722.2	MECH. ROOM 35	850	799	140	180	40	N.A.	60 PSI	4"-10.5" w.c.	MODULATING	5:1	6"ø	6"ø	120/1/60	5	20	RAYPAK	H7-850	
B-2	M722.3	MECH. ROOM 42	300	282	140	180	14	N.A.	60 PSI	4"-10.5" w.c.	MODULATING	5:1	4"ø	4"ø	120/1/60	3	20	RAYPAK	H7-300	
B-3	M722.4	MECH. ROOM 51	500	470	140	180	24	N.A.	60 PSI	4"-10.5" w.c.	MODULATING	5:1	4"ø	4"ø	120/1/60	4	20	RAYPAK	H7-500	

PUMP SCHEDULE

TAG	LOCATION DWG	LOCATION ROOM	SERVICE	TYPE	GPM	P.G.	HEAD (ft.)	EFF.	IMPELLER	SUCTION SIZE	DISCHARGE SIZE	MOTOR HP	MOTOR RPM	MOTOR VOLTAGE	MAKE	SERIES	MODEL	REMARKS
CP-1	M722.2	MECH. ROOM 35	BOILER RECIRC.	IN-LINE	40	N.A.	20	59.9%	5.25"	1.25"	1.25"	1/2	1750	120/1/60	BELL & GOSSETT	60	1-1/4x5-1/4	
CP-2	M722.3	MECH. ROOM 42	BOILER RECIRC.	IN-LINE	14	N.A.	20	49.3%	4.75"	1.00"	1.00"	1/2	1750	120/1/60	BELL & GOSSETT	60	1x5-1/4	
CP-3	M722.4	MECH. ROOM 51	BOILER RECIRC.	IN-LINE	24	N.A.	20	49.3%	4.75"	1.00"	1.00"	1/2	1750	120/1/60	BELL & GOSSETT	60	1x5-1/4	

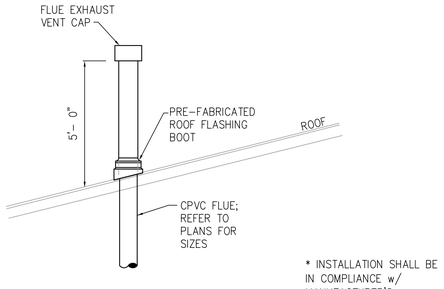
LEGEND AND SYMBOLS

HWS	HEATING WATER SUPPLY		BALL VALVE
HWR	HEATING WATER RETURN		CHECK VALVE (NON SLAM)
HTWS	HIGH TEMPERATURE HOT WATER SUPPLY		GATE VALVE
HTWR	HIGH TEMPERATURE HOT WATER RETURN		BUTTERFLY VALVE
DCW	DOMESTIC COLD WATER		CIRCUIT SETTER (FLOW AS INDICATED)
CD	CONDENSATE DRAIN		PRESSURE GAUGE (w/ RANGE)
NG	NATURAL GAS PIPING (7"-14" w.c.)		THERMOMETER (w/ RANGE)
(E)XXX	EXISTING PIPING (w/ SERVICE)		UNION
	DIRECTION OF FLOW		"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
			RELIEF VALVE
A.F.F.	ABOVE FINISHED FLOOR		2-WAY CONTROL VALVE
N.A.	NOT APPLICABLE		3-WAY MIXING VALVE
G.C.	GENERAL CONTRACTOR	CS	CURRENT SWITCH
E.C.	ELECTRICAL CONTRACTOR	T	TEMPERATURE SENSOR
M.C.	MECHANICAL CONTRACTOR		FLOW SWITCH (FS)
P.C.	PLUMBING CONTRACTOR		FLANGE
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		POINT OF CONNECTION
R.A.	RETURN AIR		POINT OF DISCONNECT
O.A.	OUTSIDE AIR		



BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE



BOILER ROOF VENT DETAIL

NO SCALE

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE, INTERNATIONAL PLUMBING CODE, AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES, AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

100% DESIGN

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MDA #08046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

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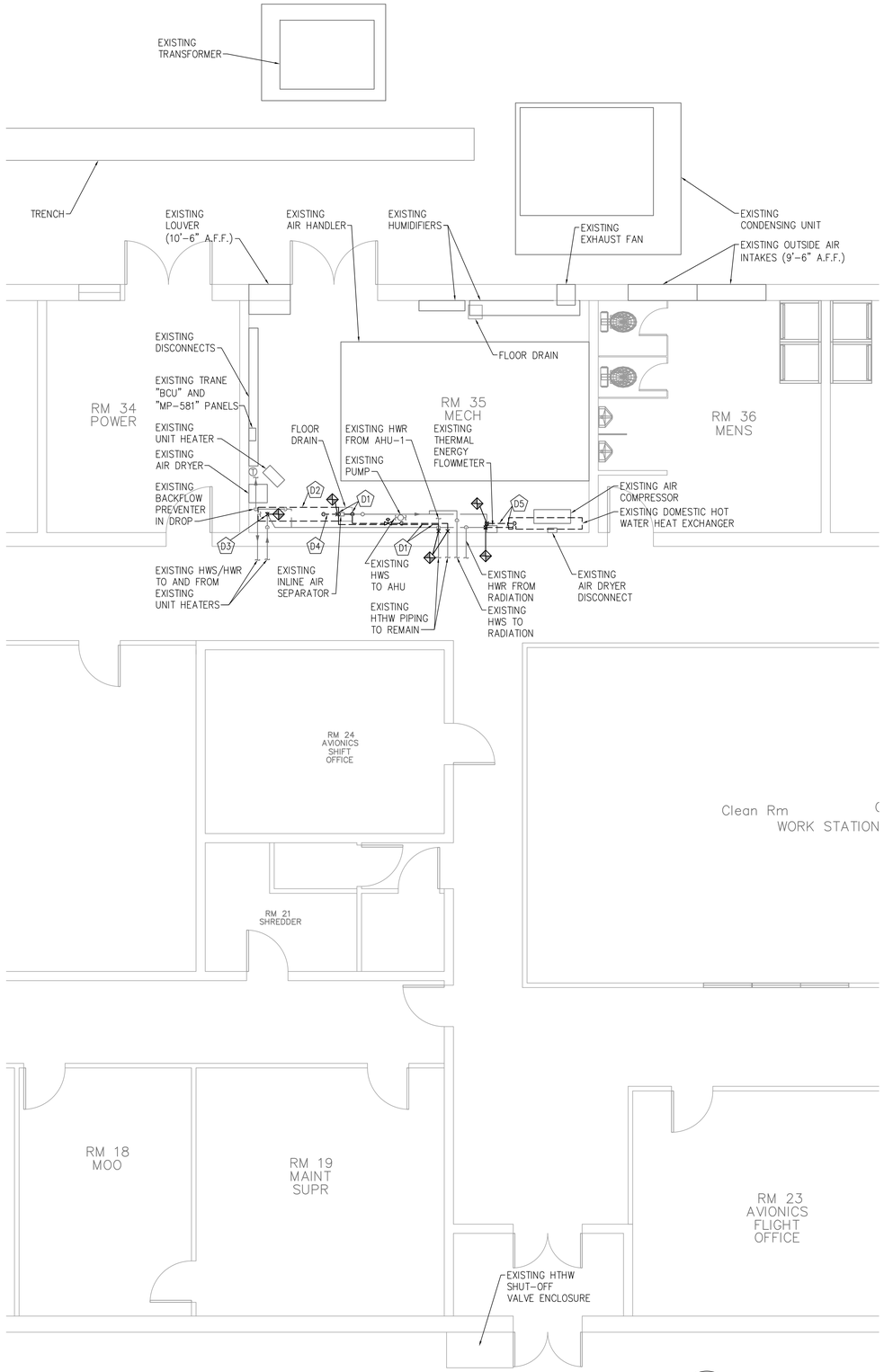
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 722
LEGEND NOTES & DETAILS-HVAC

W-5023
SHT 28 OF 63
M722.1

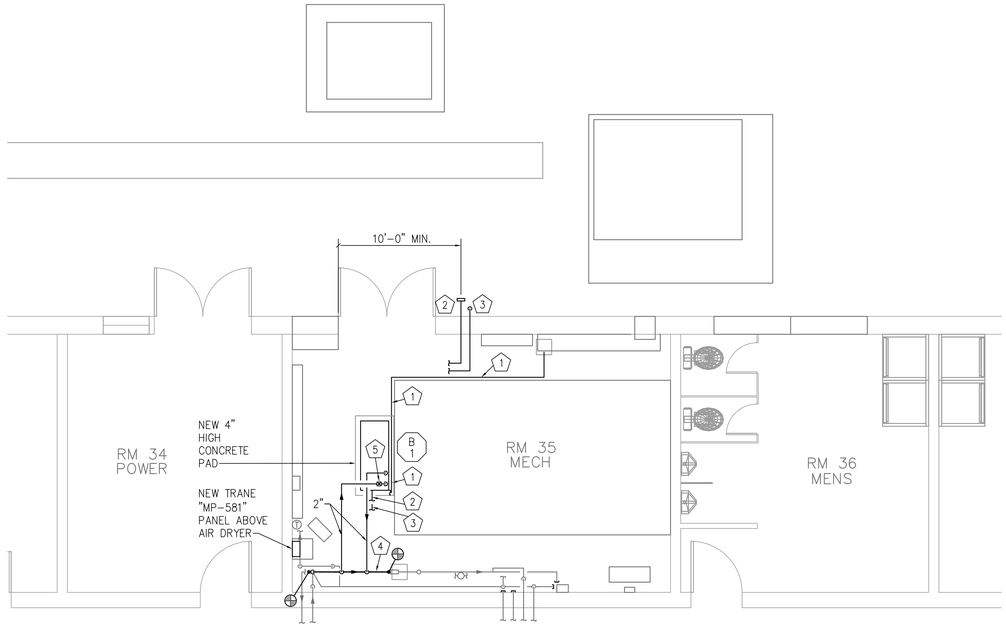


PARTIAL FLOOR PLAN (WEST BUILDING) – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH



ENLARGED MECHANICAL ROOM 35 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING REFERENCE NOTES

1. CONDENSATE PIPING TO BE ROUTED TO NEAREST FLOOR DRAIN. REFER TO FLOW DIAGRAM ON SHEET M722.5 FOR PIPING AND ROUTING REQUIREMENTS.
2. 6" CPVC FLUE OVER BOILER AND OUT SIDEWALL. REFER TO DETAIL ON SHEET M722.1.
3. 6" PVC COMBUSTION AIR INTAKE OVER BOILER AND OUT SIDEWALL. REFER TO DETAIL ON SHEET M722.1.
4. NEW 3" HEATING WATER PIPING.
5. BOILER CIRCULATING PUMP "CP-1". REFER TO FLOW DIAGRAM ON SHEET M722.5 FOR PIPING REQUIREMENTS.

DRAWING DEMOLITION NOTES

D1. REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO EXIT OF MECH ROOM AS INDICATED AND PROVIDE WELD CAPS ON PIPING. CLOSE AND LOCK OUT EXISTING VALVES AT ENTRY TO BUILDING.

D2. REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

D3. REMOVE EXISTING HWR PIPING BACK TO SHUT-OFF VALVE.

D4. REMOVE EXISTING HWS PIPING BACK TO AIR SEPARATOR.

D5. REMOVE EXISTING HWS AND HWR PIPING BACK TO SHUT-OFF VALVE AND PROVIDE WELD CAPS AT VALVES. DISCONNECT AND REMOVE HOT WATER PUMP SERVING DOMESTIC HOT WATER HEAT EXCHANGER. REFER TO FLOW DIAGRAM ON SHEET M722.5 FOR EXACT LOCATION.

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	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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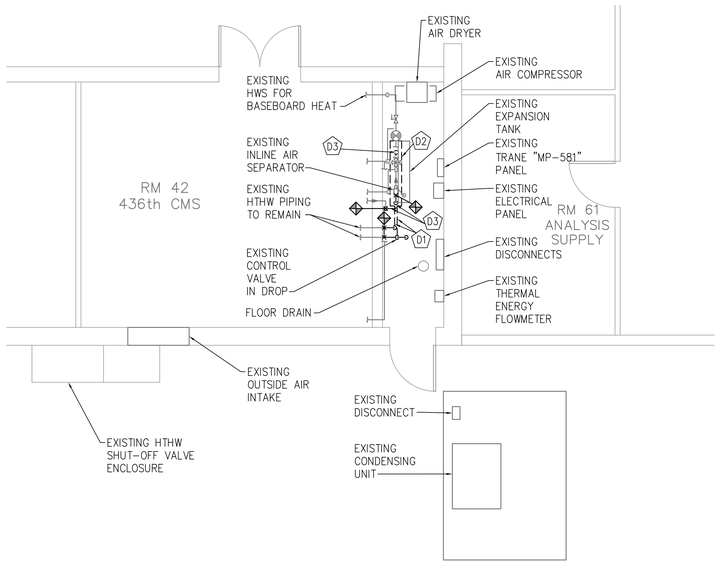
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 722
MECH ROOM 35
HVAC

W-5023

SHT 29 OF 63

M722.2



ENLARGED MECHANICAL ROOM 42 – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

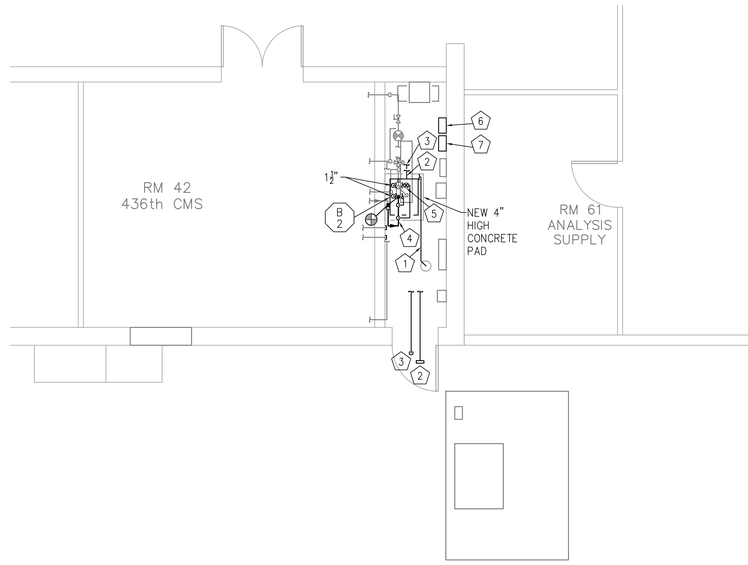
NORTH

DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO EXIT OF MECH ROOM AS INDICATED AND PROVIDE WELD CAPS ON PIPING. LOCK OUT EXISTING VALVES AT ENTRY TO BUILDING.

D2 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

D3 REMOVE EXISTING HWS AND HWR PIPING, HANGERS, VALVES, ETC. AS INDICATED.



ENLARGED MECHANICAL ROOM 42 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING REFERENCE NOTES

1 CONDENSATE PIPING TO BE ROUTED TO NEAREST FLOOR DRAIN. REFER TO FLOW DIAGRAM ON SHEET M722.6 FOR PIPING AND ROUTING REQUIREMENTS.

2 4" CPVC FLUE OUT SIDEWALL ABOVE DOOR. REFER TO DETAIL ON SHEET M722.1.

3 4" PVC COMBUSTION AIR INTAKE OUT SIDEWALL ABOVE DOOR. REFER TO DETAIL ON SHEET M722.1.

4 NEW 2" HEATING WATER PIPING.

5 BOILER CIRCULATING PUMP "CP-2". REFER TO FLOW DIAGRAM ON SHEET M722.6 FOR PIPING REQUIREMENTS.

6 NEW TRANE "MP-581" PANEL.

7 NEW TRANE "BCU" PANEL.

100% DESIGN

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

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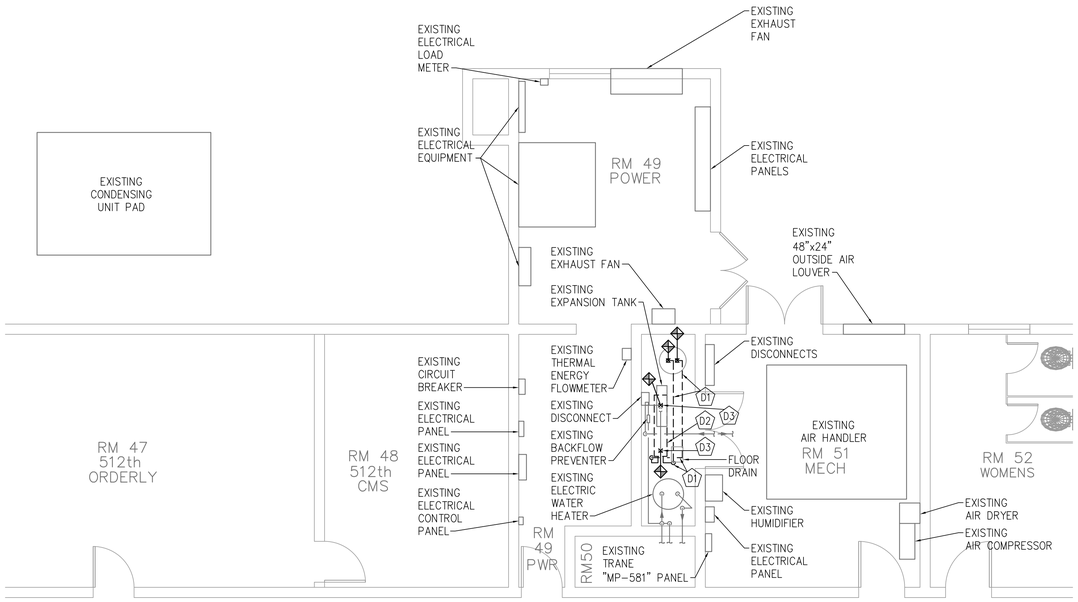
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 722
MECH ROOM 42
HVAC

W-5023

SHT 30 OF 63

M722.3



ENLARGED MECHANICAL ROOM 51 – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

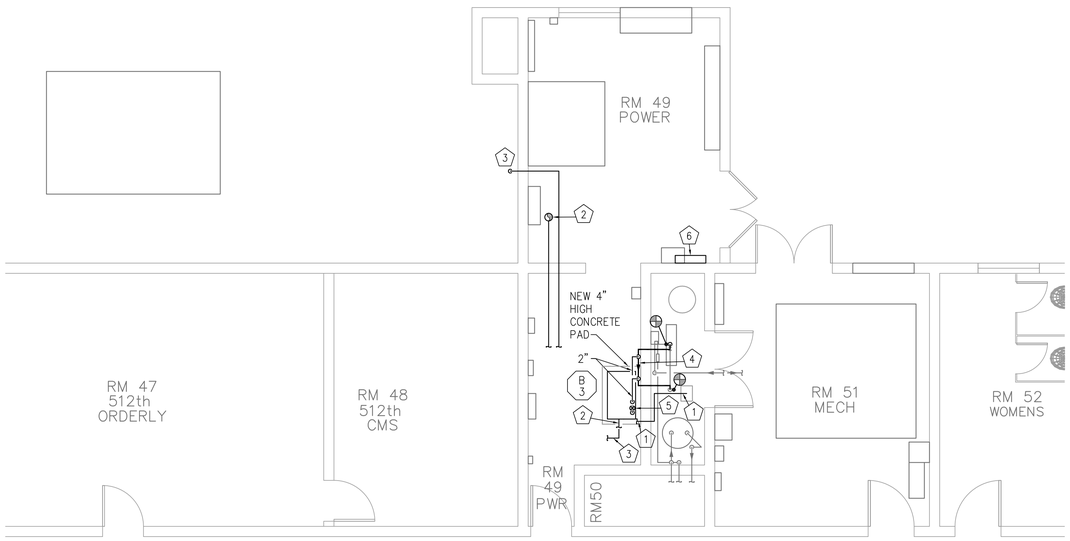
NORTH

DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO SHUT-OFF VALVES AS INDICATED AND PROVIDE WELD CAPS AT VALVES.

D2 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

D3 REMOVE EXISTING HWS AND HWR PIPING, HANGERS, VALVES, ETC. AS INDICATED.



ENLARGED MECHANICAL ROOM 51 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING REFERENCE NOTES

1 CONDENSATE PIPING TO BE ROUTED TO NEAREST FLOOR DRAIN. REFER TO FLOW DIAGRAM ON SHEET M722.7 FOR PIPING AND ROUTING REQUIREMENTS.

2 4" CPVC FLUE THRU EXISTING WALL OPENING AND UP THRU ROOF. REFER TO DETAIL ON SHEET M722.1.

3 4" PVC COMBUSTION AIR INTAKE THRU EXISTING WALL OPENING AND OUT SIDEWALL. REFER TO DETAIL ON SHEET M722.1.

4 NEW 2" HEATING WATER PIPING.

5 BOILER CIRCULATING PUMP "CP-3". REFER TO FLOW DIAGRAM ON SHEET M722.7 FOR PIPING REQUIREMENTS.

6 NEW TRANE "BCU" AND "MP-581" PANEL.

100% DESIGN

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MDA #0946

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DOVER AIR FORCE BASE, DELAWARE

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8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 722
MECH ROOM 51
HVAC

W-5023
SHT 31 OF 63

M722.4

HEATING PLANT CONTROL SEQUENCES

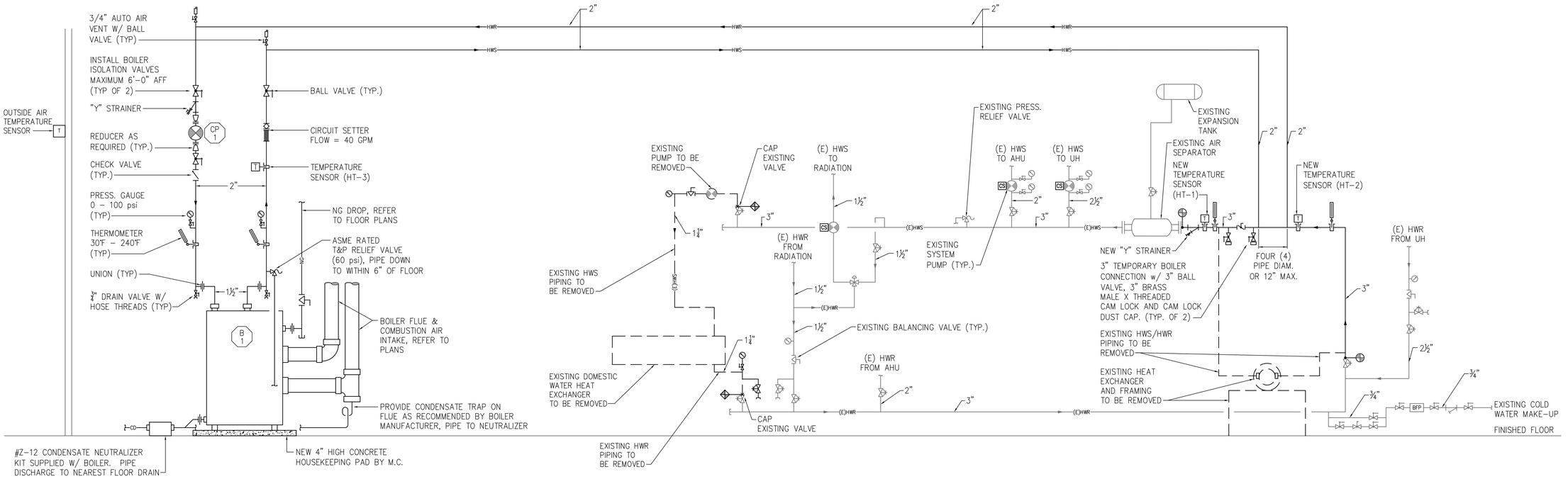
1. THE (3) SYSTEM LOOP PUMPS RUN CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE OR CALL FOR BUILDING REHEAT. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.
2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B-1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.
3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.
4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.
5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.
6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.
7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).
8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.
9. THE SYSTEM HEATING WATER LOOP PUMPS ARE TO RUN SIMULTANEOUSLY.
10. THE NEW HEATING SYSTEM CONTROLS SHALL OVERLAY AND INTERFACE WITH THE EXISTING RADIATION 3-WAY VALVE AND CONTROLS. UPDATING AND NETWORKING THE EXISTING RADIATION CONTROLS TO THE BUILDING TRANE CONTROL SYSTEM IS NOT TO BE INCLUDED IN THIS WORK.
11. ALARMS SHALL INCLUDE:
    A. PUMP FAILURE (EACH PUMP).
    B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
    C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
    D. BOILER FAILURE.
12. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM - MECH ROOM 35

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.
2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.
3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.
4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.
5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

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MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 722
BOILER DETAILS
RM 35 - HVAC

W-5023
SHT 32 OF 63
M722.5

HEATING PLANT CONTROL SEQUENCES

1. THE (2) SYSTEM LOOP PUMPS RUN CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B-2) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER LOOP PUMPS ARE TO RUN SIMULTANEOUSLY.

10. THE NEW HEATING SYSTEM CONTROLS SHALL OVERLAY AND INTERFACE WITH THE EXISTING RADIATION 3-WAY VALVE AND CONTROLS. UPDATING AND NETWORKING THE EXISTING RADIATION CONTROLS TO THE BUILDING TRANE CONTROL SYSTEM IS NOT TO BE INCLUDED IN THIS WORK.

11. ALARMS SHALL INCLUDE:
    A. PUMP FAILURE (EACH PUMP).
    B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
    C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
    D. BOILER FAILURE.

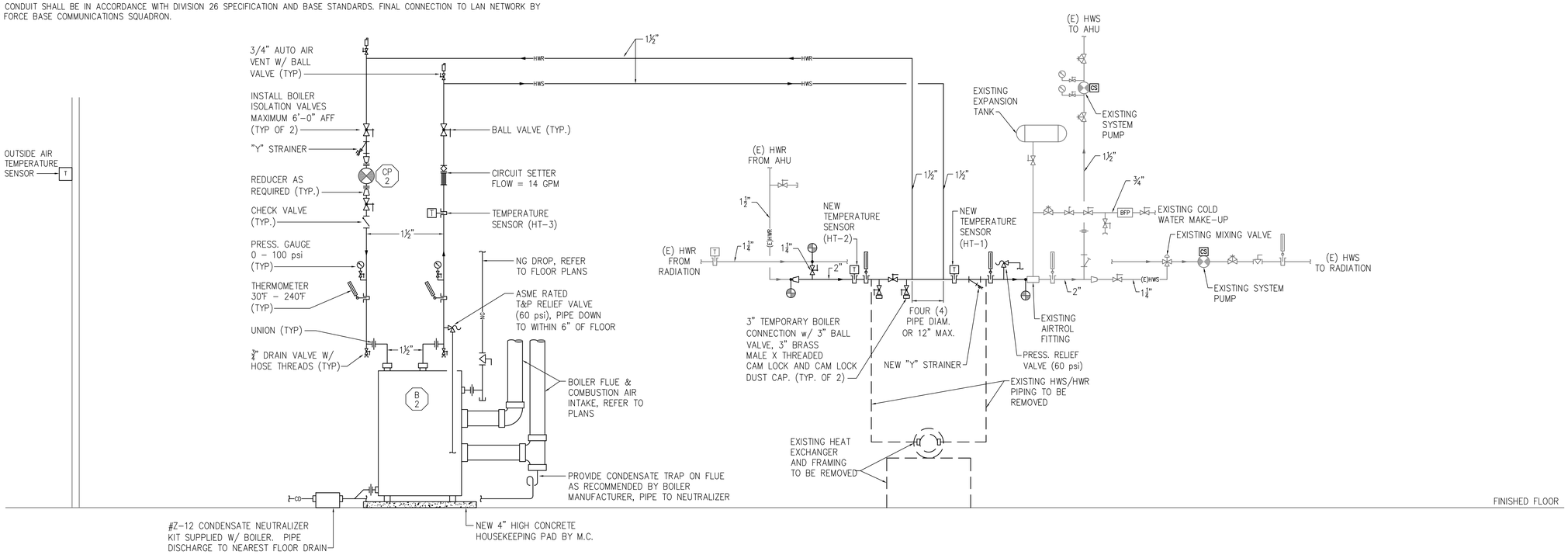
12. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM - MECH ROOM 42

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #09046

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	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 722
BOILER DETAILS
RM 42 - HVAC

W-5023
SHT 33 OF 63

M722.6

HEATING PLANT CONTROL SEQUENCES

1. THE (2) SYSTEM LOOP PUMPS RUN CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B-3) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. ALARMS SHALL INCLUDE:
   A. PUMP FAILURE (EACH PUMP).
   B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
   C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
   D. BOILER FAILURE.

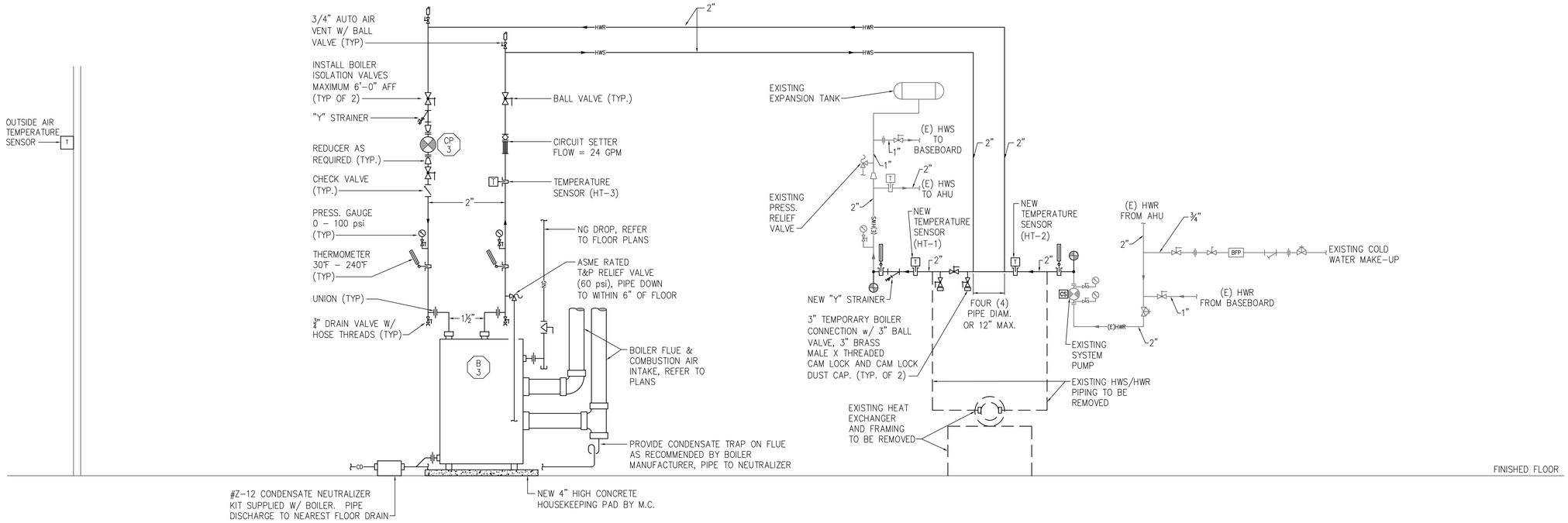
10. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM – MECH ROOM 51

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #29046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

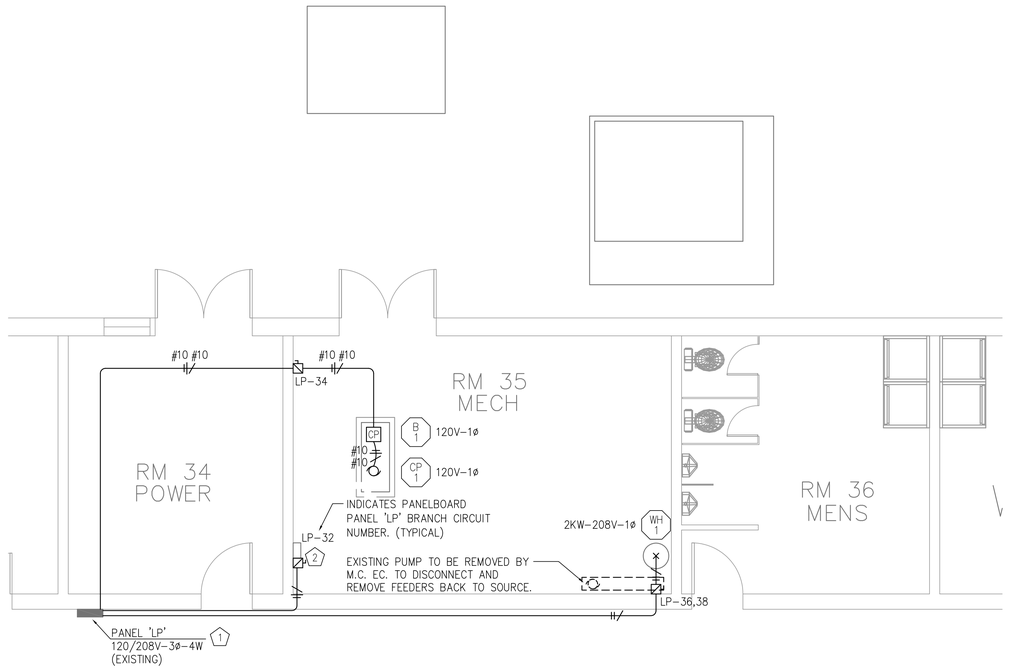
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 722
BOILER DETAILS
RM 51 – HVAC

W-5023
SHT 34 OF 63
M722.7

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——+——	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——//——	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←———	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
J	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
J	30A MANUAL MOTOR STARTER SWITCH, HORSEPOWER RATED WITH OVERLOADS, PILOT LIGHTED, NEMA 1 ENCLOSURE ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; CUTLER-HAMMER PRL1, 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
XX	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



FIRST FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. FURNISH AND INSTALL ONE (1) NEW 30ASP CIRCUIT BREAKER AND ONE (1) NEW 20A2P CIRCUIT BREAKER (MATCH EXISTING) IN EXISTING PANEL SPACE (CIRCUITS #34, #36 & #38) TO SERVE NEW BOILER (B-1), AND NEW WATER HEATER (WH-1). PROVIDE NEW TYPED UPDATED PANEL DIRECTORY FOR PANEL 'LP'.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.

PANEL: 'LP' (EXISTING) — LOCATION: CORRIDOR

NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	ø A	ø B	ø C	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	ø A	ø B	ø C	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	TEST BENCH AREA ROOM 25	20ASP	0			1	2	0			20ASP	CORRIDOR 14	
	TEST BENCH AREA ROOM 25	20ASP		0		3	4		0		20ASP	CORRIDOR 3	
	TEST BENCH AREA ROOM 25	20ASP			0	5	6			0	20ASP	CONFERENCE ROOM 27	
	TEST BENCH AREA ROOM 25	20ASP				7	8				20ASP	BREAK ROOM 28	
	MAP ROOM	20ASP				9	10				20ASP	BREAK ROOM 28	
	CLEAN ROOM 25	20ASP				11	12				20ASP	ROOMS 30, 31	
	CLEAN ROOM 25	20ASP				13	14				20ASP	ROOMS 32, 33	
	TEST BENCH AREA ROOM 40	20ASP				15	16				20ASP	ELEC ROOM 34, MECH ROOM 35	
	TEST BENCH AREA ROOM 40	20ASP				17	18				20ASP	ROOMS 37, 38, 39	
	CORRIDOR, ROOM 40	20ASP				19	20				20ASP	SPARE	
	SPARE	20ASP				21	22				20ASP	SPARE	
	SPARE	20ASP				23	24				20ASP	SPARE	
	SPARE	20ASP				25	26				20ASP	SPARE	
	SPARE	20ASP				27	28				20ASP	SPARE	
	SPARE	20ASP				29	30				20ASP	SPARE	
	SPARE	20ASP				31	32				20ASP	SPARE	
	–	SPACE				33	34			1775	30ASP	BOILER #1 (B-1)	
	–	SPACE				35	36			1000	20A2P	WATER HEATER (WH-1)	
	–	SPACE				37	38	1000					
	–	SPACE				39	40				SPACE	–	
	–	SPACE				41	42				SPACE	–	
	SUB-TOTAL PER ø		0			øA		1000			TOTAL PER ø		*
				0		øB			1775				*
					0	øC				1000			*
	MOUNTING	SURFACE									TOTAL CONNECTED (VA)		*
	LUGS OR CIRCUIT BREAKER	225A M.L.O.									TOTAL CONNECTED (AMPS)		*
	BUS RATING (AMPERES) & TYPE	225A – CU									FEEDER: EXISTING		
	VOLTAGE	120/208V-3ø-4W									OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

mda engineering, inc.
Mechanical
Electrical and
Telecommunications
Engineers
1415 Holland Road
Maumee, Ohio 43537
Phone: (419) 893-3141
Fax: (419) 893-0687
MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 722
MECH ROOM 35
ELECTRICAL

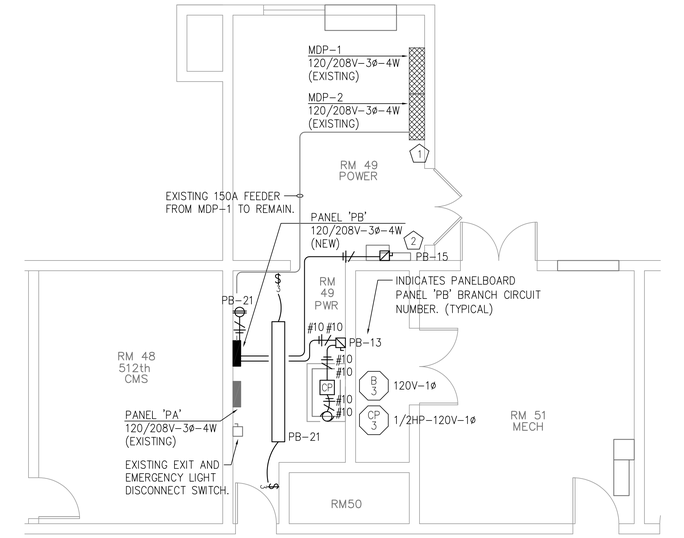
W-5023

SHT 56 OF 63

E722.1

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——+———	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——//———	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←———	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
▬	CIRCUIT BREAKER PANELBOARD; 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
	DUPLEX RECEPTACLE, GROUNDING TYPE, NEMA 5-20R, 20A-120V, 48" A.F.F., SURFACE MOUNTED.
3	3-WAY WALL SWITCH, 20A-120/277V, SURFACE MOUNTED U.N.O.; M.H. 48" A.F.F.
▭	1'x8' INDUSTRIAL LIGHT FIXTURE WITH 4-32W T8 3500'K FLUORESCENT LAMPS WITH WIRE GUARD. LITHONIA #T2EJA-4-32-MVOLT-WG OR EQUAL.
XX	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.

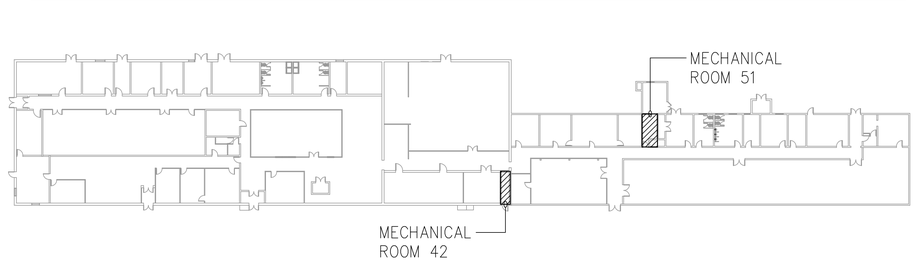


FIRST FLOOR PLAN – MECHANICAL ROOM 51 – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

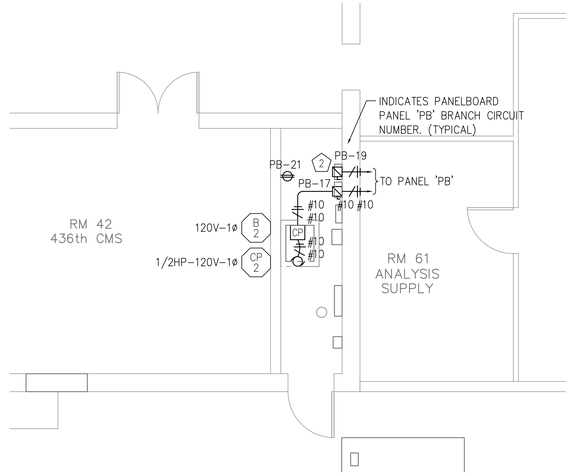
NORTH



KEY PLAN

NO SCALE

NORTH



FIRST FLOOR PLAN – MECHANICAL ROOM 42 – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

PANEL: 'PB'						LOCATION: ROOM 49					
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
1	SPARE	60A2P	0			1	2	0			50A3P	SPARE	1
				0		3	4		0				
1	POWER RAIL #8 ROOM 60	30A2P			0	5	6			0	40A2P	SPARE	1
						7	8						
1	SPARE	20A2P				9	10				30A3P	EXHAUST FAN ELEC ROOM 45a	1
						11	12						
	BOILER #3 (B-3)	30A3P	1656			13	14				20A3P	BTU METER	1
	TRANE PANEL (ROOM 51)	20A3P		500		15	16				20A3P	ATC PANEL	1
	BOILER #2 (B-2)	30A3P			1536	17	18				20A3P	AIR DRYER AIR COMPRESSOR	1
	TRANE PANEL (ROOM 42)	20A3P	500			19	20				20A3P	RECEP - ROOM 46	1
	LIGHTS/RECEP ROOM 51	20A3P		300		21	22				SPACE	–	
	–	SPACE				23	24				SPACE	–	
	–	SPACE				25	26				SPACE	–	
	–	SPACE				27	28				SPACE	–	
	–	SPACE				29	30				SPACE	–	
SUB-TOTAL PER ø			2156			øA	0				TOTAL PER ø		*
				800		øB			0				*
					1536	øC				0			*
MOUNTING		SURFACE									TOTAL CONNECTED (VA)		*
LUGS OR CIRCUIT BREAKER		150A M.C.B.									TOTAL CONNECTED (AMPS)		*
BUS RATING (AMPERES) & TYPE		150A – CU									FEEDER: EXISTING		
VOLTAGE		120/208V-3ø-4W									OPTIONS:		

PANEL SCHEDULE NOTES:

1. EXISTING LOAD.

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

FLOOR PLAN NOTES:

1. REMOVE EXISTING PANEL 'PB' AND FURNISH AND INSTALL NEW PANELBOARD IN PLACE. RECONNECT EXISTING LOADS AND PROVIDE NEW CIRCUIT BREAKERS FOR NEW LOADS. PROVIDE TYPED UPDATED PANEL DIRECTORY FOR PANEL 'PB'.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

mda engineering, inc.
Mechanical
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1415 Holland Road
Maumee, Ohio 43537
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Fax: (419) 893-0687
MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 722
MECH ROOMS 42 & 51 – ELECTRICAL

W-5023

SHT 57 OF 63

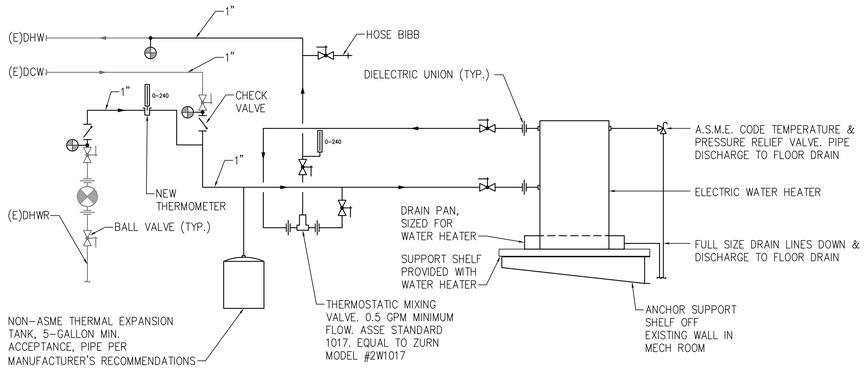
E722.2

ELECTRIC WATER HEATER SCHEDULE

SYMBOL	MANUFACTURER	MODEL NUMBER	STOR. GAL.	ELEMENT OPERATION	No. OF ELEMENTS	KW PER ELEMENT	TOTAL KW	VOLTAGE	LWT °F	REMARKS
WH-1	RHEEM	81VP20S	20	NON-SIMULT.	1	2	2	208v-1ph	100°F	PROVIDE WITH DRAIN PAN AND MANUFACTURER WALL SUPPORT (BRACKET)

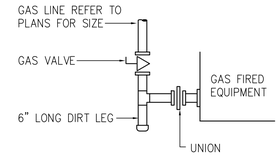
LEGEND AND SYMBOLS

DCW	DOMESTIC COLD WATER PIPING - ABOVE GROUND		PIPE REDUCER
DHW	DOMESTIC HOT WATER PIPING - ABOVE GROUND	FD	FLOOR DRAIN
DHWR	DOMESTIC HOT WATER RETURN PIPING		BALL VALVE
NG	NATURAL GAS PIPING (7"-14" w.c.)		CHECK VALVE
(E)XXX	EXISTING PIPING (w/ SERVICE)		GAS VALVE
	FLOW DIRECTION		UNION
		(x-x)	THERMOMETER w/ RANGE
		(x-x)	PRESSURE GAUGE w/ RANGE
			TEMPERATURE AND PRESSURE RELIEF VALVE
			POINT OF CONNECTION
			POINT OF DISCONNECT



ELECTRIC WATER HEATER DETAIL-MECH 35

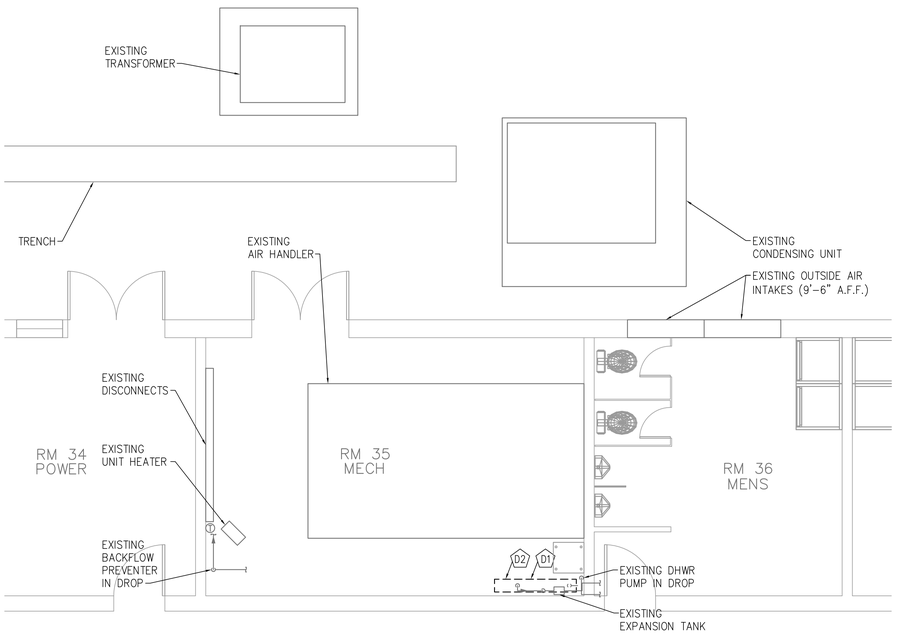
NO SCALE



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE

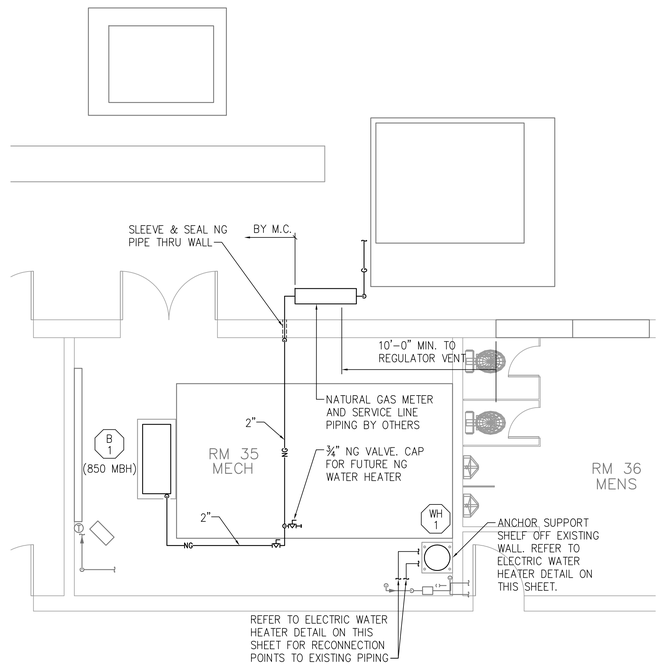


ENLARGED MECHANICAL ROOM 35 - DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH



ENLARGED MECHANICAL ROOM 35 - NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING DEMOLITION NOTES

(D1) REMOVE EXISTING DOMESTIC WATER HEAT EXCHANGER AS INDICATED.

(D2) REMOVE EXISTING DCW, DHW, AND DHWR PIPING, HANGERS, VALVES, ETC. AS INDICATED ON ELECTRIC WATER HEATER DETAIL ON THIS SHEET.

GENERAL NOTES (PLUMBING):

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. ALL WORK SHALL FOLLOW THE 2006 INTERNATIONAL PLUMBING CODE AND ALL APPROPRIATE DOVER AIR FORCE BASE STANDARDS.
5. ALL WORK CONTAINED WITHIN THE PLUMBING DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
6. ALL PIPING PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH WALL FIRE RATING.
7. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
8. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AIR FORCE BASE, MR. LEE DI SALVO, 302-677-6840.
9. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
10. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

100% DESIGN

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MDA #20046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

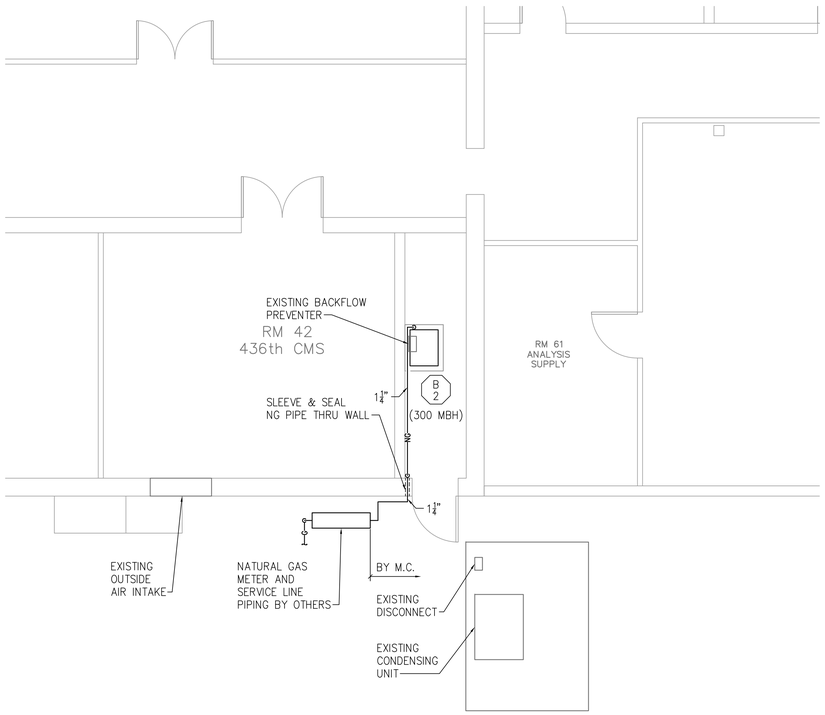
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 722
MECH ROOM 35
PLUMBING

W-5023

SHT 12 OF 63

P722.1

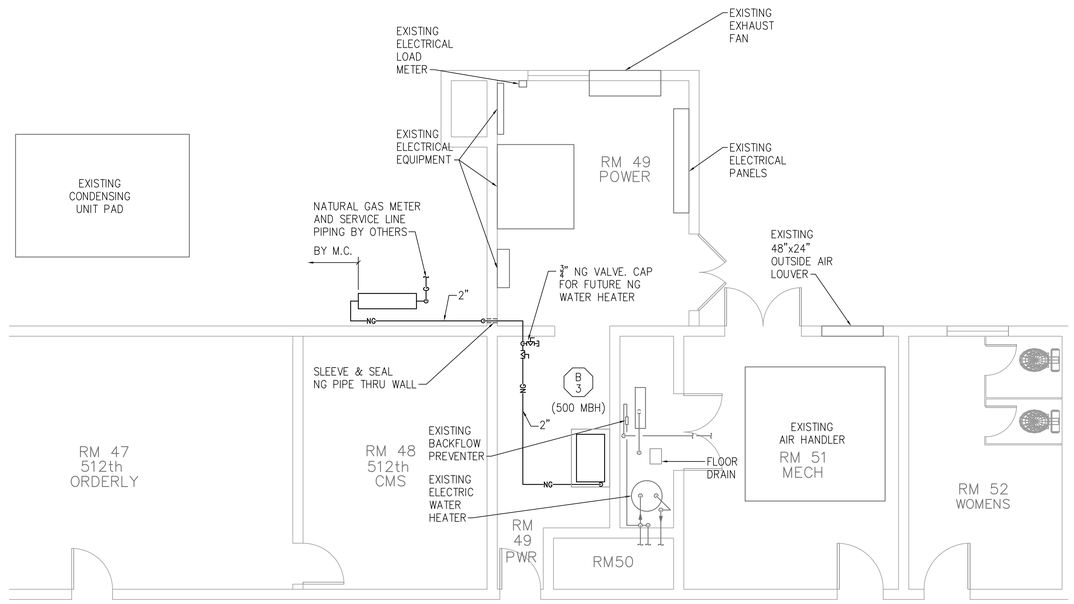


ENLARGED MECHANICAL ROOM 42 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH



ENLARGED MECHANICAL ROOM 51 – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

100% DESIGN

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Electrical and
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Maumee, Ohio 43537
Phone: (419) 893-3141
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MDA #09046

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	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 722
MECH ROOM 42
AND 51–PLBG

W-5023

SHT 13 OF 63

P722.2

HOT WATER UNIT HEATER SCHEDULE

TAG	LOCATION DWG	LOCATION ROOM	TYPE	CFM	EWT °F	LWT °F	MBH	P.G.	GPM	WTR PD (ft.)	VOLTAGE	HP	MAKE	MODEL	REMARKS
UH-1	M724.1	BLDG 724	PROPELLER	900	180	160	43.6	*	4.4	0.17	115/1/60	1/20	TRANE	S-60	PROVIDE LINE VOLTAGE THERMOSTAT WITH UNIT. THERMOSTAT TO HAVE POSITIVE OFF.

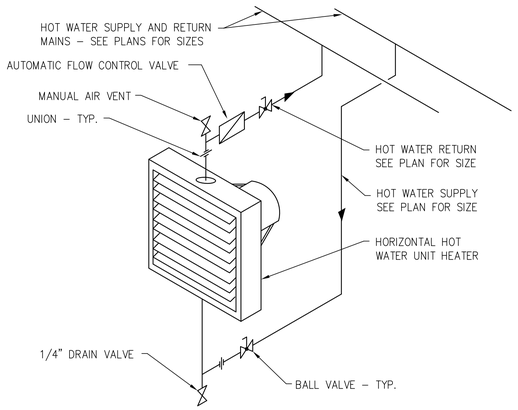
* SYSTEM CONTAINS PROPYLENE GLYCOL. CONCENTRATION TO MAINTAIN MINIMUM 10 DEG. F. FREEZE PROTECTION.

LEGEND AND SYMBOLS

——HWS——	HEATING WATER SUPPLY		BALL VALVE
——HWR——	HEATING WATER RETURN		CHECK VALVE (NON SLAM)
——HTWS——	HIGH TEMPERATURE HOT WATER SUPPLY		GATE VALVE
——HTWR——	HIGH TEMPERATURE HOT WATER RETURN		BUTTERFLY VALVE
——→——	DIRECTION OF FLOW	T	LINE VOLTAGE THERMOSTAT
A.F.F.	ABOVE FINISHED FLOOR		
N.A.	NOT APPLICABLE		
G.C.	GENERAL CONTRACTOR		
E.C.	ELECTRICAL CONTRACTOR		
M.C.	MECHANICAL CONTRACTOR		
P.C.	PLUMBING CONTRACTOR		
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
12. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES, AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
13. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT SYSTEMS, AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

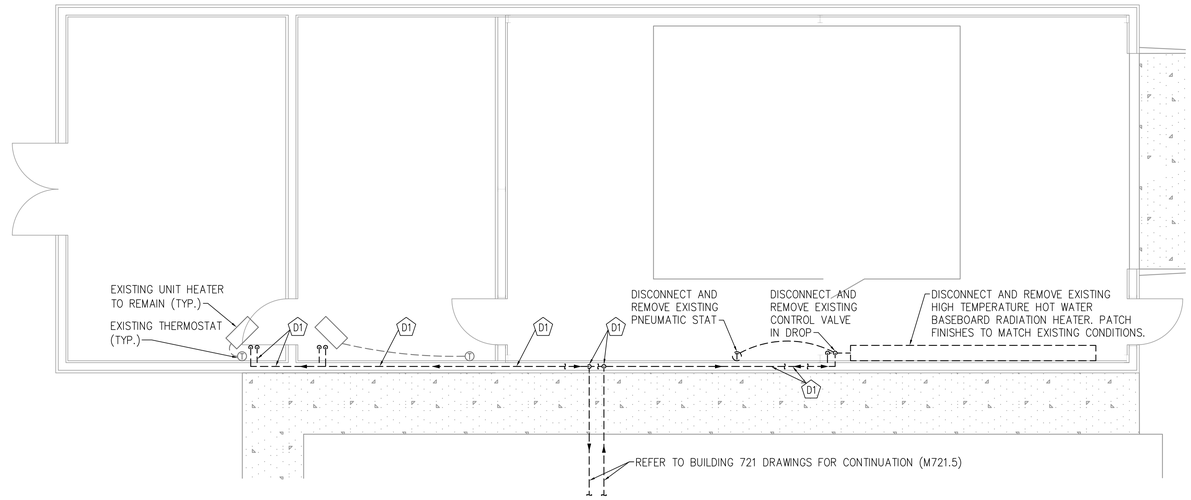


HOT WATER UNIT HEATER PIPING DETAIL

NO SCALE

HOT WATER UNIT HEATER CONTROL SEQUENCE

1. HEATING WATER SHALL FLOW THROUGH UNIT HEATER WHENEVER THE BUILDING AUTOMATION SYSTEM HAS A CALL FOR HEAT.
2. ON A CALL FOR HEAT FROM THE SPACE MOUNTED THERMOSTAT, THE UNIT HEATER FAN SHALL CYCLE AS REQUIRED TO ACHIEVE SPACE TEMPERATURE SET POINT.
3. ONCE SPACE TEMPERATURE SET POINT IS ACHIEVED, THE UNIT FAN SHALL SHUT DOWN.



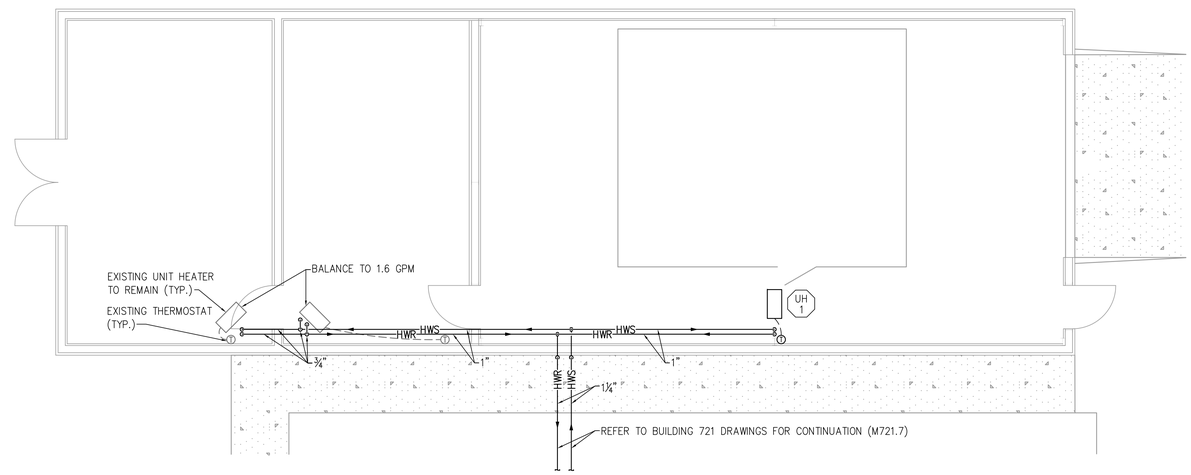
FLOOR PLAN – DEMOLITION

0 2' 4' 8' 1/4" = 1'-0"

NORTH

DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. PATCH FINISHES TO MATCH EXISTING CONDITIONS.



FLOOR PLAN – NEW WORK

0 2' 4' 8' 1/4" = 1'-0"

NORTH

100% DESIGN

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	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 724
FLOOR PLAN
HVAC

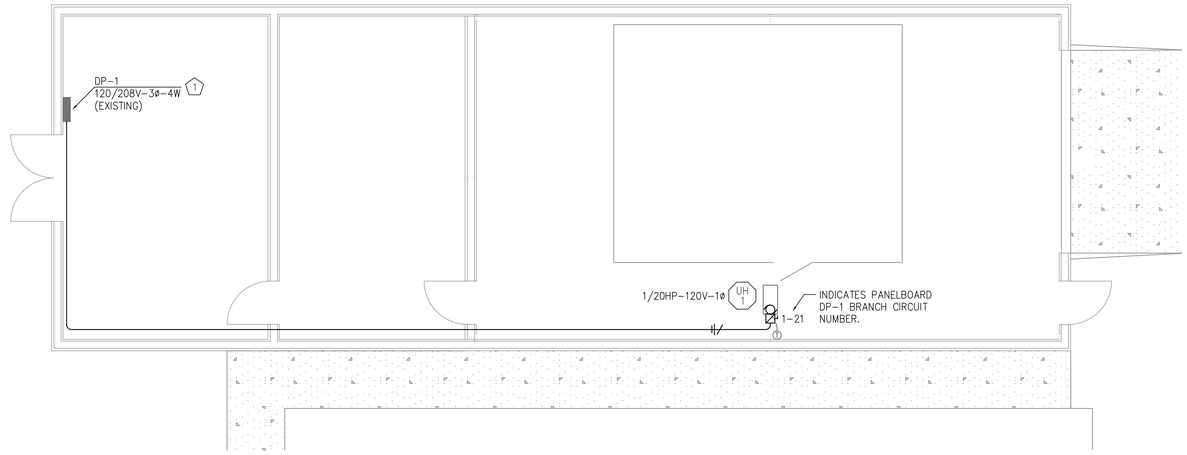
W-5023

SHT 35 OF 63

M724.1

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——+——	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——#/——	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←———	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON–REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; CUTLER–HAMMER PRL1, 120/208V–3ø–4W; SEE PANELBOARD SCHEDULE.
X X	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



PANEL: DP–1 (EXISTING) — LOCATION: ELECTRICAL ROOM

NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	ø A	ø B	ø C	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	ø A	ø B	ø C	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	–	SPACE	0			1	2	0			SPACE	–	
	–	SPACE		0		3	4		0		SPACE	–	
	–	SPACE			0	5	6			0	SPACE	–	
	–	SPACE				7	8				SPACE	–	
	–	SPACE				9	10				SPACE	–	
	–	SPACE				11	12				SPACE	–	
	–	SPACE				13	14				SPACE	–	
	–	SPACE				15	16				SPACE	–	
	–	SPACE				17	18				SPACE	–	
	–	SPACE				19	20				SPACE	–	
	UNIT HEATER	20ASP		360		21	22				20ASP	SPARE	
	COMMUNICATION CABINET	20ASP				23	24				20ASP	SPARE	
	LIGHTING	20ASP				25	26				20ASP	X FAN	
	RECEP DUST COL RM	20ASP				27	28				20ASP	RECEP MECH ROOM	
	UNIT HEATERS	20ASP				29	30				20ASP	SPARE	

SUB–TOTAL PER ø	0	ø A	0	TOTAL PER ø *
	360	ø B	0	*
	0	ø C	0	*
MOUNTING	SURFACE		TOTAL CONNECTED (VA)	*
LUGS OR CIRCUIT BREAKER	100A M.C.B.		TOTAL CONNECTED (AMPS)	*
BUS RATING (AMPERES) & TYPE	100A – CU		FEEDER: EXISTING	
VOLTAGE	120/208V–3ø–4W		OPTIONS:	

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

FIRST FLOOR PLAN – ELECTRICAL

0 2' 4' 8'

1/4" = 1'–0"

NORTH

FLOOR PLAN NOTES:

1. UTILIZE EXISTING SPARE 20ASP CIRCUIT BREAKER (CIRCUIT #21) TO SERVE NEW UNIT HEATER (UH–1). PROVIDE NEW TYPED UPDATED PANEL DIRECTORY FOR PANEL 'DP–1'.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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MDA #29046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'–0"	R. GRAHAM	R. KAYDEN

BLDG 724
FLOOR PLAN
ELECTRICAL

W–5023

SHT 58 OF 63

E724.1

GAS-FIRED HOT WATER BOILER SCHEDULE

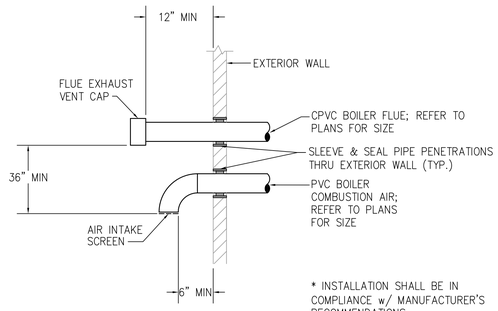
TAG	LOCATION		MBH IN	MBH OUT	EWT °F	LWT °F	GPM	P.G.	OPER. PRESS.	GAS PRESS.	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL			MAKE	MODEL	REMARKS
	DWG	ROOM													VOLTAGE	AMP	MOP			
B-1	M726.2	MECHANICAL ROOM	300	282	140	180	14	N.A.	50 PSI	4"-10.5" w.c.	MODULATING	5:1	4"ø	4"ø	120/1/60	3	15	RAYPAK	H7-300	

PUMP SCHEDULE

TAG	LOCATION		SERVICE	TYPE	GPM	P.G.	HEAD (ft.)	EFF.	SUCTION SIZE	DISCHARGE SIZE	MOTOR			MAKE	SERIES	MODEL	REMARKS
	DWG	ROOM									HP	RPM	VOLTAGE				
CP-1	M726.2	MECHANICAL ROOM	BOILER RECIRC	IN-LINE	14	N.A.	15	---	2"	2"	1/2	3300	115/1/60	B & G	PL	PL-36	

LEGEND AND SYMBOLS

——HWS——	HEATING WATER SUPPLY		BALL VALVE
——HWR——	HEATING WATER RETURN		CHECK VALVE (NON SLAM)
——HTWS——	HIGH TEMPERATURE HOT WATER SUPPLY		GATE VALVE
——HTWR——	HIGH TEMPERATURE HOT WATER RETURN		BUTTERFLY VALVE
——DCW——	DOMESTIC COLD WATER		CIRCUIT SETTER (FLOW AS INDICATED)
——CD——	CONDENSATE DRAIN		PRESSURE GAUGE (w/ RANGE)
——NG——	NATURAL GAS (7"-14" w.c.)		THERMOMETER (w/ RANGE)
——(E)XXX——	EXISTING PIPING (w/ SERVICE)		UNION
——►	DIRECTION OF FLOW		"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
A.F.F.	ABOVE FINISHED FLOOR		RELIEF VALVE
N.A.	NOT APPLICABLE		2-WAY CONTROL VALVE
G.C.	GENERAL CONTRACTOR		3-WAY MIXING VALVE
E.C.	ELECTRICAL CONTRACTOR	CS	CURRENT SWITCH
M.C.	MECHANICAL CONTRACTOR	T	TEMPERATURE SENSOR
P.C.	PLUMBING CONTRACTOR		FLOW SWITCH (FS)
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		FLANGE
O.A.	OUTSIDE AIR		POINT OF CONNECTION
H.W.	HEATING WATER		POINT OF DISCONNECT
H.T.H.W.	HIGH TEMPERATURE HEATING WATER		

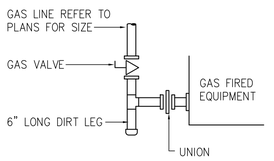


BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH x 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES. AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE

100% DESIGN

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

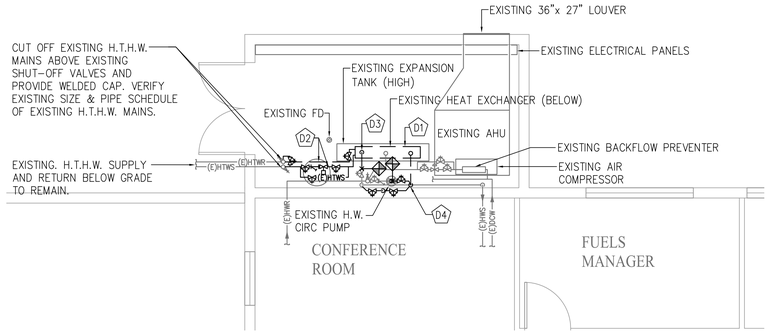
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 726
LEGEND, NOTES & DETAILS

W-5023

SHT 36 OF 63

M726.1



ENLARGED FLOOR PLAN – MECHANICAL ROOM – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH

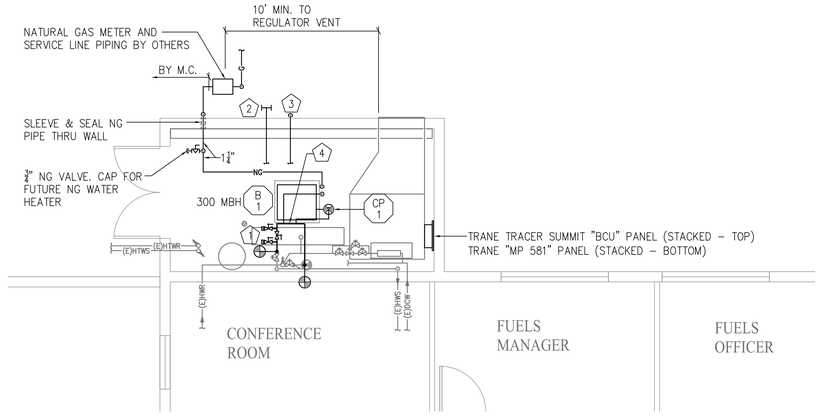
DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, FRAME, PIPING, VALVES, CONTROLS, ETC. COMPLETELY AS INDICATED.

D2 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. COMPLETELY AS INDICATED. CUT OFF EXISTING H.T.H.W. MAINS ABOVE EXISTING SHUT-OFF VALVES AT RISER FROM BELOW GRADE AND PROVIDE WELDED CAP. VERIFY EXISTING SIZE AND PIPE SCHEDULE OF EXISTING H.T.H.W. MAINS. EXISTING H.T.H.W. SUPPLY AND RETURN BELOW GRADE TO REMAIN.

D3 REMOVE EXISTING HWS DROP TO EXISTING HEAT EXCHANGER, REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION IN THIS AREA.

D4 REMOVE EXISTING HWR PIPING AS INDICATED. REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION THIS AREA.



ENLARGED FLOOR PLAN – MECHANICAL ROOM – HVAC

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING REFERENCE NOTES

1 3" TEMPORARY BOILER CONNECTIONS WITH SHUT-OFF VALVES AND MALE CAM-LOCK CONNECTORS. COORDINATE REQUIREMENTS WITH OWNER.

2 4" CPVC FLUE THRU SIDEWALL. REFER TO DETAIL ON SHEET M726.1

3 4" PVC COMBUSTION AIR INTAKE THRU SIDEWALL. REFER TO DETAIL ON SHEET M726.1

4 NEW 1½" HEATING WATER PIPING.

100% DESIGN

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MDA #09046

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	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	A. CRAFT	S. SIMON

BLDG 726
MECH ROOM
HVAC

W-5023

SHT 37 OF 63

M726.2

HEATING PLANT CONTROL SEQUENCES

1. THE SYSTEM LOOP PUMP RUNS CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP (CP-1) IS STARTED AND THE BOILER (B-1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. ALARMS SHALL INCLUDE:
   A. PUMP FAILURE (EACH PUMP).
   B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
   C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
   D. BOILER FAILURE.

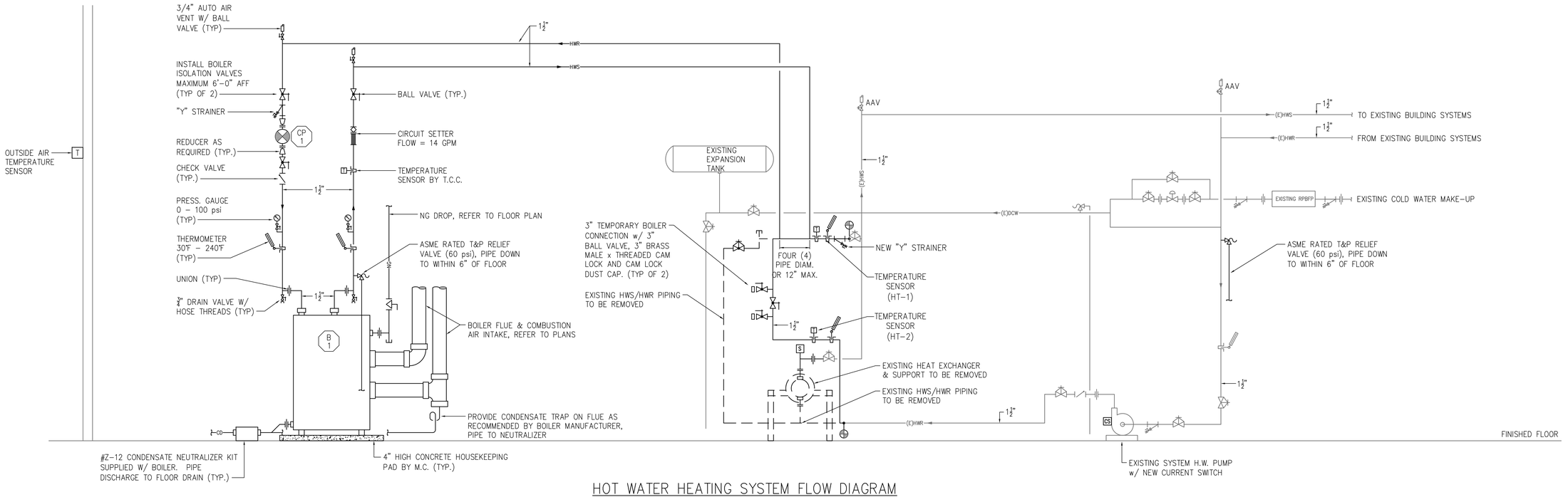
10. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING AND CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

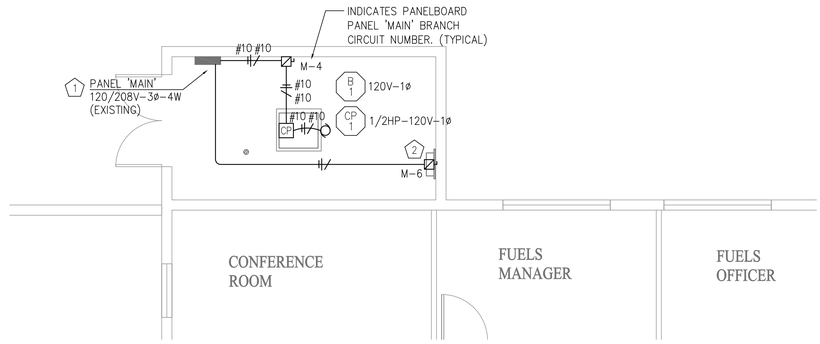
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 726
BOILER DIAGRAM

W-5023
SHT 38 OF 63
M726.3

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; CUTLER-HAMMER 'PRL1', 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
XX	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



ENLARGED FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. UTILIZE EXISTING 30ASP CIRCUIT BREAKER AND 20ASP CIRCUIT BREAKER (CIRCUITS #4 & #6) TO SERVE NEW BOILER #1 (B-1) AND NEW TRANE PANEL. PROVIDE NEW TYPED UPDATED PANEL DIRECTORY FOR PANEL 'MAIN'.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.

PANEL: 'MAIN' (EXISTING)							LOCATION: MECHANICAL ROOM					
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	SPARE	20ASP	0			1	2	0			30ASP	SPARE	
	SPARE	20ASP		0		3	4		1536		30ASP	BOILER #1 (B-1)	
	SPARE	30ASP			0	5	6			500	20ASP	TRANE PANEL	
	SPARE	30ASP				7	8				20ASP	SPARE	
	SPARE	50A3P				9	10				30ASP	SPARE	
						11	12				30ASP	SPARE	
						13	14				30ASP	SPARE	
	SPARE	30ASP				15	16				30ASP	SPARE	
	SPARE	30ASP				17	18				30ASP	SPARE	
	SPARE	30ASP				19	20				30ASP	SPARE	
	SPARE	30ASP				21	22				30ASP	SPARE	
	MECH. ROOM LIGHTS & RECEPS	20ASP				23	24				20ASP	SPARE	
	MECH. ROOM EXHAUST FAN	20ASP				25	26				20ASP	SPARE	
		20ASP				27	28				20ASP	PUMP	
		20ASP				29	30				70A2P	CONTROL FCC	
		20ASP				31	32						
	WATER HEATER	20A2P				33	34				100A2P	LP1	
						35	36						
	LP3	150A3P				37	38				150A3P	LP2	
						39	40						
						41	42						
	SUB-TOTAL PER ø		0			øA	0				TOTAL PER ø		*
				0		øB		1536					*
					0	øC			500				*
	MOUNTING	SURFACE									TOTAL CONNECTED (VA)		*
	LUGS OR CIRCUIT BREAKER	225A M.C.B.									TOTAL CONNECTED (AMPS)		*
	BUS RATING (AMPERES) & TYPE	225A – CU									FEEDER: EXISTING		
	VOLTAGE	120/208V-3ø-4W									OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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MDA #09246

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 726
MECH ROOM
ELECTRICAL

W-5023

SHT 59 OF 63

E726.1

GAS-FIRED HOT WATER BOILER SCHEDULE

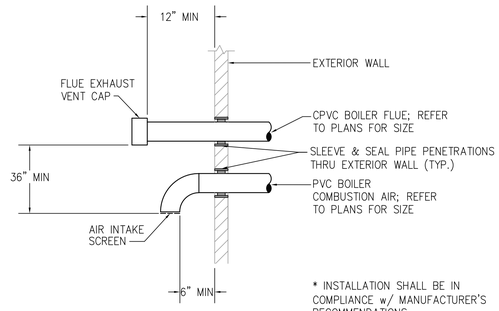
TAG	LOCATION		MBH IN	MBH OUT	EWT °F	LWT °F	GPM	P.G.	OPER. PRESS.	GAS PRESS.	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL			MAKE	MODEL	REMARKS
	DWG	ROOM													VOLTAGE	AMP	MOP			
B-1	M727.2	MECHANICAL ROOM	500	470	140	180	24	N.A.	60 PSI	4"-10.5" w.c.	MODULATING	5:1	4"ø	4"ø	120/1/60	4	20	RAYPAK	H7-500	

PUMP SCHEDULE

TAG	LOCATION		SERVICE	TYPE	GPM	P.G.	HEAD (ft.)	EFF.	IMPELLER	SUCTION SIZE	DISCHARGE SIZE	MOTOR			MAKE	SERIES	MODEL	REMARKS
	DWG	ROOM										HP	RPM	VOLTAGE				
CP-1	M727.2	MECHANICAL ROOM	BOILER RECIRC.	IN-LINE	24	N.A.	20	49.3%	4.75"	1.00"	1.00"	1/2	1750	120/1/60	BELL & GOSSETT	60	1x5-1/4	

LEGEND AND SYMBOLS

			BALL VALVE
HWS			CHECK VALVE (NON SLAM)
HWR	HEATING WATER RETURN		GATE VALVE
HTWS	HIGH TEMPERATURE HOT WATER SUPPLY		BUTTERFLY VALVE
HTWR	HIGH TEMPERATURE HOT WATER RETURN		CIRCUIT SETTER (FLOW AS INDICATED)
DCW	DOMESTIC COLD WATER		PRESSURE GAUGE (w/ RANGE)
CD	CONDENSATE DRAIN		THERMOMETER (w/ RANGE)
NG	NATURAL GAS (7"-14" w.c.)		UNION
(E)XXX	EXISTING PIPING (w/ SERVICE)		"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
	DIRECTION OF FLOW		RELIEF VALVE
A.F.F.	ABOVE FINISHED FLOOR		2-WAY CONTROL VALVE
N.A.	NOT APPLICABLE		3-WAY MIXING VALVE
G.C.	GENERAL CONTRACTOR	CS	CURRENT SWITCH
E.C.	ELECTRICAL CONTRACTOR	T	TEMPERATURE SENSOR
M.C.	MECHANICAL CONTRACTOR		FLOW SWITCH (FS)
P.C.	PLUMBING CONTRACTOR		FLANGE
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		POINT OF CONNECTION
O.A.	OUTSIDE AIR		POINT OF DISCONNECT
H.W.	HEATING WATER		
H.T.H.W.	HIGH TEMPERATURE HEATING WATER		

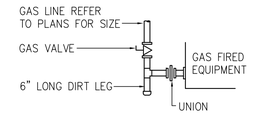


BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE, INTERNATIONAL PLUMBING CODE, AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES, AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE

100% DESIGN

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	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
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DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

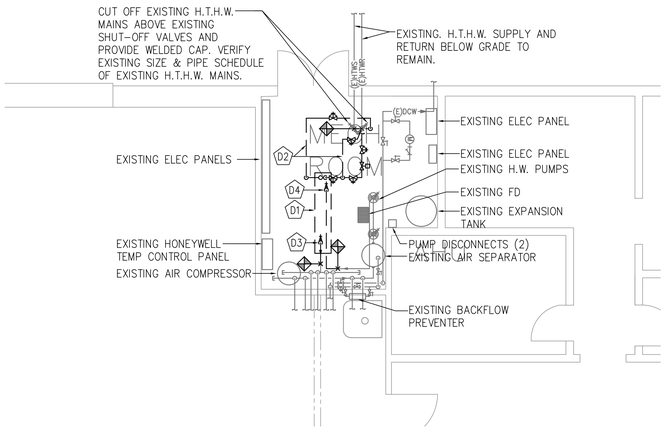
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 727
LEGEND, NOTES & DETAILS

W-5023

SHT 39 OF 63

M727.1

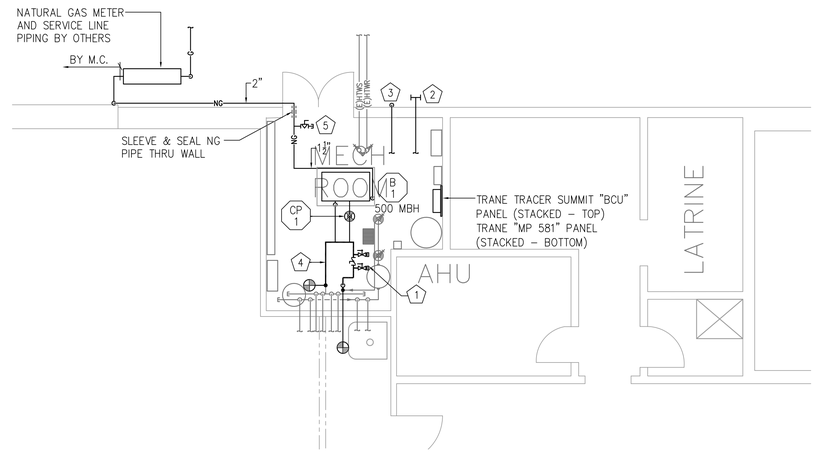


ENLARGED FLOOR PLAN – MECHANICAL ROOM – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH



ENLARGED FLOOR PLAN – MECHANICAL ROOM – HVAC

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, FRAME, PIPING, VALVES, CONTROLS, ETC. COMPLETELY AS INDICATED.

D2 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. COMPLETELY AS INDICATED.

D3 REMOVE EXISTING HWS DROP TO EXISTING HEAT EXCHANGER, REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION IN THIS AREA.

D4 REMOVE EXISTING HWR PIPING AS INDICATED. REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION THIS AREA.

DRAWING REFERENCE NOTES

1 3" TEMPORARY BOILER CONNECTIONS WITH SHUT-OFF VALVES AND MALE CAM-LOCK CONNECTORS. COORDINATE REQUIREMENTS WITH OWNER.

2 4" CPVC FLUE THRU SIDEWALL. MAINTAIN MIN. CLEARANCES TO WINDOWS. REFER TO DETAIL ON SHEET M727.1

3 4" PVC COMBUSTION AIR INTAKE THRU SIDEWALL. REFER TO DETAIL ON SHEET M727.1

4 NEW 3" HEATING WATER PIPING.

5 ¾" NG VALVE. CAP FOR FUTURE NG WATER HEATER.

100% DESIGN

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	A. CRAFT	S. SIMON

BLDG 727
MECH ROOM
HVAC

W-5023

SHT 40 OF 63

M727.2

HEATING PLANT CONTROL SEQUENCES

1. THE SYSTEM LOOP PUMP RUNS CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B-1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER PUMPS (AHU AND RADIATION) ARE TO RUN SIMULTANEOUSLY.

10. ALARMS SHALL INCLUDE:
    - A. PUMP FAILURE (EACH PUMP).
    - B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
    - C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
    - D. BOILER FAILURE.

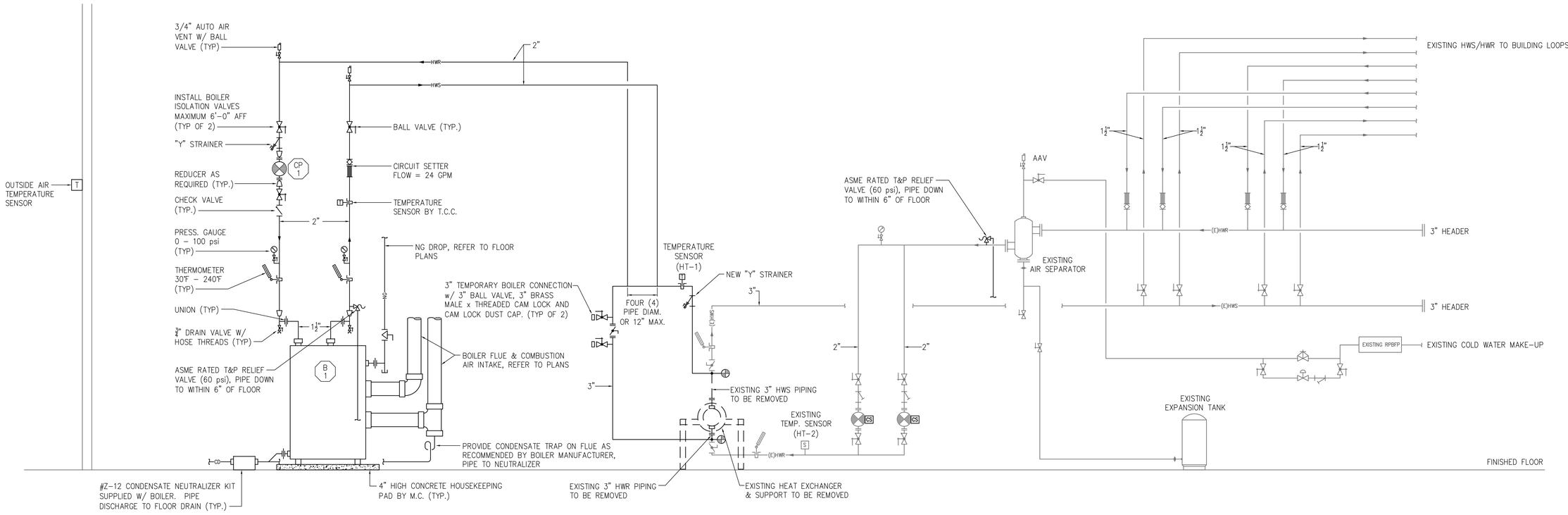
11. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

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AIR MOBILITY COMMAND
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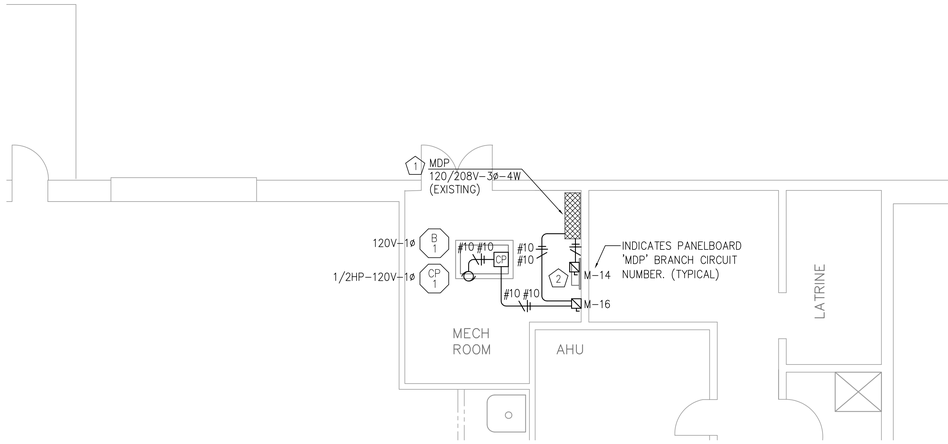
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 727
BOILER DIAGRAM

W-5023
SHT 41 OF 63
M727.3

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; SIEMENS TYPE 'S3', 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
X X	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



PANEL: MDP (EXISTING)						LOCATION: MECHANICAL ROOM					
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
			0			1	2	0					
	OUTSIDE A/C	80A3P		0		3	4		0		100A3P	PP1	
					0	5	6			0			
	PP5	100A3P				7	8						
						9	10				100A3P	PP4	
						11	12						
	FACP	20ASP				13	14	500			20ASP	TRANE PANEL	
	–	SPACE				15	16		1656		30ASP	BOILER #1 (B-1)	
	–	SPACE				17	18				SPACE	–	
	–	SPACE				19	20				SPACE	–	
	–	SPACE				21	22				SPACE	–	
	–	SPACE				23	24				SPACE	–	
	PP2	200A3P				25	26						
						27	28				150A3P	PP3	
						29	30						
	SUB-TOTAL PER ø		0			øA	500				TOTAL PER ø		*
				0		øB		1656					*
					0	øC				0			*
	MOUNTING		SURFACE								TOTAL CONNECTED (VA)		*
	LUGS OR CIRCUIT BREAKER		400A M.C.B.								TOTAL CONNECTED (AMPS)		*
	BUS RATING (AMPERES) & TYPE		400A – CU								FEEDER: EXISTING		
	VOLTAGE		120/208V-3ø-4W								OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
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11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

ENLARGED FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. FURNISH AND INSTALL ONE (1) NEW 20ASP CIRCUIT BREAKER AND ONE (1) NEW 30ASP CIRCUIT BREAKER IN EXISTING PANEL SPACE TO SERVE NEW TRANE PANEL AND NEW BOILER #1 (B-1). PROVIDE NEW TYPED UPDATED PANEL DIRECTORY FOR MDP.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 727
MECH ROOM
ELECTRICAL

W-5023

SHT 60 OF 63

E727.1

GAS–FIRED HOT WATER BOILER SCHEDULE

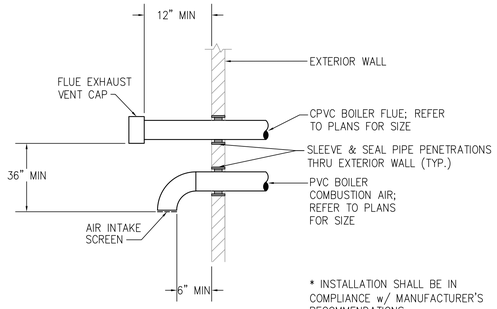
TAG	LOCATION		MBH IN	MBH OUT	EWT °F	LWT °F	GPM	P.G.	OPER. PRESS.	GAS PRESS.	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL			MAKE	MODEL	REMARKS
	DWG	ROOM													VOLTAGE	AMP	MOP			
B–1	M760.2	MECHANICAL ROOM	1,500	1,440	140	180	71	✳	60 PSI	4"–10.5" w.c.	MODULATING	4:1	8"ø	8"ø	120/1/60	26	(2)15	RAYPAK	H7–1505	✳✳

✳ SYSTEM CONTAINS PROPYLENE GLYCOL. BOILER MANUFACTURER TO CONFIRM COMPATIBILITY OF BOILER HEAT EXCHANGER WITH EXISTING GLYCOL SOLUTION.

✳✳ PROVIDE WITH INTEGRAL BOILER WATER CIRCULATION PUMP.

LEGEND AND SYMBOLS

——HWS——	HEATING WATER SUPPLY		BALL VALVE
——HWR——	HEATING WATER RETURN		CHECK VALVE (NON SLAM)
——HTWS——	HIGH TEMPERATURE HOT WATER SUPPLY		GATE VALVE
——HTWR——	HIGH TEMPERATURE HOT WATER RETURN		BUTTERFLY VALVE
——CD——	CONDENSATE DRAIN		CIRCUIT SETTER (FLOW AS INDICATED)
——A——	COMPRESSED AIR		PRESSURE GAUGE (w/ RANGE)
——NG——	NATURAL GAS PIPING (7"–14" w.c.)		THERMOMETER (w/ RANGE)
——(E)XXX——	EXISTING PIPING (w/ SERVICE)		UNION
——►	DIRECTION OF FLOW		"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
			RELIEF VALVE
			2–WAY CONTROL VALVE
A.F.F.	ABOVE FINISHED FLOOR		3–WAY MIXING VALVE
N.A.	NOT APPLICABLE	CS	CURRENT SWITCH
G.C.	GENERAL CONTRACTOR	T	TEMPERATURE SENSOR
E.C.	ELECTRICAL CONTRACTOR		FLOW SWITCH (FS)
M.C.	MECHANICAL CONTRACTOR		FLANGE
P.C.	PLUMBING CONTRACTOR		TRIPLE DUTY VALVE
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		POINT OF CONNECTION
			POINT OF DISCONNECT



BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE, INTERNATIONAL PLUMBING CODE, AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302–677–6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES, AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

100% DESIGN

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MDA #08046

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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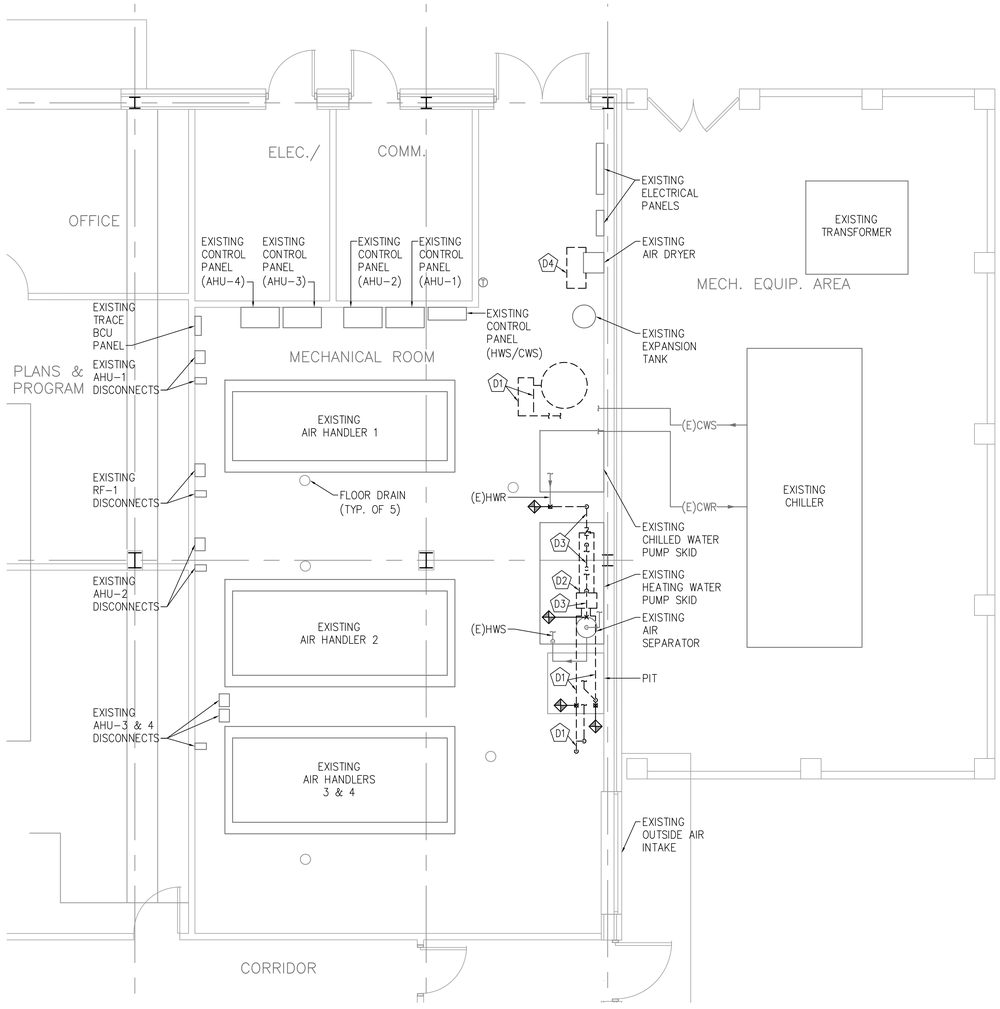
SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

BLDG 760
LEGEND NOTES & DETAILS–HVAC

W–5023
SHT 42 OF 63
M760.1



ENLARGED MECHANICAL ROOM – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH

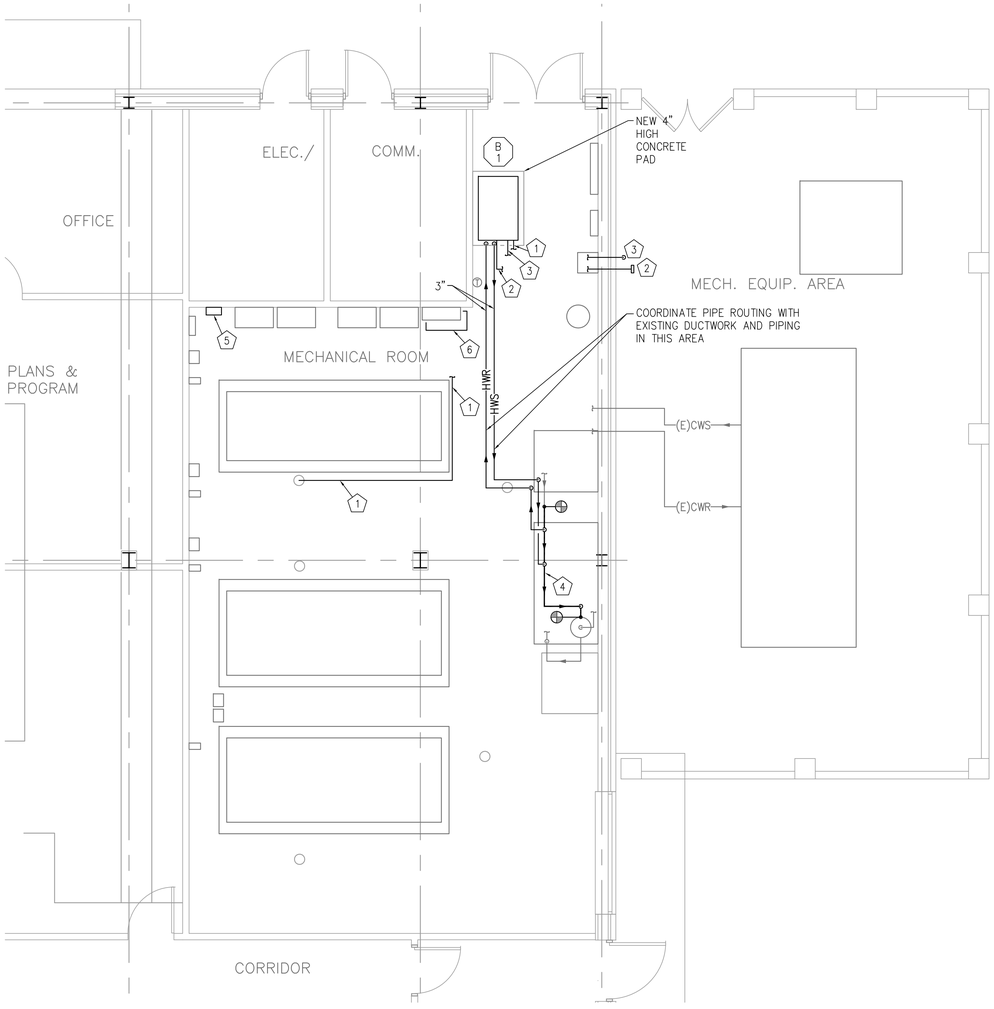
DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. BACK TO SHUT-OFF VALVES AS INDICATED AND PROVIDE WELD CAPS AT VALVES.

D2 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, PIPING, VALVES, CONTROLS, ETC. AS INDICATED.

D3 REMOVE EXISTING HWS AND HWR PIPING, HANGERS, VALVES, ETC. AS INDICATED.

D4 DISCONNECT AND RELOCATE EXISTING AIR COMPRESSOR.



ENLARGED MECHANICAL ROOM – NEW WORK

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING REFERENCE NOTES

1 CONDENSATE PIPING TO BE ROUTED TO NEAREST FLOOR DRAIN. REFER TO FLOW DIAGRAM ON SHEET M760.3 FOR PIPING AND ROUTING REQUIREMENTS.

2 8" CPVC FLUE OVER EXISTING AIR DRYER AND OUT SIDEWALL. REFER TO DETAIL ON SHEET M760.1.

3 8" PVC COMBUSTION AIR INTAKE OVER EXISTING AIR DRYER AND OUT SIDEWALL. REFER TO DETAIL ON SHEET M760.1.

4 NEW 4" HEATING WATER PIPING.

5 NEW TRANE "MP-581" PANEL.

6 RELOCATED AIR COMPRESSOR. RECONNECT TO EXISTING AIR DRYER WITH NEW $\frac{1}{4}$" COPPER TUBING.

100% DESIGN

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MDA #09046

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	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	B. RUFF	C. GOSHE

BLDG 760
MECH ROOM
HVAC

W-5023

SHT 43 OF 63

M760.2

HEATING PLANT CONTROL SEQUENCES

1. THE SYSTEM LOOP PUMP RUNS CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE OR CALL FOR BUILDING REHEAT. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B-1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT-1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM-UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER LOOP PUMPS ARE PRIMARY AND STANDBY AND ARE NOT TO RUN SIMULTANEOUSLY. THE BAS WILL START THE STANDBY PUMP IF THE PRIMARY PUMP FAILS. PROVIDE AUTOMATIC LEAD/LAG CONTROL THROUGH THE BAS WITH WEEKLY ROTATION TO REVERSE ORDER OF PUMP OPERATION AND MAINTAIN EVEN RUN TIMES.

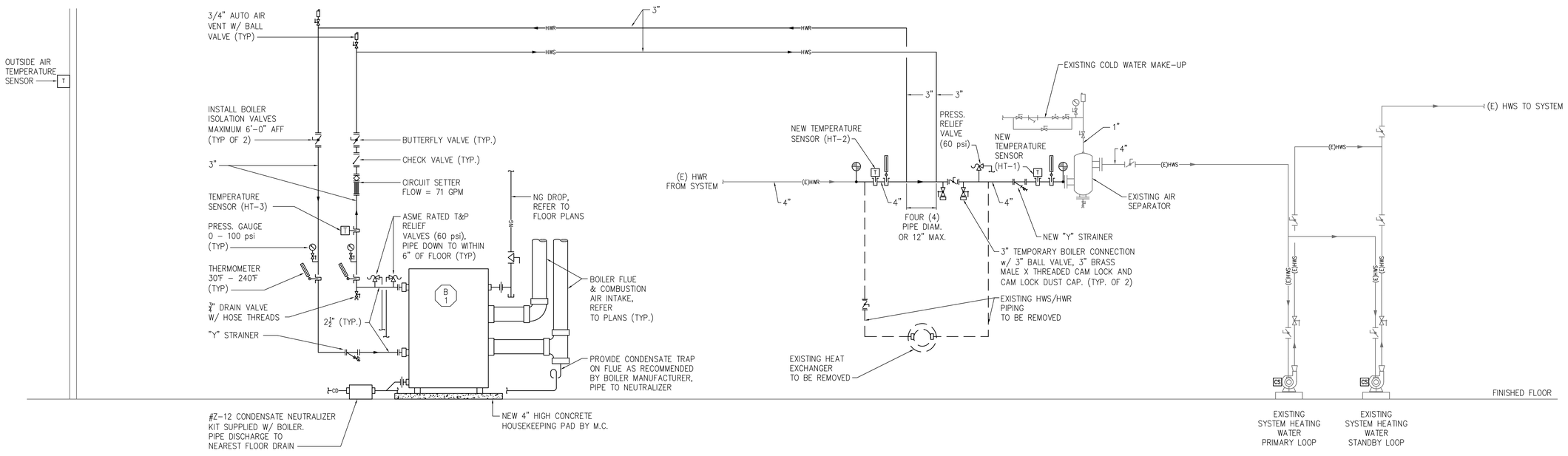
10. ALARMS SHALL INCLUDE:
    - A. PUMP FAILURE (EACH PUMP).
    - B. HIGH WATER SUPPLY TEMPERATURE (HT-1) (200 DEG. F. ADJ).
    - C. LOW WATER RETURN TEMPERATURE (HT-2) (100 DEG. F. ADJ).
    - D. BOILER FAILURE.

11. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

6. REPLENISH SYSTEM WITH PROPYLENE GLYCOL TO MAINTAIN FREEZE PROTECTION TO 10 DEG F.

100% DESIGN

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AIR MOBILITY COMMAND
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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	B. RUFF	C. GOSHE

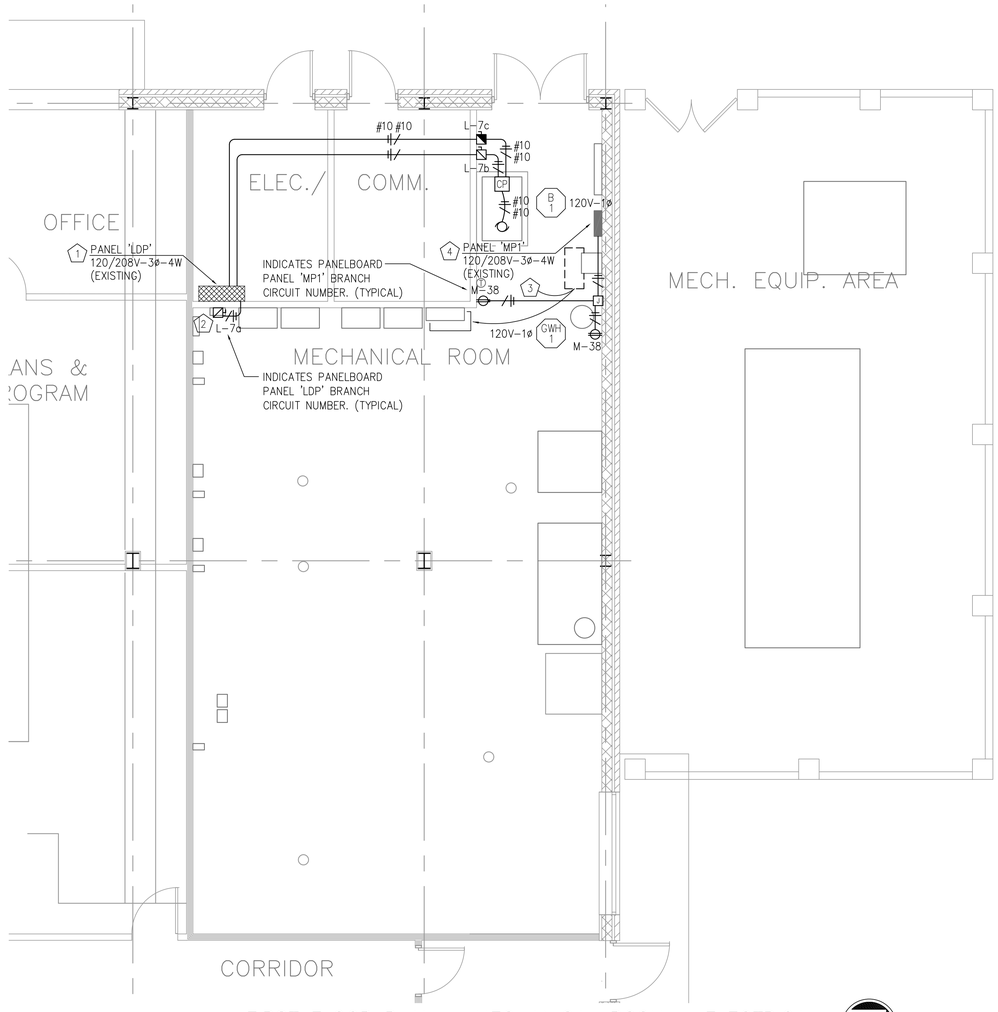
BLDG 760
BOILER DETAILS
HVAC

W-5023
SHT 44 OF 63

M760.3

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——|——	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——//——	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←———	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	30A MANUAL MOTOR STARTER SWITCH, HORSEPOWER RATED WITH OVERLOADS, PILOT LIGHTED, NEMA 1 ENCLOSURE ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; SQUARE D 'I-LINE', 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
	EXISTING CIRCUIT BREAKER PANELBOARD; SQUARE D 'NQOD', 120/208V-3ø-4W.
	DUPLEX RECEPTACLE, GROUNDING TYPE, NEMA 5-20R, 20A-120V, 48" A.F.F., SURFACE MOUNTED.
X X	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



FIRST FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. FURNISH AND INSTALL TWO (2) NEW 20ASP CIRCUIT BREAKERS AND ONE (1) NEW 25ASP CIRCUIT BREAKER IN EXISTING PANEL SPACE TO SERVE NEW TRANE PANEL, HEATER (B-1) AND HEATER PUMP (B-1). PROVIDE EMBOSSED PLASTIC LAMINATE LABEL(S) FOR NEW CIRCUIT BREAKER(S) IN PANEL 'LDP'.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.
3. E.C. TO DISCONNECT EXISTING AIR COMPRESSOR TO BE RELOCATED BY M.C. FURNISH AND INSTALL NEW 2#12 & 1#12G-3/4"C TO NEW AIR COMPRESSOR LOCATION.
4. FURNISH AND INSTALL ONE (1) NEW 20ASP CIRCUIT BREAKER IN EXISTING PANEL SPACE (CIRCUIT #38) TO SERVE NEW RECEPTACLES FOR NEW WATER HEATER (GWH-1) AND RELOCATED AIR COMPRESSOR PURGE VALVE. PROVIDE NEW TYPED UPDATED PANEL DIRECTORY FOR PANEL 'MP1'.

PANEL: 'LDP' (EXISTING) — **LOCATION: ELEC ROOM**

NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	ø A	ø B	ø C	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	ø A	ø B	ø C	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	SPARE	100A3P	0			1	2	0			100A3P	LP1A	
				0					0				
					0					0			
	LP2A	150A3P				3	4				150A3P	LP2B	
	LP1B	150A3P				5	6				150A3P	SPARE	
	TRANE PANEL	20ASP	500			7a							
	HEATER (B-1)	15ASP		1320		7b	8				SPACE	–	
	HEATER PUMP (B-1)	25ASP			1656	7c							
	–	SPACE				9	10				SPACE	–	
	–	SPACE				11	12				SPACE	–	
	–	SPACE				13	14				SPACE	–	
	–	SPACE				15	16				SPACE	–	
	SUB-TOTAL PER ø		500			ø A	0				TOTAL PER ø		*
				1320		ø B		0					*
					1656	ø C				0			*
	MOUNTING	SURFACE									TOTAL CONNECTED (VA)		*
	LUGS OR CIRCUIT BREAKER	400A M.C.B.									TOTAL CONNECTED (AMPS)		*
	BUS RATING (AMPERES) & TYPE	400A – CU									FEEDER: EXISTING		
	VOLTAGE	120/208V-3ø-4W									OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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Mechanical Electrical and Telecommunications Engineers
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Phone: (419) 893-3141
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MDA F0246

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 760
MECH ROOM
ELECTRICAL

W-5023

SHT 61 OF 63

E760.1

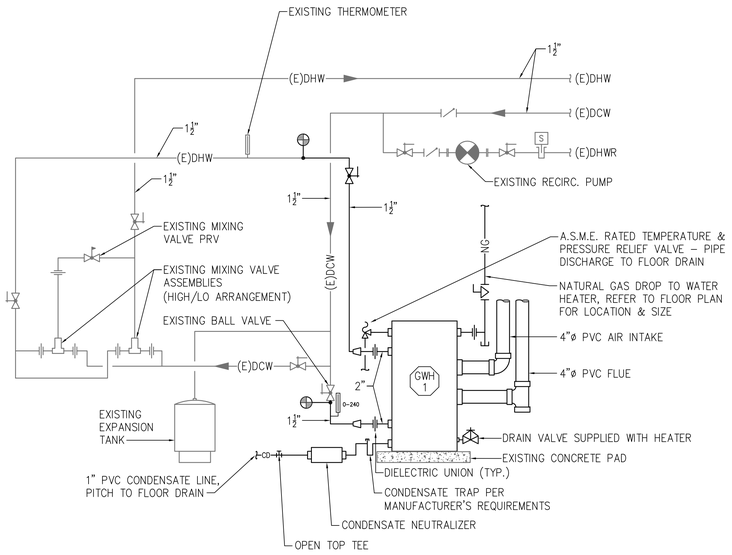
NATURAL GAS–FIRED WATER HEATER SCHEDULE

SYMBOL	MANUFACTURER	MODEL NUMBER	BTU INPUT	STOR. GAL.	RECOVERY GPH @ 100° F	THERMAL EFFICIENCY	NAT'L. GAS CONNECTION	FLUE CONNECTION	COMB. AIR CONNECTION	LWT ° F	VOLTAGE
GWH–1	RHEEM	GHE100–200 ✳	199,000	100	229	95%	3/4"	4" PVC	4" PVC	140° F	120v/1/60

✳ PROVIDE CONDENSATE NEUTRALIZER

LEGEND AND SYMBOLS

DCW	DOMESTIC COLD WATER PIPING – ABOVE GROUND		PIPE REDUCER
DHW	DOMESTIC HOT WATER PIPING – ABOVE GROUND	FD	FLOOR DRAIN
DHWR	DOMESTIC HOT WATER RETURN PIPING		BALL VALVE
NG	NATURAL GAS PIPING (7"–14" w.c.)		CHECK VALVE
(E)XXX	EXISTING PIPING (w/ SERVICE)	S	GAS VALVE
	FLOW DIRECTION		UNION
CD	CONDENSATE DRAIN	(x-x)	THERMOMETER w/ RANGE
		(x-x)	PRESSURE GAUGE w/ RANGE
			TEMPERATURE AND PRESSURE RELIEF VALVE
			POINT OF CONNECTION
			POINT OF DISCONNECT



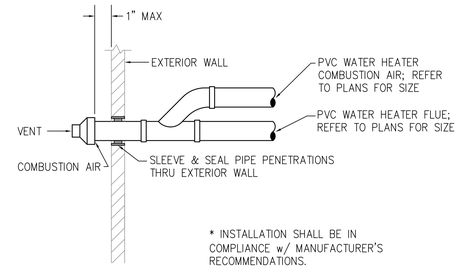
GAS FIRED WATER HEATER DETAIL

NO SCALE

NOTE:
INSTALL ALL NEW EQUIPMENT IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS.

GENERAL NOTES (PLUMBING):

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. ALL WORK SHALL FOLLOW THE 2006 INTERNATIONAL PLUMBING CODE AND ALL APPROPRIATE DOVER AIR FORCE BASE STANDARDS.
5. ALL WORK CONTAINED WITHIN THE PLUMBING DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
6. ALL PIPING PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH WALL FIRE RATING.
7. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH BY 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
8. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AIR FORCE BASE, MR. LEE DI SALVO, 302–677–6840.
9. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
10. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

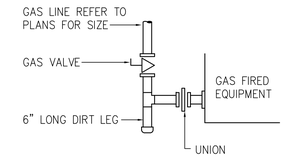


* INSTALLATION SHALL BE IN COMPLIANCE w/ MANUFACTURER'S RECOMMENDATIONS.

WATER HEATER SIDEWALL CONCENTRIC VENT/INTAKE DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE

100% DESIGN

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MDA #08046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	BRR	KPL
	18Jun10	ISSUED FOR 95% REVIEW	BRR	KPL
	30Apr10	ISSUED FOR 65% REVIEW	BRR	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

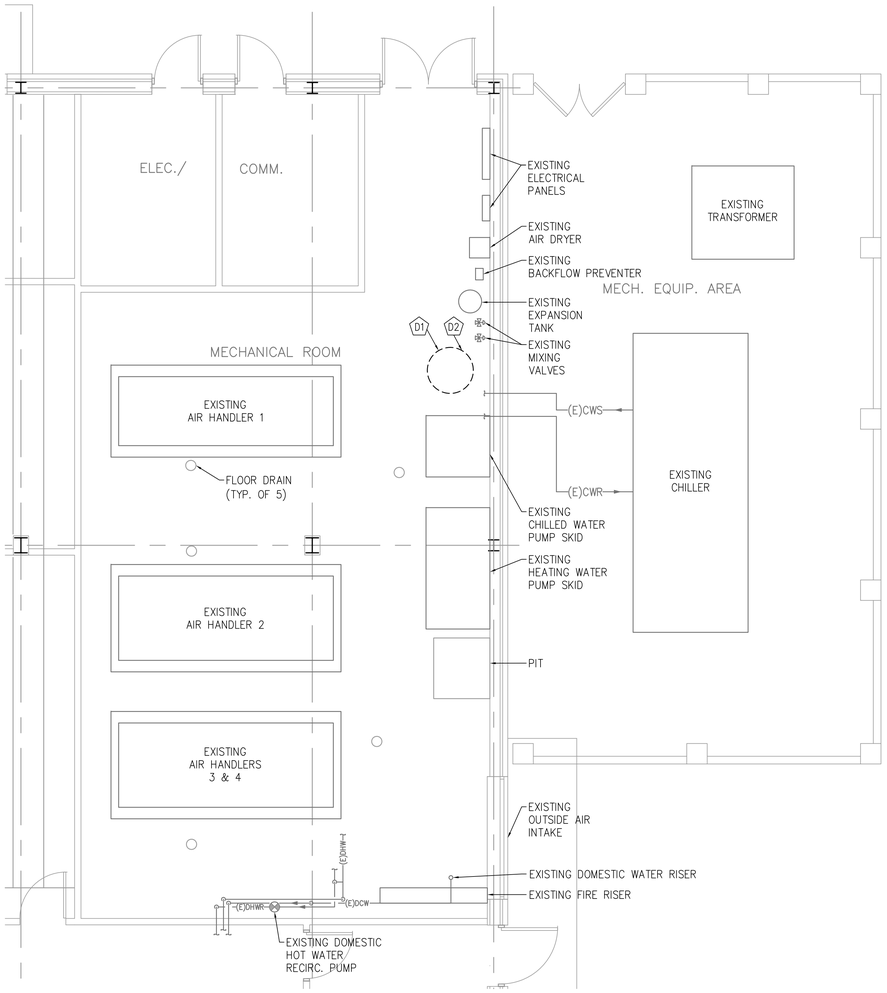
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'–0"	B. RUFF	C. GOSHE

BLDG 760
DETAILS
PLUMBING

W–5023
SHT 14 OF 63
P760.1



FIRST FLOOR PLAN – MECHANICAL ROOM DEMOLITION

0 2' 4' 8'

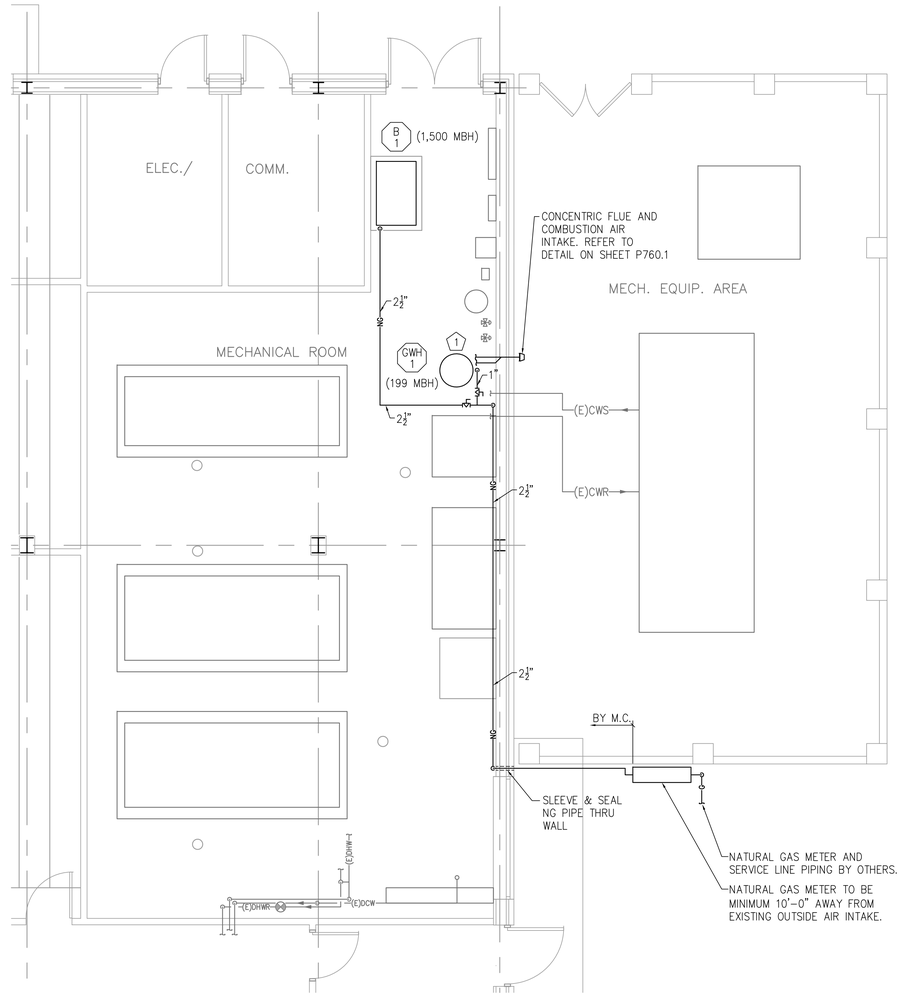
1/4" = 1'–0"

NORTH

DRAWING DEMOLITION NOTES

D1 DISCONNECT AND REMOVE EXISTING WATER HEATER.

D2 REMOVE EXISTING DCW, DHW, AND DHWR PIPING, HANGERS, VALVES, ETC. AS INDICATED ON P760.1.



FIRST FLOOR PLAN – MECHANICAL ROOM NEW WORK

0 2' 4' 8'

1/4" = 1'–0"

NORTH

DRAWING REFERENCE NOTES

1 REFER TO GAS FIRED WATER HEATER DETAIL ON SHEET P760.1 FOR PIPING REQUIREMENTS.

100% DESIGN

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Telecommunications
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MDA #09046

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AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

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DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'–0"	B. RUFF	C. GOSHE

BLDG 760
MECH ROOM
PLUMBING

W–5023

SHT 15 OF 63

P760.2

GAS-FIRED HOT WATER BOILER SCHEDULE

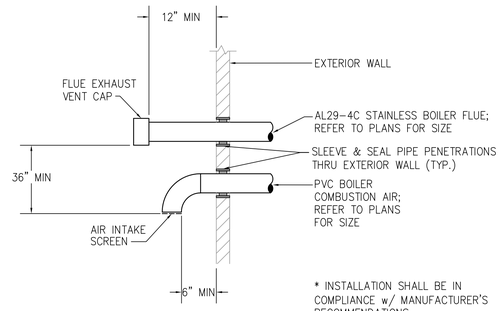
TAG	LOCATION DWG	LOCATION ROOM	MBH IN	MBH OUT	EWT °F	LWT °F	GPM	P.G.	OPER. PRESS.	GAS PRESS.	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL VOLTAGE	ELECTRICAL AMP	ELECTRICAL MOP	MAKE	MODEL	REMARKS
B-1	M793.2	MECHANICAL ROOM	1,500	1,305	140	180	65	N.A.	60 PSI	4"-10.5" w.c.	MODULATING	4:1	8"ø	8"ø	120/1/60	12	20	RAYPAK	H7-1503	NON-CONDENSING BOILER

PUMP SCHEDULE

TAG	LOCATION DWG	LOCATION ROOM	SERVICE	TYPE	GPM	P.G.	HEAD (ft.)	EFF.	IMPELLER	SUCTION SIZE	DISCHARGE SIZE	MOTOR HP	MOTOR RPM	MOTOR VOLTAGE	MAKE	SERIES	MODEL	REMARKS
CP-1	M793.2	MECHANICAL ROOM	BOILER RECIRC.	IN-LINE	65	N.A.	30	70%	4.75"	2"	2"	3/4	1750	120/1/60	BELL & GOSSETT	60	2x2x5-1/4	

LEGEND AND SYMBOLS

HWS	HEATING WATER SUPPLY		BALL VALVE
HWR	HEATING WATER RETURN		CHECK VALVE (NON SLAM)
HTWS	HIGH TEMPERATURE HOT WATER SUPPLY		GATE VALVE
HTWR	HIGH TEMPERATURE HOT WATER RETURN		BUTTERFLY VALVE
DCW	DOMESTIC COLD WATER		CIRCUIT SETTER (FLOW AS INDICATED)
CD	CONDENSATE DRAIN		PRESSURE GAUGE (w/ RANGE)
NG	NATURAL GAS (7"-14" w.c.)		THERMOMETER (w/ RANGE)
(E)XXX	EXISTING PIPING (w/ SERVICE)		UNION
	DIRECTION OF FLOW		"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
A.F.F.	ABOVE FINISHED FLOOR		RELIEF VALVE
N.A.	NOT APPLICABLE		2-WAY CONTROL VALVE
G.C.	GENERAL CONTRACTOR		3-WAY MIXING VALVE
E.C.	ELECTRICAL CONTRACTOR	CS	CURRENT SWITCH
M.C.	MECHANICAL CONTRACTOR	T	TEMPERATURE SENSOR
P.C.	PLUMBING CONTRACTOR		FLOW SWITCH (FS)
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		FLANGE
O.A.	OUTSIDE AIR		POINT OF CONNECTION
H.W.	HEATING WATER		POINT OF DISCONNECT
H.T.H.W.	HIGH TEMPERATURE HEATING WATER		

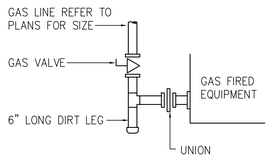


BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH x 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES. AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE

100% DESIGN

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REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

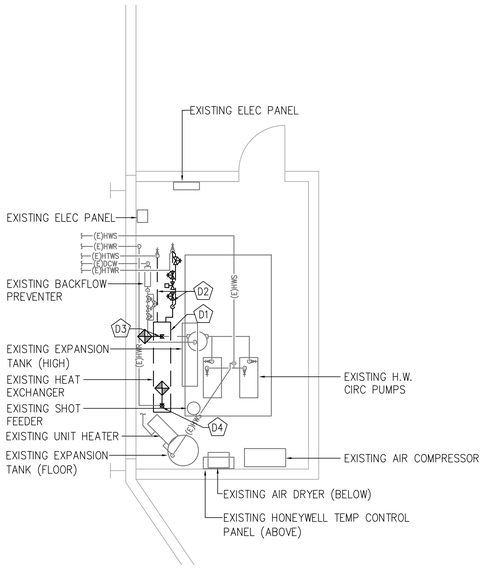
TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 793
LEGEND, NOTES & DETAILS

W-5023
SHT 45 OF 63
M793.1

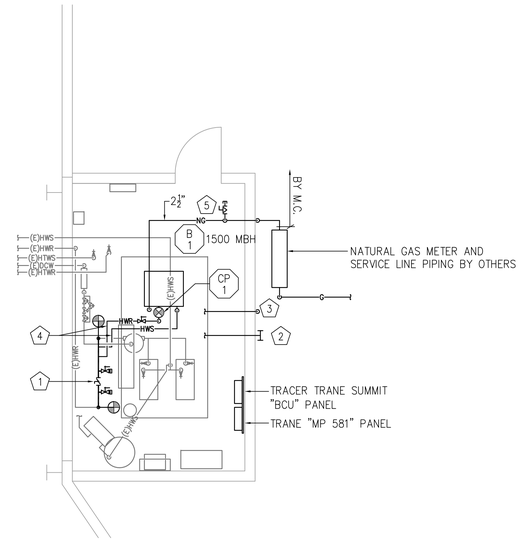


FIRST FLOOR PLAN – MECHANICAL ROOM – DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH



FIRST FLOOR PLAN – MECHANICAL ROOM – HVAC

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, FRAME, PIPING, VALVES, CONTROLS, ETC. COMPLETELY AS INDICATED.

D2 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, VALVES, ETC. COMPLETELY AS INDICATED. CUT OFF EXISTING H.T.H.W. MAINS ABOVE EXISTING SHUT-OFF VALVES AT RISER AND PROVIDE WELDED CAP. VERIFY EXISTING SIZE AND PIPE SCHEDULE OF EXISTING H.T.H.W. MAINS. EXISTING H.T.H.W. SUPPLY AND RETURN BELOW GRADE TO REMAIN.

D3 REMOVE EXISTING HWS DROP TO EXISTING HEAT EXCHANGER, REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION IN THIS AREA.

D4 REMOVE EXISTING HWR PIPING AS INDICATED. REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION THIS AREA.

DRAWING REFERENCE NOTES

1 3" TEMPORARY BOILER CONNECTIONS WITH SHUT-OFF VALVES AND MALE CAM-LOCK CONNECTORS. COORDINATE REQUIREMENTS WITH OWNER.

2 8" AL29-4C FLUE THRU SIDEWALL. REFER TO DETAIL ON SHEET M793.1

3 8" PVC COMBUSTION AIR INTAKE THRU SIDEWALL. REFER TO DETAIL ON SHEET M793.1

4 NEW 2½" HEATING WATER PIPING.

5 ¾" NG VALVE. CAP FOR FUTURE NG WATER HEATER.

100% DESIGN

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REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	A. CRAFT	S. SIMON

BLDG 793
MECH ROOM
HVAC

W-5023

SHT 46 OF 63

M793.2

HEATING PLANT CONTROL SEQUENCES

1. THE SYSTEM LOOP PUMP RUNS CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B–1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT–1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM–UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER LOOP PUMPS ARE PRIMARY AND STANDBY AND ARE NOT TO RUN SIMULTANEOUSLY. THE BAS WILL START THE STANDBY PUMP IF THE PRIMARY PUMP FAILS. PROVIDE AUTOMATIC LEAD/LAG CONTROL THROUGH THE BAS WITH WEEKLY ROTATION TO REVERSE ORDER OF OPERATION AND MAINTAIN EVEN RUN TIMES.

10. ALARMS SHALL INCLUDE:
    A. PUMP FAILURE (EACH PUMP).
    B. HIGH WATER SUPPLY TEMPERATURE (HT–1) (200 DEG. F. ADJ).
    C. LOW WATER RETURN TEMPERATURE (HT–2) (100 DEG. F. ADJ).
    D. BOILER FAILURE.

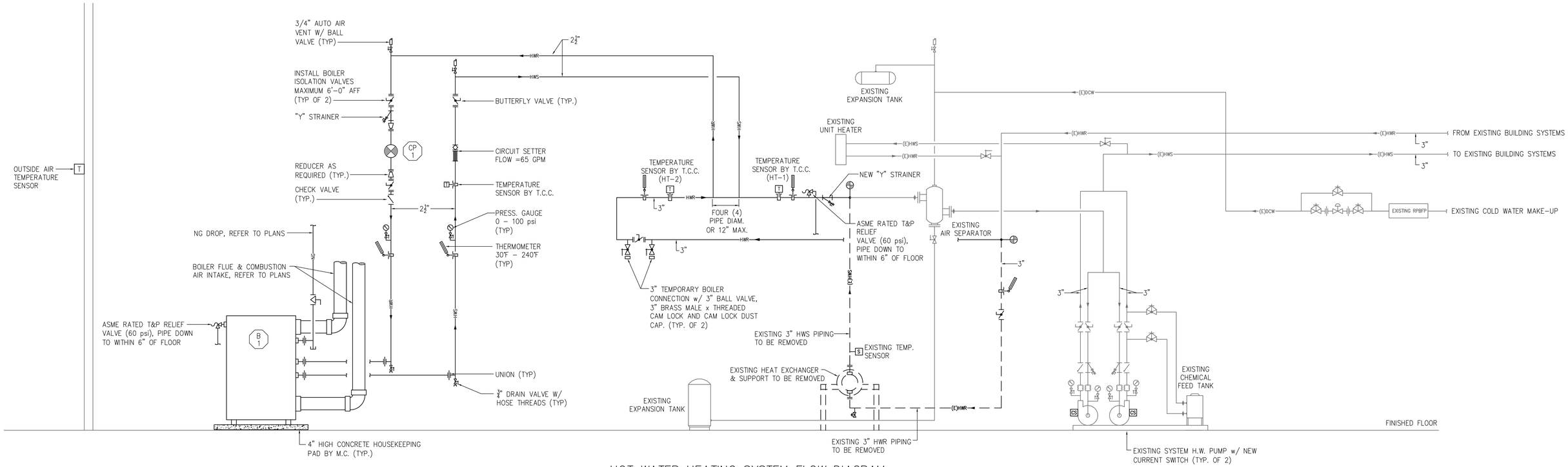
11. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

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MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

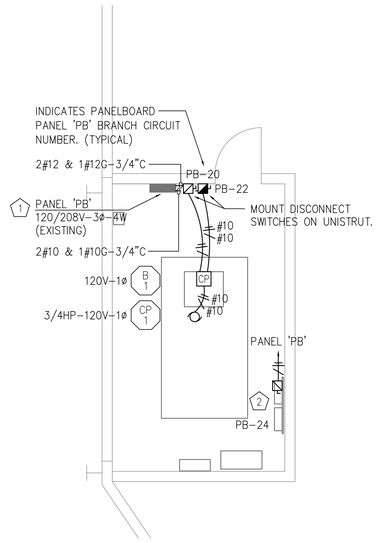
BLDG 793
BOILER DIAGRAM

W–5023
SHT 47 OF 63

M793.3

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——+———	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——//———	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←———	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
J	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
J	30A MANUAL MOTOR STARTER SWITCH, HORSEPOWER RATED WITH OVERLOADS, PILOT LIGHTED, NEMA 1 ENCLOSURE ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; SIEMENS BG24MB4100STM, 120/208V-3ø-4W; SEE PANELBOARD SCHEDULE.
XX	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



PANEL: 'PB' (EXISTING)							LOCATION: MECHANICAL ROOM						
NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	HONEYWELL FEED	20ASP	0			1	2	0			20ASP	OUTLETS AND AIR COMPRESSOR	
	LIGHTS AND EMERGENCY LIGHTS	20ASP		0		3	4		0		20ASP	UNIT HEATER	
	FLOWMETER CONTROL	20ASP			0	5	6			0	20ASP	EXTERIOR RECEPTACLE	
	SPARE	20ASP				7	8						
	PUMP #2	20A3P				9	10				20A3P	PUMP #1	
						11	12						
						13	14						
	–	SPACE				15	16				20A3P	SPARE	
	–	SPACE				17	18						
	–	SPACE				19	20	660			15ASP	HEATER (B-1)	
	–	SPACE				21	22		1656		25ASP	HEATER PUMP (CP-1)	
	–	SPACE				23	24			500	20ASP	TRANE PANEL	
	SUB-TOTAL PER ø		0			øA	660				TOTAL PER ø		*
				0		øB		1656					*
					0	øC			500				*
	MOUNTING	SURFACE									TOTAL CONNECTED (VA)		*
	LUGS OR CIRCUIT BREAKER	100A M.C.B.									TOTAL CONNECTED (AMPS)		*
	BUS RATING (AMPERES) & TYPE	100A – CU									FEEDER: EXISTING		
	VOLTAGE	120/208V-3ø-4W									OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

FIRST FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. FURNISH AND INSTALL ONE (1) NEW 15ASP CIRCUIT BREAKER, ONE (1) 20ASP CIRCUIT BREAKER AND ONE (1) NEW 25ASP CIRCUIT BREAKER IN EXISTING PANEL SPACE TO SERVE NEW TRANE PANEL, HEATER (B-1) AND HEATER PUMP (CP-1). PROVIDE TYPED NEW UPDATED PANEL DIRECTORY FOR PANEL 'PB'.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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MDA #09246

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	RDG	RST
	18Jun10	ISSUED FOR 95% REVIEW	RDG	RST
	30Apr10	ISSUED FOR 65% REVIEW	RDG	RST

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 793
MECH ROOM
ELECTRICAL

W-5023

SHT 62 OF 63

E793.1

GAS-FIRED HOT WATER BOILER SCHEDULE

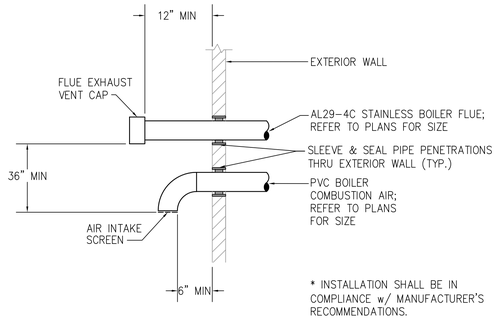
TAG	LOCATION		MBH IN	MBH OUT	EWT °F	LWT °F	GPM	P.G.	OPER. PRESS.	GAS PRESS.	CONT. TYPE	TURNDOWN	FLUE SIZE	AIR INLET SIZE	ELECTRICAL			MAKE	MODEL	REMARKS
	DWG	ROOM													VOLTAGE	AMP	MOP			
B-1	M794.2	MECHANICAL ROOM	1,500	1,305	140	180	65	N.A.	60 PSI	4"-10.5" w.c.	MODULATING	4:1	8"ø	8"ø	120/1/60	12	20	RAYPAK	H7-1503	NON-CONDENSING BOILER

PUMP SCHEDULE

TAG	LOCATION		SERVICE	TYPE	GPM	P.G.	HEAD (ft.)	EFF.	IMPELLER	SUCTION SIZE	DISCHARGE SIZE	MOTOR			MAKE	SERIES	MODEL	REMARKS
	DWG	ROOM										HP	RPM	VOLTAGE				
CP-1	M794.2	MECHANICAL ROOM	BOILER RECIRC.	IN-LINE	65	N.A.	30	70%	4.75"	2"	2"	3/4	1750	120/1/60	BELL & GOSSETT	60	2x2x5-1/4	

LEGEND AND SYMBOLS

——HWS——	HEATING WATER SUPPLY		BALL VALVE
——HWR——	HEATING WATER RETURN		CHECK VALVE (NON SLAM)
——HTWS——	HIGH TEMPERATURE HOT WATER SUPPLY		GATE VALVE
——HTWR——	HIGH TEMPERATURE HOT WATER RETURN		BUTTERFLY VALVE
——DCW——	DOMESTIC COLD WATER		CIRCUIT SETTER (FLOW AS INDICATED)
——CD——	CONDENSATE DRAIN		PRESSURE GAUGE (w/ RANGE)
——NG——	NATURAL GAS (7"-14" w.c.)		THERMOMETER (w/ RANGE)
——(E)XXX——	EXISTING PIPING (w/ SERVICE)		UNION
——►	DIRECTION OF FLOW		"Y" STRAINER w/ 3/4" BALL VALVE & 3/4" GARDEN HOSE THREAD CONNECTION
A.F.F.	ABOVE FINISHED FLOOR		RELIEF VALVE
N.A.	NOT APPLICABLE		2-WAY CONTROL VALVE
G.C.	GENERAL CONTRACTOR		3-WAY MIXING VALVE
E.C.	ELECTRICAL CONTRACTOR	CS	CURRENT SWITCH
M.C.	MECHANICAL CONTRACTOR	T	TEMPERATURE SENSOR
P.C.	PLUMBING CONTRACTOR		FLOW SWITCH (FS)
T.C.C.	TEMPERATURE CONTROL CONTRACTOR		FLANGE
O.A.	OUTSIDE AIR		POINT OF CONNECTION
H.W.	HEATING WATER		POINT OF DISCONNECT
H.T.H.W.	HIGH TEMPERATURE HEATING WATER		

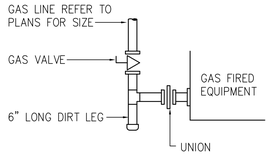


BOILER SIDEWALL VENT/INTAKE DETAIL

NO SCALE

GENERAL NOTES:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS UNDER WHICH WORK MUST BE PERFORMED, AND CHECK ALL ELEVATIONS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL AND DEVICES, ETC. MUST BE COORDINATED IN THE FIELD. CONTRACTOR MUST COMPLY WITH MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR ALL NEW EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY OF HIS WORK.
4. REFER TO H.V.A.C. SEQUENCES OF OPERATIONS (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, ETC. AS REQUIRED TO ACHIEVE THOSE SEQUENCES.
5. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROL DEVICES THAT ARE INSERTED INTO THE PIPING. THE DEVICE AND CONTROL SIGNAL WIRING INCLUDING ANY REQUIRED POWER IS BY THE T.C.C. DEVICES THAT COULD REQUIRE INSTALLATION ARE AS FOLLOWS: WELLS, FLOW SWITCHES, AND PRESSURE TAPS WITH SHUT OFF VALVES. THE T.C.C. MOUNTS THE ACTUAL SENSING DEVICE.
6. INSTALL ALL CABLING PER ELECTRICAL SPECIFICATION SECTIONS.
7. THE ELECTRICAL CONTRACTOR PROVIDES AND WIRES THE STARTER FOR ALL MOTORS (WHERE STARTERS ARE REQUIRED PER ELECTRICAL DRAWINGS). THE T.C.C. PROVIDES THE AUTO CONTROL WIRING, TEMPERATURE SAFETIES, AND INTERLOCKS REQUIRED BY THE SPECIFICATIONS.
8. ALL WORK SHALL FOLLOW THE INTERNATIONAL MECHANICAL CODE AND ALL DOVER AIR FORCE BASE STANDARDS.
9. ALL WORK CONTAINED WITHIN THE MECHANICAL DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
10. ALL PIPING/DUCTWORK/CONTROLS PENETRATING FIRE RATED PARTITIONS, WALLS AND CEILINGS SHALL BE SEALED ON BOTH SIDES USING AN APPROVED, UL LISTED FIRE SEALANT TO MATCH REQUIRED FIRE RATING.
11. CONCRETE HOUSEKEEPING PADS SHALL BE NOMINAL 4" HIGH x 6" LARGER ON ALL SIDES OF EQUIPMENT. CONCRETE SHALL BE MINIMUM 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. PROVIDE WELDED STEEL WIRE FABRIC REINFORCING MESH AND PIN PADS TO EXISTING FLOOR WITH EPOXY COATED STEEL BARS, MINIMUM (4) PER PAD LOCATED NEAR CORNERS. TROWEL FINISH SURFACE AND CHAMFER (45°) ALL TOP EDGES.
12. ALL FLUE DISCHARGES SHALL BE LOCATED IN ACCORDANCE WITH 2006 INTERNATIONAL MECHANICAL CODE.
13. DISCHARGE OF CHEMICALS, INCLUDING CHEMICALLY TREATED WATER IN HVAC OR PLUMBING SYSTEMS, INTO THE DOVER AIR FORCE BASE SANITARY OR STORM SEWAGE SYSTEMS IS PROHIBITED. THE CONTRACTOR IS TO CAPTURE AND LEGALLY DISPOSE OF ALL CHEMICALS AND CHEMICALLY TREATED WATER. ALL QUESTIONS SHOULD BE ADDRESSED TO DOVER AFB, MR. LEE DI SALVO, 302-677-6840.
14. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS. ALL ROOFING WORK TO BE PERFORMED BY CERTIFIED ROOFING CONTRACTOR TO ENSURE NEW ROOF PENETRATIONS WILL NOT VOID ROOFING WARRANTIES. PROVIDE DOCUMENTATION INDICATING WARRANTIES HAVE NOT BEEN VOIDED BY NEW PENETRATIONS UPON REQUEST.
15. COORDINATE INSTALLATION OF ALL NEW PIPING AND EQUIPMENT WITH EXISTING EQUIPMENT SERVICING AND MAINTENANCE CLEARANCES. AVOID INSTALLING NEW PIPING AND EQUIPMENT IN SUCH A MANNER THAT WILL INTERFERE WITH PROPER SERVICING AND MAINTENANCE OF EXISTING OR NEW EQUIPMENT. NOTIFY PROJECT MANAGER PRIOR TO INSTALLATION OF ANY NEW PIPING OR EQUIPMENT THAT WILL INTERFERE WITH EXISTING EQUIPMENT SERVICING OR MAINTENANCE. DO NOT PROCEED WITH INSTALLATIONS WITHOUT APPROVAL OF PROJECT MANAGER.
16. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.



TYPICAL GAS CONNECTION DETAIL

NO SCALE

NOTE: REFER TO FLOOR PLANS FOR GAS LINE SIZE

100% DESIGN

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MDA #09046

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	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
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DOVER AIR FORCE BASE, DELAWARE

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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

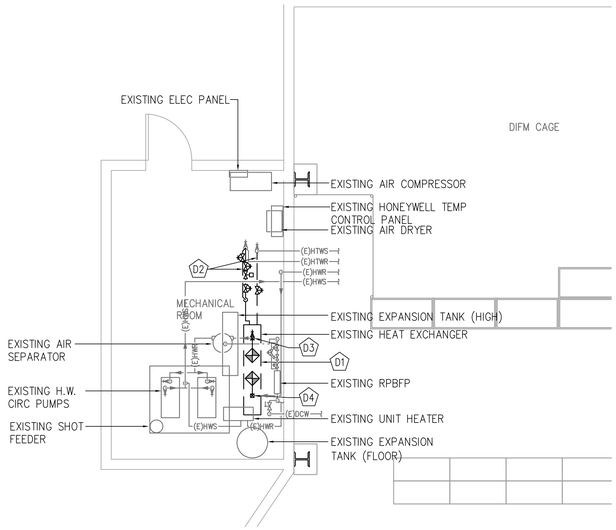
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 794
LEGEND, NOTES & DETAILS

W-5023

SHT 48 OF 63

M794.1

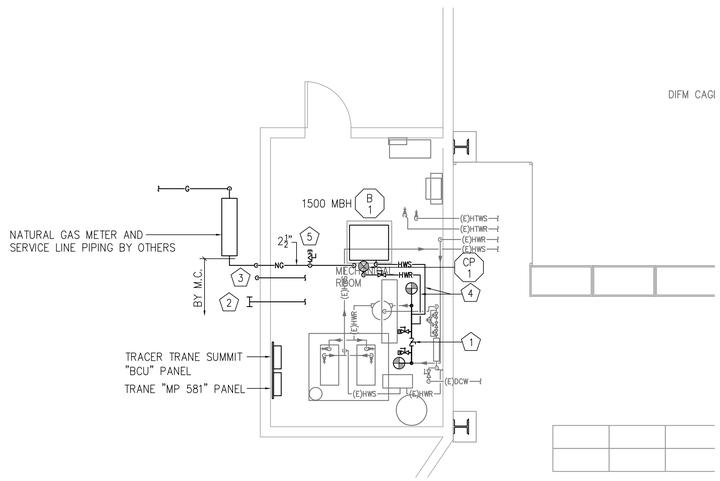


FIRST FLOOR PLAN – MECHANICAL ROOM DEMOLITION

0 2' 4' 8'

1/4" = 1'-0"

NORTH



ENLARGED FLOOR PLAN – MECHANICAL ROOM – HVAC

0 2' 4' 8'

1/4" = 1'-0"

NORTH

DRAWING DEMOLITION NOTES

D1 REMOVE EXISTING WATER-TO-WATER HEAT EXCHANGER, FRAME, PIPING, VALVES, CONTROLS, ETC. COMPLETELY AS INDICATED.

D2 REMOVE EXISTING HTWS AND HTWR PIPING, HANGERS, CONTROL VALVES, VALVES, ETC. COMPLETELY AS INDICATED.

D3 REMOVE EXISTING HWS DROP TO EXISTING HEAT EXCHANGER, REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION IN THIS AREA.

D4 REMOVE EXISTING HWR PIPING AS INDICATED. REFER TO MECHANICAL ROOM THIS SHEET FOR RECONNECTION THIS AREA.

DRAWING REFERENCE NOTES

1 3" TEMPORARY BOILER CONNECTIONS WITH SHUT-OFF VALVES AND MALE CAM-LOCK CONNECTORS. COORDINATE REQUIREMENTS WITH OWNER.

2 8" AL29-4C FLUE THRU SIDEWALL. REFER TO DETAIL ON SHEET M794.1

3 8" PVC COMBUSTION AIR INTAKE THRU SIDEWALL. REFER TO DETAIL ON SHEET M794.1

4 NEW 2½" HEATING WATER PIPING.

5 3/4" NG VALVE. CAP FOR FUTURE NG WATER HEATER.

100% DESIGN

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REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	A. CRAFT	S. SIMON

BLDG 794
MECH ROOM
HVAC

W-5023

SHT 49 OF 63

M794.2

HEATING PLANT CONTROL SEQUENCES

1. THE SYSTEM LOOP PUMP RUNS CONTINUOUSLY ON DEMAND FROM THE BAS BASED ON OUTSIDE AIR TEMPERATURE. FLOW WILL BE PROVEN FOR EACH PUMP SEPARATELY WITH A CURRENT SWITCH.

2. ON CALL FOR HEAT IN THE PRIMARY HEATING WATER LOOP, THE BOILER RECIRCULATION PUMP IS STARTED AND THE BOILER (B–1) FIRES AND OPERATES OFF ITS PACKAGED CONTROLS. BOILER OPERATES TO MAINTAIN HOT WATER HEATING SUPPLY TEMPERATURE IN THE PRIMARY HOT WATER LOOP (HT–1). REVERSE SEQUENCE WHEN PRIMARY HEATING WATER LOOP TEMPERATURE IS SATISFIED.

3. FLOW WILL BE PROVEN THROUGH BOILER WITH A FACTORY INSTALLED FLOW SWITCH.

4. PROVIDE CONTROLS TO UTILIZE THE FULL RANGE OF THE BOILER BURNER MODULATING CONTROL CAPABILITY THROUGH THE BOILER CONTROL PANEL.

5. DURING THE WARM–UP PERIOD (AS DETERMINED BY THE TEMPERATURE CONTROL SYSTEM), THE PRIMARY HEATING WATER LOOP SUPPLY TEMPERATURE SHALL BE AT THE MAXIMUM DESIGN SETPOINT, REGARDLESS OF OUTDOOR TEMPERATURE.

6. THE BOILER AND PRIMARY HOT WATER LOOP SUPPLY TEMPERATURES SHALL BE LINEARLY RESET WITH OUTDOOR AIR TEMPERATURE THROUGH THE BAS.

7. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY WIRING NECESSARY BETWEEN THE BUILDING AUTOMATION SYSTEM MASTER CONTROL PANEL AND THE BOILER CONTROL PANELS, AND ANY NECESSARY WIRING FROM UNIT CONTROL PANELS TO INPUT OR CONTROLLED DEVICES (FLOW SWITCHES, TEMPERATURE SENSORS, PUMPS, ETC.).

8. THE TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONTROLLERS, SENSORS, EQUIPMENT, AND PROGRAMMING REQUIRED TO CONFIRM THAT THE NEW BOILER SYSTEM AND EXISTING EQUIPMENT ARE ENABLED WHENEVER THERE IS A CALL FOR HEAT IN THE FACILITY.

9. THE SYSTEM HEATING WATER LOOP PUMPS ARE PRIMARY AND STANDBY AND ARE NOT TO RUN SIMULTANEOUSLY. THE BAS WILL START THE STANDBY PUMP IF THE PRIMARY PUMP FAILS. PROVIDE AUTOMATIC LEAD/LAG CONTROL THROUGH THE BAS WITH WEEKLY ROTATION TO REVERSE ORDER OF OPERATION AND MAINTAIN EVEN RUN TIMES.

10. ALARMS SHALL INCLUDE:
    - A. PUMP FAILURE (EACH PUMP).
    - B. HIGH WATER SUPPLY TEMPERATURE (HT–1) (200 DEG. F. ADJ).
    - C. LOW WATER RETURN TEMPERATURE (HT–2) (100 DEG. F. ADJ).
    - D. BOILER FAILURE.

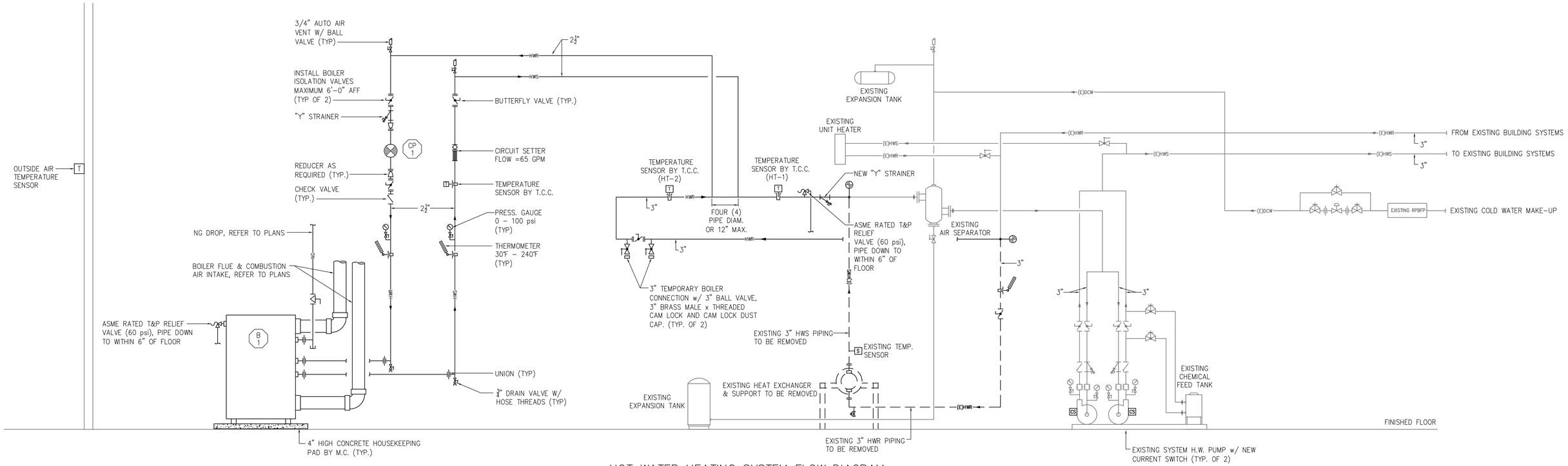
11. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE CAT 6 CABLING FROM TRANE BCU PANEL TO COMMUNICATION CABINET WITHIN BUILDING. CABLING & CONDUIT SHALL BE IN ACCORDANCE WITH DIVISION 26 SPECIFICATION AND BASE STANDARDS. FINAL CONNECTION TO LAN NETWORK BY DOVER AIR FORCE BASE COMMUNICATIONS SQUADRON.

I/O SUMMARY	DEVICE/SYSTEM HOT WATER SYSTEM						
POINT DESCRIPTION	AO	AI	DO	DI	V	ALARM	REMARKS
OUTSIDE AIR TEMPERATURE		X					
SUPPLY WATER TEMPERATURE		X					
SUPPLY WATER TEMPERATURE SETPOINT	X						
RETURN WATER TEMPERATURE		X					
BOILER LEAVING WATER TEMPERATURE		X					
BOILER ENABLE			X			X	
BOILER MODULATION	X						
BOILER ALARM STATUS				X		X	
BOILER RECIRC PUMP START/STOP			X				✳
SYSTEM HEATING WATER PUMP START/STOP (EACH)			X			X	
SYSTEM HEATING WATER PUMP STATUS (EACH)				X			

✳ RECIRC PUMP START/STOP SHALL BE PROVIDED THROUGH THE BOILER'S CONTROL PANEL.

I/O SUMMARY LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
V	VIRTUAL POINT (GENERALLY NOT REQUIRING ADDITIONAL WIRING)



HOT WATER HEATING SYSTEM FLOW DIAGRAM

NO SCALE

NOTES:

1. MECHANICAL CONTRACTOR TO INSTALL WELLS FOR SENSORS, SWITCHES, METERS, ETC. FURNISHED BY TEMPERATURE CONTROL CONTRACTOR.

2. MECHANICAL CONTRACTOR TO INSTALL, WIRE, AND PROGRAM ALL CONTROLS AND CONTROL DEVICES FURNISHED WITH BOILERS.

3. CONTRACTOR TO VERIFY CURRENT SYSTEM OPERATING PRESSURE PRIOR TO START OF CONSTRUCTION AND DOCUMENT. CONTRACTOR TO RESTORE SYSTEM TO "NORMAL" OPERATING PRESSURE ONCE NEW SYSTEM IS OPERATIONAL.

4. CONTRACTOR TO PROVIDE & INSTALL TWO (2) ADDITIONAL AUTOMATIC AIR VENTS, WITH VALVES. AIR VENTS TO BE LOCATED AT HIGHEST POINT POSSIBLE IN HEATING SYSTEM IN THE MECHANICAL ROOM ON SUPPLY & RETURN PIPING. FIELD VERIFY FINAL LOCATION DURING CONSTRUCTION.

5. WHENEVER POSSIBLE, BOILER LOOP PIPING SHALL CONNECT TO THE "SIDE" OF THE BUILDING LOOP PIPING.

100% DESIGN

mda engineering, inc.
Mechanical Electrical and Telecommunications Engineers
1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687
MDA #09046

REV	DATE	DESCRIPTION	DRAWN	APPR'D
	27Aug10	ISSUED FOR INSTALLATION	ALC	KPL
	18Jun10	ISSUED FOR 95% REVIEW	ALC	KPL
	30Apr10	ISSUED FOR 65% REVIEW	ALC	KPL

AIR MOBILITY COMMAND
DOVER AIR FORCE BASE, DELAWARE

TITLE: HTHW PLANT DECENTRALIZATION AT DOVER AFB, DE

SUBMITTED	APPROVED	APPROVED
CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

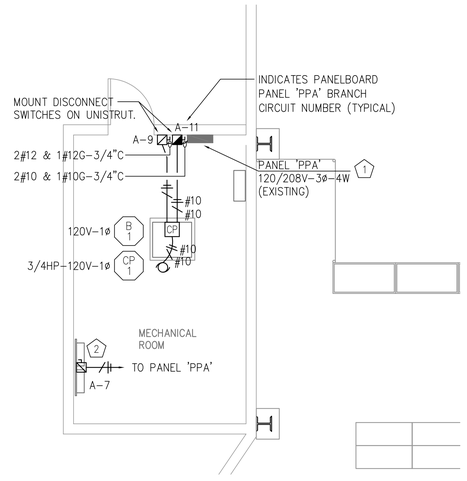
DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	FULL	A. CRAFT	S. SIMON

BLDG 794
BOILER DIAGRAM

W–5023
SHT 50 OF 63
M794.3

PLAN SYMBOLS LEGEND

SYMBOL	DESCRIPTION
———	INDICATES CONDUIT ABOVE GRADE, SURFACE MOUNTED OR CONCEALED INSIDE THE BUILDING SURFACE. EXPOSED CONDUIT ON THE BUILDING EXTERIOR WILL NOT BE ACCEPTED.
——+———	INDICATES CONDUCTOR (MINIMUM #12AWG COPPER) IN CONDUIT, QUANTITY AS SHOWN.
——//———	INDICATES PHASE, NEUTRAL AND GROUND CONDUCTORS (MINIMUM #12AWG COPPER) IN CONDUIT.
←———	HOME RUN TO SOURCE PANELBOARD OR CONTROL PANEL.
J	JUNCTION BOX BLANK COVER.
CP	EQUIPMENT CONTROL PANEL. WIRING TO LINE TERMINALS BY E.C.
	MOTOR, HORSEPOWER AND VOLTAGE AS SCHEDULED.
J	30A MANUAL MOTOR SAFETY DISCONNECT SWITCH, HORSEPOWER RATED, NON-REVERSING, NEMA 1 ENCLOSURE, ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
J	30A MANUAL MOTOR STARTER SWITCH, HORSEPOWER RATED WITH OVERLOADS, PILOT LIGHTED, NEMA 1 ENCLOSURE ENGRAVED NAMEPLATE, SURFACE MOUNTED; 48" A.F.F. U.N.O. SQUARE D CLASS 2510 OR EQUAL.
	EXISTING CIRCUIT BREAKER PANELBOARD; GE 'NLAB', 120/208V-3ø-4W. SEE PANELBOARD SCHEDULE.
X X	MECHANICAL EQUIPMENT SCHEDULE ITEM, UNIT BY M.C. SEE HVAC SCHEDULE.
X	PLAN NOTE ITEM.



PANEL: 'PPA' — LOCATION: MECHANICAL ROOM

NOTES	LOAD DESCRIPTION	CIRCUIT BREAKER	øA	øB	øC	BRANCH CIRCUIT No.	BRANCH CIRCUIT No.	øA	øB	øC	CIRCUIT BREAKER	LOAD DESCRIPTION	NOTES
	LIGHTS / EM LIGHTS	20ASP	0			1	2	0			20ASP	UNIT HEATER	
	RECEPTACLES	20ASP		0		3	4		0		20ASP	AIR COMPRESSOR	
	SPARE	20ASP			0	5	6			0	20ASP	EXTERIOR RECEPTACLE	
	TRANE PANEL	20ASP	500			7	8				20ASP	HONEYWELL FEED	
	HEATER (B-1)	20ASP		660		9	10				20ASP	FLOW METER	
	HEATER PUMP (CP-1)	25ASP			1656	11	12				SPACE	–	
	PUMP #1	15A3P				13	14				15A3P	PUMP #2	
						15	16						
						17	18						
	SPARE	30A3P				19	20				100A3P	SPARE	
						21	22						
						23	24						
	SUB-TOTAL PER ø		500			øA	0				TOTAL PER ø		*
				660		øB			0				*
					1656	øC				0			*
	MOUNTING	SURFACE									TOTAL CONNECTED (VA)		*
	LUGS OR CIRCUIT BREAKER	225A M.L.O.									TOTAL CONNECTED (AMPS)		*
	BUS RATING (AMPERES) & TYPE	225A – CU									FEEDER: EXISTING		
	VOLTAGE	120/208V-3ø-4W									OPTIONS:		

GENERAL NOTES – ELECTRICAL:

1. PERFORM ALL WORK IN ACCORDANCE WITH NFPA 70 (NATIONAL ELECTRICAL CODE) AND ALL APPLICABLE LOCAL AND STATE CODES AND DOVER AIR FORCE BASE STANDARDS.
2. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
3. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
4. COORDINATE ALL WORK AND SCHEDULES WITH DOVER AIR FORCE BASE, PROJECT MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE REGULARLY AND DISPOSE OF BY PROPER AND LEGAL METHODS.
6. SCHEDULE ALL POWER, INTERRUPTIONS WITH DOVER AIR FORCE BASE AND PROJECT MANAGER 72 HOURS PRIOR TO INTERRUPTION.
7. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH SECURELY FASTENED NAMEPLATES. PROVIDE DESCRIPTIVE CIRCUIT DIRECTORIES FOR ALL PANELS.
8. PATCH AND FINISH DAMAGED FINISHES. PROVIDE PROPER FIRESTOPPING AT ALL WALL AND FLOOR PENETRATIONS.
9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS.
10. REMOVE ELECTRICAL EQUIPMENT AND CIRCUITRY NO LONGER REQUIRED TO REMAIN IN SERVICE. REMOVE SERVICES BACK TO SOURCE. PROVIDE JUNCTION BOXES AND MAKE UP RACEWAY TO EXTEND EXISTING CIRCUITRY.
11. DEMOLISHED MATERIALS TO BE REMOVED AND DISPOSED OF BY CONTRACTOR. STORE SALVAGED ITEMS ON SITE WHERE DIRECTED.
12. CONTRACTOR IS TO PERFORM ALL WORK TO MINIMIZE INTERRUPTIONS TO THE BUILDING HEATING/REHEAT (AND COOLING) SYSTEMS, DOMESTIC WATER HEATING SYSTEM AND ELECTRICAL SYSTEMS. THE BUILDING WILL REMAIN IN OPERATION WHILE THE CONTRACTOR IS PERFORMING THE WORK. ALL SYSTEM INTERRUPTIONS MUST BE COORDINATED IN ADVANCE WITH THE TOLTEST, INC. PROJECT MANAGER AND THE OAK RIDGE NATIONAL LABORATORY DESIGNATED REPRESENTATIVE.

ENLARGED FLOOR PLAN – MECHANICAL ROOM – ELECTRICAL

0 2' 4' 8'

1/4" = 1'-0"

NORTH

FLOOR PLAN NOTES:

1. UTILIZE EXISTING TWO (2) 20ASP CIRCUIT BREAKERS AND FURNISH AND INSTALL ONE (1) NEW 25ASP CIRCUIT BREAKER IN EXISTING PANEL SPACE TO SERVE NEW TRANE PANEL, HEATER (B-1) AND HEATER PUMP (CP-1). PROVIDE NEW TYPED UPDATED PANEL DIRECTORY FOR PANEL 'PPA'.
2. PROVIDE 120V CIRCUIT TO NEW TRANE PANEL (BY M.C.). VERIFY REQUIREMENTS AND LOCATION WITH M.C.

ALL NEW 120V BRANCH CIRCUITS SHALL HAVE AN INDIVIDUAL NEUTRAL FOR EACH PHASE. EACH NEUTRAL CONDUCTOR SHALL BE IDENTIFIED THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

100% DESIGN

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CHIEF ENGINEER	CHIEF ENGINEER	COMMANDER

DATE:	PROJECT #:	SCALE:	DRAWN BY:	DESIGNED BY:
8/27/10	FJXT091076E2	1/4" = 1'-0"	R. GRAHAM	R. KAYDEN

BLDG 794
MECH ROOM
ELECTRICAL

W-5023

SHT 63 OF 63

E794.1