OUTSIDE AIR HANDLING UNIT WITH ENERGY RECOVERY WHEEL

MARK	MFR.	MODEL	LOCATION	SERVING	ENERGY RECOVERY WHEEL																SUPPLY FAN				RETURN FAN				CHILLED WATER COIL							HOT WATER COIL						FILTER MERV	VOLTAGE	NOTES
					DESIGN CONDITIONS - ROOM AIR						DESIGN CONDITIONS - OUTSIDE AIR						TOTAL EFFECTIVENESS		LEAVING CONDITIONS																										
					WINTER		SUMMER				WINTER		SUMMER						WINTER		SUMMER																								
					DB (°F)	WB (°F)	DB (°F)	WB (°F)	CFM EA	ESP IN. WC MAX	DB (°F)	WB (°F)	DB (°F)	WB (°F)	CFM SA	ESP IN. WC MAX	WINTER (%)	SUMMER (%)	DB (°F)	WB (°F)	DB (°F)	WB (°F)	TYPE (°F)	ESP ("WC)	MOTOR HP	DRIVE	TYPE (°F)	ESP ("WC)	MOTOR HP	DRIVE	MAX FACE VELOC. (FPM)	EAT DB/WB (°F)	LAT DB/WB (°F)	TOTAL CAPAC. (MBH)	SENS. CAPAC. (MBH)	EWT/LWT (°F)	FLOW (GPM)	MAX FACE VELOC. (FPM)	EAT DB/WB (°F)	LAT DB/WB (°F)	TOTAL CAPAC. (MBH)	EWT/LWT (°F)	FLOW (GPM)			
OAHU-1	Mc QUAY	CAHO2OGDAM	MECH. ROOM	AHU-1, AHU-2	75	62	75	62	9000	1.00	25	25	96	78	9000	1.00	80	55	58.9	58.9	81.0	69.8	AF	1.00	10.0	VFD	AF	1.00	10.0	VFD	450	96/78	55/54	752.8	397.7	44/56	125	450	25	60	340.2	180/160	34.0	8.0	480/3/60	1,2,3,4,5,6,7

NOTES:
1. OUTSIDE AIR UNIT SHALL BE PROVIDED WITH ENERGY RECOVERY WHEEL AND RETURN FAN.
2. THE COOLING COIL ON THE OUTSIDE AIR UNIT SHALL HAVE A FIN SPACING OF NO MORE THAN 8 FINS PER INCH.
3. COOLING AND HEATING COILS SHALL BE SIZED ASSUMING NO WHEEL OPERATION.
4. PROVIDE ULTRAVIOLET TUBES ON THE COOLING COIL SIDE.
5. FAN MOTORS SHALL BE INVERTER DUTY RATED. SUITABLE FOR WORK WITH VFD..
6. VFD's SHALL BE DESIGNED TO PROVIDE DESIGN AIR FLOWS AT 60 HZ. FREQUENCIES OVER 60 HZ ARE NOT ACCEPTABLE.
7. PROVIDE PLEATED FILTERS, AFF VERICELL II M, MERV 15 OR BETTER. FILTER SHALL BE REPLACED IMMEDIATELY PRIOR TO OCCUPANCY.

AIR HANDLING UNIT SCHEDULE

MARK	MFR.	MODEL No.	UNIT CONFIGURATION/ DISCHARGE DIRECTION	LOCATION	SERVICE	AIR FLOW (CFM)	MIN. OUTSIDE AIR CFM @ DESIGN	SUPPLY FAN			CHILLED WATER COOLING COIL							HOT WATER HEATING COIL				ELECTRICAL	NOTES
								DRIVE TYPE	EXT SP (IN WC)	HP	TOT CAP MBH	SENS CAP MBH	EWT/LWT (°F)	EAT DB/WB (°F)	LAT DB/WB (°F)	MAX WATER ΔP (IN WC)	MAX FACE VELOC. (FPM)	FLOW RATE (GPM)	TOT CAP (MBH)	EWT/LWT (°F)	EAT/LAT DB (°F)	FLOW RATE (GPM)	VOLTAGE	
AHU-1	Mc Quay	CAH020	HORIZONTAL/VERTICAL	MECH ROOM	GYMNASIUM	9300	4,530	VFD	2.00	10.00	229.92	202.43	44/56	75.0/62.5	55.1/54.0	20	450	38.4	410.72	180/160	60/101.7	41.2	480/3/60	1,2,3,4
AHU-2	Mc Quay	CAH026	HORIZONTAL/VERTICAL	MECH ROOM	WEST WING	12300	4,450	VFD	2.00	15.00	330.12	280.62	44/56	75/62.5	54.7/54.1	20	450	55.0	NO HEAT	NO HEAT	NO HEAT	NO HEAT	480/3/60	1,2,3,4

NOTES:
1 . ALL UNITS SHALL BE PROVIDED WITH ULTRAVIOLET TUBES AND VFD'S CAPABLE OF REDUCING FAN SPEED DOWN TO 30% OF MAXIMUM DESIGN AIR FLOW.
2. FAN MOTORS SHALL BE INVERTER DUTY RATED, APPROPRIATE FOR OPERATION WITH VARIABLE FREQUENCY DRIVE.
3. VFD's SHALL BE DESIGNED TO PROVIDE DESIGN AIR FLOWS AT 60 HZ. FREQUENCIES OVER 60 HZ ARE NOT ACCEPTABLE.
4. PROVIDE PLEATED FILTERS, AFF VERICE II M, MERV 15 OR BETTER. FILTER SHALL BE REPLACED IMMEDIATELY PRIOR OCCUPANCY.

WATER COOLED CHILLER SCHEDULE

DESIGNATION	DESCRIPTION	NOMINAL (TONS)	CAPACITY (TONS)	PERFORMANCE (KW/TON)	EVAPORATOR DATA						CONDENSER DATA				ELECTRICAL DATA					REFRIGERANT TYPE	WEIGHT (LBS)	MFR	MODEL	NOTES
					MEDIA	EWT (°F)	LWT (°F)	FLOW (GPM)	MAX PD (FT W)	FOULING FACTOR	MEDIA	EWT (°F)	LWT (°F)	FLOW (GPM)	VOLTAGE	UNIT POWER (KW)	MCA (A)	MOCP (A)	VFD					
CH-1	MAGNETIC BEARING, CENTRIFUGAL	120	120	0.624	WATER	56.0	44.0	240	9.5	0.0001	WATER	85	94.4	360	460/3/60	74.85	115	175	YES	R-134A	9,900	MULTISTACK	MS120FIL2W2HI	1, 2

NOTES:
1. PROVIDE VIBRATION ISOLATION PER SPECIFICATIONS.
2. CONTROLS SHALL TIE-INTO EMCS CONTROL CENTER.

FAN SCHEDULE

MARK	SERVICE	TYPE	CFM	SP "H2O	POWER (HP)	VOLTS/ PH/HZ	FAN RPM	MAKE AND MODEL	REMARKS
EF-1	LOCKERS/BATHROOMS	IN-LINE	1700	0.25	1/2	120/1/60	1100.0	COOK 120SQN-B	1
EF-2	FAMILY CHANGE ROOMS	IN-LINE	650	0.35	1/6	120/1/60	1796.0	COOK 80SQN-B	1
EF-3	POOL CHEMICAL STORAGE	WALL	320	0.25	1/6	120/1/60	1550.0	COOK 10SP15D	2
EF-4	MECH ROOM VENTILATION	IN-LINE	1400/2800	0.125/0.5	1.0	460/3/60	724/1448	COOK 150 SQN-B	3

NOTES:
1. PROVIDE WITH GRAVITY BACKDRAFT DAMPER AND EXHAUST LOUVER. REFER TO PLANS FOR LOUVER APPROXIMATE DIMENSIONS.
2. PROVIDE WITH FACTORY MADE WALL COVER, GRAVITY SHUTTERS AND BIRD SCREEN.
3. FAN HAS TWO SPEEDS. LOWER SPEED IS FOR NORMAL MECH ROOM VENTILATION AND HIGHER SPEED IS FOR PURGE IN CASE A REFRIGERANT LEAK IS DETECTED. LOWER SPEED SHALL BE CONNECTED TO BUILDING CONTROL SYSTEM TO OPERATE CONTINUOUSLY BASED ON BUILDING SCHEDULE, HIGHER SPEED SHALL BE ENERGIZED BY BUILDING CONTROL SYSTEM UPON DETECTION OF REFRIGERANT LEAKAGE.

PUMP SCHEDULE

DESIGNATION	LOCATION	TYPE	SERVICE	GPM	HEAD (FT)	MIN EFF. (%)	MOTOR HP	RPM	V/PH	VFD	MFR	MODEL	NOTES
CHP-1,2	MECH. ROOM	HORIZONTAL END SUCTION	CHILLED WATER	240	75	76	10.0	1750	480/3	YES	B&G	1510, 2-1/2 BC	1, 2, 3, 4
CWP-1,2	MECH. ROOM	HORIZONTAL END SUCTION	CONDENSER WATER	360	62	77	10.0	1750	480/3	YES	B&G	1510, 3 BC	1, 2, 3, 4
HWP-1,2	BOILER ROOM	HORIZONTAL END SUCTION	HOT WATER	66	70	56	3	1750	480/3	YES	B&G	1510, 1-1/4 BC	1, 2, 3
PWP-1	MECH. ROOM	VERTICAL IN-LINE	POOL HEAT WATER	120	35	67	2	1750	480/3	NO	B&G	SERIES 80 2-1/2X2-1/2X7	2, 3

NOTES:
1. PROVIDE VFD WITH INTEGRAL DISCONNECT, MOUNTED ON WALL OF MECHANICAL ROOM.
2. CONTROLS SHALL TIE-INTO EMCS CONTROL CENTER.
3. PROVIDE PREMIUM-EFFICIENCY MOTOR. MOTORS SHALL BE INVERTER DUTY RATED.
4. OPERATING/STAND BY ARRANGEMENT

BOILER SCHEDULE

MARK	FUEL	FIRING TYPE	FLUE SIZE	INPUT MBH	OUTPUT MBH	EFFICIENCY (%)	FLOW GPM AT 20° ΔT	ELECTRICAL			STORAGE CAPACITY GALLONS	MANUFACTURER	MODEL	REMARKS
								VOLTS	PHASE	HERTZ				
B-1	NATURAL GAS	MODULATING	6"	753	653	87	65.3	120	1	60	750	RAYPAK	MVB 753	1
B-2	NATURAL GAS	MODULATING	6"	753	653	87	65.3	120	1	60	750	RAYPAK	MVB 753	

NOTES:
1. FOLLOW MANUFACTURER's STANDARDS AND GUIDELINES IN CONNECTING GAS, WATER, VENT AND ELECTRICAL.

DIFFUSER NECK AND DUCT SIZE SCHEDULE

SUPPLY AIR (CFM)	DIFFUSER NECK AND BRANCH DUCT SIZE
0 - 100	6 " Ø
101 - 200	8" Ø
201 - 300	10" Ø
301 - 400	12" Ø
401 - 500	14" Ø

AIR DEVICE SCHEDULE

MARK	DESCRIPTION	MOUNTING	MATERIAL	FINISH	FRAME SIZE (N)	MANUFACTURER AND MODEL	REMARKS
A	CEILING SUPPLY	LAY-IN	STEEL	OFF WHITE	24X24	TITUS TDCA	1
B	CEILING RETURN	LAY-IN	STEEL	OFF WHITE	24X24	TITUS TDC	1
C	DUCT MOUNTED	DUCT	STEEL	SEE NOTE 1	12X10	TITUS S300FL	1
E	CEILING EXHAUST	LAY-IN	STEEL	OFF WHITE	24X24	TITUS TDC	1

NOTES:
1. COORDINATE FINISH WITH ARCHITECT.

APPR	DATE	SYM	DESCRIPTION
	7/17/12		AS BUILT
	7/13/11	1	ENERGY MOD (1 OF 2)

NAVFAC

RECORD DRAWINGS
08/13/2012
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SATISFACTORY TO DATE: Okin Courtesy 5/5/11
DES SN | DRW ECE | CHK JDJ
PROJECT MANAGER
IPT TECH. BRANCH HEAD
CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
NAVAL AIR STATION JACKSONVILLE
IPT GULF COAST
NAVAL AIR STATION KINGSVILLE
KINGSVILLE, TEXAS
NAVAL FACILITIES ENGINEERING COMMAND

INDOOR PHYSICAL FITNESS FACILITY

MECHANICAL SCHEDULES

SCALE: AS NOTED
EPROJECT NO.: 812380
CONSTR. CONTR. NO. N69450-10-D-0771
NAVFAC DRAWING NO. 15068038 – 15068165
SHEET OF
M-601

DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: L:\110-10137-000\4-0-Production\4-01-Drawings\Mechanical\BLDGP279-812380-M-601.dwg LAYOUT NAME: Layout1 PLOTTED: Wednesday, August 01, 2012 - 3:53pm USER: oldshelton

COOLING TOWER SCHEDULE

MARK	FILOW RATE (GPM)	NUMBER OF FAN MOTORS	FAN POWER (HP)	EWT(°F)	LWT(°F) 1	PANELS MATERIAL	WET DECK MATERIAL	ELECTRICAL			BASIN LEVEL CONTROL	MANUFACTURER	MODEL	OPERATING WEIGHT (LBS.)	REMARKS
								VOLTS	PHASE	HERTZ					
CT-1	180	ONE	5	96	86	STAINLESS STEEL	PVC FILM	480	3	60	FLOAT VALVE	BAC	FXT-68	3,200	1,2
CT-2	180	ONE	5	96	86	STAINLESS STEEL	PVC FILM	480	3	60	FLOAT VALVE	BAC	FXT-68	3,200	1,2

NOTE:
1. ALL PANELS, STRUCTURAL MEMBERS AND BASINS SHALL BE MADE OF STAINLESS STEEL.
2. FAN MOTORS SHALL BE EQUIPPED WITH VARIABLE FREQUENCY DRIVES.

COMPUTER ROOM AIR CONDITIONER SCHEDULE

INDOOR UNIT									OUTDOOR UNIT							
PLAN MARK	LOCATION	TYPE	CFM	TOTAL/SENSIBLE CAP MBH	VOLTS	MCA	MOCP	MODEL	PLAN MARK	LOCATION	VOLTS	MCA	MOCP	MODEL	MANUFACTURER	REMARKS
CRAC-1	IT CLOSET	CEILING MOUNTED	800	23.8/19.2	230/1/60	48.00	50.0	MMH24E	CRCU-1	GROUND	230/1/60	15.70	25.0	PFH027A	LIEBERT	1, 2
DSAC-1	ELEC ROOM	SUSPENDED	470	17	230/1/60	0.80	15.0	40KMC018	DSCU-1	GROUND	230/1/60	12.00	20.0	38HDF018	CARRIER	1,2

NOTES:
1. FOLLOW MANUFACTURER GUIDELINES FOR INSTALLATION, CONNECTION AND REFRIGERANT LINES SIZES.
2. OUTDOOR UNIT COIL SHALL HAVE CORROSION PROTECTION COATING.

PLATE AND FRAME HEAT EXCHANGERS SCHEDULE

MARK	HOT FLUID					COLD FLUID					CAPCITY BTU/H	MANUFACTURER	MODEL	REMARKS
	TYPE	ET (°F)	LT (°F)	FLOW (GPM)	Δ P (FT W)	TYPE	ET (°F)	LT (°F)	FLOW (GPM)	Δ P (FT W)				
HX-1	C. W.	96	86	180	11	DOMESTIC H. W.	60	90	60	2.5	898,000	BELL & GOSSETT	P37-DW	
HX-2	C. W.	96	86	240	11	POOL HEATING W,	60	80	120	4	1,199,000	BELL & GOSSETT	P21	

HYDRONIC FAN COIL UNIT SCHEDULE

MARK	SERVES	CFM	FAN DATA				COOLING COIL DATA							HEATING COIL DATA					WEIGHT, POUNDS	MANUFACTURER & MODEL	REMARKS
			DRIVE TYPE	MOTOR HP	V/PH	UNIT MTD DISC SWITCH	TOTAL MBTUH	SENS MBTUH	EAT, DB/WB DEG F	EWT, DEG F	LWT, DEG F	GPM	MAX WATER PD, FT	TOTAL MBTUH	EAT, DB/WB DEG F	EWT, DEG F	LWT, DEG F	GPM	MAX WATER PD, FT			
FCU-1	MECH ROOM	1000	BELT	3/4	230/1/60	YES	46.4	31	80/67	44	56	7.7	3.5	30.7	60	180	160	3.1	1.3	364	CARRIER, 42BV10	1,2,3

NOTES:
1. PROVIDE SPACE THERMOSTAT AND FAN SUB BASE.
2. UNIT IS UPFLOW. PROVIDE PLENUM FOR HORIZONTAL AIR FLOW WITH 4 DIFFUSERS AT EACH SIDE.
3. SUSPEND UNIT FROM STRUCTURE, WITH ENOUGH SPACE FOR SERVICE AND MAINTENANCE.

EXPANSION TANK SCHEDULE

MARK	MANUFACTURER	MODEL	TYPE	LOCATION	SERVICE	NOMINAL SIZE (DIA X LENGTH)	CAPACITY		MAXIMUM ALLOWABLE PRESS (PSIG)	REMARKS
							TANK	ACCEPT		
ET-1	BELL & GOSSETT	D-80	HORIZONTAL	MECH ROOM	CHW	16-1/4 X 56-7/8	44.4	22.6	125	1
ET-2	BELL & GOSSETT	D-80	HORIZONTAL	MECH ROOM	HW	16-1/4 X 56-7/8	44.4	22.6	125	1

NOTES:
1. SUSPEND FROM STRUCTURE

VAV UNIT SCHEDULE

DESIGNATION	INLET SIZE (INCHES)	AIRFLOW RANGE MIN/MAX (CFM)	MIN AIR FLOW (CFM)	COOLING AIRFLOW (CFM)	HEATING AIRFLOW (CFM)	MAX PD (IN WC)	HOT WATER REHEAT BTUH	HW FLOW GPM	EWT/LWT °F	MANUFACTURER	MODEL	REMARKS
VAV-1	9	0-1050	600	720	600	1	13000.00	1.30	180/160	TITUS	DESV	1.2
VAV-2	12	0-2000	480	1,600	800	1	16200.00	16.20	180/160	TITUS	DESV	1.2
VAV-3	10	0-1400	750	810	750	1	8700.00	0.90	180/160	TITUS	DESV	1.2
VAV-4	12	0-2000	540	1,800	900	1	12500.00	12.50	180/160	TITUS	DESV	1.2
VAV-5	12	0-2000	575	860	575	1	14500.00	1.50	180/160	TITUS	DESV	1.2
VAV-6	8	0-900	200	660	330	1	7200.00	0.70	180/160	TITUS	DESV	1.2
VAV-7	7	0-650	140	450	230	1	5000.00	0.50	180/160	TITUS	DESV	1.2
VAV-8	9	0-1050	250	800	400	1	8700.00	0.90	180/160	TITUS	DESV	1.2
VAV-9	10	0-1400	400	1,050	530	1	12000.00	1.20	180/160	TITUS	DESV	1.2
VAV-10	14	0-3000	850	2,200	1,100	1	24000.00	2.40	180/160	TITUS	DESV	1.2
VAV-11	12	0-2000	420	1,400	700	1	15500.00	1.60	180/160	TITUS	DESV	1.2
VAV-12	8	0-900	550	560	550	1	12000.00	1.20	180/160	TITUS	DESV	1.2

NOTES:
1. PROVIDE FACTORY INSTALLED DDC CONTROLS, TIED-INTO EMCS CONTROL CENTER.
2. FACTORY-PROVIDED 120V/24V TRANSFORMER.

AIR SEPARATOR SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	TYPE	LOCATION	SERVICE	FLOW (GPM)	FLANGE SIZE (INCH)	REMARKS
AS-1	BELL & GOSSETT	R-4F	TANGENTIAL	MECH ROOM	CHW	300	4	1
AS-2	BELL & GOSSETT	R-3F	TANGENTIAL	MECH ROOM	HW	160	3	1

NOTES:
1. SUSPEND FROM STRUCTURE

SYM	DESCRIPTION	DATE	APPR
	AS BUILT	7/17/12	
2	ASI #12	9/02/11	
1	ENERGY ENHANCEMENT #2	3/25/11	

RECORD DRAWINGS
08/13/2012
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INDOOR PHYSICAL FITNESS FACILITY

MECHANICAL SCHEDULES

SCALE: AS NOTED
EPROJECT NO.: 812380
CONSTR. CONTR. NO. N69450-10-D-0771
NAVFAC DRAWING NO. 15068039 – 15068165
SHEET OF
M-602
DRAWFORM REVISION: 7 AUGUST 2009

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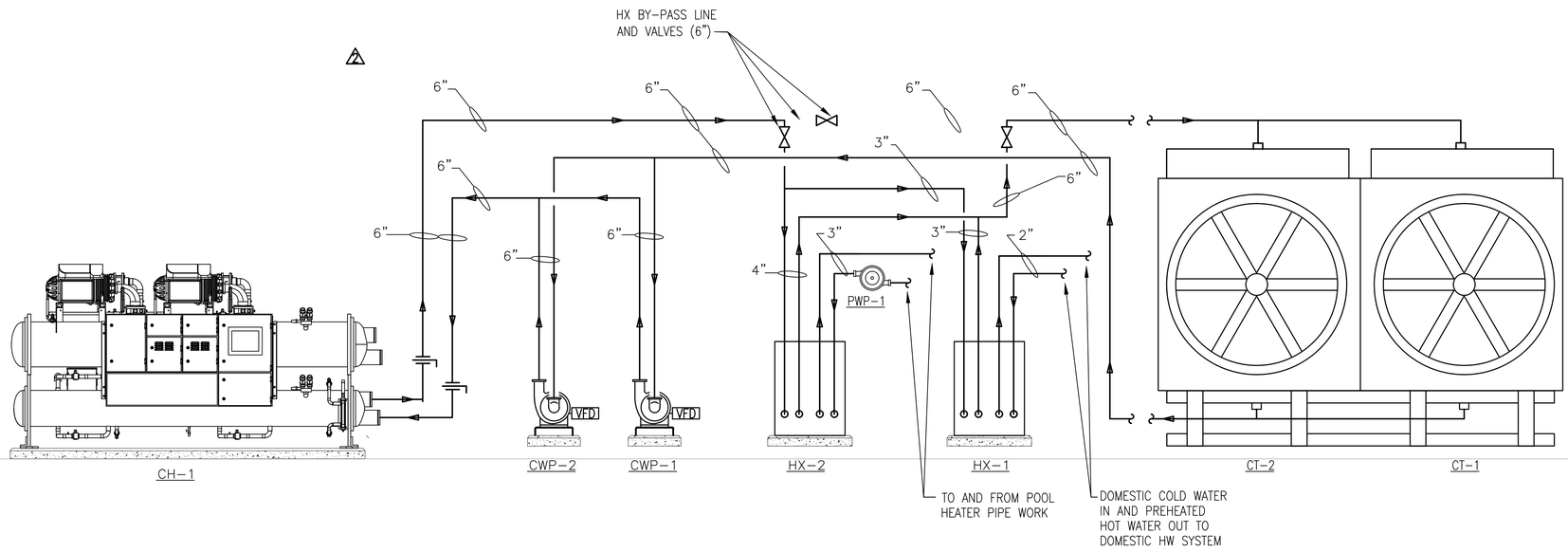
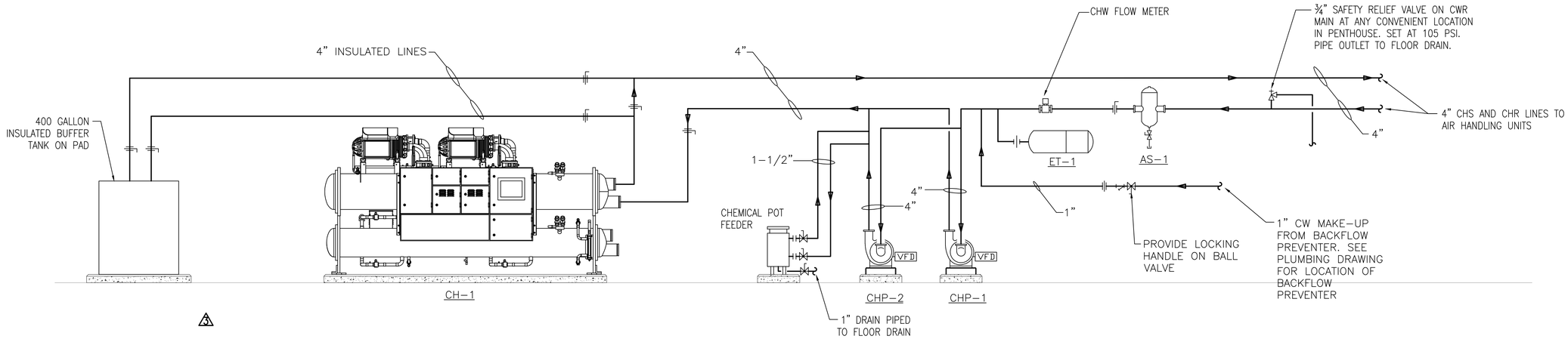


CONDENSER WATER FLOW DIAGRAM

SCALE: N.T.S.

C3



CHILLED WATER FLOW DIAGRAM

SCALE: N.T.S.

A3

SYM	DESCRIPTION	DATE	APPR
	AS BUILT	7/17/12	
⚠4	ASI #18	7/12/12	
⚠3	ASI #12	9/02/11	
⚠2	ENERGY ENHANCEMENT #2	3/25/11	

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RECORD DRAWINGS
08/13/2012
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INDOOR PHYSICAL FITNESS FACILITY

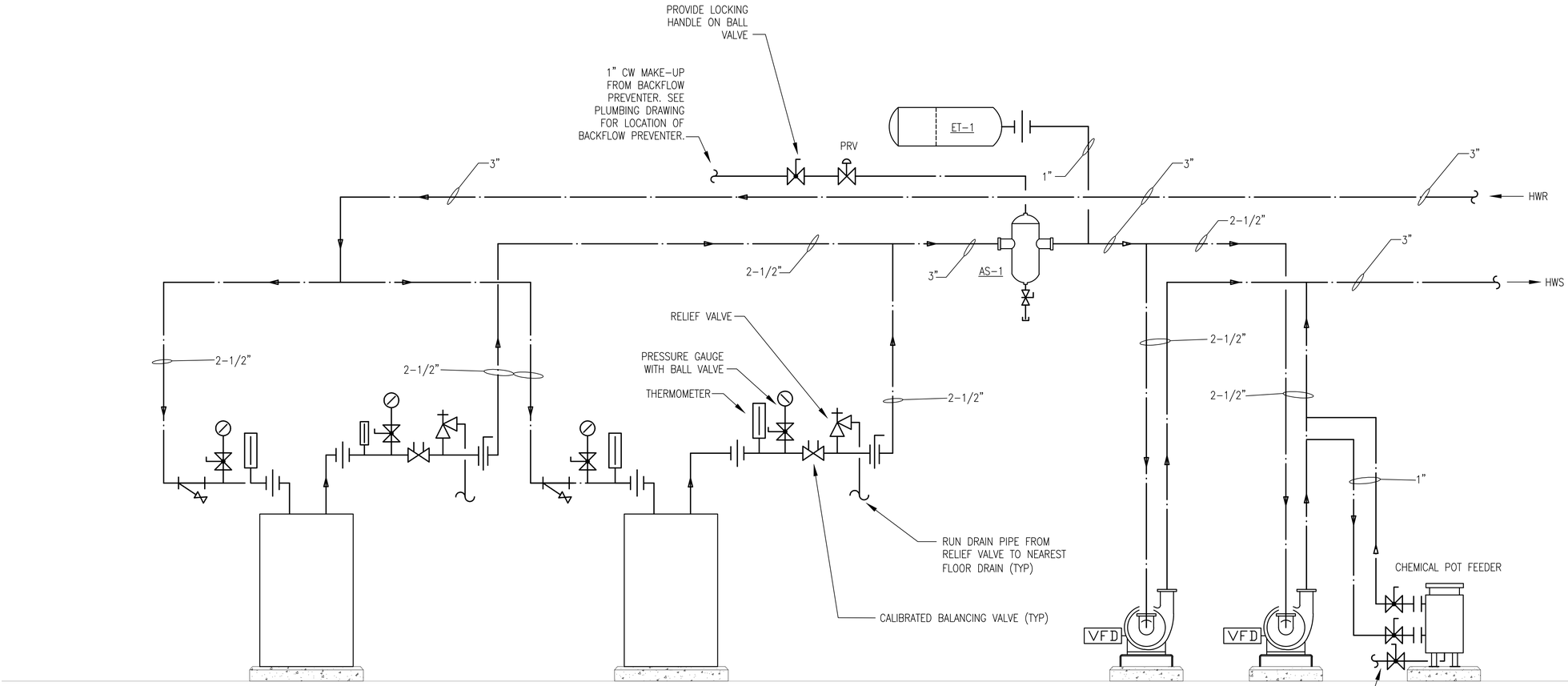
MECHANICAL FLOW DIAGRAMS

SCALE:	AS NOTED
EPROJECT NO.:	812380
CONSTR. CONTR. NO.	N69450-10-D-0771
NAVFAC DRAWING NO.	15068040 – 15068165
SHEET	OF

M-603

DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: L:\110-10137-000\4-0-Production\4-01-Drawings\Mechanical\BLDG#279-812380-M-603.dwg LAYOUT NAME: Layout1 PLOTTED: Wednesday, August 01, 2012 - 3:53pm USER: adshelton



HOT WATER FLOW DIAGRAM

SCALE: N.T.S.

A3

SYM	DESCRIPTION	DATE	APPR
	AS BUILT	7/17/12	

RECORD DRAWINGS
08/13/2012
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ACTIVITY

SATISFACTORY TO DATE: Okin Courtesy 5/5/11

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INDOOR PHYSICAL FITNESS FACILITY

MECHANICAL FLOW DIAGRAM

SCALE: AS NOTED
EPROJECT NO.: 812380
CONSTR. CONTR. NO.: N69450-10-D-0771
NAVFAC DRAWING NO.: 15068041 – 15068165
SHEET OF
M-604

DRAWFORM REVISION: 7 AUGUST 2009

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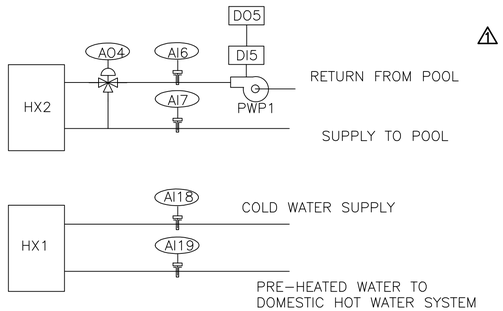
POINTS LIST

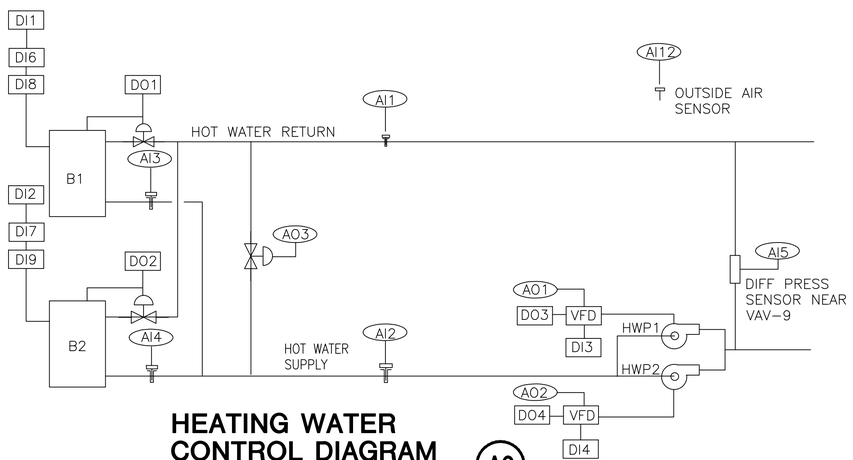
		I/O POINT	POINT NAME	POINT DESCRIPTION
INPUTS	ANALOG INPUTS	AI-1	LHWS	HOT WATER SUPPLY (LOOP)
		AI-2	LHWR	HOT WATER RETURN (LOOP)
		AI-3	B1_HWS	B-1 SUPPLY TEMP
		AI-4	B2_HWS	B-2 SUPPLY TEMP
		AI-5	HWL_DP	HOT WATER LOOP DIFF. PRESSURE
		AI-6	HX_2 EWT	POOL RETURN TEMPERATURE
		AI-7	HX_2 EWT	POOL SUPPLY TEMPERATURE
		AI-8	HX1_EWT	HEAT X 1 ENT WATER TEMP
		AI-9	HX1_LWT	HEAT X 1 LVG WATER TEMP
		AI-10	HX2	ENT WATER TEMP
		AI-11	HX2	LVG WATER TEMP
		AI-12	OAT	OUTSIDE AIR TEMP
	DIGITAL INPUTS	DI-1	B1_S	BOILER 1 RUN STATUS
		DI-2	B2_S	BOILER 2 RUN STATUS
		DI-3	HWP1_S	HOT WATER PUMP 1 STATUS
		DI-4	HWP2_S	HOT WATER PUMP 2 STATUS
		DI-5	PCP_S	POOL CIRC. PUMP STATUS
		DI-6	B1_A	BOILER 1 ALARM
		DI-7	B2_A	BOILER 2 ALARM
		DI-8	BP1_S	BOILER 1 CIRCULATING PUMP STATUS
		DI-9	BP2_S	BOILER 2 CIRCULATING PUMP STATUS
OUTPUTS	ANALOG OUTPUTS	AO-1	HWP1_VFD	HOT WATER PUMP 1 SPEED
		AO-2	HWP2_VFD	HOT WATER PUMP 2 SPEED
		AO-3	HWBPV	HOT WATER BYPASS VALVE
		AO-4	PBPV	POOL BYPASS VALVE
	DIGITAL OUTPUTS	DO-1	B1_ENA	BOILER 1 ENABLE
		DO-2	B2_ENA	BOILER 2 ENABLE
		DO-3	HWP1_ENA	HOT WATER PUMP 1 ENABLE
		DO-4	HWP2_ENA	HOT WATER PUMP 2 ENABLE
		DO-5	PCP_ENA	POOL CIRCULATING PUMP ENABLE
		DO-6	CHP2_ENA	CHILL WATER PUMP 2 ENABLE

SEQUENCE OF OPERATION:
LEAD PUMP WILL BE COMMANDED ON AND LEAD BOILER ISOLATION VALVE COMMANDED TO OPEN. CONTACTS ON ISOLATION VALVE WILL BE WIRED TO REMOTE ENABLE CONTACTS ON BOILER(S) BOILERS ONBOARD CONTROLS WILL MAINTAIN LOCAL SETPOINT. EMS WILL MONITOR STATUS OF BOILER, BOILER CIRC. PUMP(IF EQUIPPED) AND BOILER ALARM OUTPUT. VFD ON HOT WATER PUMPS WILL MAINTAIN LOOP PRESSURE AS DETERMINED BY T&B.
BYPASS VALVE WILL MODULATE TO MAINTAIN LOOP SUPPLY SETPOINT. SETPOINT WILL BE RESET BASED ON OUTSIDE AIR TEMP. BOILERS AND PUMPS WILL ROTATE BASED ON RUNTIME OR SWITCH AUTOMATICALLY UPON FAILURE.

MINIMUM FLOW ON CHILLED WATER PUMPS TO BE 150 GPM.



1 WHEN THE POOL NEEDS HEATING, CIRC. PUMP WILL BE COMMANDED ON AND BYPASS VALVE WILL MODULATE TO MAINTAIN POOL WATER RETURN SETPOINT

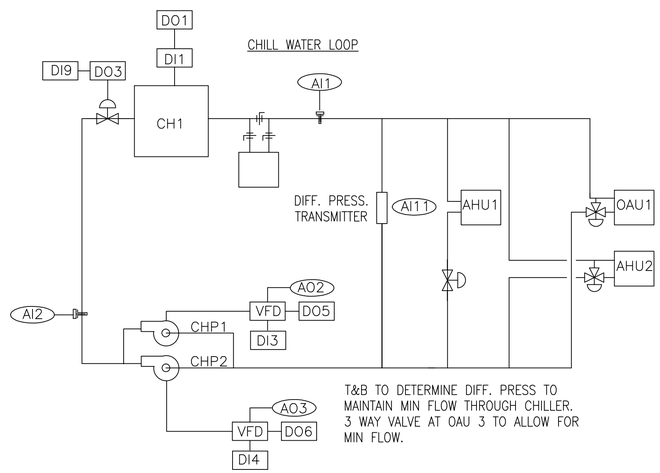


HEATING WATER CONTROL DIAGRAM (A2)
SCALE: N.T.S. M-606

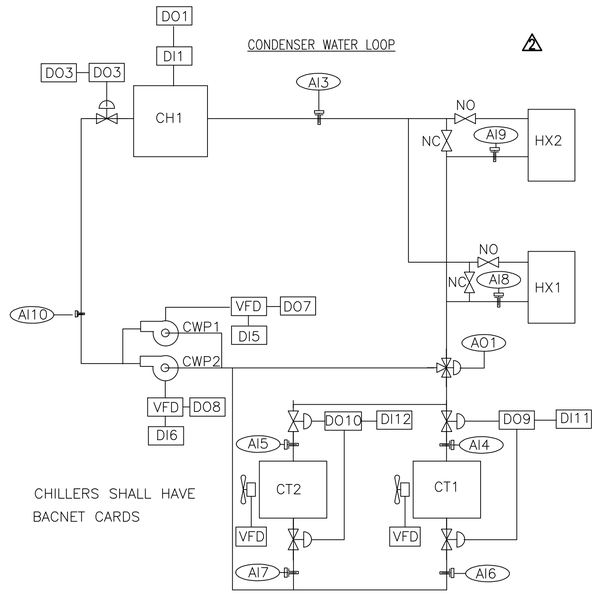
POINTS LIST

		I/O POINT	POINT NAME	POINT DESCRIPTION
INPUTS	ANALOG INPUTS	AI-1	LCHWS	CHILL WATER SUPPLY (LOOP)
		AI-2	LCHWR	CHILL WATER RETURN (LOOP)
		AI-3	CWS	CONDENSER WATER SUPPLY
		AI-4	CT1_EW	CLG TOWER 1 ENT WATER
		AI-5	CT2_EW	CLG TOWER 2 ENT WATER
		AI-6	CT1_LW	CLG TOWER 2 LVG WATER
		AI-7	CT2_LW	CLG TOWER 2 LVG WATER
		AI-8	HX1_LW	HEAT X 1 LVG WATER
		AI-9	HX2_LW	HEAT X 2 LVG WATER
		AI-10	CWR	CONDENSER WATER RETURN
		AI-11	CHWL_DP	CHILL WATER LOOP DIFF PRESS
	DIGITAL INPUTS	DI-1	CH1_S	CHILLER 1 ALARM STATUS
		DI-3	CHWP1_S	CHILL WATER PUMP 1 STATUS
		DI-4	CHWP2_S	CHILL WATER PUMP 2 STATUS
		DI-5	CWP1_S	CONDENSER WATER PUMP 1 STATUS
		DI-6	CWP2_S	CONDENSER WATER PUMP 2 STATUS
		DI-7	CT1F_S	CLG TOWER 1 FAN STATUS
		DI-8	CT2F_S	CLG TOWER 2 FAN STATUS
		DI-9	CH1IV	CHILLER 1 ISOLATION VALVES
		DI-11	CT1IV	CLG TOWER 1 ISOLATION VALVES
		DI-12	CT2IV	CLG TOWER 2 ISOLATION VALVES
OUTPUTS	ANALOG OUTPUTS	AO-1	CT_BPV	CLG TOWER BYPASS VALVE
		AO-2	CHP1_VFD	CHILL WATER PUMP 1 SPEED
		AO-3	CHP2_VFD	CHILL WATER PUMP 2 SPEED
		AO-4	CTF_VFD	CLG TOWER VFD SIGNAL (COMMON SIGNAL TO BOTH DRIVES)
	DIGITAL OUTPUTS	DO-1	CH1_ENA	CHILLER 1 ENABLE
		DO-3	CH1_IV	CHILLER 1 ISOLATION VALVES
		DO-5	CHP1_ENA	CHILL WATER PUMP 1 ENABLE
		DO-6	CHP2_ENA	CHILL WATER PUMP 2 ENABLE
		DO-7	CP1_ENA	CONDENSER WATER PUMP 1 ENABLE
		DO-8	CP2_ENA	CONDENSER WATER PUMP 2 ENABLE
		DO-9	CT1_IV	CLG TOWER 1 ISOLATION VALVES
		DO-10	CT2_IV	CLG TOWER 2 ISOLATION VALVES
		DO-11	CT1F_ENA	CLG TOWER 1 FAN ENABLE
		DO-12	CT2F_ENA	CLG TOWER 2 FAN ENABLE

SEQUENCE OF OPERATION:
CHILLER AND COOLING TOWER ISOLATION VALVES WILL BE COMMANDED OPEN, UPON PROOF THAT THE VALVES ARE OPEN, THE LEAD CHILL WATER AND CONDENSER WATER PUMPS WILL START. CHILLER ONBOARD CONTROLLER WILL CONTROL CAPACITY AS NEEDED TO MAINTAIN CHILL WATER SETPOINT. CCONDENSER WATER PUMPS SHALL RAMP UP AND DOWN TO MAINTAIN THE CONDENSER WATER RETURN TEMPERATURE AT 85 DEG. F. COOLING TOWER FAN(S) WILL RAMP UP AND DOWN THROUGH VFD's TO MAINTAIN CONDENSER WATER RETURN TEMPERATURE AT 85° F (ADJ), PUMPS AND TOWERS WILL ROTATE BASED ON RUNTIME AND SWAP AUTOMATICALLY UPON FAILURE. CHILL WATER LOOP DIFF. PRESS. WILL BE DETERMINED BY T&B AND VFD'S MIN. SPEED WILL BE SET TO MAINTAIN MIN. RECOMMENDED FLOW THRU CHILLER.



CHILLED WATER LOOP (A4)
SCALE: N.T.S. M-606



CONDENSER WATER CONTROL DIAGRAM (A5)
SCALE: N.T.S. M-606

DATE	DESCRIPTION	SYM
7/17/12	AS BUILT	
7/12/12	ASI #18	2
9/02/11	ASI #12	1

NAVFAC

RECORD DRAWINGS
08/13/2012
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FOR COMMANDER NAVFAC / B.L.T.L.
ACTIVITY
SATISFACTORY TO DATE Okin Courtesy 5/5/11
DES SN DRW ECE CHK DR
PROJECT MANAGER
IPT TECH. BRANCH HEAD
CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
IPT GULF COAST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
NAVAL AIR STATION KINGSVILLE
NAVAL AIR STATION KINGSVILLE, TEXAS

INDOOR PHYSICAL FITNESS FACILITY

CONTROL DIAGRAMS

SCALE: NONE
EPROJECT NO.: 812380
CONSTR. CONTR. NO. N69450-10-D-0771
NAVFAC DRAWING NO. 15068042 – 15068165
SHEET OF
M-605

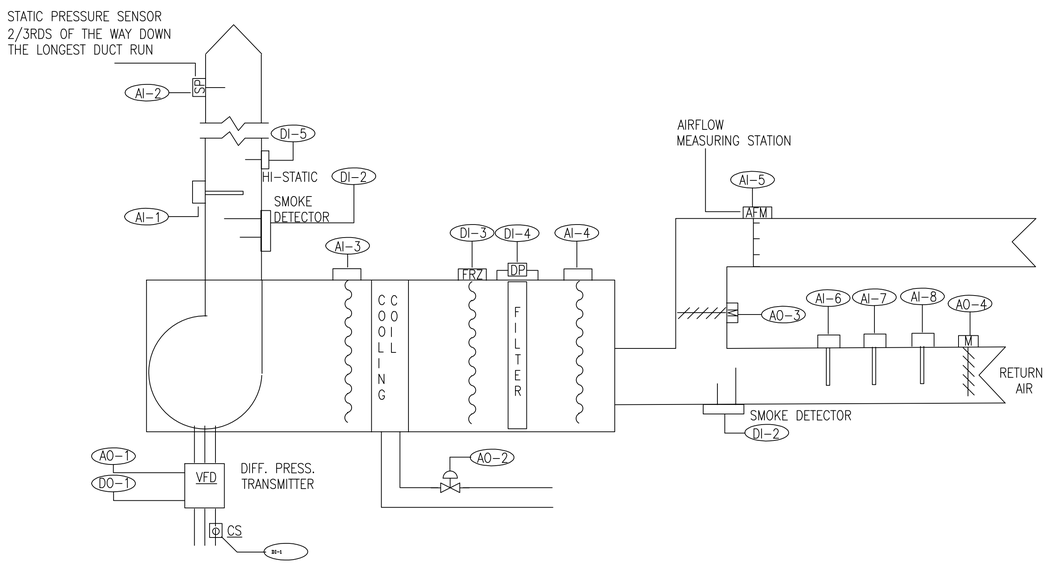
DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: L:\110-10137-000\4-0-Production\4-01-Drawings\Mechanical\BLDGP279-812380-M-605.dwg LAYOUT NAME: Layout1 PLOTTED: Wednesday, August 01, 2012 - 3:53pm USER: odshelton

POINTS LIST

		I/O POINT	POINT NAME	POINT DESCRIPTION
INPUTS	ANALOG INPUTS	AI-1	SAT	SUPPLY AIR TEMPERATURE
		AI-2	SAP	SUPPLY AIR PRESSURE
		AI-3	CCLAT	CLG COIL LEAVING AIR TEMP
		AI-4	MAT	MIXED AIR TEMP
		AI-5	OAF	OUTSIDE AIR FLOW (CFM)
		AI-6	RAT	RETURN AIR TEMPERATURE
		AI-7	RAH	RETURN AIR HUMIDITY
		AI-8	CO2	RETURN AIR CO2 (PPM)
	DIGITAL INPUTS	DI-1	SF_S	SUPPLY FAN STATUS
		DI-2	SMK	DUCT SMOKE DETECTORS
		DI-3	FRZ	LOW TEMPERATURE CUT-OUT (FREEZESTAT MAN. RE-SET)
		DI-4	FLTR	FILTER STATUS
		DI-5	HI_STATIC	HIGH STATIC (MANUAL RE-SET)
OUTPUTS	ANALOG OUTPUTS	AO-1	SF_O	SUPPLY FAN SPEED SPEED
		AO-2	CHWV_O	CHILL WATER VALVE PERCENT OPEN
		AO-3	OAD_O	OUTSIDE AIR DAMPER PERCENT OPEN
		AO-4	RAD-O	RETURN AIR DAMPER PERCENT OPEN
	DIGITAL OUTPUTS	DO-1	SF_C	SUPPLY FAN COMMAND
		DO-2	N/A	NOT USED
		DO-3	N/A	NOT USED
		DO-4	N/A	NOT USED
		DO-5	N/A	NOT USED
		DO-6	N/A	NOT USED

SEQUENCE OF OPERATION:
OCCUPIED MODE: FREEZESTAT, HI-PRESSURE AND SMOKE DETECTORS OK, SUPPLY FAN WILL RUN CONTINOUSLY.
CHILL WATER VALVE WILL MODULATE TO MAINTAIN 54 DEG. F LEAVING AIR TEMP (ADJ.)
SUPPLY FAN WILL MODULATE TO MAINTAIN DUCT STATIC PRESSURE SETPOINT (DETERMINED BY T&B)
OUTSIDE AIR DAMPER WILL MODULATE IN COMBINATION WITH THE R/A DAMPER TO PROVIDE ASHRAE REQUIRED OUTSIDE AIR FLOW BASED ON THE SIGNAL FROM FLOW MEASURING STATION.
UNOCCUPIED MODE: SUPPLY FAN WILL CYCLE ON AND OFF WITH CALL FOR HEAT OR COOL FROM ANY ZONE, OUTSIDE AIR TO REMAIN CLOSED.
IF FREEZESTAT OPENS, FAN WILL SHUT DOWN, OUTSIDE AIR DAMPER WILL CLOSE AND CHILL WATER VALVE WILL REMAIN OPEN.



AHU-2 (VAV UNIT) DETAIL

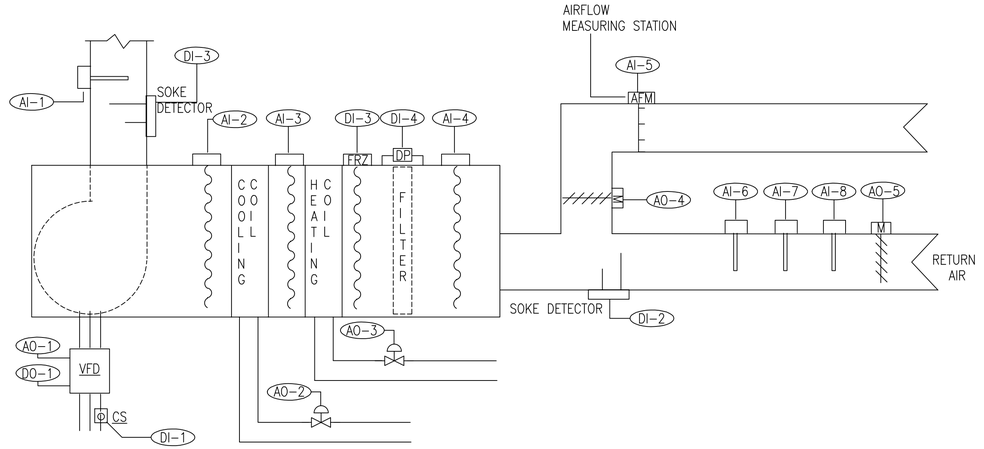
SCALE: N.T.S. M-607 (A2)

POINTS LIST

		I/O POINT	POINT NAME	POINT DESCRIPTION
INPUTS	ANALOG INPUTS	AI-1	SAT	SUPPLY AIR TEMPERATURE
		AI-2	CCLAT	CLG COIL LEAVING AIR TEMP.
		AI-3	HCLAT	HTG COIL LEAVING AIR TEMP.
		AI-4	MAT	MIXED AIR TEMP
		AI-5	OAF	OUTSIDE AIR FLOW (CFM)
		AI-6	RAT	RETURN AIR TEMPERATURE
		AI-7	RAH	RETURN AIR HUMIDITY
		AI-8	CO2	RETURN AIR CO2 (PPM)
	DIGITAL INPUTS	DI-1	SF_S	SUPPLY FAN STATUS
		DI-2	SMK	DUCT SMOKE DETECTORS
		DI-3	FRZ	LOW TEMPERATURE CUT-OUT (FREEZESTAT)
		DI-4	FLTR	FILTER STATUS
OUTPUTS	ANALOG OUTPUTS	AO-1	SF_O	SUPPLY FAN SPEED SPEED
		AO-2	CHWV_O	CHILL WATER VALVE PERCENT OPEN
		AO-3	HWV_O	HOT WATER VALVE PERCENT OPEN
		AO-4	OAD_O	OUTSIDE AIR DAMPER PERCENT OPEN
		AO-5	RAD_O	RETURN AIR DAMPER PERCENT OPEN
	DIGITAL OUTPUTS	DO-1	SF_C	SUPPLY FAN COMMAND
		DO-2	N/A	NOT USED
		DO-3	N/A	NOT USED
		DO-4	N/A	NOT USED
		DO-5	N/A	NOT USED
		DO-6	N/A	NOT USED

SEQUENCE OF OPERATION:
OCCUPIED MODE: FREEZESTAT AND SMOKE DETECTORS OK, SUPPLY FAN WILL RUN CONTINOUSLY. CHILL WATER VALVE WILL MODULATE TO MAINTAIN EITHER ZONE COOLING SETPOINT OR ZONE HUMIDITY SETPOINT (HIGHEST SIGNAL)
HOT WATER VALVE WILL MODULATE TO MAINTAIN ZONE HEATING SETPOINT (HUMIDITY NORMAL) OR ZONE COOLING SETPOINT (HUMIDITY HIGH)
OUTSIDE AIR DAMPER WILL MODULATE IN COMBINATION WITH THE R/A DAMPER TO PROVIDE ASHRAE REQUIRED OUTSIDE AIR FLOW BASED ON THE SIGNAL FROM FLOW MEASURING STATION.
UNOCCUPIED MODE: SUPPLY FAN WILL CYCLE ON AND OFF WITH CALL FOR HTG, CLG, OR DE-HUMIDIFICATION. HEATING AND COOLING SETPOINTS WILL BE SET-UP OR SET-BACK AN ADJ. AMOUNT. OUTSIDE AIR WILL REMAIN CLOSED.

ALTERNATE CONTROL SCHEME:
COOLING MODE
MAINTAIN 54 DEG.(ADJ.) SUPPLY AIR TEMP. AND RAMP FAN SPEED DOWN TO MIN AS ZONE SETPOINT IS SATISFIED.
HEATING MODE
MAINTAIN 85 DEG.(ADJ.) SUPPLY AIR TEMP. AND RAMP FAN SPEED DOWN TO MIN AS ZONE SETPOINT IS SATISFIED.



AHU-1 (CONSTANT VOLUME UNIT) DETAIL

SCALE: N.T.S. M-607 (A5)

SYM	DESCRIPTION	DATE	APPR
	AS BUILT	7/17/12	

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RECORD DRAWINGS
08/13/2012
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FOR COMMANDER NAVFAC / B.L.T.L.

ACTIVITY

SATISFACTORY TO DATE Okin Courtesy 5/5/11

DES SN DRW ECE CHK DR

PROJECT MANAGER

IPT TECH. BRANCH HEAD

CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY
IPT GULF COAST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
NAVAL AIR STATION KINGSVILLE
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL AIR STATION KINGSVILLE, TEXAS

INDOOR PHYSICAL FITNESS FACILITY

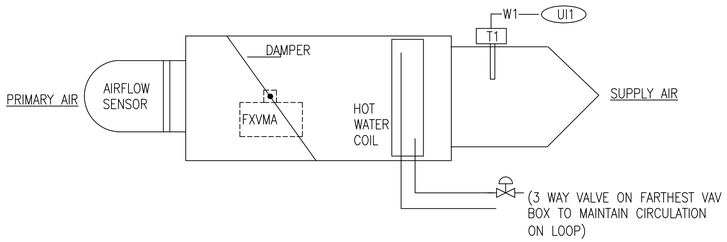
SEQUENCE OF OPERATION

SCALE:	NONE
EPROJECT NO.:	812380
CONSTR. CONTR. NO.	N69450-10-D-0771
NAVFAC DRAWING NO.	15068043 - 15068165
SHEET	OF
	M-606

DRAWFORM REVISION: 7 AUGUST 2009

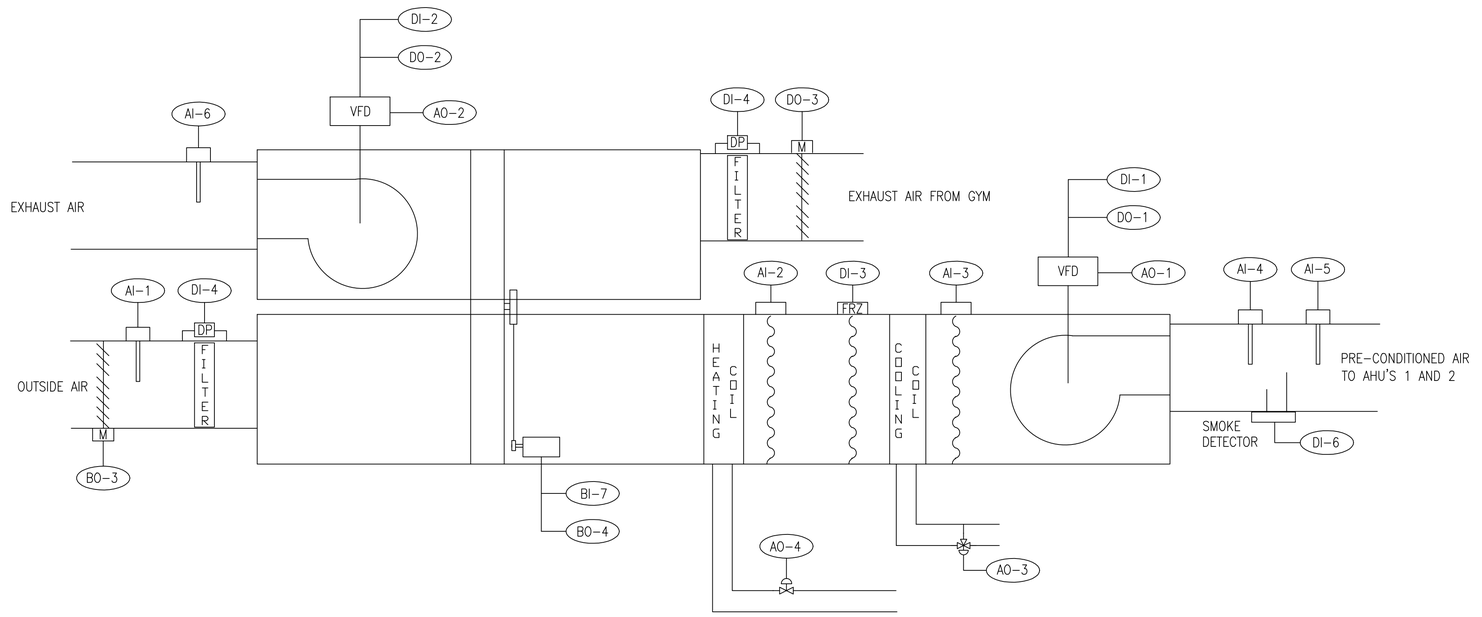
FILE NAME: L:\110-10137-000\4-0-Production\4-01-Drawings\Mechanical\BLDG#279-812380-M-606.dwg LAYOUT NAME: Layout1 PLOTTED: Wednesday, August 01, 2012 - 3:54pm USER: odshelton

COMFORT VERIFICATION NOTE
A SURVEY PLAN SHALL BE DEVELOPED AND IMPLEMENTED WITHIN SIX TO EIGHTEEN MONTHS AFTER BUILDING IS OCCUPIED TO GATHER DATA AND COLLECT RESPONSES ABOUT THE THERMAL COMFORT IN THE BUILDING. THE SURVEY SHALL ALSO BE USED TO ASSESS THE OVERALL SATISFACTION WITH THE THERMAL PERFORMANCE OF THE DESIGN AND POSSIBLE PROBLEMS WITH THE THERMAL COMFORT. IF SURVEY RESULTS SHOW DISSATISFACTION OF MORE THAN 20% OF THE OCCUPANTS, A CORRECTIVE ACTION SHALL BE DEVELOPED INCLUDING MEASUREMENT OF ALL RELATED VARIABLES WITHIN THE AREAS WHERE PROBLEMS ARE REPORTED BASED ON ASHRAE STANDARD 55-2004. THE SURVEY AND CORRECTIVE ACTION ARE REQUIREMENTS FOR LEED EQ CREDIT 7.2



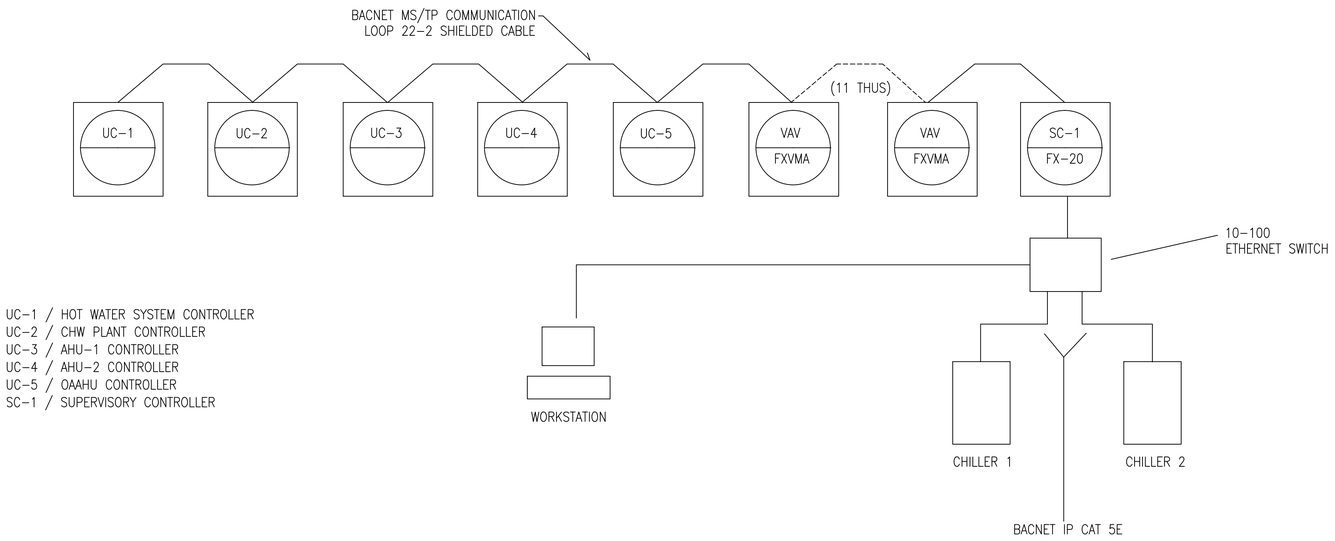
OCCUPIED MODE:
COOLING AND VENT MODE: DAMPER WILL MODULATE BETWEEN MIN. AND MAX OCC. CLG. AIRFLOW SETPOINTS TO MAINTAIN OCC. CLG. SETPOINT.
HEATING MODE: DAMPER WILL MODULATE BETWEEN MIN. AND MAX OCC. HTG. AIRFLOW SETPOINTS AND HOT WATER VALVE WILL MODULATE TO MAINTAIN OCC. HTG. SETPOINT.
UN-OCCUPIED MODE: SAME AS ABOVE BUT FOLLOW UN-OCCUPIED SETPOINTS.

VA TERMINAL UNIT
SCALE: N.T.S. M-607 (C2)



OAU-1 CONTROL DIAGRAM
SCALE: N.T.S. M-607 (C4)

SEQUENCE OF OPERATION:
SYSTEM ENABLED AND SMOKE DETECTOR NOT TRIPPED, DAMPERS WILL OPEN AND SUPPLY AND EXHAUST FANS WILL RAMP UP TOGETHER TO MEET AIRFLOW REQUIREMENTS OF AIRHANDLERS 1 AND 2 BASED ON THEIR RETURN AIR CO2 LEVELS. COOLING AND HEATING VALVES WILL MODULATE TO MAINTAIN 55 DEGREE LEAVING AIR DRY BULB TEMPERATURE AND 70% LEAVING AIR HUMIDITY. IF FREEZE-STAT DOWNSTREAM OF HEATING COIL OPENS, THE UNIT WILL SHUT DOWN, DAMPERS WILL CLOSE, AND THE HOT AND CHILL WATER VALVES WILL REMAIN OPEN.



UC-1 / HOT WATER SYSTEM CONTROLLER
UC-2 / CHW PLANT CONTROLLER
UC-3 / AHU-1 CONTROLLER
UC-4 / AHU-2 CONTROLLER
UC-5 / OAAHU CONTROLLER
SC-1 / SUPERVISORY CONTROLLER

DDC SYSTEM ARCHICHECTURE
SCALE: N.T.S. M-607 (A2)

POINTS LIST

		I/O POINT	POINT NAME	POINT DESCRIPTION
INPUTS	ANALOG INPUTS	AI-1	OAT	OUTSIDE AIR TEMPERATURE
		AI-2	HCLAT	HTG COIL LEAVING AIR TEMP.
		AI-3	CCLAT	CLG COIL LEAVING AIR TEMP.
		AI-4	SAT	SUPPLY AIR TEMPERATURE
		AI-5	SAH	SUPPLY AIR HUMIDITY
		AI-6	SAT	EXHAUST AIR TEMPERATURE
	DIGITAL INPUTS			
		DI-1	SFS	SUPPLY FAN STATUS
		DI-2	EFS	EXHAUST FAN STATUS
		DI-3	FRZ	LOW TEMPERATURE CUT-OUT (FREEZESTAT)
		DI-4	OAF	OUTSIDE AIR FILTER STATUS
		DI-5	EAF	EXHAUST AIR FILTER STATUS
		DI-5	SMK	SMOKE DETECTOR STATUS
		DI-5	RWS	RECOVERY WHEEL STATUS
OUTPUTS	ANALOG OUTPUTS	AO-1	SF_O	SUPPLY FAN SPEED
		AO-2	EF_O	EXHAUST FAN SPEED
		AO-3	CWV_O	CHILLED WATER VALVE PERCENT OPEN
		AO-4	HWV_O	HOT WATER VALVE PERCENT OPEN
	DIGITAL OUTPUTS	DO-1	SF_C	SUPPLY FAN COMMAND
		DO-2	EF_C	EXHAUST FAN COMMAND
		DO-3	DMPR	DAMPER OPEN COMMAND
		DO-4	EW_C	ENTHALPY WHEEL COMMAND
		DO-5	N/A	NOT USED
		DO-6	N/A	NOT USED

APPR	DATE	DESCRIPTION	SYM
	7/17/12	AS BUILT	
	9/02/11	ASI #12	1

NAVFAC

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08/13/2012
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DES SN | DRW ECE | CHK DR
PROJECT MANAGER -
IPT TECH. BRANCH HEAD -
CHIEF ENG/ARCH (CORE) -

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
IPT GULF COAST
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL AIR STATION JACKSONVILLE
NAVAL AIR STATION KINGSVILLE
KINGSVILLE, TEXAS
INDOOR PHYSICAL FITNESS FACILITY
SEQUENCE OF OPERATION

SCALE: NONE
EPROJECT NO.: 812380
CONSTR. CONTR. NO. N69450-10-D-0771
NAVFAC DRAWING NO. 15068044 - 15068165
SHEET OF
M-607
DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: L:\110-10137-000\4-0-Production\4-01-Drawings\Mechanical\BLDG2279-812380-M-607.dwg LAYOUT NAME: Layout1 PLOTTED: Wednesday, August 01, 2012 - 3:54pm USER: adshelton