



one-eighth inch = one foot

# VETERANS HEALTH CARE SYSTEM

Alexandria, Louisiana

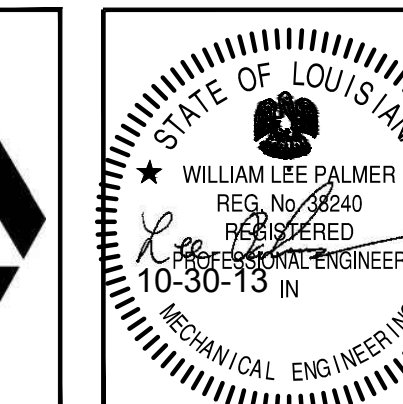
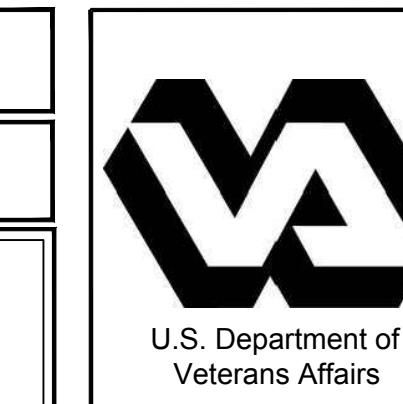



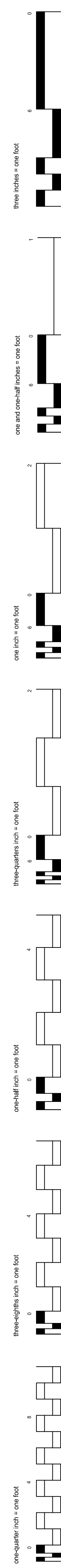
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	Drawing Title
	2ND FLOOR PLAN - MECHANICAL
	Approved: Service Engineer
	Approved: Service Director

Project Title			
A&E Design - Upgrade Energy Management Control Systems			
Building Number	Checked	Drawn	
2	WLP	NMT	
Location			
Alexandria, LA			

Date	October 30, 2013
Project No.	VA256-12-C-0253
DRAWING NO.	M2-102





one-eighth inch = one foot

# VETERANS HEALTH CARE SYSTEM

Alexandria, Louisiana

**Hernandez Consulting**  
ALBERT ARCHITECTURE

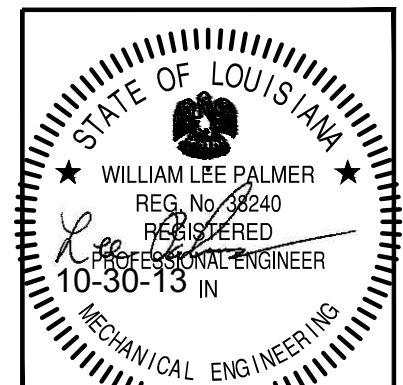
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<b>Approved:</b>	
<b>Title</b>	<b>Signature</b>

	Drawing Title
	3RD FLOOR PLAN - MECHANICAL
	Approved: Service Engineer
	Approved: Service Director

Project Title			
A&E Design - Upgrade Energy Management Control Systems			
Building Number	Checked	Drawn	
2	WLP	NMT	
Location			
Alexandria, LA			

Date	October 30, 2013
Project No.	VA256-12-C-0253
DRAWING NO.	M2-103

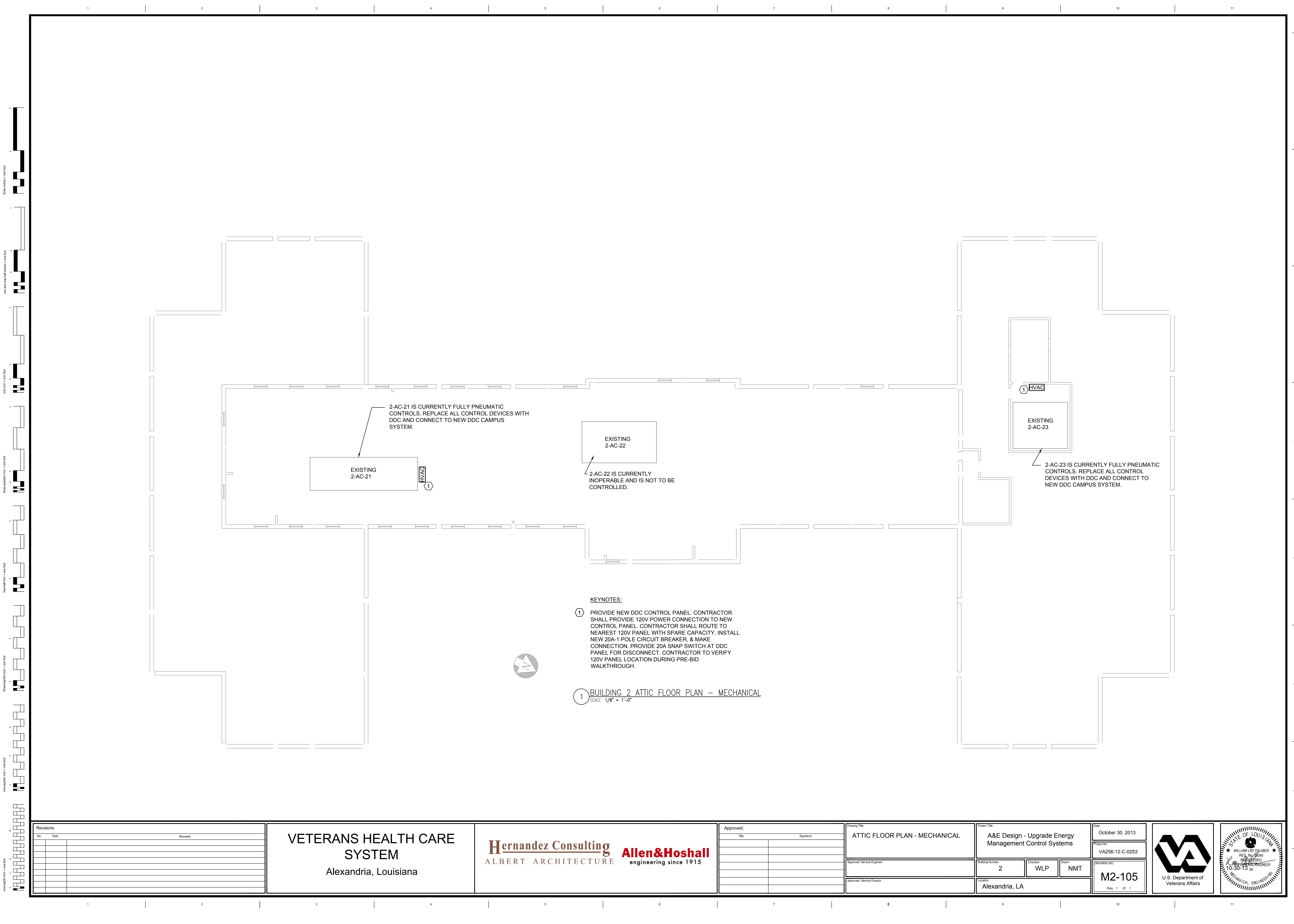






1. NO EXISTING OR NEW MECHANICAL EQUIPMENT TO BE CONTROLLED ON THIS FLOOR.

STATE OF LOUISIANA  
 WILLIAM LEE PALMER  
 REG. NO. 16240  
 REGISTERED  
 MECHANICAL ENGINEER  
 10-30-13  
 MECHANICAL ENGINEERING



Revisions		
No.	Date	Remarks

VETERANS HEALTH CARE  
SYSTEM  
Alexandria, Louisiana

**Hernandez Consulting**  
ALBERT ARCHITECTURE

**Allen&Hoshall**  
engineering since 1915

Approved:	
Title	Signature

Drawing Title	
ATTIC FLOOR PLAN - MECHANICAL	
Approved: Service Engineer	
Approved: Service Director	

Project Title		
A&E Design - Upgrade Energy Management Control Systems		
Building Number	Checked	Drawn
2	WLP	NMT
Location		
Alexandria, LA		

Date	
October 30, 2013	
Project No.	
VA256-12-C-0253	
Drawing No.	
M2-105	
Sheet 1 of 1	

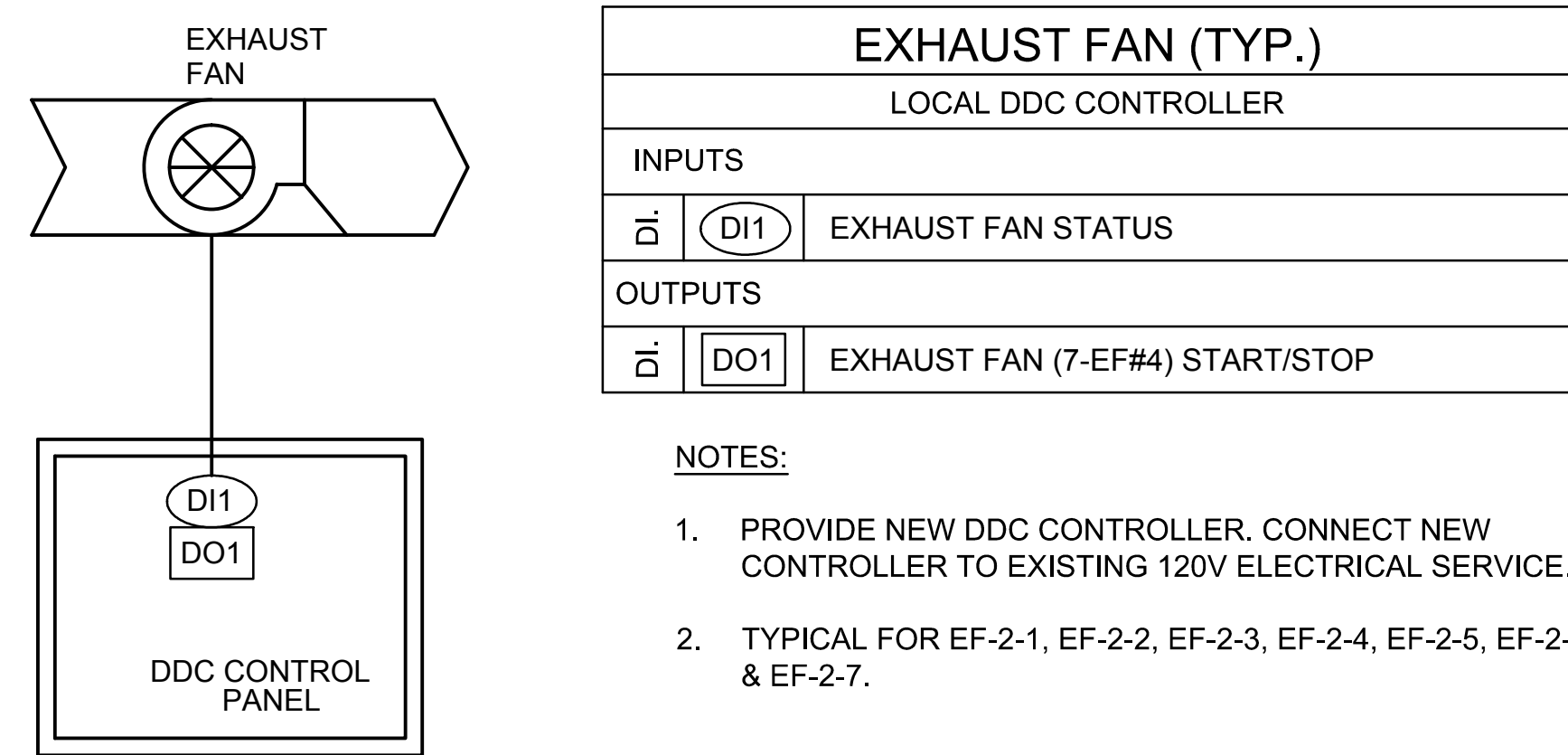




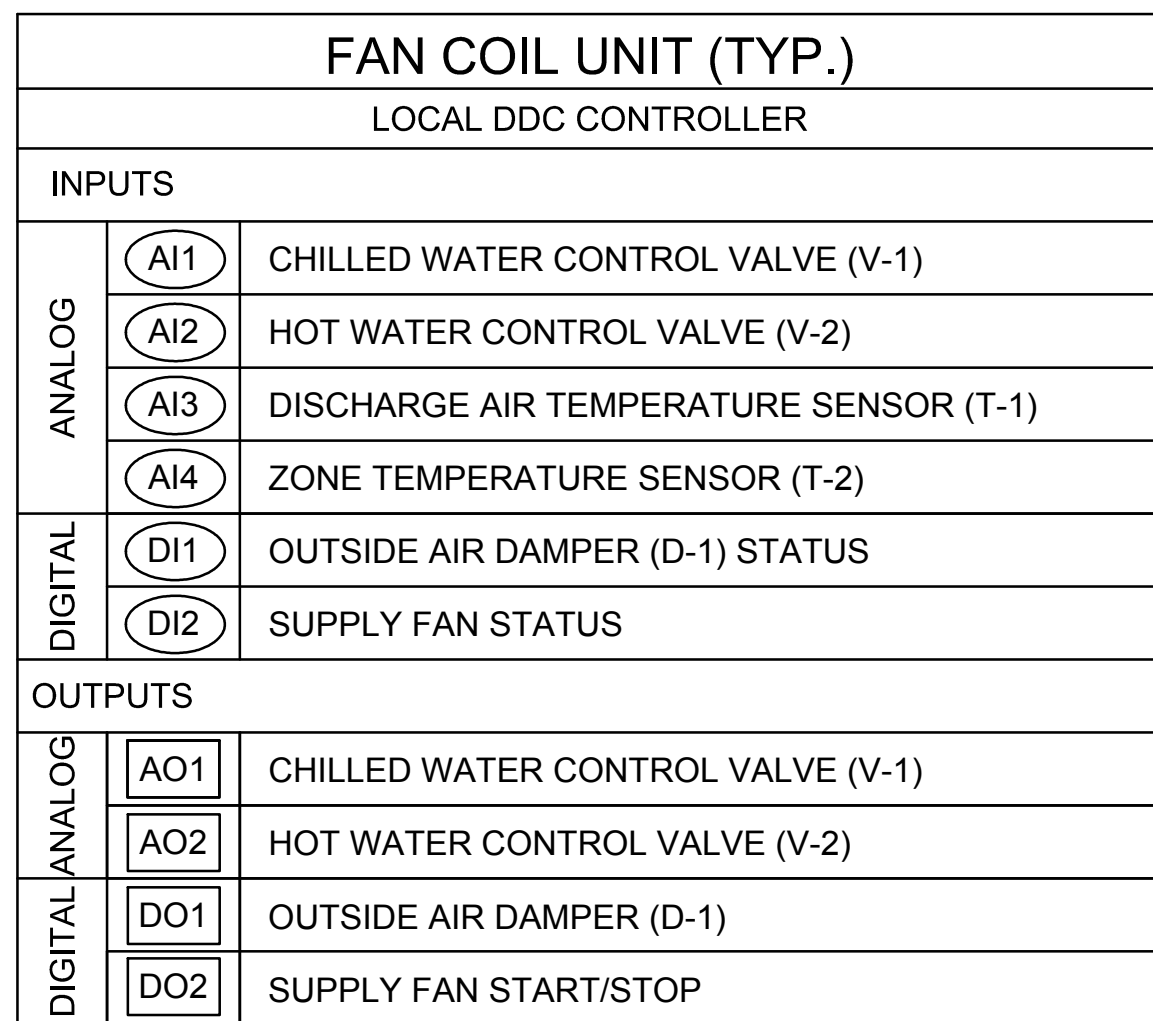


SEQUENCE OF OPERATION: EXHAUST FAN (TYP.)

- START/STOP CONTROL
  - FAN TO BE STARTED AND STOPPED BY A TIME SCHEDULE OF 24 HOURS A DAY (ADJ.).
- ALARM
  - ALARM SHALL BE GENERATED WHEN STATUS DOES NOT MATCH COMMAND.



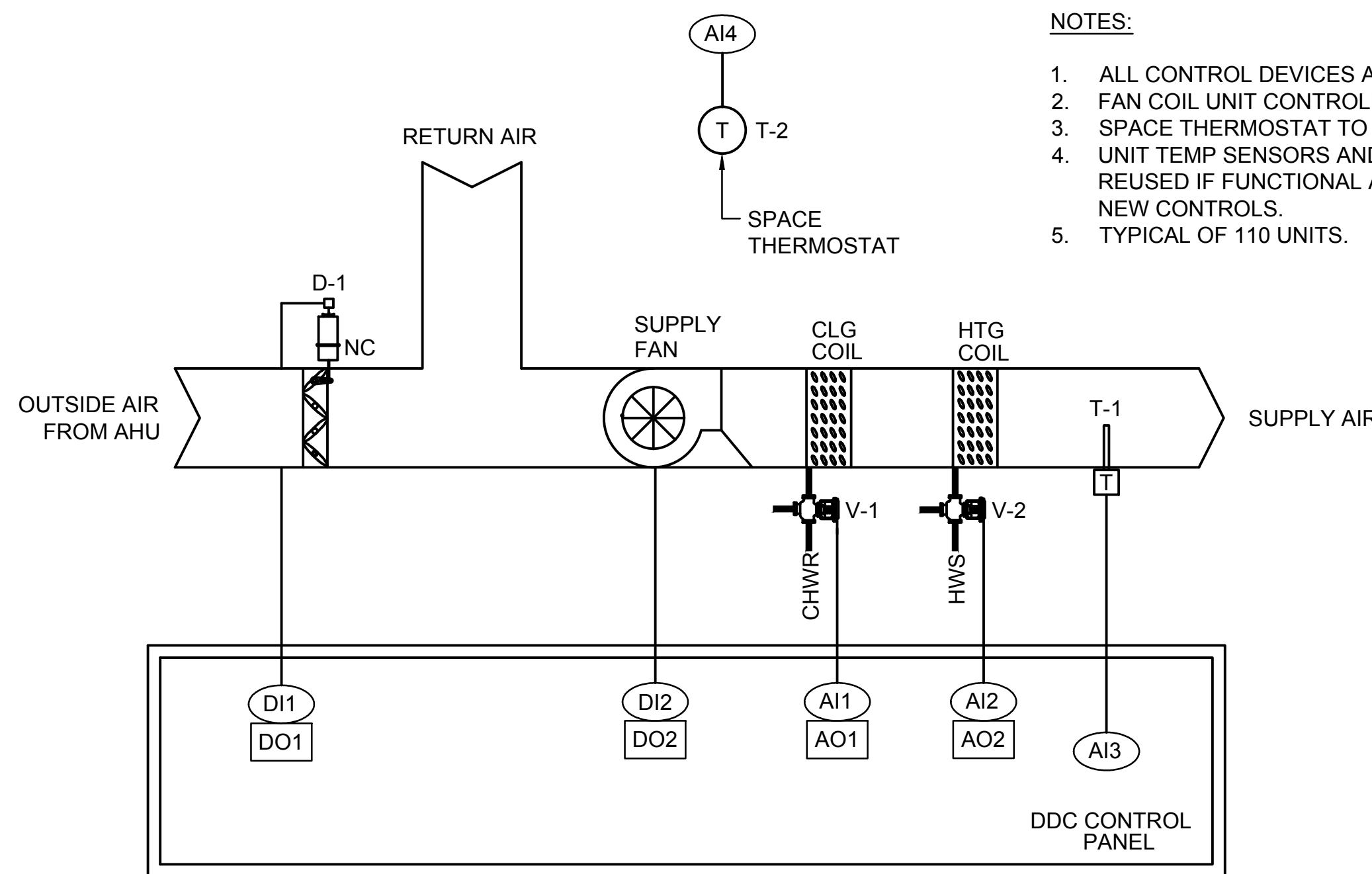
1 BUILDING 2 EXHAUST FAN (TYP.) CONTROL SCHEMATIC & SEQUENCE  
SCALE: NOT TO SCALE



SEQUENCE OF OPERATION: FAN COIL UNIT (TYP.)

- SUPPLY FAN CONTROL
  - WHEN THE THERMOSTAT FAN MODE IS SET TO "ON", THE SUPPLY FAN SHALL RUN CONTINUOUSLY.
  - WHEN THE THERMOSTAT FAN MODE IS SET TO "AUTO", THE SUPPLY FAN SHALL RUN ANYTIME THERE IS A CALL FOR HEATING OR COOLING.
- TEMPERATURE CONTROL
  - THE UNIT SHALL CONTROL TO MAINTAIN THE ZONE TEMPERATURE SETPOINT AS SENSED BY THE ZONE TEMPERATURE SENSOR, T-2.
- OCCUPIED MODE
  - THE OCCUPANCY MODE SHALL BE CONTROLLED VIA A NETWORK INPUT.
- OUTSIDE AIR DAMPER
  - OUTSIDE AIR DAMPER SHALL BE OPEN WHEN RESPECTIVE AHU IS ON.

- NOTES:
- ALL CONTROL DEVICES ARE EXISTING DDC.
  - FAN COIL UNIT CONTROLLER TO BE REPLACED.
  - SPACE THERMOSTAT TO BE REPLACED.
  - UNIT TEMP SENSORS AND ACTUATORS CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE WITH NEW CONTROLS.
  - TYPICAL OF 110 UNITS.



1 BUILDING 2 FAN COIL UNIT (TYP.) CONTROL SCHEMATIC & SEQUENCE  
SCALE: NOT TO SCALE

2ND FLOOR FAN COIL UNITS BALANCING SCHEDULE						
QTY. FCU PER ROOM	AREA SERVED	SUPPLIED BY AHU	TOTAL CFM	OA CFM	GPM	
					COOLING	HEATING
2	201	2-AC-21	220	30	1.50	1.0
1	201C	2-AC-21	420	45	2.25	1.0
1	201B	2-AC-21	450	45	2.50	1.0
1	203	2-AC-21	200	30	1.50	1.0
1	203	2-AC-21	400	40	2.25	1.0
1	205	2-AC-21	150	20	0.75	0.75
1	206	2-AC-21	280	30	1.25	1.0
1	208	2-AC-21	240	30	1.25	0.75
1	209	2-AC-21	450	45	2.50	1.0
2	210	2-AC-21	570	40	3.50	1.0
2	210	2-AC-21	320	40	2.25	1.0
1	210	2-AC-21	250	40	1.25	1.0
1	212	2-AC-21	150	30	1.0	0.75
1	213	2-AC-21	150	30	1.0	0.75
1	214	2-AC-21	150	30	1.0	0.75
1	217	2-AC-21	560	90	4.0	1.0
1	217B	2-AC-21	840	90	5.75	0.75
1	217E	2-AC-21	560	90	4.0	1.0
1	217F	2-AC-21	560	90	4.0	1.0
1	POST DEPLOYMENT CLERK	2-AC-21	560	90	4.0	1.0
1	218	2-AC-21	80	20	0.75	0.50
1	219	2-AC-21	190	30	1.25	0.75
2	220	2-AC-21	450	50	3.25	1.0
2	221	2-AC-21	350	40	2.0	1.0
2	222	2-AC-21	250	40	1.25	1.0
1	226	2-AC-21	570	45	3.0	1.0
1	227	2-AC-21	350	40	2.0	1.0
1	228	2-AC-21	320	40	1.75	1.0
1	229	2-AC-21	270	40	1.25	1.0
1	230	2-AC-21	320	40	1.75	1.0
1	231	2-AC-21	340	40	1.75	1.0
1	232	2-AC-23	330	30	1.75	1.0
1	233	2-AC-23	325	30	1.75	1.0
1	234	2-AC-23	200	20	1.00	0.75
1	235	2-AC-23	300	40	1.50	1.0
1	236	2-AC-23	400	50	2.0	1.0
1	237	2-AC-23	80	20	0.75	0.50
1	237A	2-AC-23	200	30	1.25	1.0
2	238	2-AC-23	530	40	2.75	1.0
2	239	2-AC-23	530	40	2.75	1.0
1	240	2-AC-23	210	45	1.50	1.0
1	241A	2-AC-23	620	65	3.50	0.75
1	241	2-AC-23	840	120	6.70	1.0
1	242	2-AC-23	630	60	3.00	0.75
1	242B	2-AC-23	840	80	5.75	0.75
1	242C	2-AC-23	760	50	3.50	0.75
1	242D	2-AC-23	250	30	1.25	1.0
1	245	2-AC-23	90	30	0.75	0.50
1	246	2-AC-23	80	20	0.75	0.50
1	247	2-AC-23	80	20	1.25	0.50
4	248	2-AC-23	530	55	3.50	1.0
2	249	2-AC-23	270	40	1.50	1.0
1	250	2-AC-23	430	45	2.50	1.0
1	252	2-AC-21	200	20	1.25	0.75
1	254	2-AC-21	250	30	1.25	1.0
1	255	2-AC-21	170	25	1.0	0.75
1	256	2-AC-21	450	45	2.50	1.0
1	2ND FLOOR SOUTHEAST CORRIDOR	2-AC-21	830	90	3.50	0.75
1	2ND FLOOR SOUTHWEST CORRIDOR	2-AC-21	830	90	3.75	0.75
1	2ND FLOOR NORTH CORRIDOR	2-AC-23	830	80	3.50	0.75

3RD FLOOR FAN COIL UNITS BALANCING SCHEDULE						
QTY. FCU PER ROOM	AREA SERVED	SUPPLIED BY AHU	TOTAL CFM	OA CFM	GPM	
					COOLING	HEATING
2	301	2-AC-21	300	40	2.25	1.0
1	301C	2-AC-21	450	45	2.50	1.0
1	301B	2-AC-21	540	60	2.50	1.0
2	303	2-AC-21	430	60	3.50	1.0
1	305	2-AC-21	150	20	0.75	0.75
1	306	2-AC-21	150	20	0.75	0.75
2	308	2-AC-21	280	35	1.50	1.0
1	309	2-AC-21	270	45	1.75	1.0
2	310	2-AC-21	550	50	3.0	1.0
2	311	2-AC-21	430	50	2.75	1.0
1	312	2-AC-21	130	45	0.75	0.75
1	313	2-AC-21	240	65	1.25	1.0
4	316	2-AC-21	750	90	5.25	0.75
1	316B	2-AC-21	840	90	6.70	0.75
1	319	2-AC-21	80	20	0.75	0.5
1	320	2-AC-21	240	65	1.25	1.0
1	321	2-AC-21	270	45	1.25	1.0
1	322	2-AC-21	460	45	2.75	1.0
1	323	2-AC-21	460	45	2.50	1.0
1	324	2-AC-21	270	45	1.25	1.0
1	325	2-AC-21	270	45	1.25	1.0
1	326	2-AC-21	230	30	1.25	1.0
1	329	2-AC-21	230	30	1.25	1.0
1	330	2-AC-21	270	45	1.25	1.0
1	331	2-AC-21	200	30	1.25	1.0
1	332	2-AC-21	270	30	1.0	1.0
2	333	2-AC-21	250	25	1.25	1.0
1	334	2-AC-23	750	60	3.50	0.75
1	335	2-AC-23	840	90	5.80	0.75
1	336	2-AC-23	300	30	1.50	1.0
1	337	2-AC-23	350	30	2.0	1.0
1	338	2-AC-23	310	30	1.0	1.0
3	339	2-AC-23	400	35	2.50	1.0
3	340	2-AC-23	320	35	2.0	1.0
2	341	2-AC-23	120	35	1.0	0.50
1	342	2-AC-23	550	50	2.50	1.0
1	342A	2-AC-23	840	240	6.70	0.75
4	343	2-AC-23	630	70	4.50	1.0
1	346	2-AC-23	150	20	0.75	0.5
1	347	2-AC-23	200	45	1.25	0.5
2	348	2-AC-23	450	50	3.0	1.0
2	349	2-AC-23	330	25	2.0	1.0
1	350	2-AC-23	280	45	1.25	0.75
1	351	2-AC-23	280	45	1.25	0.75
1	352	2-AC-23	280	45	1.25	0.75
1	353	2-AC-23	300	45	1.25	0.75
1	355	2-AC-23	220	30	1.0	0.75
1	357	2-AC-23	220	40	1.25	0.75
1	358	2-AC-23	180	20	1.0	0.50
1	359	2-AC-23	400	40	2.25	1.0
1	3RD FLOOR SOUTHEAST CORRIDOR	2-AC-21	1000	80	6.70	0.75
1	3RD FLOOR SOUTHWEST CORRIDOR	2-AC-21	1000	80	6.70	0.75
1	3RD FLOOR NORTH CORRIDOR	2-AC-23	1100	80	6.70	0.75

Revisions		
No.	Date	Remarks

**VETERANS HEALTH CARE SYSTEM**  
Alexandria, Louisiana

**Hernandez Consulting**  
ALBERT ARCHITECTURE

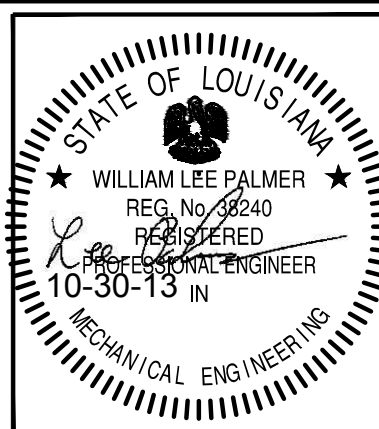
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Approved:	
Title	Signature

Drawing Title	
FAN COIL UNIT (TYP.) & EXHAUST FAN (TYP.) CONTROL SCHEMATICS, SEQUENCES & BALANCE SCHEDULES	
Approved: Service Engineer	
Approved: Service Director	

Project Title	
A&E Design - Upgrade Energy Management Control Systems	
Building Number	2
Checked	WLP
Drawn	NMT
Location	Alexandria, LA

Date	
October 30, 2013	
Project No.	VA256-12-C-0253
Drawing No.	M2-201
Dwg.	1 OF 1





SEQUENCE OF OPERATION

1. START/STOP CONTROLS

- 1.1. THE EXISTING CHILLED WATER SUPPLY FROM THE CENTRAL COOLING PLANT PROVIDES CHILLED WATER TO THE SECONDARY PUMPING SYSTEM FOR BUILDING 2. SYSTEM ENABLE SHALL BE CONTROLLED BY THE DDC SYSTEM.
- 1.2. WHEN THE SYSTEM IS ENABLED THE SECONDARY CHILLED WATER PUMPS SHALL BE COMMANDED "ON".
- 1.3. WHEN THE SYSTEM IS "OFF", THE SYSTEM SHALL BE DISABLED.

2. CHILLED WATER VALVE CONTROLS

- 2.1. THE VALVES SHALL MODULATE TO MAINTAIN THE DESIRED CHILLED WATER SUPPLY TEMPERATURE TO SETPOINT FOR EACH SECTION. INITIAL SETTING WILL BE 60°F FOR THE INDUCTION UNITS SECTION.

3. CHILLED WATER PUMP CONTROLS

- 3.1. WHEN ENABLED, THE PUMPS WILL BE STARTED. IF THE PUMP STATUS DOES NOT MATCH THE COMMAND, AN ALARM SHALL BE GENERATED, AND THE PUMP SHALL BE STOPPED. THE PUMP SHALL AUTOMATICALLY RETRY TO START
- 3.2. 2-SCHWP4 VFD SHALL MODULATE TO MAINTAIN STATIC PRESSURE SETPOINT. STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON VALVE POSITION.

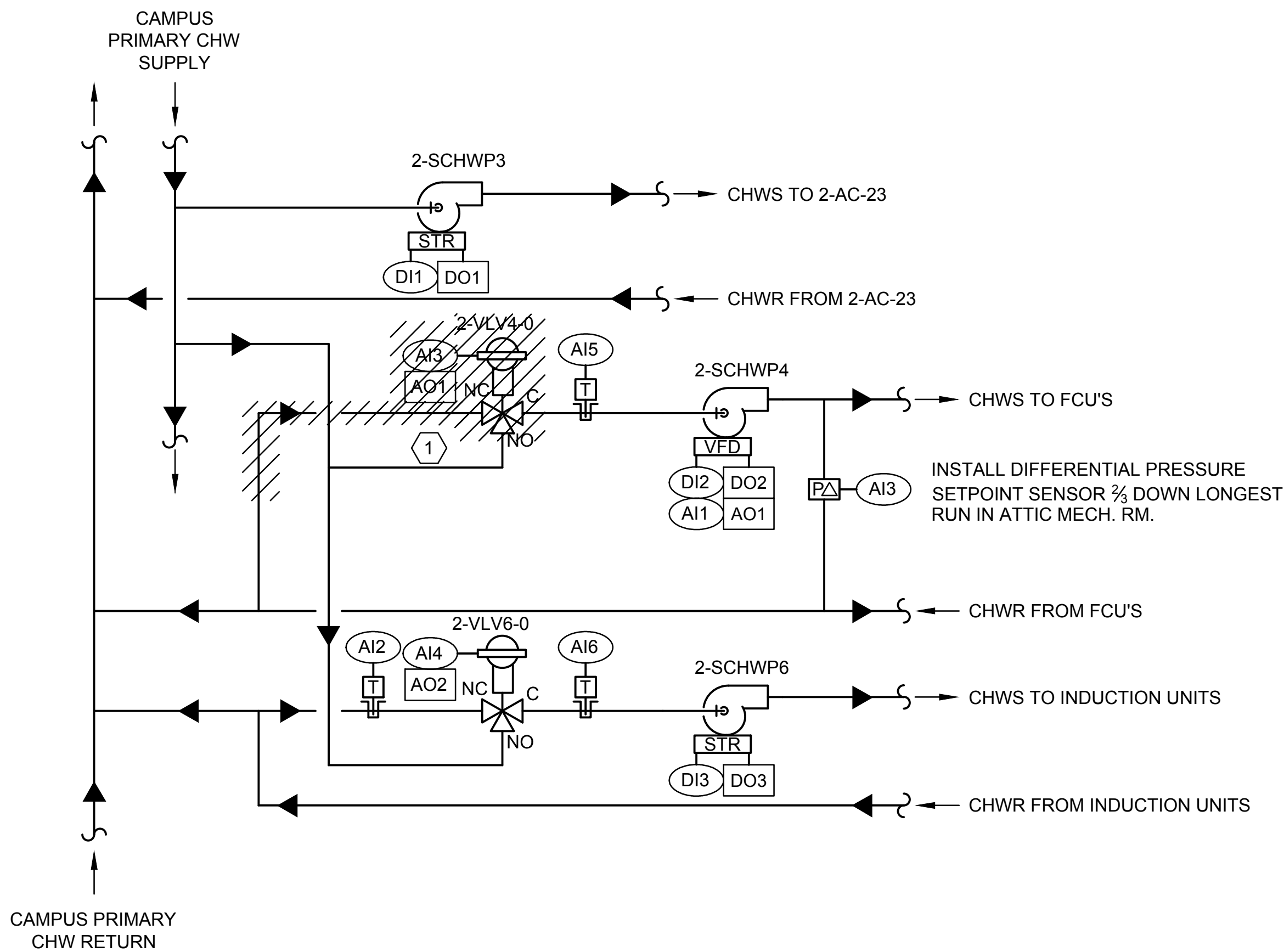
NORTH SECONDARY CHILLED WATER SYSTEM		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	2-SCHWP4 CHILLED WATER PUMP VFD STATUS
	AI2	INDUCTION UNITS CHILLED WATER BYPASS TEMPERATURE SENSOR
	AI3	2-SCHWP-4 SYSTEM DIFFERENTIAL PRESSURE SETPOINT SENSOR
	AI4	INDUCTION UNITS CHWS CONTROL VALVE (2-VLV6-0)
	AI5	FCU'S CHWS TEMPERATURE SENSOR
	AI6	INDUCTION UNITS CHWS TEMPERATURE SENSOR
DIGITAL	DI1	CHILLED WATER PUMP (2-SCHWP3) STATUS
	DI2	CHILLED WATER PUMP (2-SCHWP4) STATUS
	DI3	CHILLED WATER PUMP (2-SCHWP6) STATUS
OUTPUTS		
ANALOG	AO1	2-SCHWP4 CHILLED WATER PUMP VFD SPEED
	AO2	INDUCTION UNITS CHWS CONTROL VALVE (2-VLV6-0)
DIGITAL	DO1	CHILLED WATER PUMP (2-SCHWP3) START/STOP
	DO2	CHILLED WATER PUMP (2-SCHWP4) START/STOP
	DO3	CHILLED WATER PUMP (2-SCHWP5) START/STOP

NOTES:

1. ALL CONTROL DEVICES ARE EXISTING DDC. TEMPERATURE SENSORS, VALVE ACTUATORS, ETC. CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
2. CONTROLLERS ARE TO BE REPLACED.
3. SERVES NORTHSIDE OF BLDG 2, 2ND AND 3RD FLOOR FCUS AND INDUCTION UNITS.

KEYNOTES:

- 1 DEMO CHILLED WATER BYPASS LINE AND 3-WAY CONTROL VALVE ON FCU CHILLED WATER PUMP. CONNECT PUMP INLET TO CAMPUS PRIMARY CHILLED WATER SUPPLY.



1 BUILDING 2 NORTH SECONDARY CHILLED WATER SYSTEM CONTROL SCHEMATIC & SEQUENCE  
SCALE: NOT TO SCALE

SEQUENCE OF OPERATION

1. START/STOP CONTROLS

- 1.1. THE EXISTING CHILLED WATER SUPPLY FROM THE CENTRAL COOLING PLANT PROVIDES CHILLED WATER TO THE SECONDARY PUMPING SYSTEM FOR BUILDING 2. SYSTEM ENABLE SHALL BE CONTROLLED BY THE DDC SYSTEM.
- 1.2. WHEN THE SYSTEM IS ENABLED THE SECONDARY CHILLED WATER PUMPS SHALL BE COMMANDED "ON".
- 1.3. WHEN THE SYSTEM IS "OFF", THE SYSTEM SHALL BE DISABLED.

2. CHILLED WATER VALVE CONTROLS

- 2.1. THE VALVES SHALL MODULATE TO MAINTAIN THE DESIRED CHILLED WATER SUPPLY TEMPERATURE TO SETPOINT FOR EACH SECTION. INITIAL SETTING WILL BE 60°F FOR THE INDUCTION UNITS SECTION.

3. CHILLED WATER PUMP CONTROLS

- 3.1. WHEN ENABLED, THE PUMPS WILL BE STARTED. IF THE PUMP STATUS DOES NOT MATCH THE COMMAND, AN ALARM SHALL BE GENERATED, AND THE PUMP SHALL BE STOPPED. THE PUMP SHALL AUTOMATICALLY RETRY TO START.
- 3.2. 2-SCHWP1 & 2-SCHWP2 VFD SHALL MODULATE TO MAINTAIN STATIC PRESSURE SETPOINT. STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON VALVE POSITION.

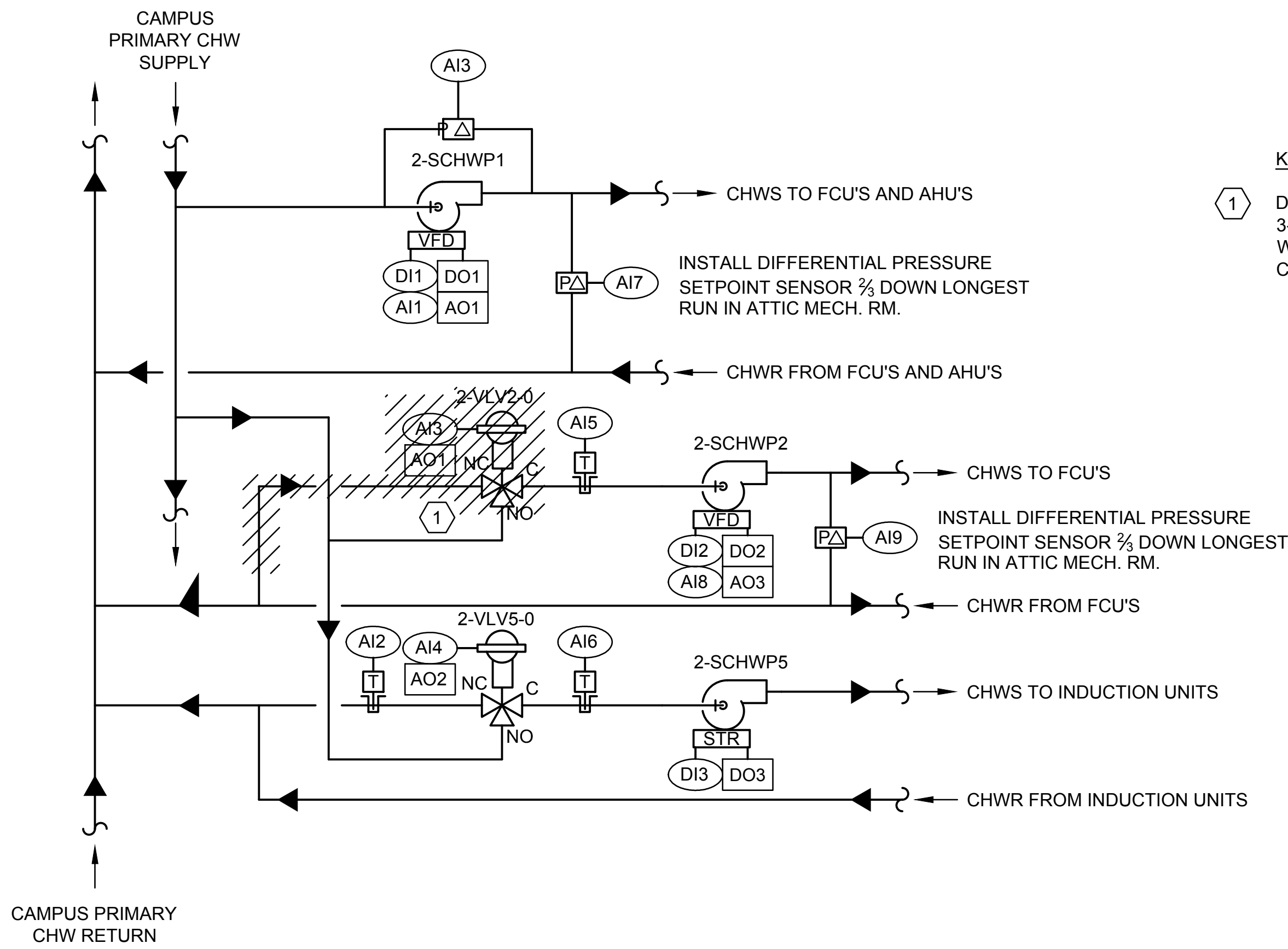
SOUTH SECONDARY CHILLED WATER SYSTEM		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	2-SCHWP1 CHILLED WATER PUMP VFD STATUS
	AI2	INDUCTION UNITS CHILLED WATER BYPASS TEMPERATURE SENSOR
	AI3	2-SCHWP1 CHILLED WATER PUMP DIFFERENTIAL PRESSURE SENSOR
	AI4	INDUCTION UNITS CHWS CONTROL VALVE (2-VLV5-0)
	AI5	FCU'S CHWS TEMPERATURE SENSOR
	AI6	INDUCTION UNITS CHWS TEMPERATURE SENSOR
	AI7	2-SCHWP-1 SYSTEM DIFFERENTIAL PRESSURE SETPOINT SENSOR
	AI8	2-SCHWP-2 CHILLED WATER PUMP VFD STATUS
	AI9	2-SCHWP-2 SYSTEM DIFFERENTIAL PRESSURE SETPOINT SENSOR
DIGITAL	DI1	CHILLED WATER PUMP (2-SCHWP1) STATUS
	DI2	CHILLED WATER PUMP (2-SCHWP2) STATUS
	DI3	CHILLED WATER PUMP (2-SCHWP5) STATUS
OUTPUTS		
ANALOG	AO1	2-SCHWP1 CHILLED WATER PUMP VFD SPEED
	AO2	INDUCTION UNITS CHWS CONTROL VALVE (2-VLV5-0)
	AO3	2-SCHWP2 CHILLED WATER PUMP VFD SPEED
DIGITAL	DO1	CHILLED WATER PUMP (2-SCHWP1) START/STOP
	DO2	CHILLED WATER PUMP (2-SCHWP2) START/STOP
	DO3	CHILLED WATER PUMP (2-SCHWP5) START/STOP

NOTES:

1. ALL CONTROL DEVICES ARE EXISTING DDC. TEMPERATURE SENSORS, VALVE ACTUATORS, ETC. CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
2. CONTROLLERS ARE TO BE REPLACED. CONNECT NEW CONTROLLERS TO EXISTING ELECTRICAL SERVICE.
3. SERVES SOUTHSIDE OF BLDG 2, 2ND AND 3RD FLOOR FCUS AND INDUCTION UNITS.

KEYNOTES:

- 1 DEMO CHILLED WATER BYPASS LINE AND 3-WAY CONTROL VALVE ON FCU CHILLED WATER PUMP. CONNECT PUMP INLET TO CAMPUS PRIMARY CHILLED WATER SUPPLY.



2 BUILDING 2 SOUTH SECONDARY CHILLED WATER SYSTEM CONTROL SCHEMATIC & SEQUENCE  
SCALE: NOT TO SCALE

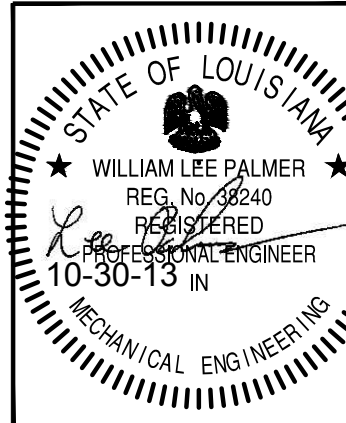
Revisions		
No.	Date	Remarks

VETERANS HEALTH CARE  
SYSTEM  
Alexandria, Louisiana

Hernandez Consulting  
ALBERT ARCHITECTURE  
Allen&Hoshall  
engineering since 1915

Approved:	
Title	Signature

Drawing Title		Project Title		Date	
NORTH & SOUTH SCHWS CONTROL SCHEMATICS & SEQUENCES		A&E Design - Upgrade Energy Management Control Systems		October 30, 2013	
Approved: Service Engineer		Building Number		Project No.	
		2		VA256-12-C-0253	
Approved: Service Director		Location		Drawing No.	
		Alexandria, LA		M2-202	
				Dwg. 1 OF 1	

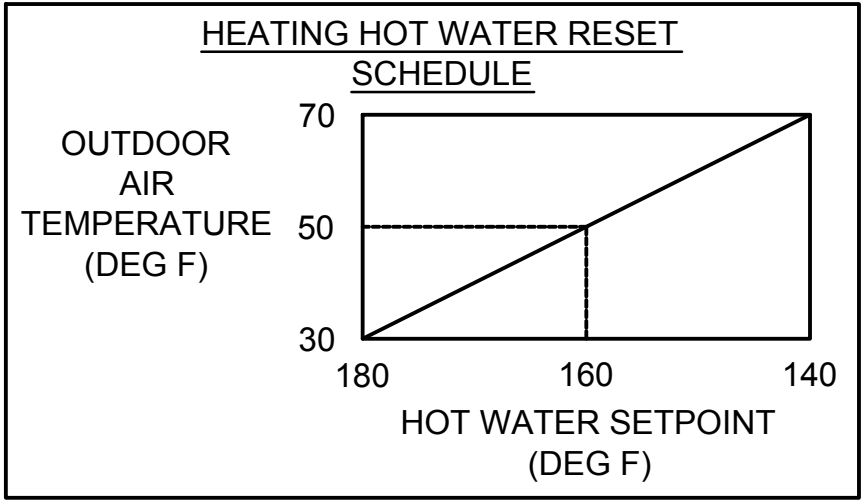




NORTH HEATING HOT WATER SYSTEM		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	STEAM CONVERTER (2-HTX-3) VALVE 2 STATUS
	AI2	STEAM CONVERTER (2-HTX-3) VALVE 1 STATUS
	AI3	STEAM CONVERTER (2-HTX-4) VALVE 2 STATUS
	AI4	STEAM CONVERTER (2-HTX-4) VALVE 1 STATUS
	AI5	HOT WATER SUPPLY TEMPERATURE SENSOR
	AI6	HOT WATER RETURN TEMPERATURE SENSOR
	AI7	AMBIENT AIR TEMPERATURE SENSOR
DIGITAL	DI1	STEAM CONVERTER (2-HTX-3) FLOW SWITCH STATUS
	DI2	STEAM CONVERTER (2-HTX-4) FLOW SWITCH STATUS
	DI3	HOT WATER PUMP (2-HWP9) STATUS
	DI4	HOT WATER PUMP (2-HWP10) STATUS
OUTPUTS		
ANALOG	AO1	STEAM CONVERTER (2-HTX-3) VALVE 2 CONTROLLER
	AO2	STEAM CONVERTER (2-HTX-3) VALVE 1 CONTROLLER
	AO3	STEAM CONVERTER (2-HTX-4) VALVE 2 CONTROLLER
	AO4	STEAM CONVERTER (2-HTX-4) VALVE 1 CONTROLLER
DIGITAL	DO1	HOT WATER PUMP (2-HWP9) START/STOP
	DO2	HOT WATER PUMP (2-HWP10) START/STOP

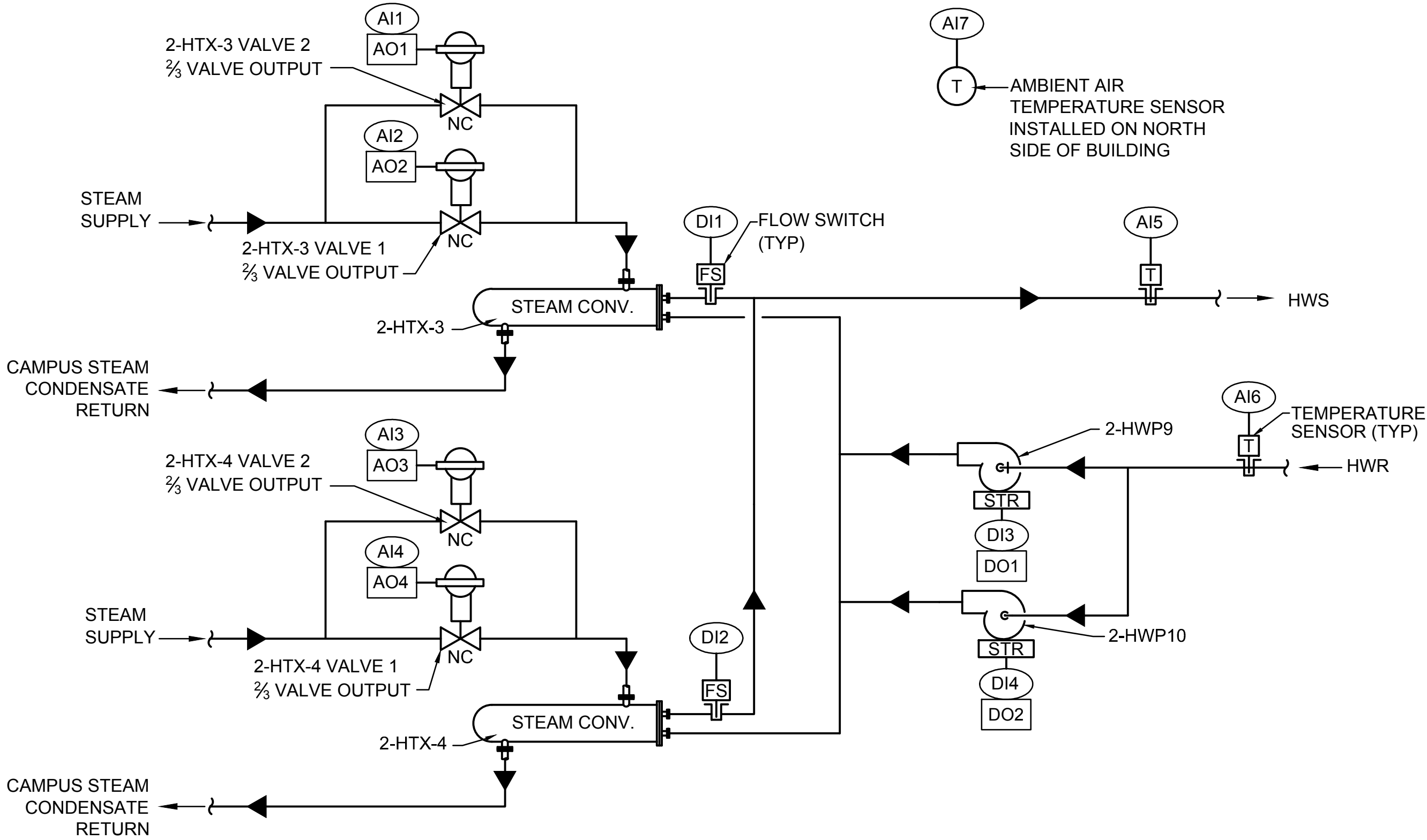
SEQUENCE OF OPERATION

1. START/STOP CONTROLS
  - 1.1. THE HEATING SYSTEM SHALL AUTOMATICALLY START WHEN THE OUTSIDE AIR TEMPERATURE FALLS BELOW THE SYSTEM ENABLE SETPOINT.
  - 1.2. WHEN THE SYSTEM IS "ON":
    - 1.2.1. STEAM CONTROL VALVES SHALL MODULATE TO MAINTAIN THE HOT WATER SUPPLY TEMPERATURE AT SETPOINT.
    - 1.2.2. THE HOT WATER SUPPLY TEMPERATURE RESETS INVERSELY WITH THE OUTDOOR TEMPERATURE AS SCHEDULED: AT 30°F OA, HWS TEMPERATURE AT 180°F, AT 70°F OA, HWS TEMPERATURE AT 140°F.
    - 1.2.3. STEAM HOT WATER CONVERTERS, 2-HTX-3 & 2-HTX-4, ARE 100% REDUNDANT AND ONLY ONE UNIT AT A TIME SHALL OPERATE.
    - 1.2.4. HOT WATER PUMPS ARE CONTROLLED BY THE DDC SYSTEM. THE PUMPS ARE 100% REDUNDANT REQUIRING ONLY ONE PUMP AT A TIME TO OPERATE.
  - 1.3. WHEN THE OUTSIDE AIR TEMPERATURE RISES ABOVE THE SYSTEM ENABLE SETPOINT OR THE SYSTEM IS "OFF", THE HEATING SHALL BE DISABLED.
2. HEAT EXCHANGER CONTROL
  - 2.1. THIS SYSTEM CONSISTS OF TWO STEAM HEAT EXCHANGERS WITH ½ - ½ STEAM VALVES. AFTER THE FLOW THROUGH THE HEAT EXCHANGER HAS BEEN CONFIRMED VIA THE FLOW SWITCH, THE 24VAC POWER SHALL BE APPLIED TO THE STEAM VALVE ACTUATORS. THE TWO STEAM INLET VALVES WILL MODULATE IN SEQUENCE TO MAINTAIN THE DESIRED HOT WATER SUPPLY TEMPERATURE TO SETPOINT AS RESET BY THE OUTDOOR AIR TEMPERATURE.
3. HOT WATER PUMP CONTROL
  - 3.1. WHEN ENABLED, A PUMP SHALL BE STARTED. IF THE PUMP STATUS DOES NOT MATCH THE COMMAND, AN ALARM SHALL BE GENERATED AND THE LAG PUMP SHALL BE STARTED. LEAD/LAG STATUS SHALL BE SWITCHED WEEKLY TO EQUALIZE RUNTIME.



NOTES:

1. ALL CONTROL DEVICES ARE EXISTING DDC. TEMPERATURE SENSORS, VALVE ACTUATORS, ETC. CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
2. CONTROLLERS ARE TO BE REPLACED.
3. SERVES NORTHSIDE OF BLDG 2, 2ND AND 3RD FLOOR FCU'S AND INDUCTION UNITS.

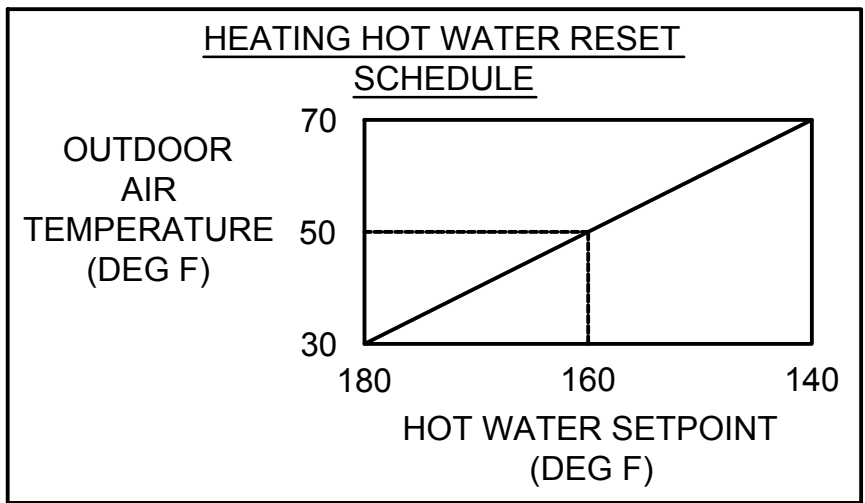


1 BUILDING 2 NORTH HEATING HOT WATER SYSTEM CONTROL SCHEMATIC & SEQUENCE  
SCALE: NOT TO SCALE

SOUTH HEATING HOT WATER SYSTEM		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	STEAM CONVERTER (2-HTX-1) VALVE 2 STATUS
	AI2	STEAM CONVERTER (2-HTX-1) VALVE 1 STATUS
	AI3	STEAM CONVERTER (2-HTX-2) VALVE 2 STATUS
	AI4	STEAM CONVERTER (2-HTX-2) VALVE 1 STATUS
	AI5	HOT WATER SUPPLY TEMPERATURE SENSOR
	AI6	HOT WATER RETURN TEMPERATURE SENSOR
	AI7	AMBIENT AIR TEMPERATURE SENSOR
DIGITAL	DI1	STEAM CONVERTER (2-HTX-1) FLOW SWITCH STATUS
	DI2	STEAM CONVERTER (2-HTX-2) FLOW SWITCH STATUS
	DI3	HOT WATER PUMP (2-HWP7) STATUS
	DI4	HOT WATER PUMP (2-HWP8) STATUS
OUTPUTS		
ANALOG	AO1	STEAM CONVERTER (2-HTX-1) VALVE 2 CONTROLLER
	AO2	STEAM CONVERTER (2-HTX-1) VALVE 1 CONTROLLER
	AO3	STEAM CONVERTER (2-HTX-2) VALVE 2 CONTROLLER
	AO4	STEAM CONVERTER (2-HTX-2) VALVE 1 CONTROLLER
DIGITAL	DO1	HOT WATER PUMP (2-HWP7) START/STOP
	DO2	HOT WATER PUMP (2-HWP8) START/STOP

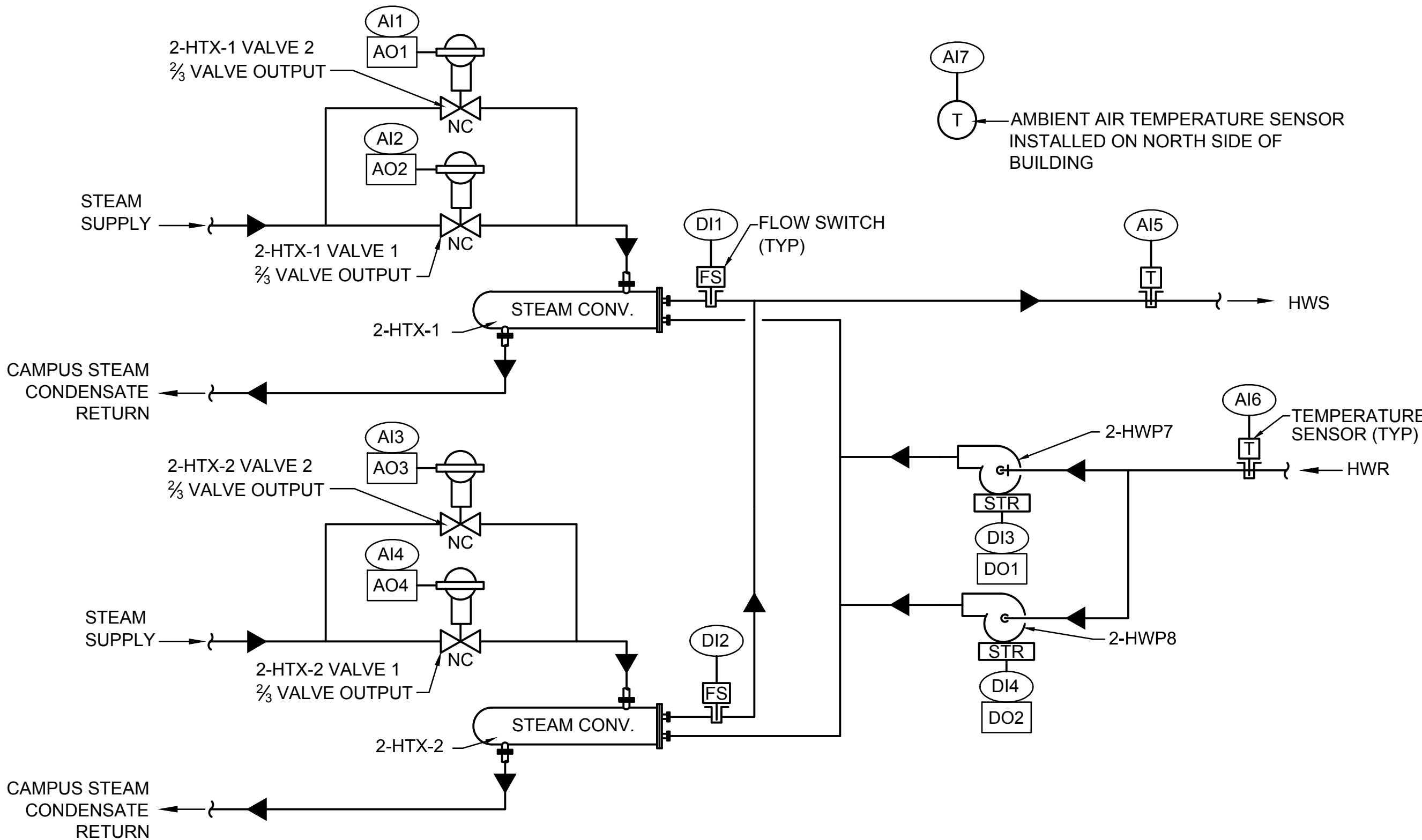
SEQUENCE OF OPERATION

1. START/STOP CONTROLS
  - 1.1. THE HEATING SYSTEM SHALL AUTOMATICALLY START WHEN THE OUTSIDE AIR TEMPERATURE FALLS BELOW THE SYSTEM ENABLE SETPOINT.
  - 1.2. WHEN THE SYSTEM IS "ON":
    - 1.2.1. STEAM CONTROL VALVES SHALL MODULATE TO MAINTAIN THE HOT WATER SUPPLY TEMPERATURE AT SETPOINT.
    - 1.2.2. THE HOT WATER SUPPLY TEMPERATURE RESETS INVERSELY WITH THE OUTDOOR TEMPERATURE AS SCHEDULED: AT 30°F OA, HWS TEMPERATURE AT 180°F, AT 70°F OA, HWS TEMPERATURE AT 140°F.
    - 1.2.3. STEAM HOT WATER CONVERTERS, 2-HTX-1 & 2-HTX-2, ARE 100% REDUNDANT AND ONLY ONE UNIT AT A TIME SHALL OPERATE.
    - 1.2.4. HOT WATER PUMPS ARE CONTROLLED BY THE DDC SYSTEM. THE PUMPS ARE 100% REDUNDANT REQUIRING ONLY ONE PUMP AT A TIME TO OPERATE.
  - 1.3. WHEN THE OUTSIDE AIR TEMPERATURE RISES ABOVE THE SYSTEM ENABLE SETPOINT OR THE SYSTEM IS "OFF", THE HEATING SHALL BE DISABLED.
2. HEAT EXCHANGER CONTROL
  - 2.1. THIS SYSTEM CONSISTS OF TWO STEAM HEAT EXCHANGERS WITH ½ - ½ STEAM VALVES. AFTER THE FLOW THROUGH THE HEAT EXCHANGER HAS BEEN CONFIRMED VIA THE FLOW SWITCH (FS-X), THE 24VAC POWER SHALL BE APPLIED TO THE STEAM VALVE ACTUATORS. THE TWO STEAM INLET VALVES WILL MODULATE IN SEQUENCE TO MAINTAIN THE DESIRED HOT WATER SUPPLY TEMPERATURE TO SETPOINT AS RESET BY THE OUTDOOR AIR TEMPERATURE.
3. HOT WATER PUMP CONTROL
  - 3.1. WHEN ENABLED, A PUMP SHALL BE STARTED. IF THE PUMP STATUS DOES NOT MATCH THE COMMAND, AN ALARM SHALL BE GENERATED AND THE LAG PUMP SHALL BE STARTED. LEAD/LAG STATUS SHALL BE SWITCHED WEEKLY TO EQUALIZE RUNTIME.



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2 BUILDING 2 SOUTH HEATING HOT WATER SYSTEM CONTROL SCHEMATIC & SEQUENCE  
SCALE: NOT TO SCALE

Revisions		
No.	Date	Remarks

VETERANS HEALTH CARE  
SYSTEM  
Alexandria, Louisiana

Hernandez Consulting  
ALBERT ARCHITECTURE  
Allen&Hoshall  
engineering since 1915

Approved:	
Title	Signature

Drawing Title		Project Title		Date	
NORTH & SOUTH HEATING HOT WATER SYSTEMS CONTROL SCHEMATICS & SEQUENCES		A&E Design - Upgrade Energy Management Control Systems		October 30, 2013	
Approved: Service Engineer		Building Number		Project No.	
		2		VA256-12-C-0253	
Approved: Service Director		Checked		Drawing No.	
		WLP		M2-203	
		Drawn		Dwg. 1 OF 1	
		Location			
		Alexandria, LA			

