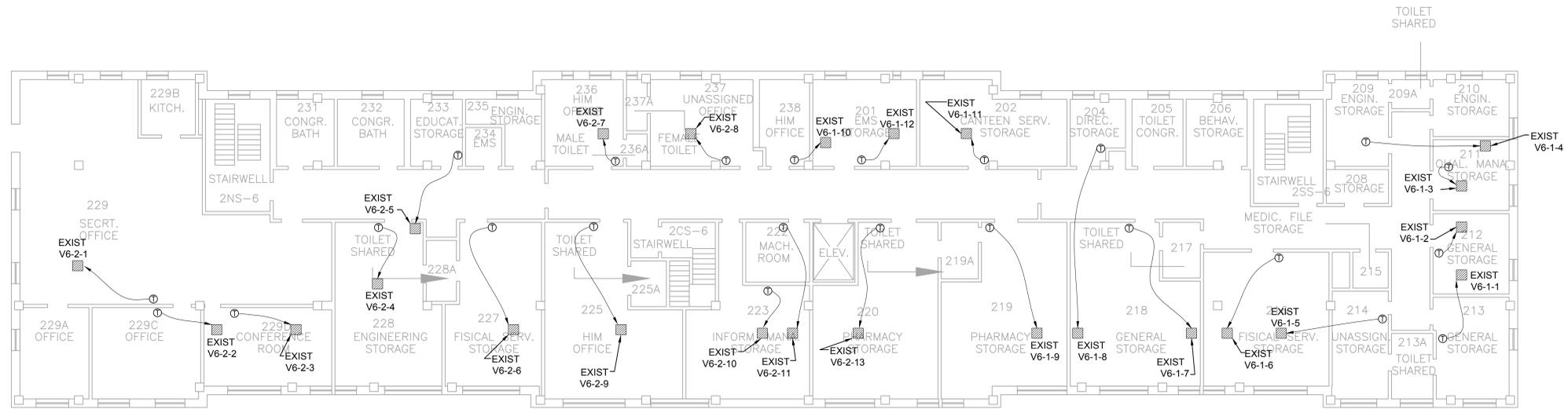


NOTES:

1. EXISTING DDC SYSTEM IS JCI. REPLACE CONTROLLERS TO FULLY INTEGRATE TO CAMPUS SIEMENS SYSTEM.



1 BUILDING 6 2ND FLOOR PLAN - MECHANICAL
SCALE: 1/8" = 1'-0"

Revisions	NO.	Date	Remarks

VETERANS HEALTH CARE SYSTEM
Alexandria, Louisiana

Hernandez Consulting
ALBERT ARCHITECTURE

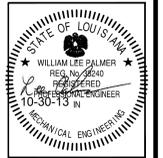
Allen & Hoshall
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Approved:	Signature

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

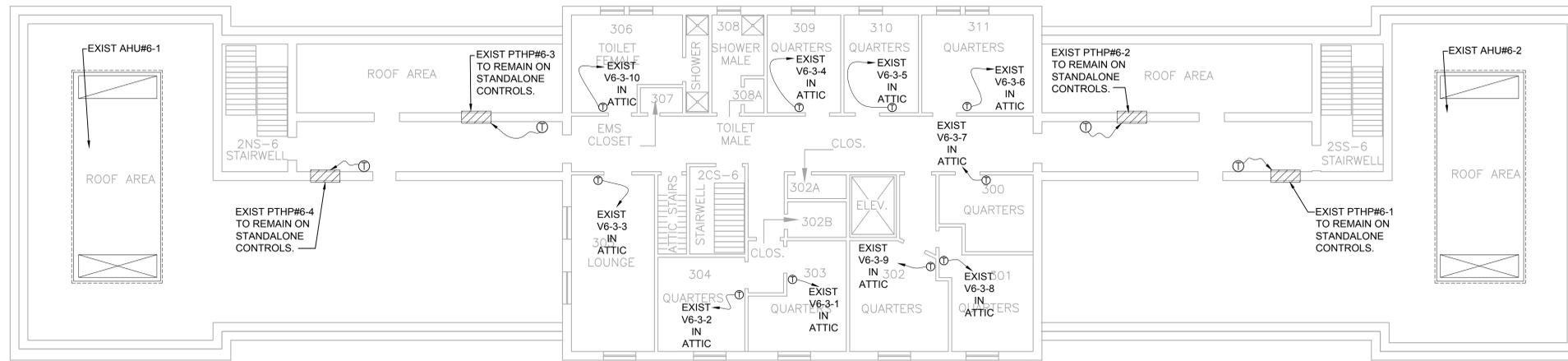
Project Title	A&E Design - Upgrade Energy Management Control Systems		
Building Number	6	Checked	WLP
Drawn	NMT		
Location	Alexandria, LA		

Date	October 30, 2013
Project No.	VA256-12-C-0253
DWG/PROJ. NO.	M6-102
Dwg. 1 of 1	



NOTES:

- EXISTING DDC SYSTEM IS JCI. REPLACE CONTROLLERS TO FULLY INTEGRATE TO CAMPUS SIEMENS SYSTEM.



1 BUILDING 6 3RD FLOOR PLAN - MECHANICAL
SCALE: 1/8" = 1'-0"

Revisions	NO.	Date	Remarks

VETERANS HEALTH CARE SYSTEM
Alexandria, Louisiana

Hernandez Consulting
ALBERT ARCHITECTURE

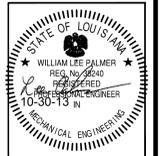
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Approved:	Signature

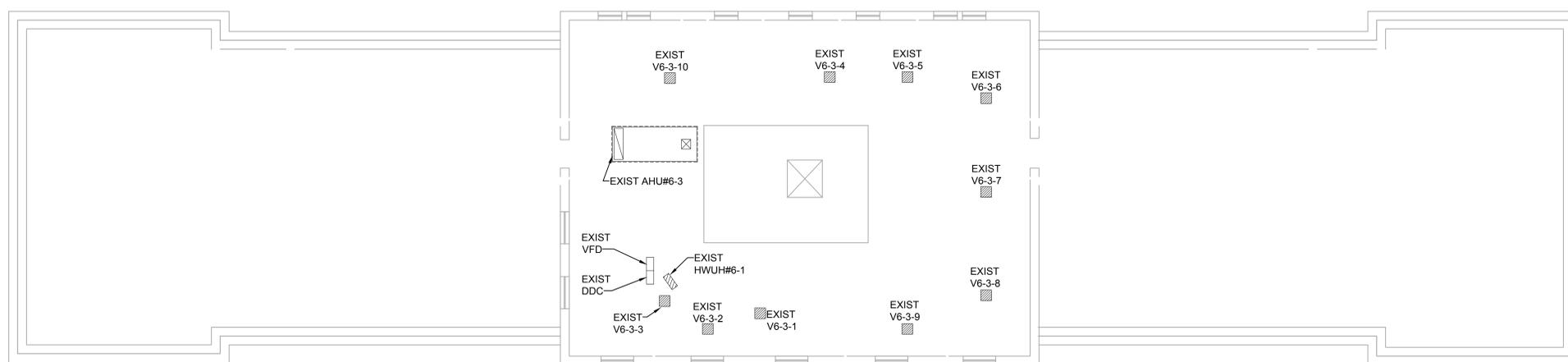
Drawing Title	3RD FLOOR PLAN - MECHANICAL
Approved Service Engineer	
Approved Service Director	

Project Title	A&E Design - Upgrade Energy Management Control Systems
Building Number	6
Checked	WLP
Drawn	NMT
Location	Alexandria, LA

Date	October 30, 2013
Project No.	VA256-12-C-0253
Sheet No.	M6-103
Page	Dwg. 1 of 1



1. EXISTING DDC SYSTEM IS JCI. REPLACE CONTROLLERS TO FULLY INTEGRATE TO CAMPUS SIEMENS SYSTEM.



1 BUILDING 6 ATTIC FLOOR PLAN - MECHANICAL
SCALE: 1/8" = 1'-0"

Revisions		
No.	Date	Remarks

VETERANS HEALTH CARE SYSTEM
Alexandria, Louisiana

Hernandez Consulting
ALBERT ARCHITECTURE

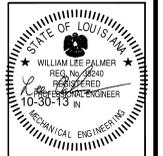
Allen&Hoshall
engineering since 1915

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	6	Checked	WLP
		Drawn	NMT
Location	Alexandria, LA		

Date	October 30, 2013
Project No.	VA256-12-C-0253
DWG/PROJ. NO.	M6-104
	Dwg. 1 of 1



SEQUENCE OF OPERATION

1. GENERAL

1.1 THE AIR HANDLING UNIT SHALL BE STARTED AND STOPPED AUTOMATICALLY AT THE ECC. THE HOA SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF POSITIONS SHALL BE USED FOR MAINTENANCE ONLY. UPON RECEIVING A START COMMAND THE SUPPLY FAN SHALL START ONLY AFTER ALL INTERNAL SAFETIES ARE PROVEN. ONCE FAN RUN STATUS IS PROVEN BY A CURRENT SENSING RELAY, THE CONTROLS SHALL OPERATE ACCORDING TO THE SEQUENCES AS DESCRIBED BELOW.

2. AIR FLOW

2.1 OUTSIDE AIR IS METERED BY FLOWMETER, F-1, TO MONITOR AND MAINTAIN A CONSTANT MIN. OUTSIDE AIR FLOW BY MODULATING THE RETURN DAMPER, D-2, AND OUTSIDE AIR DAMPER, D-1, UP TO THE MAX. FLOW SETPOINT OF 5000 CFM (ADJUSTABLE).

3. TEMPERATURE CONTROL

3.1 TEMPERATURE SENSOR, T-3, IN THE PREHEAT COIL DISCHARGE SHALL TRANSMIT TEMPERATURE CHANGES TO THE DDC. THE DDC SYSTEM SHALL MODULATE THE 2-WAY STEAM PREHEAT CONTROL VALVE, V-1, TO MAINTAIN PREHEAT TEMPERATURE SETPOINT (ADJUSTABLE).

3.2 TEMPERATURE SENSOR, T-7, IN THE DISCHARGE AIR DUCT TRANSMITS TEMPERATURE CHANGES TO THE DDC. THE DDC MODULATES THE 2-WAY COOLING CONTROL VALVE, V-2, TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT OF 55°F (ADJUSTABLE).

4. STATIC PRESSURE AND SUPPLY FAN SPEED CONTROL

4.1 THE VFD SHALL MODULATE THE SPEED OF THE SUPPLY FAN TO MAINTAIN DISCHARGE AIR STATIC PRESSURE TO ITS SETPOINT OF 1.0 IN. WC. (ADJUSTABLE) AS SENSED BY THE DUCT STATIC PRESSURE SENSOR, SPS-4, LOCATED ¾ OF THE WAY DOWN THE LONGEST DUCT MAIN.

4.2 THE SUPPLY FAN SPEED SHALL DECREASE TOWARDS ITS MIN. FREQUENCY. AS THE DISCHARGE AIR STATIC PRESSURE DECREASES, THE SUPPLY FAN SPEED SHALL INCREASE.

4.3 THE STATIC PRESSURE IS RESET BASED ON ACTUAL BUILDING LOAD BY POLLING ALL VAV TERMINAL UNITS.

5. DEHUMIDIFICATION CONTROL

5.1 A DUCT HUMIDITY SENSOR, H-1, SHALL MEASURE THE RETURN AIR HUMIDITY AT THE AHU. THE DDC WILL AVERAGE THE POSITION OF THE VAV BOX AIR VALVES AND SHALL ADJUST THE AIR TEMPERATURE UP OR DOWN TO PROVIDE THE MOST EFFICIENT SUPPLY AIR TEMPERATURE TO SATISFY VAV BOX DURING OCCUPIED OPERATION.

5.2 IF THE RETURN AIR HUMIDITY RISES ABOVE SETPOINT OF 60% (ADJUSTABLE) THE SUPPLY AIR TEMPERATURE OF THE AHU SHALL BE LOWERED TO KEEP THE RETURN AIR HUMIDITY BELOW SETPOINT.

6. ALARMS

6.1 THE UNIT SHALL STOP UPON ANY OF THE SAFETIES BEING TRIPPED REGARDLESS OF THE MODE OF OPERATION (AUTOMATIC, HAND OR BYPASS).

6.2 THE AIR HANDLER RETURN AIR SMOKE DETECTOR, SD-1, AND THE DISCHARGE AIR SMOKE DETECTOR, SD-2, SHALL STOP THE UNIT AND CLOSE THE SMOKE DAMPERS UPON SENSING COMBUSTION PRODUCTS IN THE SYSTEM. SMOKE DETECTORS MUST BE MANUALLY RESET AFTER AN ALARM CONDITION IN ORDER FOR THE FAN TO RESTART AND THE SMOKE DAMPERS TO OPEN.

6.3 A MIXED AIR TEMPERATURE SENSOR, T-2, UPSTREAM OF THE COOLING COIL SIGNALS THE DDC UPON A DROP IN TEMPERATURE BELOW 45°F, WHICH SHALL GENERATE AN ALARM TO THE ECC.

6.4 A TEMPERATURE LOW LIMIT SWITCH, T-4, SHALL STOP THE UNIT, CLOSE THE OUTSIDE AIR DAMPER, OPEN THE PREHEAT VALVE, AND SEND A CRITICAL ALARM TO THE ECC UPON SENSING A FALL IN TEMPERATURE BELOW SETPOINT (40°F ADJUSTABLE). THE LOW LIMIT SWITCHES MUST BE MANUALLY RESET AFTER AN ALARM CONDITION.

6.5 A TEMPERATURE HIGH LIMIT, T-6, SHALL SHUTDOWN THE FAN AND SEND AN ALARM TO THE ECC UPON A RISE IN DISCHARGE AIR ABOVE 125°F. THE HIGH LIMIT SWITCH MUST BE MANUALLY RESET AFTER AN ALARM.

6.6 A DISCHARGE AIR HIGH STATIC PRESSURE SAFETY SWITCH, SPS-2, LOCATED AT THE SUPPLY FAN DISCHARGE SHALL STOP THE UNIT UPON SENSING HIGH DISCHARGE DUCT STATIC ABOVE 3 IN. STATIC PRESSURE (ADJUSTABLE) TO PREVENT OVER PRESSURIZING THE DUCTWORK. STATIC PRESSURE SWITCH IS HARDWIRED TO THE VFD AND UNIT IS SHUTDOWN IN HAND, AUTO, OR BYPASS MODE. THE HIGH STATIC PRESSURE SAFETIES MUST BE MANUALLY RESET AFTER AN ALARM CONDITION.

6.7 UPON FAILURE OF THE VFD, THE SUPPLY FAN SHALL BE CONTROLLED MANUALLY AT THE DDC PANEL OR THE ECC THROUGH THE BYPASS STARTER. FAN SHALL BE OPERATED AT CONSTANT SPEED.

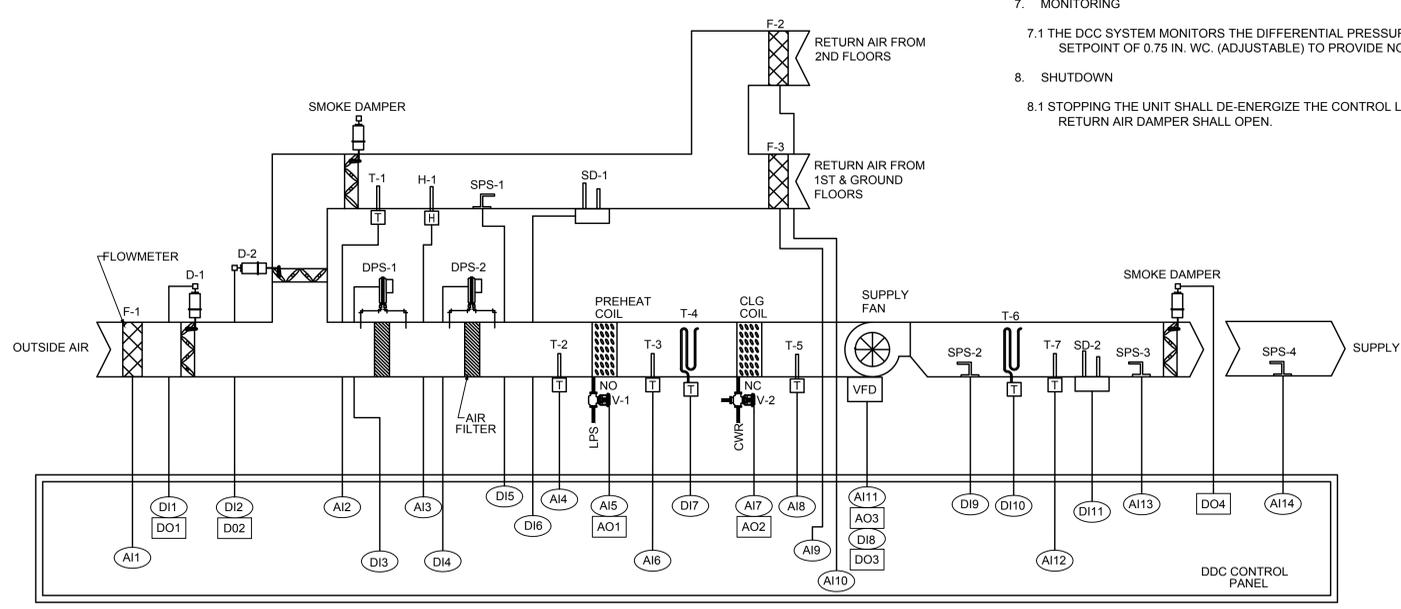
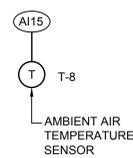
7. MONITORING

7.1 THE DDC SYSTEM MONITORS THE DIFFERENTIAL PRESSURE ACROSS EACH FILTER AND GENERATES AN ALARM IF THE DIFFERENTIAL PRESSURE INCREASES ABOVE THE SETPOINT OF 0.75 IN. WC. (ADJUSTABLE) TO PROVIDE NOTIFICATION OF A DIRTY FILTER.

8. SHUTDOWN

8.1 STOPPING THE UNIT SHALL DE-ENERGIZE THE CONTROL LOOPS AND SEND THE CONTROL VALVES TO THE CLOSED POSITION. THE OUTSIDE AIR DAMPER WILL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN.

VAV AIR HANDLING UNIT		VAV AIR HANDLING UNIT	
LOCAL DDC CONTROLLER		LOCAL DDC CONTROLLER	
INPUTS		OUTPUTS	
ANALOG	(AI1) OUTSIDE AIR FLOWMETER (F-1)	(AO1) PREHEAT STEAM CONTROL VALVE (V-1)	
	(AI2) RETURN AIR TEMPERATURE SENSOR (T-1)	(AO2) CHILLED WATER CONTROL VALVE (V-2)	
	(AI3) RETURN AIR HUMIDITY SENSOR (H-1)	(AO3) SUPPLY FAN VFD SPEED	
	(AI4) MIXED AIR TEMPERATURE SENSOR (T-2)	(DO1) OUTSIDE AIR DAMPER (D-1)	
	(AI5) PREHEAT STEAM CONTROL VALVE (V-1)	(DO2) RETURN AIR DAMPER (D-2)	
	(AI6) PREHEAT COIL DISCHARGE AIR TEMPERATURE SENSOR (T-3)	(DO3) SUPPLY FAN START/STOP	
	(AI7) CHILLED WATER CONTROL VALVE (V-2)	(DO4) SMOKE DAMPER OPEN/CLOSE	
	(AI8) COOLING COIL DISCHARGE AIR TEMPERATURE SENSOR (T-5)		
	(AI9) RETURN AIR GROUND & 1ST FLOORS FLOWMETER (F-3)		
	(AI10) RETURN AIR 2ND & 3RD FLOORS FLOWMETER (F-2)		
	(AI11) SUPPLY FAN VFD STATUS		
	(AI12) SUPPLY AIR TEMPERATURE SENSOR (T-7)		
	(AI13) SUPPLY AIR STATIC PRESSURE SENSOR (SPS-3)		
	(AI14) DISCHARGE AIR STATIC PRESSURE SENSOR (SPS-4)		
	(AI15) AMBIENT AIR TEMPERATURE SENSOR (T-8)		
DIGITAL	(DI1) OUTSIDE AIR DAMPER (D-1) STATUS		
	(DI2) RETURN AIR DAMPER (D-2) STATUS		
	(DI3) FILTER STATUS (DPS-1)		
	(DI4) FILTER STATUS (DPS-2)		
	(DI5) RETURN AIR STATIC PRESSURE SENSOR (SPS-1) STATUS		
	(DI6) RETURN AIR SMOKE DETECTOR (SD-1) STATUS		
	(DI7) LOW LIMIT TEMPERATURE SENSOR (T-4) STATUS		
	(DI8) SUPPLY FAN STATUS		
	(DI9) DISCHARGE AIR HIGH STATIC PRESSURE SWITCH (SPS-2) STATUS		
	(DI10) HIGH LIMIT TEMPERATURE SENSOR (T-6) STATUS		
	(DI11) SUPPLY AIR SMOKE DETECTOR (SD-2) STATUS		



- NOTES:
1. ALL CONTROL DEVICES ARE EXISTING DDC. SENSOR, VALVES, ETC CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
 2. DDC CONTROLLER TO BE REPLACED. CONNECT NEW CONTROLLER TO EXISTING ELECTRICAL SERVICE.

1 BUILDING 6 AHU#6-1 & AHU#6-2 CONTROL SCHEMATIC & SEQUENCE
SCALE: NOT TO SCALE

Rev	Date	Remarks

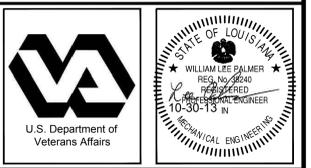
VETERANS HEALTH CARE SYSTEM
Alexandria, Louisiana

Hernandez Consulting
ALBERT ARCHITECTURE
Allen & Hoshall
engineering since 1915

Approved: _____
Title: _____
Signature: _____

Drawing Title: AHU#6-1 & AHU#6-2 CONTROL SCHEMATIC & SEQUENCE
Project Title: A&E Design - Upgrade Energy Management Control Systems
Building Number: 6
Checked: WLP
Drawn: NMT
Location: Alexandria, LA

Date: October 30, 2013
Project No: VA256-12-C-0253
Drawing No: M6-200
Dwg. 1 of 1

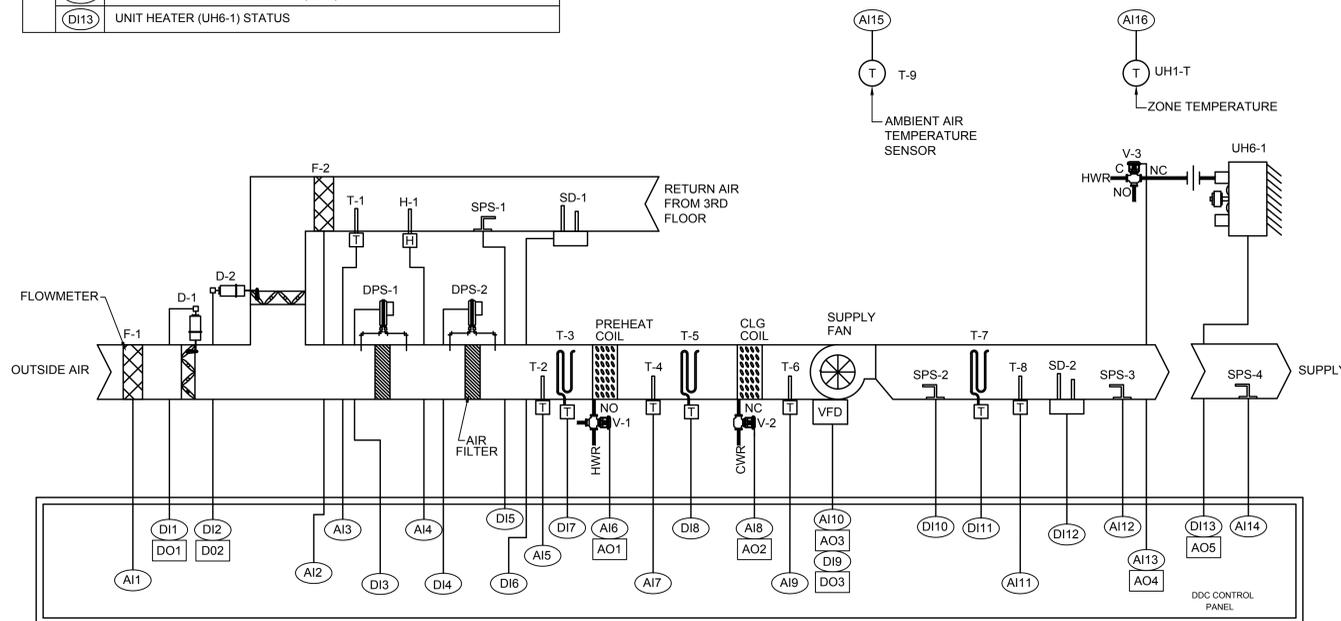


VAV AIR HANDLING UNIT	
LOCAL DDC CONTROLLER	
INPUTS	
(AI1)	OUTSIDE AIR FLOWMETER (F-1)
(AI2)	RETURN AIR FLOWMETER (F-2)
(AI3)	RETURN AIR TEMPERATURE SENSOR (T-1)
(AI4)	RETURN AIR HUMIDITY SENSOR (H-1)
(AI5)	MIXED AIR TEMPERATURE SENSOR (T-2)
(AI6)	6-AHU-3 HOT WATER CONTROL VALVE (V-1)
(AI7)	PREHEAT COIL DISCHARGE AIR TEMPERATURE SENSOR (T-4)
(AI8)	CHILLED WATER CONTROL VALVE (V-2)
(AI9)	COOLING COIL DISCHARGE AIR TEMPERATURE SENSOR (T-8)
(AI10)	SUPPLY FAN VFD STATUS
(AI11)	SUPPLY AIR TEMPERATURE SENSOR (T-7)
(AI12)	SUPPLY AIR STATIC PRESSURE SENSOR (SPS-3)
(AI13)	UNIT HEATER (UH6-1) HOT WATER CONTROL VALVE (V-3)
(AI14)	DISCHARGE AIR STATIC PRESSURE SENSOR (SPS-4)
(AI15)	AMBIENT AIR TEMPERATURE SENSOR (T-9)
(AI16)	ZONE TEMPERATURE SENSOR (UH1-T)
ANALOG	
(AI1)	OUTSIDE AIR FLOWMETER (F-1)
(AI2)	RETURN AIR FLOWMETER (F-2)
(AI3)	RETURN AIR TEMPERATURE SENSOR (T-1)
(AI4)	RETURN AIR HUMIDITY SENSOR (H-1)
(AI5)	MIXED AIR TEMPERATURE SENSOR (T-2)
(AI6)	6-AHU-3 HOT WATER CONTROL VALVE (V-1)
(AI7)	PREHEAT COIL DISCHARGE AIR TEMPERATURE SENSOR (T-4)
(AI8)	CHILLED WATER CONTROL VALVE (V-2)
(AI9)	COOLING COIL DISCHARGE AIR TEMPERATURE SENSOR (T-8)
(AI10)	SUPPLY FAN VFD STATUS
(AI11)	SUPPLY AIR TEMPERATURE SENSOR (T-7)
(AI12)	SUPPLY AIR STATIC PRESSURE SENSOR (SPS-3)
(AI13)	UNIT HEATER (UH6-1) HOT WATER CONTROL VALVE (V-3)
(AI14)	DISCHARGE AIR STATIC PRESSURE SENSOR (SPS-4)
(AI15)	AMBIENT AIR TEMPERATURE SENSOR (T-9)
(AI16)	ZONE TEMPERATURE SENSOR (UH1-T)
DIGITAL	
(DI1)	OUTSIDE AIR DAMPER (D-1) STATUS
(DI2)	RETURN AIR DAMPER (D-2) STATUS
(DI3)	FILTER STATUS (DPS-1)
(DI4)	FILTER STATUS (DPS-2)
(DI5)	RETURN AIR STATIC PRESSURE SENSOR (SPS-1) STATUS
(DI6)	RETURN AIR SMOKE DETECTOR (SD-1) STATUS
(DI7)	LOW LIMIT TEMPERATURE SENSOR (T-3) STATUS
(DI8)	HIGH LIMIT TEMPERATURE SENSOR (T-5) STATUS
(DI9)	SUPPLY FAN STATUS
(DI10)	DISCHARGE AIR HIGH STATIC PRESSURE SWITCH (SPS-2) STATUS
(DI11)	HIGH LIMIT TEMPERATURE SENSOR (T-7) STATUS
(DI12)	SUPPLY AIR SMOKE DETECTOR (SD-2) STATUS
(DI13)	UNIT HEATER (UH6-1) STATUS

VAV AIR HANDLING UNIT	
LOCAL DDC CONTROLLER	
OUTPUTS	
(AO1)	HOT WATER CONTROL VALVE (V-1)
(AO2)	CHILLED WATER CONTROL VALVE (V-2)
(AO3)	SUPPLY FAN VFD SPEED
(AO4)	UNIT HEATER (UH6-1) HOT WATER CONTROL VALVE (V-3)
(AO5)	UNIT HEATER (UH6-1) OUTPUT LEVEL
ANALOG	
(AO1)	HOT WATER CONTROL VALVE (V-1)
(AO2)	CHILLED WATER CONTROL VALVE (V-2)
(AO3)	SUPPLY FAN VFD SPEED
(AO4)	UNIT HEATER (UH6-1) HOT WATER CONTROL VALVE (V-3)
(AO5)	UNIT HEATER (UH6-1) OUTPUT LEVEL
DIGITAL	
(DO1)	OUTSIDE AIR DAMPER (D-1)
(DO2)	RETURN AIR DAMPER (D-2)
(DO3)	SUPPLY FAN START/STOP

NOTES:

1. ALL CONTROL DEVICES ARE EXISTING DDC. SENSORS, VALVES, ETC CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
2. DDC CONTROLLER TO BE REPLACED. CONNECT NEW CONTROLLER TO EXISTING ELECTRICAL SERVICE.
3. UNIT HEATER UH6-1 IS CONNECTED TO THIS CONTROL PANEL.



1 BUILDING 6 AHU#6-3 CONTROL SCHEMATIC & SEQUENCE
SCALE: NOT TO SCALE

SEQUENCE OF OPERATION

1. GENERAL
 - 1.1. THE AIR HANDLING UNIT SHALL BE STARTED AND STOPPED AUTOMATICALLY AT THE ECC. THE HOA SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF POSITIONS SHALL BE USED FOR MAINTENANCE ONLY. UPON RECEIVING A START COMMAND THE SUPPLY FAN SHALL START ONLY AFTER ALL INTERNAL SAFETIES ARE PROVEN. ONCE FAN RUN STATUS IS PROVEN BY A CURRENT SENSING RELAY, THE CONTROLS SHALL OPERATE ACCORDING TO THE SEQUENCES AS DESCRIBED BELOW.
2. AIR FLOW
 - 2.1. OUTSIDE AIR IS METERED BY FLOWMETER, F-1, TO MONITOR AND MAINTAIN A CONSTANT MIN. OUTSIDE AIR FLOW BY MODULATING THE RETURN DAMPER, D-2, AND OUTSIDE AIR DAMPER, D-1, UP TO THE MAX. FLOW SETPOINT OF 5000 CFM (ADJUSTABLE).
3. TEMPERATURE CONTROL
 - 3.1. TEMPERATURE SENSOR, T-3, IN THE PREHEAT COIL DISCHARGE SHALL TRANSMIT TEMPERATURE CHANGES TO THE DDC. THE DDC SYSTEM SHALL MODULATE THE 2-WAY STEAM PREHEAT CONTROL VALVE, V-1, TO MAINTAIN PREHEAT TEMPERATURE SETPOINT (ADJUSTABLE).
 - 3.2. TEMPERATURE SENSOR, T-8, IN THE DISCHARGE AIR DUCT TRANSMITS TEMPERATURE CHANGES TO THE DDC. THE DDC MODULATES THE 2-WAY COOLING CONTROL VALVE, V-2, TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT OF 55°F (ADJUSTABLE).
4. STATIC PRESSURE AND SUPPLY FAN SPEED CONTROL
 - 4.1. THE VFD SHALL MODULATE THE SPEED OF THE SUPPLY FAN TO MAINTAIN DISCHARGE AIR STATIC PRESSURE TO ITS SETPOINT OF 1.0 IN. WC. (ADJUSTABLE) AS SENSED BY THE DUCT STATIC PRESSURE SENSOR, SPS-4, LOCATED ¾ OF THE WAY DOWN THE LONGEST DUCT MAIN.
 - 4.2. THE SUPPLY FAN SPEED SHALL DECREASE TOWARDS ITS MIN. FREQUENCY, AS THE DISCHARGE AIR STATIC PRESSURE DECREASES, THE SUPPLY FAN SPEED SHALL INCREASE.
 - 4.3. THE STATIC PRESSURE IS RESET BASED ON ACTUAL BUILDING LOAD BY POLLING ALL VAV TERMINAL UNITS.
5. DEHUMIDIFICATION CONTROL
 - 5.1. A DUCT HUMIDITY SENSOR, H-1, SHALL MEASURE THE RETURN AIR HUMIDITY AT THE AHU. THE DDC WILL AVERAGE THE POSITION OF THE VAV BOX AIR VALVES AND SHALL ADJUST THE AIR TEMPERATURE UP OR DOWN TO PROVIDE THE MOST EFFICIENT SUPPLY AIR TEMPERATURE TO SATISFY VAV BOX DURING OCCUPIED OPERATION.
 - 5.2. IF THE RETURN AIR HUMIDITY RISES ABOVE SETPOINT OF 60% (ADJUSTABLE) THE SUPPLY AIR TEMPERATURE OF THE AHU SHALL BE LOWERED TO KEEP THE RETURN AIR HUMIDITY BELOW SETPOINT.
6. ALARMS
 - 6.1. THE UNIT SHALL STOP UPON ANY OF THE SAFETIES BEING TRIPPED REGARDLESS OF THE MODE OF OPERATION (AUTOMATIC, HAND OR BYPASS).
 - 6.2. THE AIR HANDLER RETURN AIR SMOKE DETECTOR, SD-1, AND THE DISCHARGE AIR SMOKE DETECTOR, SD-2, SHALL STOP THE UNIT UPON SENSING COMBUSTION PRODUCTS IN THE SYSTEM. SMOKE DETECTORS MUST BE MANUALLY RESET AFTER AN ALARM CONDITION IN ORDER FOR THE FAN TO RESTART.
 - 6.3. A MIXED AIR TEMPERATURE SENSOR, T-3 UPSTREAM OF THE COOLING COIL SIGNALS THE DDC UPON A DROP IN TEMPERATURE BELOW 45°F, WHICH SHALL GENERATE AN ALARM TO THE ECC.
 - 6.4. A TEMPERATURE LOW LIMIT SWITCH, T-5, SHALL STOP THE UNIT, CLOSE THE OUTSIDE AIR DAMPER, OPEN THE PREHEAT VALVE, AND SEND A CRITICAL ALARM TO THE ECC UPON SENSING A FALL IN TEMPERATURE BELOW SETPOINT (40°F ADJUSTABLE). THE LOW LIMIT SWITCHES MUST BE MANUALLY RESET AFTER AN ALARM CONDITION.
 - 6.5. A TEMPERATURE HIGH LIMIT, T-7, SHALL SHUTDOWN THE FAN AND SEND AN ALARM TO THE ECC UPON A RISE IN DISCHARGE AIR ABOVE 125°F. THE HIGH LIMIT SWITCH MUST BE MANUALLY RESET AFTER AN ALARM.
 - 6.6. A DISCHARGE AIR HIGH STATIC PRESSURE SAFETY SWITCH, SPS-2, LOCATED AT THE SUPPLY FAN DISCHARGE SHALL STOP THE UNIT UPON SENSING HIGH DISCHARGE DUCT STATIC ABOVE 3 IN. STATIC PRESSURE (ADJUSTABLE) TO PREVENT OVER PRESSURIZING THE DUCTWORK. STATIC PRESSURE SWITCH IS HARDWIRED TO THE VFD AND UNIT IS SHUTDOWN IN HAND, AUTO, OR BYPASS MODE. THE HIGH STATIC PRESSURE SAFETIES MUST BE MANUALLY RESET AFTER AN ALARM CONDITION.
 - 6.7. UPON FAILURE OF THE VFD, THE SUPPLY FAN SHALL BE CONTROLLED MANUALLY AT THE DDC PANEL OR THE ECC THROUGH THE BYPASS STARTER. FAN SHALL BE OPERATED AT CONSTANT SPEED.
7. MONITORING
 - 7.1. THE DDC SYSTEM MONITORS THE DIFFERENTIAL PRESSURE ACROSS EACH FILTER AND GENERATES AN ALARM IF THE DIFFERENTIAL PRESSURE INCREASES ABOVE THE SETPOINT OF 0.75 IN. WC. (ADJUSTABLE) TO PROVIDE NOTIFICATION OF A DIRTY FILTER.
8. SHUTDOWN
 - 8.1. STOPPING THE UNIT SHALL DE-ENERGIZE THE CONTROL LOOPS AND SEND THE CONTROL VALVES TO THE CLOSED POSITION. THE OUTSIDE AIR DAMPER WILL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN.
9. UNIT HEATER CONTROL
 - 9.1. A ZONE TEMPERATURE SENSOR MOUNTED IN THE ATTIC SPACE TRANSMITS TEMPERATURE READINGS TO THE DDC SYSTEM. UPON A FALL IN ZONE TEMPERATURE BELOW SETPOINT, THE DDC SYSTEM COMMANDS THE UNIT HEATER ON AND OPENS THE UNIT HEATER CONTROL VALVE, V-3, TO ALLOW HOT WATER TO FLOW THROUGH THE UNIT'S HEATING COIL UNTIL THE ZONE HAS REACHED THE SETPOINT TEMPERATURE (ADJUSTABLE). IF THE UNIT HEATER FAILS TO OPERATE WHEN COMMANDED, AN ALARM WILL BE GENERATED AT THE ECC, AND THE HEATING CONTROL VALVE SHALL CLOSE.

Rev	Date	Remarks

VETERANS HEALTH CARE SYSTEM
Alexandria, Louisiana

Hernandez Consulting
ALBERT ARCHITECTURE

Allen & Hoshall
engineering since 1915

Approved:	Signature

Drawing Title	AHU#6-3 CONTROL SCHEMATIC & SEQUENCE
Project Title	A&E Design - Upgrade Energy Management Control Systems
Approved Service Engineer	
Building Number	6
Checked	WLP
Drawn	NMT
Approved Service Director	
Location	Alexandria, LA

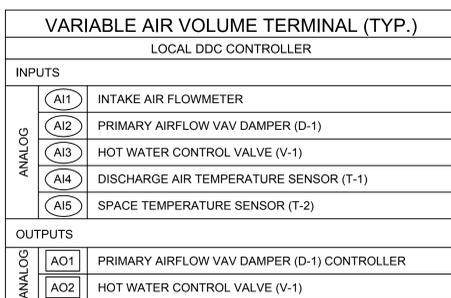
Date	October 30, 2013
Project No.	VA256-12-C-0253
Sheet No.	M6-201
Scale	Dwg. 1 of 1

U.S. Department of Veterans Affairs

STATE OF LOUISIANA
WILLIAM LEE PALMER
REGISTERED PROFESSIONAL ENGINEER
10-30-13

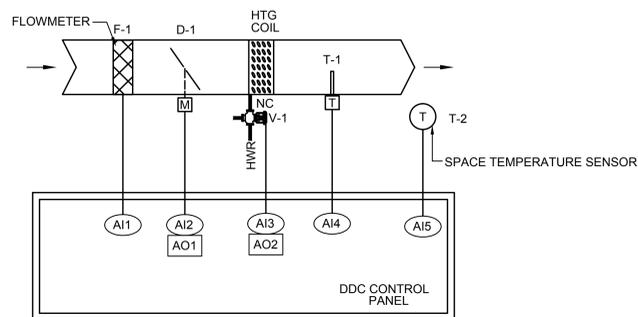
SEQUENCE OF OPERATION

1. OCCUPIED MODE
 - 1.1. THE ZONE TEMPERATURE SENSOR, T-2, TRANSMITS READINGS TO THE VAV CONTROLLER WHICH IN TURN MODULATES THE PRIMARY AIRFLOW VAV DAMPER, D-1, AND REHEAT CONTROL VALVE, V-1, TO MAINTAIN SPACE TEMPERATURE SETPOINTS (ADJUSTABLE).
 - 1.2. UPON A RISE IN ZONE TEMPERATURE ABOVE SETPOINT, THE VAV BOX CONTROLLER MODULATES THE PRIMARY AIRFLOW VAV DAMPER TO MAX. CFM SETPOINT.
 - 1.3. A DROP IN SPACE TEMPERATURE SETPOINT SIGNALS THE VAV TO MODULATE THE PRIMARY AIRFLOW VAV DAMPER TO THE MIN. CFM SETPOINT. A FURTHER DROP IN ZONE TEMPERATURE SIGNALS THE VMA TO MODULATE THE VAV BOX REHEAT CONTROL VALVE OPEN TO HEAT THE ZONE TO WITHIN +/- 0.5°F OF SETPOINT.
2. UNOCCUPIED MODE
 - 2.1. WHEN THE SYSTEM IS INDEXED TO UNOCCUPIED MODE, THE AIR HANDLER STOPS, THE PRIMARY AIRFLOW VAV DAMPER AND THE REHEAT CONTROL VALVE CLOSES.
 - 2.2. IF THE ZONE TEMPERATURE FALLS BELOW THE NIGHT SETBACK SETPOINT (ADJUSTABLE), THE AIR HANDLING UNIT WILL START, THE VAV BOX DAMPER OPEN, AND THE REHEAT CONTROL VALVE WILL MODULATE OPEN TO MAINTAIN THE UNOCCUPIED ZONE TEMPERATURE AT SETPOINT.
 - 2.3. IF THE ZONE TEMPERATURE RISES ABOVE THE NIGHT CYCLE SETPOINT, THE AIR HANDLING UNIT WILL START AND THE VAV BOX DAMPER WILL MODULATE OPEN TO COOL THE ZONE TO THE UNOCCUPIED COOLING SETPOINT TEMPERATURE.
 - 2.4. T-2 CONTAINS A PUSH BUTTON OVERRIDE TO ALLOW OCCUPANTS TO INDEX THE SYSTEM TO OCCUPIED MODE FOR AFTER HOURS USE. THE VMA CONTROLLER WILL FUNCTION PER THE OCCUPIED MODE OF OPERATION UNTIL THE TEMPORARY OCCUPANCY TIMER EXPIRES, AT WHICH TIME THE VAV CONTROLLER WILL REVERT TO UNOCCUPIED MODE OF OPERATION DEPENDING ON TIME OF DAY SCHEDULING.
3. MORNING WARM-UP MODE
 - 3.1. WHEN INDEXED TO THE MORNING WARM-UP MODE OF OPERATION, THE DDC SYSTEM WILL SET THE SPACE SENSOR TO ITS OCCUPIED HEATING TEMPERATURE SETPOINT (ADJUSTABLE). THE VMA CONTROLLER WILL INDEX THE PRIMARY AIRFLOW VAV DAMPER TO 100% OPEN. THE REHEAT CONTROL VALVE WILL OPEN AND ALLOW THE PRIMARY AIRFLOW TO HEAT THE ZONE WHEN THE RESPECTIVE AIR HANDLER IS CYCLED TO MORNING WARM-UP MODE.
 - 3.2. WHEN THE ZONE TEMPERATURE REACHES ITS OCCUPIED SETPOINT, THE PRIMARY AIRFLOW VAV DAMPER AND THE REHEAT CONTROL VALVE WILL CLOSE AND THE AIR HANDLER IS STILL IN WARM-UP MODE. AS THE AIR HANDLER IS INDEXED TO OCCUPIED MODE OF OPERATION, THE VAV BOX WILL INDEX TO OCCUPIED MODE AS WELL.



NOTES:

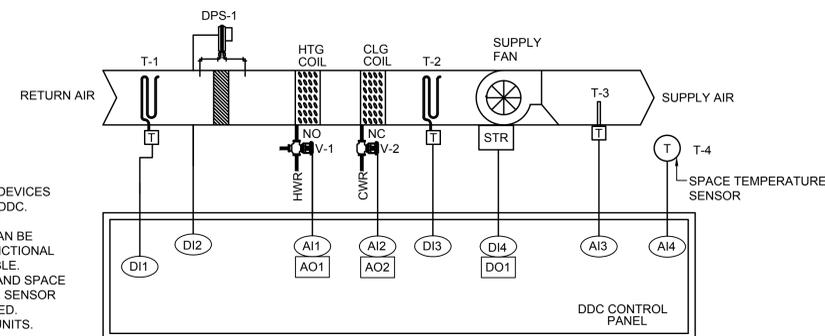
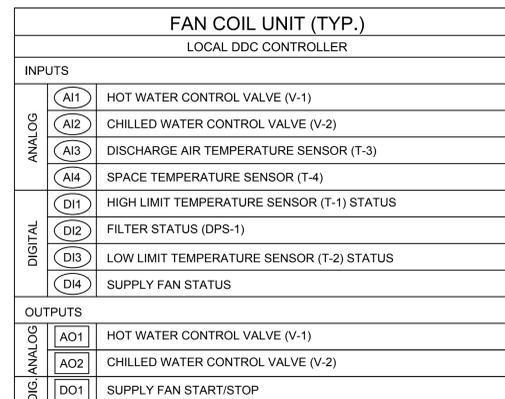
1. ALL CONTROL DEVICES ARE EXISTING DDC. SENSORS & ACTUATORS CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
2. CONTROLLER AND SPACE TEMPERATURE SENSOR TO BE REPLACED.



1 BUILDING 6 VARIABLE AIR VOLUME TERMINAL (TYP.) CONTROL SCHEMATIC & SEQUENCE
SCALE: NOT TO SCALE

SEQUENCE OF OPERATION

1. START/STOP CONTROL
 - 1.1. THE BLOWER COIL WILL OPERATE ON A SCHEDULE AS SET BY THE ECC. THE UNIT FAN WILL BE STARTED AND STOPPED BY THE DDC SYSTEM THROUGH THE ECC. THE CONTROL LOOPS ARE ENERGIZED WHEN FAN RUN STATUS IS PROVEN BY THE CURRENT SENSING RELAY. STOPPING THE UNIT WILL DE-ENERGIZE THE CONTROL LOOPS AND SEND THE HOT WATER AND CHILLED WATER CONTROL VALVES TO THE CLOSED POSITION.
2. TEMPERATURE CONTROL
 - 2.1. A ZONE TEMPERATURE SENSOR SENDS TEMPERATURE INFORMATION TO THE DDC SYSTEM. THE DDC SYSTEM THEN MODULATES THE CHILLED WATER AND HOT WATER CONTROL VALVES, V-2 AND V-1 RESPECTIVELY, IN SEQUENCE TO MAINTAIN ZONE TEMPERATURE SETPOINT.
 - 2.2. UPON A RISE IN ZONE TEMPERATURE, THE CHILLED WATER VALVE WILL MODULATE OPEN TO MAINTAIN ZONE TEMPERATURE SETPOINT OF 75°F (ADJUSTABLE).
 - 2.3. IF THE ZONE TEMPERATURE FALLS BELOW 70°F SETPOINT (ADJUSTABLE), THE HOT WATER VALVE WILL MODULATE OPEN TO MAINTAIN ZONE SETPOINT.
 - 2.4. IF THE UNIT FAILS TO OPERATE BETWEEN THE RANGE OF 70-75°F (ADJUSTABLE), AN ALARM MESSAGE WILL BE SENT TO THE ECC, AND BOTH CHILLED AND HOT WATER CONTROL VALVES WILL CLOSE.
3. SYSTEM SAFETIES
 - 3.1. HIGH LIMIT THERMOSTAT, T-1, IN THE RETURN AIR PATH WILL STOP THE UNIT UPON DETECTION OF TEMPERATURE ABOVE ITS SETPOINT OF 125°F.
 - 3.2. LOW LIMIT THERMOSTAT, T-2, LOCATED BEFORE THE CHILLED WATER COILS WILL STOP THE UNIT UPON DETECTION OF AIR TEMPERATURE BELOW ITS SETPOINT OF 35°F.
 - 3.3. FILTER STATUS WILL BE MONITORED BY A DIFFERENTIAL PRESSURE SENSOR, DPS-1, AT THE FILTER BANK.



NOTES:

1. ALL CONTROL DEVICES ARE EXISTING DDC. SENSORS, AND ACTUATORS CAN BE REUSED IF FUNCTIONAL AND COMPATIBLE.
2. CONTROLLER AND SPACE TEMPERATURE SENSOR TO BE REPLACED.
3. TYPICAL OF 3 UNITS.

2 BUILDING 6 FAN COIL UNIT (TYP.) CONTROL SCHEMATIC & SEQUENCE
SCALE: NOT TO SCALE

Rev	Date	Remarks

VETERANS HEALTH CARE SYSTEM
Alexandria, Louisiana

Hernandez Consulting
ALBERT ARCHITECTURE
Allen&Hoshall
engineering since 1915

Approved:	Signature

Drawing Title	VAV TERMINAL (TYP.) & FCU (TYP.) CONTROL SCHEMATICS & SEQUENCES
Approved Service Engineer	
Approved Service Director	

Project Title	A&E Design - Upgrade Energy Management Control Systems
Building Number	6
Checked	WLP
Drawn	NMT
Location	Alexandria, LA

Date	October 30, 2013
Project No.	VA256-12-C-0253
Sheet No.	M6-203
Dwg. 1 of 1	

