

College of San Mateo, Building 9 - 2009 Renovation
HVAC and Temperature Control System Analysis and Preliminary Scope of Repairs
July 19, 2009
developed by GRD Energy

MECHANICAL SYSTEMS:

1. The offices on the South East side of the library should be equipped with User Adjustable directional diffusers, or new locations for the ceiling grills to prevent occupants being exposed to direct air. Reassess the air flow requirements for this space according to the new room size.
2. The offices 205 & 209 have to be divided into two VAV zones to better accommodate the current occupants. Separate the office of the Library director from the adjacent open office space.
3. The air flow in the individual office next to room 016 and 019 should be reduced to better suit the single office requirement. Also, review the location of the sensors for FC-2, it may have to be moved to a more suitable location.
4. Provide either A or B and indicate the preference in the bid document
 - A. Provide and install 21 thermostatically actuated heating valves for the radiators in the library. Some of the risers to these radiators may have to be reconnected to put the radiators back into service.
 - B. If the radiators are not suited for the retrofit of thermostatically controlled valves, provide one resettable zone per building exposure to be able to reset the supply water the supply water temperature for all radiators in each zone. Further investigation of the piping system in the basement is required to determine the best solution for this issue. The existing drawings show a non conventional HW distribution system showing most radiators in series with each other. Water balance the individual zones per load requirement.
5. Provide separate schedules for each studio and separate into individual zones wherever necessary. Program the local thermostat's push button to enable the VAV controller and the associated AH unit for the remainder of the day once it is pushed. More specific on controls in the controls section of the scope.
6. FC-8 and VAV-24 serve the same space and it has been noted that the space is usually overcooled. Reassess the current location of the grills for VAV-24 based on the current location of the equipment. Some grills were recently blocked by the user. Install logic that will enable VAV-24 and the associated AH-1, during unoccupied periods when the temperature in the space exceeds a user adjustable value. Issue a high temp alarm. Run VAV-24 & FCU-8 at the same setpoint from the same sensor.
7. The drip pan overflows for the FCU's & AHU's are not connected to a drainage system. Verify the existing pumps for the drip pans are operational. Verify gravity drain lines are functional and connected to the plumbing system for all gravity drains. Several users have indicated that at most of the units at some time will leak water from the overflows.
8. The electronics lab 019 should be served by AHU-3 and disconnected from FC-2.
9. VAV's 22 & 23 have disconnected reheat coils, reconnect if required.
10. TAB: Rebalance all air side systems based on SMCCCD standards, and the new requirements based on current use and projected loads, after all mechanical modifications have been completed. Rebalance the HW risers feeding the radiators in the library.

11. The sequence of operation for AHU-3 during power outages needs to be reviewed.
12. Review the sizing for all cooling coils based on a CHWS temperature of 54 Deg and provide recommendation for replacements of cooling coil. Trend reports have indicated that units FC-5, AHU-1, AHU-2, AHU-3, are not able to perform at the new CHWS design temperature under normal load conditions.
13. As part of a separate scope of work, the chiller will be replaced and the pumps for the building will be moved to a new location. Provide all required services not part of the chiller replacement work pertaining to the new chiller systems under this scope of work.

ALTERNATES

1. AH-1, install economizer actuator(s) for the existing economizer dampers in the ductwork to add an economizer control loop. See picture 1 in Addenda A
2. AH-2, indicates having manual damper, we could not find the dampers. Install new OA and RA dampers or place actuators on existing dampers to add an economizer control loop.
3. FC-5, provide an OA duct to the unit and add and an economizer cycle to the unit.
4. Move the shut off valve for the AHU-1 (Main AHU in basement) further downstream to allow the unit to be shut off without shutting down the main line to the remaining building systems.
5. Replace leaking dielectric unions in the building with a district approved union. Provide a unit price for the replacement of one 1" fitting in ceiling space.

2. ELECTRICAL SYSTEMS:

1. Provide a general sweep for all three lighting panels in the library.

3. DDC CONTROLS:

At least all FCU's & AHU's and VAV's should be re-commissioned to ensure that they operate as per design. Specifically, verify all I/O's from the existing DDC system to verify the proposed functions of all sensors, relays, dampers and valves and provide updated documentation such as I/O checkout sheets and updated "As Built" if changes are found. Verify trends and alarms. The verification needs to be end to end and documented on checkout sheet approved by the owner.

GENERAL ISSUES

- a) The controls sequences have to be reviewed and modified per user requirements to ensure that they still fit the current application and increase energy efficiency. Provide all suggestions for review.
- b) Verify all building operating schedules assignments based on current requirements.
- c) All zone thermostats to be labeled with the associated VAV # or HC #, none of them are currently labeled.

- d) Change the function of all the Studio Thermostat override buttons to provide an override that changes the studio condition from standby (Determined by the schedule to occupied for the remainder of the day whenever the pushbutton is used to activate the system. Provide unoccupied standby and occupied setpoints (Coordinate with users)
- e) Review mechanical scope for controls work listed under mechanical.
- f) All trend items should be labeled with the unit designation.

SOME SPECIFIC ISSUES NOTED DURING THE SCOPE REVIEW

- a) FC-2 has the heating valve stuck causing it to heat and cool at the same time
- b) The chiller pump 2 was showing a status of not running while commanded on and the chiller likely running based on the CHWS temperature at the time of the snapshot.
- c) SF-6, RF-3 show almost design cfm flow while not running.
- d) opening the VAV-13 reheat valve increases VAV-14 supply air temperature.
- e) Library AHU's have a different schedule than AHU-1, why?
- f) VAV-24 has a flow setpoint of 3000 cfm and a Max flow of 2400 ?
- g) Heating coil HC-7 shows 0.0 Deg setpoint. Also, this and some other HC's show "Emergency Setpoints" what is that?
- h) The VAV boxes indicated occupied status with most of them showing no flow at all but with dampers closed and some HW valves open, see attached picture for more information. This does not make any sense and indicates an issue with at least the scheduling and interlocking of valves for these units.
- i) The setpoints for the BMS system are reportedly changing back to their original values after a period of time. This would be normal for zone initiated changes, but it does occur even when initiated from the GUI. This needs to be changed to allow the building engineers to permanently change setpoints in areas with known, hot/cold issues.
- j) AHU-3 was seen at min outside air with OA temp in the fifties using the cooling coil the cool to 62 Deg, re view the economizer cycle for this unit
- k) VAV-13 shows an SA temperature of 43 Deg with the AHU not operating and the reheat valve fully open
- l) VAV's 14&15 show an SA temperature of ~110 Deg with no air flow and reheat valves closed.
- m) None of the reheat valves for VAV's or HC's appear to be interlocked with the associated makeup units.

Addenda A

Photo I (AHU-1)

