

### **Business Learning Center Community Phase III (0734 and 0737)**

Phase III of the Business Learning Community includes two, four story buildings, Ivester Hall and Sanford & Barbara Orkin Hall, encompassing a total of 82,000 square feet between them. Each building's HVAC system consists of two variable volume, air handling units (AHUs) with heating and cooling provided by chilled water coils and hot water heating coils located in the attic. MERV 11 filters are utilized in each of the air handling units.

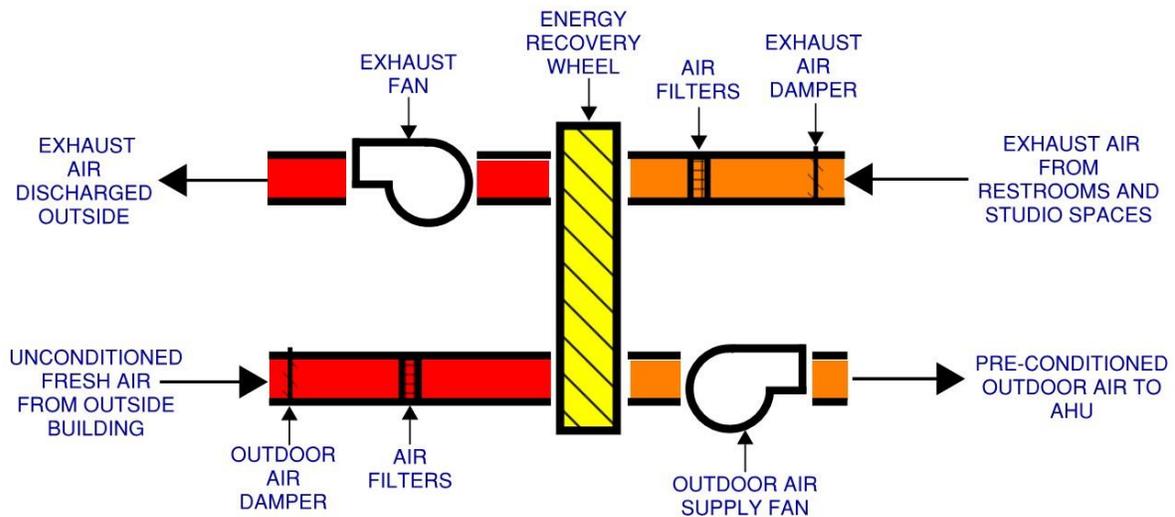
Outdoor ventilation air in each building is provided by an energy recovery ventilation unit (ERU) that helps precondition the outdoor air coming into the building by recovering some of the energy from the exhaust air. The outdoor air from the ERU is supplied to each AHUs where it is mixed with recirculated air and cooled before being distributed throughout the building via above ceiling ductwork. The air distribution systems are grouped together with both AHUs discharging into a common supply duct that provides conditioned air to the building.

The building HVAC systems are operated according to an occupancy schedule that disables the central air handling equipment during periods when the building is scheduled to be unoccupied (typically nights and weekends). In order to increase building ventilation, unoccupied periods have been removed from this schedule to operate the building systems continuously as part of FMD's COVID-19 response plan. The AHUs have a demand controlled ventilation program that reduces ventilation to the building based on sensed occupancy in the larger classrooms. This energy saving function has been disabled in order to maintain higher ventilation rates as part of FMD's COVID 19 response plan. The AHUs have also been equipped with ultraviolet filtration (UV) units which inhibit biological activity within the units.

Main entrances to the building, stairwells and mechanical equipment rooms are conditioned by 4-pipe fan coil units with distribution ductwork.

## ENERGY RECOVERY VENTILATION UNIT

Ventilation and building exhaust is provided by an energy recovery ventilation unit located in the attic of each building. The energy recovery units precondition the incoming outdoor ventilation air using a total energy recovery wheel that is exposed to the outdoor airstream flowing into the building and the exhaust airstream leaving the building. Exhaust air is drawn through the building via ductwork by exhaust fans in the ERU where it passes through a filter bank and then through a turning energy recovery wheel that transfers both sensible and latent heat to/from the exhaust air stream. The incoming outdoor air is drawn through the ERU via separate fans within the unit where it passes through a filter bank and the turning total energy recovery wheel to be preconditioned with energy transferred from the exhaust air stream. The pre-conditioned outdoor air is then supplied to the corresponding system of three AHUs that it is associated with.



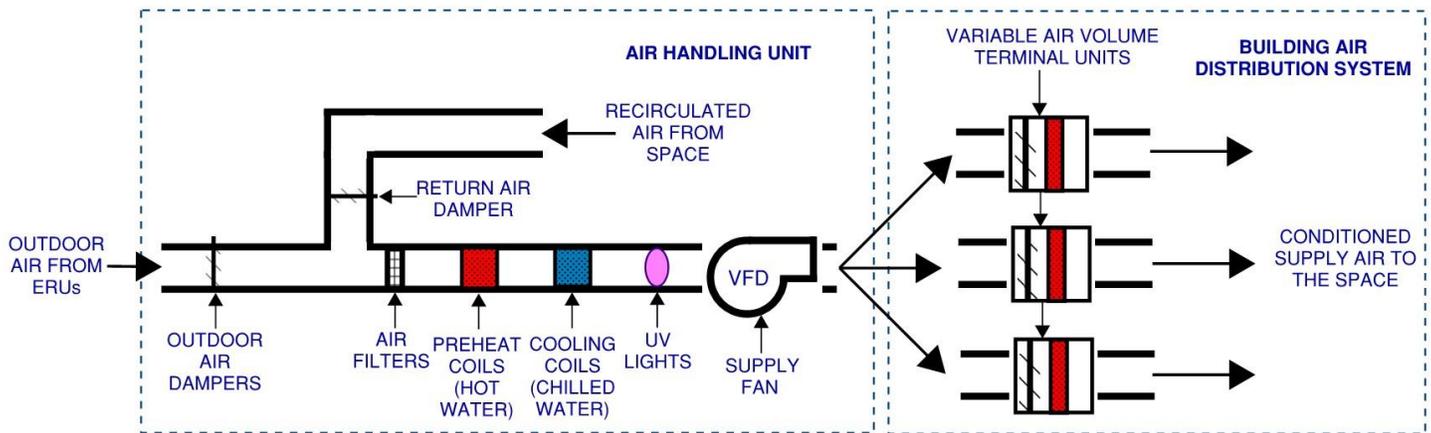
**ENERGY RECOVERY UNIT SCHEMATIC**

## VARIABLE VOLUME AIR HANDLING UNITS

The air handling units deliver a variable volume of conditioned air consisting of a mixture of recirculated building air and fresh air from outside of the building. The building return air is filtered, mixed with outdoor air and cooled with chilled water coils in the air handling units before being supplied to rooms throughout the building via above ceiling ductwork. The variable air volume zone terminal units (VAVs) are equipped with an air damper to regulate the volume of air delivered from the central AHUs to the space based on the current space temperatures. In some locations, the VAVs also include a fan, a hot water coil and a filter combination that will mix in air from the above ceiling plenum with the conditioned air from the central AHUs when the space requires heating.

Air is recirculated from the building back to the air handling unit through ceiling mounted air return registers located in each space. Return air is pulled from a plenum space above the ceiling. Exhaust is provided in restrooms on each floor to remove odors and to maintain a slightly positive building pressurization.

Chilled water is supplied throughout the building from the campus chilled water system. Heating hot water, distributed throughout the building for heating, is provided from the campus heating hot water system.

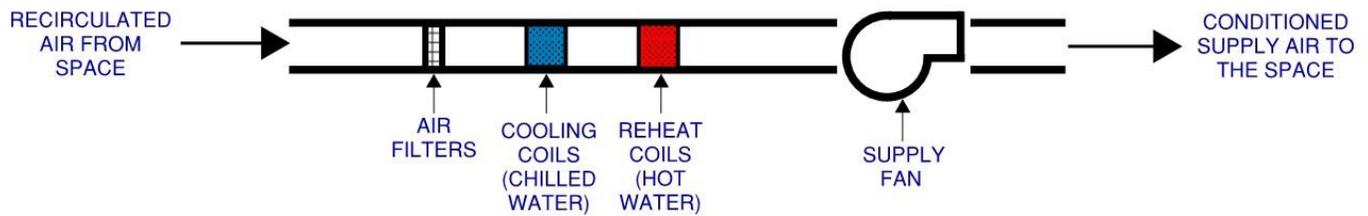


**VARIABLE VOLUME AIR HANDLING UNIT SCHEMATIC**

## FAN COIL UNITS

A fan coil unit is fairly simple: it's a fan with a coil or coils (like a car radiator) that can add heating and cooling to the air stream flowing through it. The FCUs have air filters to remove particulate matter from the air, a hot water coil and chilled water coil for heating and cooling the air, and a supply fan for forced air circulation through the unit and into the space. There is no ventilation air provided for these FCUs because they are located in spaces with transient occupancy.

Chilled water is supplied throughout the building from the campus chilled water system. Heating hot water, distributed throughout the building for heating, is provided from the campus heating hot water system.



**4-PIPE FAN COIL UNIT SCHEMATIC**