

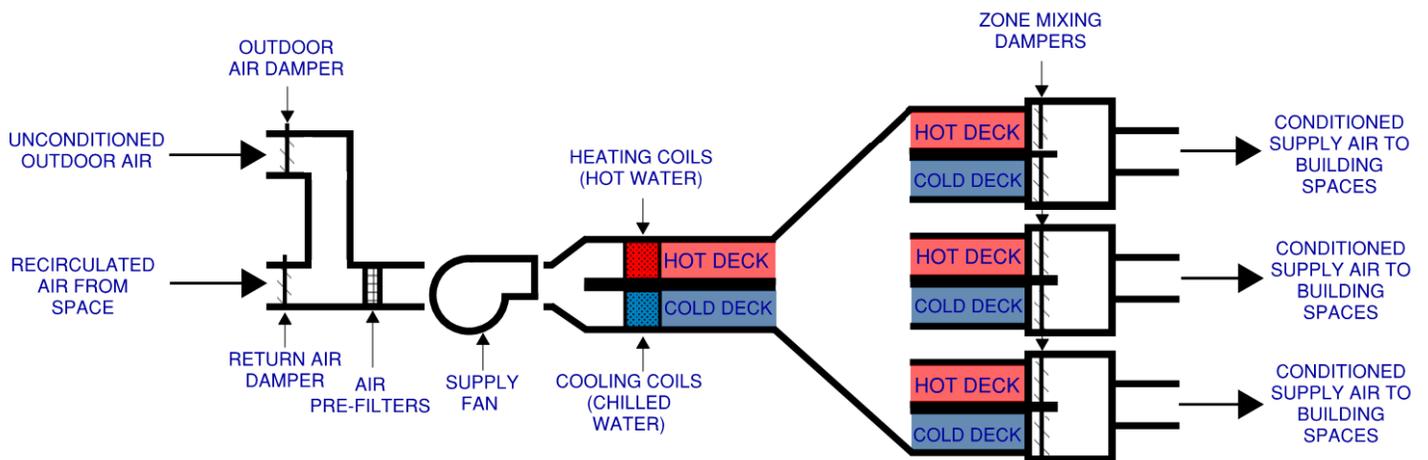
## BOYD GRADUATE STUDIES BUILDING

The Boyd Graduate Studies Building was originally built with multi-zone air handling units, one per floor. Outside air is provided through a chase that runs vertically through the center of the building and opens into each floor's mechanical room, where it mixes with return air from above the ceiling of each floor as the constant-speed fan in the air handling unit draws it through a wall of filters.

The 1<sup>st</sup> (2018), 7<sup>th</sup> (2013), and 8<sup>th</sup> (2009) floors have been renovated in recent years and now have modern variable-volume air handling units with air side economizer functions which increase ventilation when ambient temperature conditions allow it. Lecture room 328 has also been renovated with a demand-controlled ventilation unit and UV filtration.

### MULTI-ZONE AIR HANDLING UNITS (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> Floors)

Each Multi-zone Air Handling Unit (AHU) provides ventilation, air filtration and movement, and heating and cooling functions to a single floor. Each AHU has a hot water heating coil and chilled water cooling coil that respectively generate parallel warm and cool air streams. The air flow is distributed to a number of ducts that exit the AHU to serve individual zones, which may be single rooms or groups of rooms depending on their size. Each zone's duct has a mixing damper that allows only warm air, only cool air, or a mixture of the two, depending on the signal being sent from the zone thermostat. Ventilation is provided at each AHU by drawing a mixture of fresh air from outdoors and recirculated air from the floor being served by each AHU.



**MULTI-ZONE AIR HANDLING SYSTEM SCHEMATIC**

## VARIABLE VOLUME AIR HANDLING UNITS (1<sup>st</sup>, 7<sup>th</sup> and 8<sup>th</sup> Floors)

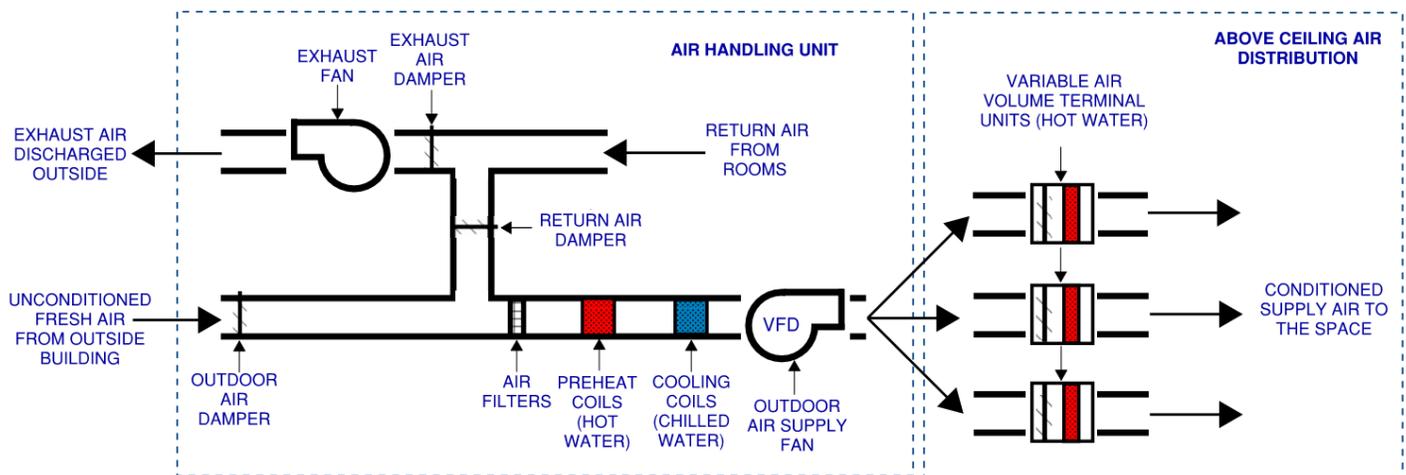
Variable Volume Air Handling Units (AHUs) deliver a variable volume of conditioned air consisting of a mixture of recirculated building air and fresh air from outside of the building. The building return air is mixed with outdoor air, filtered and cooled with chilled water coils in each of the two building air handling units before being supplied to rooms throughout the building via above ceiling ductwork.

Space heating is provided by Variable Air Volume terminal units (VAVs) with hot water reheat coils located in supply ductwork throughout the building. The VAVs are equipped with an air damper to regulate the volume of air delivered from the central AHU to the space based on the current space temperatures and a hot water reheat coil to provide space heating when called for by a space thermostat.

Air is recirculated from the spaces 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, in lieu of ductwork. 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 a chiller located in the basement mechanical room along with being imported from the North Campus Chilled Water District.

Hot water is provided by a steam to water heat exchanger which uses steam delivered from the Central Campus Steam Plant to heat water used for air heating in the building.



**1ST FLOOR VARIABLE VOLUME AIR HANDLING UNIT - UNIT SCHEMATIC**