Whitman-Hanson Regional High School Energy Efficient Systems: HVAC

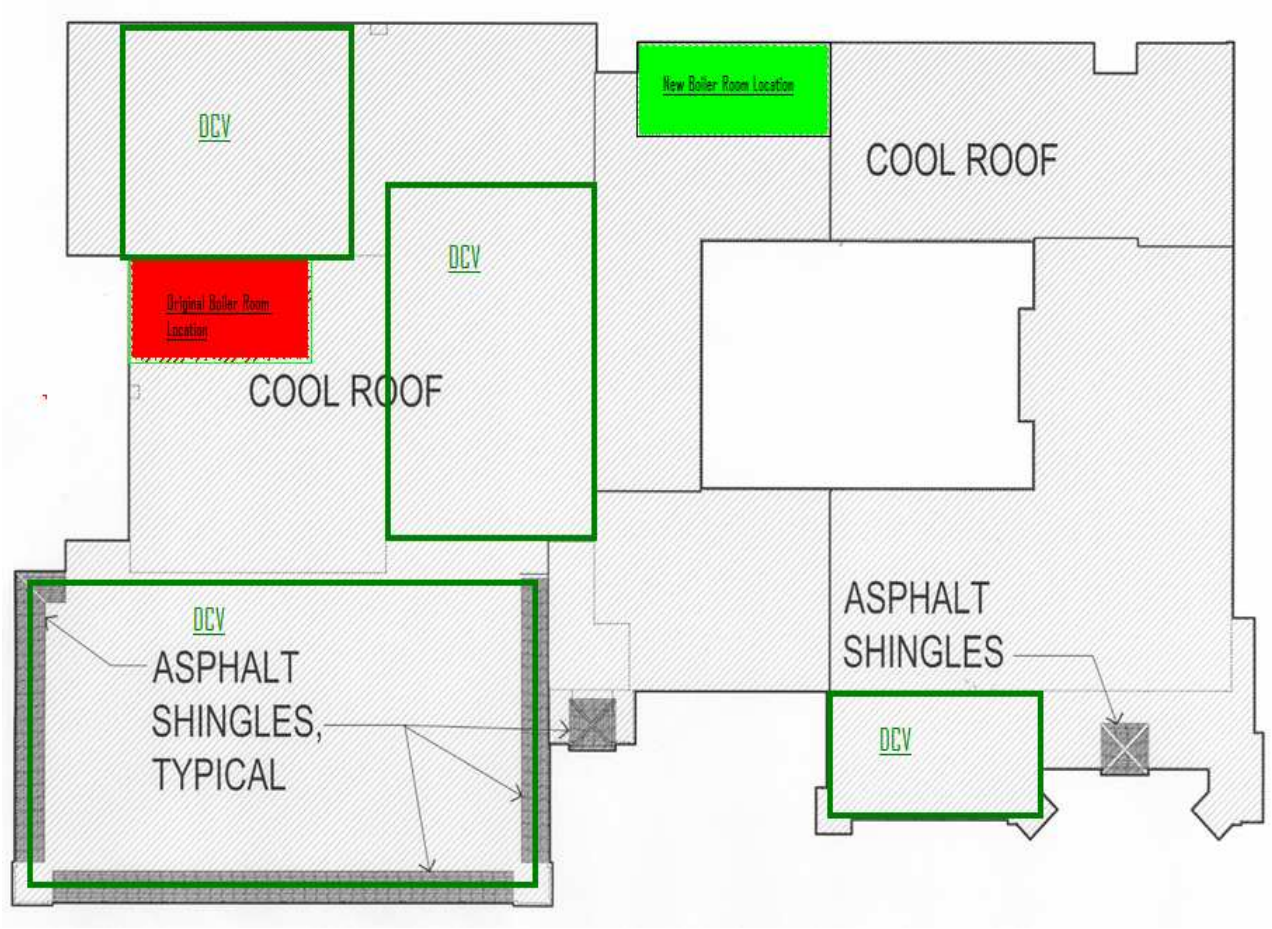
- All fans and pumps are VFD controlled with fully reactive controls
- Condensing gas-fired boilers
- Condensing DHW
  - One for bathrooms
  - One for kitchen
  - Both located close to the loads to reduce piping and pumping energy
- Building uses less gas than one of the districts existing 8 classroom schools!

Hybrid Chiller Plant

- Hybrid chilled water system 200 Ton Evaporative cooled chiller and 200 Ton Air cooled
- Carrier Hap Bin analysis showed peak of 419 tons but load for school year is 206 tons
- Variable Primary Pumping for CHW & HW circulation
- Money saved from not needing additional pumps was allocated to convert from 2 pipe change over to a four pipe system

Mechanical Specialties

- Boiler Room moved to reduce piping estimated $212,000 savings
- CO2 based DCV controls in all Large Spaces (Green)
- Building ventilation is DCV based upon space occupancy (lighting occupancy sensors control VAV boxes setback)
- Energy Recovery Unit for Auditorium as well as DCV



Commissioning

Design Team Goal: Integrate commissioning throughout the project to assure success in achieving project goals.

- Traditional construction commissioning performed by the design engineer: All systems operational
- The electric utility's commissioning agent contract was extended to do functional testing after occupancy and within season for equipment.
  - Within the warrantee year, found issues with many parts of the mechanical systems
  - Associated suppliers/ vendors extended warrantee due to commissioning documentation
  - This was money well spent!

Other unique features

- Johnson Medysis Energy Management System (EMS)
  - School district allowed sole-source bid to allow connection their five other schools currently using the Medysis system
- School district has a part time energy manager who assisted in testing and operation of systems
- Students do much of the energy analysis
  - Earth Science students monitor CO_2 levels and water collection
  - Physical science students monitor electric production
  - Math students graph the data collected from trend logs on EMS and electric production from PV for other students to analyze