

## **Executive Summary**

The New Learning Center is designed with a mechanical system that heats, cools, and ventilates correctly. Even with a system that is fully functional, there is room for more investigation into more energy efficient or higher thermal comfort systems. The energy consumption and operation of the system are well within code. The system was designed to meet all of the goals, requirements, and objectives set forth early in the process and almost all were met.

When looking to redesign the mechanical system a few issues can be attacked. First of all, humidity control should be addressed in the basement areas. Whether it is another air handling unit to supply previously conditioned the air to the basement or a cooling coil in the supply air path, some sort of dehumidification system should be installed. Second, the rooftop units should be analyzed to see whether it is worth running hot water and chilled water to the units for conditioning. The selection of a different chiller might also need to be analyzed to make the plant efficient enough so the operating costs can outweigh the increased initial costs. Third, the pump sizing in the chilled water distribution loop needs to be addressed. The oversizing of the secondary loop decreases efficiency and increases initial cost and motor power.

The system design successfully maximizes thermal comfort with the adjustable supply air temperatures from the fan coil units. The Direct Digital Control (DDC) system was also the proper choice. A DDC system allows for better network communication and control, less maintenance, higher energy efficiency, and lower operating costs. The thermal comfort and overall humidity control of the building shows that the mechanical system obtained the correct loads, made the correct assumptions, ventilated beyond code, and designed the system properly. By including the enthalpy wheels as an energy recovery portion of the system, the engineer found ways to reduce the initial sizing and cost of the equipment as well as minimize the operating energy and cost.

Overall, The New Learning Center has a properly designed, constructed, and operating mechanical system. All requirements, codes, and objectives seem to have been met. Alterations to the system and equipment may result in a more energy and cost efficient building. In this case, there is always a chance that the system designed and selected may be the best possible system for The New Learning Center.