

East Middle School



This 140,000 SF middle school addition includes new classrooms, gymnasiums, kitchen, library, and cafeteria/commons space. The sustainable design employs the most economically responsible energy efficiency, environment, and human factor principals.

Mechanical systems include a centralized geothermal heater/chiller plant, VAV air handling systems, demand control ventilation, and energy recovery ventilators. Electrical systems include direct/indirect lighting with switching for comfortable viewing of an interactive learning board system. (2012 - \$18,275,000)

Project Data

Owner

Rapid City Area School District

Location

Rapid City, SD

Building Type

Educational

Building Size

140,000 SF

Mechanical Systems / Features

Central Geothermal Plant
Low Temperature Heating
VAV Air Handling Systems
Energy Recovery Ventilators
Variable Primary Pumping
228 Bore Geothermal Field

Electrical Systems / Features

High Efficient Lighting
Occupancy Controls
2-277/480v, 800 amp services
Utilized Existing Backup Generator
Computer-Based Interactive Learning
Integrated Intercom/Phones/Class Bell
Atomic Clocks
Security/CCTV
Addressable Fire Alarm

Construction Cost

\$18,275,000

Completion Date

Summer 2012

2013 Utility Cost

Less than \$.60/ft²

Mechanical Engineering

Mechanical systems are based on low temperature heating water to improve boiler efficiency and allow recovery of condenser heat from the geothermal chiller. The central geothermal system serves multiple variable volume air handling units, perimeter flat panel radiation system and is also used to preheat water for the domestic hot water system.

The air handler serving the locker rooms incorporates a total energy recovery wheel and smaller energy recovery ventilators are used in other areas where appropriate.

A variable primary pumping scheme was specified for both heating and chilled water distribution systems. In addition, the vertical in-line pumps were selected and optimized using full size impellers and the pump VFD to match flow requirements.

Electrical Engineering

The facility lighting predominately utilizes efficient troffer fixtures in the classrooms where occupancy sensors combined with wall switches are utilized to economically control each classroom's lighting. Common areas lighting consists of multiple technologies to facilitate excellent control for a diverse list of planned activities.

Power includes 2-800 amp, 277/488v, 3 phase services (1 for heat) with backup provided by an existing natural gas backup generator.

The special systems include; Computer and overhead projector-based interactive learning board system, a "matrixed" intercom system synchronized with an atomic clock system and integrated with the classroom projector and telephone systems to provide all classroom amplified sound including the class bell function, security system consisting of closed circuit television systems (CCTV), and card access, addressable fire alarm system and communications wired with copper and fiber for a category 5e network.