

AE Senior Thesis

Phoenixville Area Middle School: Final Proposal

Richard Schimpf

Richard S Schimpf

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Breadth Topic: System Analysis of Geothermal Heat Pump Alternative (Mechanical)

This area will cover the difference in energy efficiency of the proposed geothermal heat pump system compared to the current water source system. This analysis is necessary for the cost comparison described in analysis area two. This study will be done to a somewhat limited extent since accuracy is not required as much as a relative comparison. In order to accomplish this, energy evaluation programs will be used with basic building geometry. The exact program to be used will be chosen based on those available to students at Penn State University. The control system and any other significant issues will be researched through consultation with established mechanical contractors.

Breadth Topic: Strip Footing Redesign for Precast Wall Load (Structural)

Analysis Area 4 focuses on the design on a precast wall panel system to replace the current masonry / brick façade in place. This proposed design change would result in a loading increase on the strip footings. Once a design has been finalized for these precast walls, the design load will be determined for the footings. The exterior walls of the classroom areas have a typical design along the perimeter. This will allow a design load per unit foot to be determined, and thus a typical spread footing design for the entire exterior.