

Executive Summary

The Northeastern Pennsylvania Office Building is a single story project that contains an approximately 11,000 SF office building and an approximately 14,000 SF shop building. The office building will accommodate about fifty employees, while the shop building will contain four truck work bays and one wash bay. Construction is scheduled to last nine months and cost approximately \$5.4 million. The owner has requested that the project name and location remain anonymous for this study.

The first analysis will determine whether an alternate structural system could replace the current pre-engineered metal building. Alternate structural systems include standard steel, cast-in-place concrete, and tilt-up concrete panels. Out of these three possible systems, the single best alternate will be further analyzed. A structural analysis will be performed to size the components of the system so that cost and duration data can be directly compared to that of the pre-engineered metal building.

Since there are two later phases of this project (Phase 2 & 3) that are nearly identical to the Northeastern Pennsylvania Office Building, the second analysis will determine whether or not these phases could be delivered as design-build projects. If it is determined that Phase 2 & 3 could be delivered in this manner, potential cost savings and schedule acceleration will be determined.

The third analysis of this report will be based on a hypothetical situation that may eventually arise for the later phases of this project. The scenario is that the owner has requested to double the size of the office building portion of the project while it is in the schematic phase of design. Expansion options that have been suggested are a vertical expansion or a horizontal expansion. This analysis will consider cost, schedule, function, and aesthetical impacts for both options. The most suitable expansion option for this project will then be recommended for further design.

The final analysis for the Northeastern Pennsylvania Office Building will be determining whether or not a geothermal system could be installed in the shop building. In order to compile cost and schedule data for the alternate system, a mechanical analysis must be performed to size the components of the system. Once the components have been sized, the initial cost and schedule data will be directly compared to that of the current natural gas heating system. Other factors, such as possible cooling effects and impacts on the environment will also be considered when comparing the two systems. The most suitable heating system for the Northeastern Pennsylvania Office Building will then be recommended to be used on this project.