

Executive Summary:

This report provides detailed overviews of four technical analyses conducted for the LancasterHistory.org project that involved a renovation and addition to the existing Lancaster Historical Society Building located in Lancaster, Pennsylvania. These analyses include a critical industry research topic and demonstrate two breadth areas.

The four technical analyses provided in this report include:

- 1) A study of soil remediation effects on constructability and schedule
- 2) A review of whether a conventional mechanical system would be more cost effective than an open-loop geothermal system
- 3) An examination of whether the application of MEPF prefabrication would increase constructability and shorten the project schedule
- 4) An analysis of whether a greater use of Building information Modeling could have benefitted the parties during the project

The study of soil remediation is conducted because unsuitable soils caused construction issues and schedule delays early into the project. This analysis includes critical research in the form of a case study to show the importance of a well conducted geotechnical report. Also, it includes a structural breadth regarding subsurface design. The analysis shows that an alternate soil remediation approach is the best resolution.

The second analysis investigates LH.O's potential for a conventional mechanical system to replace its geothermal one, considering value. This is because the geothermal system had not been able to meet performance requirements at the time of the investigation. The analysis includes a mechanical breadth regarding value. The implemented open loop geothermal is found to have a much higher initial cost, but has much lower future annual energy costs.

Application of prefabrication presented an opportunity for LH.O because its MEPF systems are fairly complex. It is discovered that plumbing and electrical systems lend themselves to prefabrication, and it is determined that various electrical assemblies could be prefabricated in order to reduce construction schedule and improve constructability.

The final analysis detailed in this report considers a greater use of BIM on LH.O. This analysis is intended to increase value for the project. A greater use of seven BIM utilizations in pre-construction and in construction is deemed valuable from a cost and constructability standpoint.