



## Appendix C: Breadth Studies

### Structural Breadth

Calculations will be performed on the existing structure utilizing the structural analysis program, RAM structural system. This will be completed by exporting my model from Autodesk Revit Structure to the analysis program (this process was researched and documented as part of a team project for my virtual facilities prototyping class). Hand calculations will be performed and will size the members to confirm that the program is properly functioning. Once this is complete I will redesign a portion of the system in an attempt to reduce the number of columns necessary to support the new structure. I will utilize the analysis program to quickly check and size different options. Additionally, any increased reinforcement at remaining columns and footings will be calculated as part of this study.

### Mechanical Breadth

Research will be done on the various options for energy recovery that are currently available on the market. Specifically, the investigation will focus on the use of energy captured from the exhaust air as preheat for the domestic hot water system. I will evaluate each based on the design criteria for the project and efficiency keeping in mind that indoor air quality is a top concern. Utilizing this research, the best system for the project will be selected and incorporated it into the mechanical design. An energy analysis utilizing this new system to determine the amount of energy saved through the use of such a system. Additionally, I will investigate if any subsequent upsizing of fans and downsizing of boilers which could result from this change in the system.