



Executive Summary

Wellington at Hershey's Mill is a recently completed 370,000 square feet retirement community consisting of 5 stories and 197 independent living units located in West Chester, Pennsylvania. Wellington's structure consists of a non-composite steel framing system for the lobby and first floor and a wood floor joist, wood framed system on the top three residential levels.

The depth study for this thesis is the design of an alternate structural system that is more appropriate for Wellington's intended use. A less combustible material was preferred for a retirement community, therefore the chosen system is a hollowcore floor system supported by masonry bearing walls.

Two additional analyses were performed for the breadth study of this thesis. The intention of these studies was to determine which system offered an improved standard of living for the occupants of Wellington. An acoustical analysis of the floor system between the garage and the first floor residential section was completed to verify the amount of noise transferred through the two floor systems. To determine the amount of heat lost through the exterior walls of the apartments, a building envelope heat transfer analysis was also conducted.

A summary of my findings are:

- An initial design of the alternate system showed the need for the masonry bearing walls of the residential levels to bear directly on the columns in the garage.
- The weight of the structure increased significantly, making the current lateral system fail after the application of the new seismic loads. Reinforcing the masonry of the lateral system will allow the system to resist the loads.
- The acoustical analysis showed the alternate system to be a superior acoustic barrier between the garage and first floor.
- Heat loss calculations proved the original system was better for slowing heat loss.