



### **Executive Summary:**

George Read Hall is a new five story dormitory on the campus of The University of Delaware. The building is approximately 129,000 square feet. Its architecture is accentuated by its “U-shape” and Georgian style. George Read Hall is the largest of three new buildings being built to replace the existing Pencader residential complex.

The existing structural system of George Read Hall is composed of a Hambro composite floor system with light gauge metal stud bearing walls. The lateral force resisting system is X-braced shear walls composed of light gauge metal straps. The roof structure is prefabricated light gauge metal trusses.

This thesis project is an in depth study of an alternate structural system. The goal of the alternate system is to find a more suitable lateral force resisting system as well as a more economical overall system. This study investigated pre-cast hollow core planks, masonry bearing walls, and reinforced masonry shear walls. The results show lightweight 8” deep hollow core planks with a 2” concrete topping. Supporting these planks is 12” hollow blocks. The new lateral force resisting system is comprised of grouted 8” blocks with #8 reinforcing bars. Prefabricated light gauge roof trusses are still the roof framing system.

In addition to the depth study, two breadth studies were also performed. A cost analysis of the new system showed a savings of \$23,643 over the existing system. The new system can be constructed in about the same amount of time. Hence, it can be concluded that this system is a very viable alternative. A study into LEED certification was also performed, and it can be concluded that a level of certification could have been achieved if properly incorporated into the original design.