Executive Summary

In conclusion, the effort put for this thesis has created a functional family resort which would potentially provide entertainment for the Baltimore Maryland area. This thesis looked into all aspects of design and implementation of creating an indoor water park and hotel. The ideas put forth developed a vibrant thrilling attraction out of a "cookie cutter," dull dormitory. When guests enter the newly designed hotel they are immersed in a completely new world of adventure where they become a part of Blackbeard's crew. Guests get to relax in their luxury hotel rooms before hitting the surf and splashing down the winding slides at the indoor water park. New architectural floor plans provided hotel amenities such as a fully interactive arcade and a pirate themed bar. Guests can enjoy over ten wet rides and attractions at Blackbeard's Oasis Indoor Water Park.

An architectural breadth provided new architectural floor plans for each level of the hotel and design plans for the indoor water park. Converting each floor from a dormitory occupancy to hotel created an uphill battle of system integration problems. Strategic placement of building systems were created through this breadth to create a final working product presented in this thesis. A complete design of the indoor water park was presented and abides by ASTM F 2376-06. Each element of the water park was created with guest flow, safety, and satisfaction in mind.

A structural depth allowed for the analysis and design of the water park structures. Through trial and error, it was determined that the exterior water slide structures were best designed when all members were connected. This steel maze created an architecturally appealing exterior addition. The water park gravity and lateral system were designed based off of ASCE 7-10 wind and gravity loading conditions. Plate girders were designed to handle the large spans and heavy loading patterns for the water park built up roof. Plate girders were used to provide as an educational experience and were determined not to be the best solution. Their deep beam sizes used an unnecessary amount of steel and could have been done other ways. Columns with relative bracing were created to span the large height in the open space. Knee braces added to the water park lateral frames are very effective against the loading. With almost a 70% reduction of lateral deflection, these braces were an economical and effective solution.

With new architectural floor plans, different column locations were selected for the steel gravity system. Composite decking and beams were designed using RAM to provide a more economical solution to a full concrete design. Existing shear walls from Prince Frederick Hall were used as the later resisting members. One of the shear walls was moved six feet from its original location and virtually had minimal effects on the overall deflection of the building.

A HVAC breadth allowed for the exploration of temperature and humidity control of the indoor water park. With such a large space, it was necessary to provide 4 separate systems to control the conditions. Four feet diameter distribution and return ducts were designed to allow proper air flow. Locating the HVAC system on the roof of the hotel structure posed multiple complications and would be more economical if designed on the water park roofing structure itself.