# EXECUTIVE SUMMARY

The Borgata Hotel Casino & Spa is a 2.2 million square foot resort located in Atlantic City, New Jersey. The hotel is a 40 story tower located on top of 3 levels of casino within a podium structure. The hotel tower is constructed with a full cast-in-place concrete structural system. Gravity loads are resisted by a post-tensioned flat plate system. Lateral loads are resisted by normal and coupled concrete shear walls as well as a concrete shear wall core. Loads are transferred to the earth through complex mat foundations supported by a network of concrete filled steel tube piles.

Due to the size, dimensions and location of the building, extreme lateral loads due to wind need to be resisted. The original design of the lateral system has an unsymmetrical layout and the core has a complex geometry. The main focus of this thesis is to perform a lateral redesign using the same lateral force resisting system. The redesign of the system will aim towards reducing the number of walls, creating symmetry and redundancy, and simplifying the geometry. With these goals, the lateral system could be greatly simplified and reduced in size. In addition to reducing the size of the system, the redesign is aimed towards simplifying the construction process. A system using less walls and simpler geometries will reduce construction time and costs.

In addition to performing a redesign of the lateral system, an investigation into the use of an alternate floor system will be done. The original design of the structure uses a post-tensioned flat plate. This system works efficiently for the hotel because it provides thin slabs with long spans. The thin slabs allow maximum floor to floor dimension to be achieved. The alternate floor system that will be sued is a composite concrete system. This system uses 2-1/4" precast concrete planks topped with a 5-3/4" cast-in-place, voided concrete slab. This system effectively eliminates the need for formwork. Without the need for fabricating and installing formwork, the erection schedule can be greatly reduced. In addition to schedule effects, this system also reduces the dead weight of the structure. Since the slabs are voided, the weight of slab decreases dramatically, creating smaller loads on columns and walls. In addition, the effective seismic weight of the structure is reduced; this reduction in effective seismic weight drastically reduces the effects of seismic loading.

Along with the structural depth, two non-structural breadths will be investigated.

The first breadth involves the construction management aspect of the project. Since many changes will occur on the project, a cost and schedule analysis will be performed to compare costs and benefits of the structural system changes versus the original design.

The second breadth involves the architectural aspect of the project. With the lateral redesign, the core of the building was completely redesigned. Since the core is such a large part of the building, this affects the entire room layout around the core. This breadth investigates a redesign of the room layout in the areas surrounding the core of the building.