

THE ODYSSEY

ARLINGTON, VA

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Structural Option

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Senior Thesis Proposal

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Executive Summary:

The Odyssey is a 475,650 SF luxury residential complex located in Arlington, Virginia. The main structure are two adjoined 16 story towers with residential units and are clad with glass curtain walls and brick facade. The Odyssey is a perfect example of the latest designs for the rising market of luxury apartment and condominium construction with a concrete structural system. The typical floor system throughout the residential levels is a 2-way post-tensioned flat plate and the lateral systems are shear walls located throughout the plan of the Odyssey and concrete slab frames.



The building was structurally designed to minimize floor-to-floor heights thereby maximizing residential units which increase the profit return on the building. A post-tensioned 2-way flat plate system was chosen for the minimal design slab depth which effectively fits 16 residential levels under the zoning height limitation. Maintaining a comparable floor-to-floor height and preserving the architectural layout of residential units will be one of the objectives in redesigning the structural system of the Odyssey.

A 2-way reinforced flat plate system will be designed and investigated as an alternative to the current system. The similarity of systems will enable the design to have slight modifications in floor-to-floor heights while maintaining the integrity of the architecture and column layout. The lateral system will be redesigned to accommodate the alterations in the floor system and lateral loading in combination with the slab frame of the Odyssey. The proposed designs will be carried out using design references and computer analysis throughout the semester. This structural redesign will provide a better understanding of alternative concrete designs of similar mid-rise building structures as the Odyssey.

The structural redesign of the Odyssey will be evaluated further through breadth studies focusing in topics pertaining to non-structural option areas. First, a construction management breadth study will investigate the implications of the alternative design with respect to the construction schedule and cost compared to the current system. Second, a study of the existing building envelope will explore the thermal and moisture efficiency of the curtain walls compared to the typical brick façade with aluminum punch windows. Additionally, construction schedule and cost implications will be investigated to evaluate the value engineering practicality of the glass curtain walls.