Executive Summary:

The purpose of this thesis proposal is to analyze current construction industry issues and how they apply to the Potomac Yard Land Bay E project in Arlington, VA. A large portion of this proposal is focused on energy conservation in the industry and ways that new technologies and construction methods may be applied to my project.

The first analysis involves implementing a supplemental energy source on the rooftop of the building. This proposes the use of Solyndra PV panels. Solyndra solar panels are proven to be more efficient than most conventional PV panels because of the 360-degree solar absorption. This design works particularly well with white TPO roofing membrane that is already installed on the Potomac Yard project. The areas of research for this topic involve investigating the cost of the panels and their mounting hardware and the amount of energy produced compared to the total building's energy consumption.

The second analysis deals with changing the building envelope from a combination of a curved curtain wall and architectural precast panels with punched windows to a solid curtain wall system. The main areas for analysis on this topic are the difference in solar heat gain on the building, schedule reduction, construction needs and serviceability.

The third analysis topic deals with the mechanical system of the building. This analysis proposes changing the existing forced air VAV distribution system to a chilled beam mechanical system. The main areas for research are the comparison between the installations of the original and proposed system, schedule implications and the reduction of tonnage cooling load from the reduced floor height.

The fourth analysis topic for this proposal will be pursued but only implemented if one of the first three analyses becomes unachievable. This analysis consists of interchanging the existing compact florescent lighting CFL to light emitting diode LED lamps. The main areas of study for this analysis would be efficiency, heat production, lifespan, durability and disposal of the fixtures. An interview with a construction professional and product data will assist in the comparison between these two lighting systems.

The two breadth analyses for this proposal will cover the mechanical system and the electrical system for the Potomac Yard Land Bay E. The mechanical breadth will be used to help determine if the proposed solid curtain wall system would increase the need for additional cooling for the building. The electrical breadth consist of the analysis of the building's total energy consumption and compare it to the supplemental energy produced by the Solyndra solar array.