

Executive Summary

The information found in this document is the culmination of a year-long thesis project involving the study and analysis of a luxury apartment building located in Virginia. At the request of the owner the actual name and location of the apartment building will remain anonymous. For the purposes of this report the building will be referred to as Falls Church Tower and as its name suggests I have located it in Falls Church, Virginia. To clarify, the name and more importantly the location provided have no influence throughout the following analyses as the true location was used to attain the appropriate data for studies such as seismic and wind loading.

The main focus of this report is redesign of the existing lateral force resisting system. The current ordinary concrete moment frame in combination with the post-tensioned flat plate floor system provides an extremely efficient means of resisting most kinds of loads. The engineers of SK&A have designed a framing system that minimizes the floor to floor height of the building while avoiding the overcrowding of columns.

But in spite of these positive aspects there is still room for improvement. The depth portion of the report addresses this by proposing the implication of a concrete shear wall system. This would allow for the elimination of oversized columns; their excessive girth only serving the purpose of resisting lateral loads.

This, in turn, prompts an architectural response that is aesthetic as well as practical in a structural sense. The architectural breadth portion focuses on redesigning the building's column layout to account for the change in column sizes. This presents the opportunity to align the columns to a more definable grid that allows for more flexibility within the building in addition to providing some redundancy to the frame which simplifies the analysis of applied loads.

The second breadth of this report involves a relative cost analysis of the moment frame and shear wall systems. This breadth is important in determining whether or not the alternative system is worth consideration given the fact that even the most superior systems won't make it past the shop drawing phase if the price tag is too high.