

River Tower at Christina Landing

Wilmington, DE

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Structural Option
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Structural Thesis Proposal: **Structural and Breadth Redesign Options**

Executive Summary

The River Tower is part of the latest phase of redevelopment along the banks of the Christina River in Wilmington, DE. The redevelopment site consists of luxury townhouses, a 22-story apartment building, and will now add the River Tower, a 25-story condominium tower. The River Tower's structural system includes a slab-on-grade structural slab and 8" post-tensioned floor slabs with reinforced concrete columns for gravity load support. The primary lateral system for the tower consists of reinforced concrete shear walls, but the concrete columns also provide lateral resistance.

Previous technical assignments have presented preliminary analysis on the existing post-tensioned slab system and the existing lateral system of reinforced concrete shear walls. Alternate floor systems were also considered, with composite steel framing and hollow core slab planks yielding the most promising results. When compared to the existing system, these alternates would add to the floor-to-floor height by several inches per floor. This would ordinarily be a deciding factor, had the River Tower design team not already received code variance for its building height from the city of Wilmington, DE.

For the educational purposes of this assignment, the composite steel framing system will be further studied despite its increase in assembly cost and floor thickness from the existing conditions. The composite steel framing system would significantly provide a lighter overall building weight and simplify the lateral resistance system. This could potentially open up the current column and architectural layout. Both braced and moment frames will be considered initially, with research and preliminary RAM output becoming deciding factors.

With such a significant change in building material, a complete analysis of the construction management aspects of budget, scheduling, and erection will be considered as a secondary breadth assignment. Finally, with this redesign of steel and the potential change of layout of the interior spaces, the current mechanical system will be analyzed and redesigned accordingly. The fire resistance system will be another key factor in this new analysis, as the new steel framing will also require fire-proofing of some kind. This report finally lists the procedures involved to accomplish these design goals, and provides a tentative timetable for their completion.