



## **Conclusions and Recommendations**

The proposed staggered truss system was determined to be the most efficient, in terms of cost and spatial requirements, of an alternative structural steel system in preliminary study. Allowing the maximum clearspan in between interior columns, this arrangement provides the greatest amount of flexibility in the use of interior spaces. Without the weighty columns and shear walls of the existing concrete system, the system dead weight has been lowered, alleviating the requirements on the foundation piles. However, the proposed staggered truss system is not without its shortfalls. Great care was made to preserve the architectural spaces of the existing system, but the combination of floor slab and thickness of braced members in the trusses results in tight spaces where current unit hallways are intersected by some of the placed staggered trusses. Of course, these issues are narrowed to only several units, on alternating stories, so a minor architectural redesign can diminish this effect on the floorplan.

However, theory can not totally predict a particular system's appropriateness for a specific project. In the instance of the River Tower, concrete proves to be the cost-efficient material due to the rising steel costs and expensive connections required with such a complex framing structure. In larger cities like Philadelphia or Washington, DC, concrete may be at a premium. The unit costs from R.S. Means are reflective of the building's location in Wilmington, DE, and confirm that the existing design of post-tensioned concrete slabs would be a much more viable option than the proposed staggered truss system. Either system results in fairly massive columns, due to the shear amount of floor support required. The additional architectural clear spaces created by the staggered truss layout are offset by the cost premiums of the project. The existing columns are spaced out enough to allow for fairly large luxury condo units, and the post-tensioning keeps the floor system at its very minimum thickness of eight inches. Despite evidence to the contrary on smaller buildings, the staggered truss configuration does not provide enough efficiency in cost or architectural considerations to merit further consideration for this particular building in Wilmington, DE.



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