

EXECUTIVE SUMMARY

The second technical report consists of comparative analyses of proposed alternate floor systems for the Soho high rise condo. The existing structural system of the 13 story project consists of a two-way flat plate slab. A description of the system over a typical bay is contained in the following section of this report.

To remain consistent with typical design practice of residential construction, alternate floor systems were analyzed that provided a small floor sandwich dimension. These systems include:

- Redesigned two-way Flat Plate w/ Light weight concrete
- Post tensioned two-way Flat Plate
- Precast Slab-Girder
- Composite Steel

Alternative systems were analyzed using loadings following ASCE 7-05. In some cases existing span condition were modified for alternate systems to remain consistent with typical and economical design/construction practices for these systems. Sizes and properties of these systems were determined through analyses located in the Appendix. Each section includes a depiction of a typical floor plan as well a summary of analyses. Advantages and disadvantages of each system are described throughout the report with a summary table included in the conclusion. The table includes overall depth, constructability, cost, vibration concerns, lead time, and Fireproofing.

Through the comparison a concrete flat plate remained the ideal system for the high rise. The redesigned flat plate system provided a better solution to the floor framing than the original with a decrease in floor depth and a 29% decrease in service loads. The total cost of the redesigned flat plate was also one dollar cheaper per square foot. On a project of this size significant cost implications will result. The other alternative systems all provided viable options although due to the irregular column layout of the high rise condo the composite steel and slab-girder systems may result in some architectural layout implications. The post tensioned flat plate provided the largest bay sizes with the composite steel providing the second largest, however the cost associated with the PT system is 30% higher than the existing flat plate. The structural depth of the floor sandwich was comparative for all systems excluding the composite steel. Additional investigation would be required to analyze its impact on building systems.