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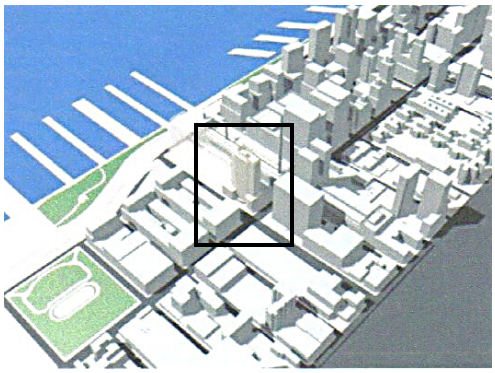

Pictures courtesy of Fox & Fowle Architects

Pro-Con Structural Study of Alternate Floor Systems

Executive Summary

This document will discuss the possible alternatives for a floor system in The Helena. The existing floor system is a 8" flat plate slab on all levels but the ground floor. All levels of the building except the ground floor and sub-floors are for residential use. The existing system seems to be the best choice for the building from a structural standpoint. However, the time it takes to integrate some of the conduit for other systems into the slab creates room for possible alternatives which could be quicker. To determine these issues, four alternative floor systems will be discussed in-depth with other systems also being mentioned. A typical bay area from a residential floor was used as the basis for the design of the alternative systems. The alternative systems were examined on the issues of cost, constructability, and the effects the system had on the other building systems. The four alternative building systems which were considered for in-depth design analysis are:

- One-way concrete slab with beams
- Concrete T-beam
- Open web steel joist
- Composite steel

Other floor systems which were considered are non-composite steel, pre-cast concrete planks, and a waffle slab.

The one-way slab and T-beam showed the best results to being acceptable alternatives to the existing system. Also, pre-cast concrete planks were discussed as a possible alternative and were viewed as being worth the time to perform an in-depth analysis on the system. The open web steel joist and

composite steel systems were not seen as viable alternatives and any further investigation into their design was not considered necessary.