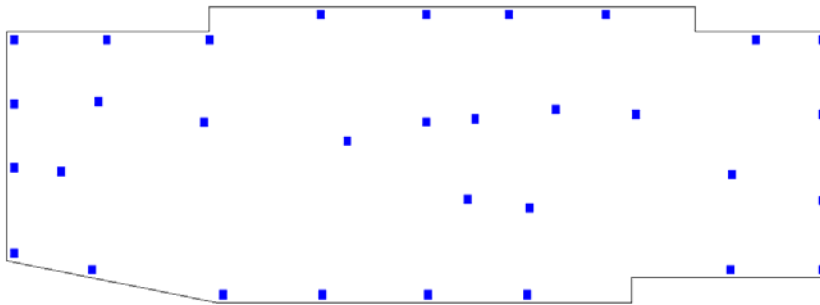




Column Re-locations

Currently, the columns are located around the perimeter of the building as well as scattered throughout the floor plan. This layout is not conducive for the formation of a grid layout to be able to create a typical bay for design. The formation of typical bays is helpful for the design of many floor systems. However, The Helena features the only viable floor system solution for the current column layout, a flat plate slab. The most important governing aspect of the current column layout is the need for the columns to integrate with the architectural layout of the floor plan. The new column layout uses many of the existing column locations as well as adjusting some of the existing column locations and adding columns where needed. A diagram of the existing column layout is shown below.



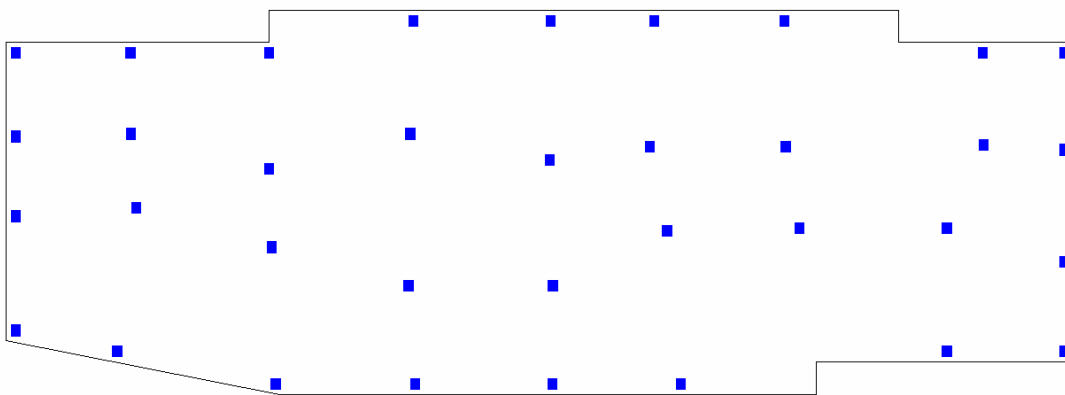
Column layout for the 12th through 38th floor

This diagram illustrates the fact that the columns are not arranged in a repetitive manner making it impossible to establish a typical bay. The architecture of the building seems to take precedent over the simplicity of design for this building. Along with the scattered arrangement of the columns, the shear walls are also placed in spots where they will have a minimum affect on the floor plan layout. Because of the importance paid to design, it was critical to work within the boundaries of the architecture and try to establish a grid pattern that would be integrated with the floor layout. All of the columns around the perimeter of the building were kept in place to ensure to exterior look of the building would stay



the same. Almost all of the columns in the interior of the floor plan were simply moved to a different location to accommodate the grid pattern, but the addition of a few columns was necessary to complete the grid and ensure the new floor system would be properly supported. In total, three columns were added to the floor layout and the total was brought from 32 columns to 35. The affect this will have on the overall building structure will have advantages as well as disadvantages. The added weight of the columns will have a greater bearing on the foundation and will require greater support from the footings. Also, the added space required for the columns will take away space which may be needed for the building's other systems. There are more advantages to disadvantages however. The added weight from the additional columns will increase the overall building weight and thus make it less susceptible to overturning from lateral loads. Also, adding a few extra columns will help to lighten the load that will be distributed to each column. In turn, the lighter loads will allow for the design of smaller columns which will open up more space for the floor plan, lessening the impact the columns will have on the architectural layout. The columns were designed to make sure all of the locations were integrated among the floor plan throughout all floors of the building.

Below is the diagram for the new column layout. The columns are set up in a grid layout which provides the ability to create typical bays for ease of construction.



New column layout for the 12th through 38th floor



Keeping the columns in a grid layout is important because it will allow for square or rectangular bays which make it easier and more suitable for floor system design. The pre-cast concrete plank floor system, which will be supported by members that will rest on the columns, will span in the East-West direction. This leaves the members to span in the North-South direction to create the support the planks will need. This made it especially important to try to keep the columns in line with each other in the North-South direction. The members will then span between the columns, giving the planks a place to rest upon and designating their span length. Having the columns arranged in a way that is conducive to design is the most important part of the structure. It is what will designate which types of floor systems are possible which has an impact on the dimensional layout of the building as well as the overall building height. The columns create the structural base from which the building will be created around and that makes it that much more important for the layout of the columns to be open to different design possibilities. Other floor plan diagrams can be referenced in Appendix A at the end of this document.