Executive Summary

Parkridge 6 is a 7 story 226,000 sq.ft. commercial office building located in Reston, VA. The building is designed to a maximum height of 115'. The south face of the building is made up of sloping columns that slope outward from the ground level to the roof. The north face of the building contains an arcade created by stepped portions of additional floor area on the second floor through the fifth floor.

The foundation for Parkridge 6 is a shallow foundation system made up primarily of spread footings. The typical floor is a composite system with 3 ¼" of lightweight concrete on a 2"-20 gauge steel deck. The buildings grid consists of 3 bays in the N-S direction spaced at 37'-2", 35'-0", and 37'-2" respectively. In the E-W direction there are 10 bays with the first bay on both ends being 25'-8" and all others 25'-0".

The lateral system for Parkridge 6 is a series of braced frames. In the N-S direction there are 2 frames and in the E-W direction there are 3 frames. The bracing elements of these frames are made up of HSS sections ranging from 8x8 to 12x12.

Through this report I have found that seismic loading controls the lateral design of Parkridge 6 based on the load combinations in ASCE 7-05. In addition to the applied seismic loads the building induces other lateral loads based on the eccentricity of the frames enter of rigidity to the buildings center of gravity. The resulting torsion from this eccentricity increased the load in the frames by up to 50 Kips. The sloping columns on the south face also create a lateral load due to self weight.

The method used to distribute the lateral force to each of the frames was done using the distribution by rigidity method. In this method the rigidity of each frame is determined. Then the rigidity of each frame is divided by the sum of the rigidities in the same direction. This decimal value is the percentage of the load that will be resisted by that particular frame.

Using the determined worst case lateral loading the deflection of the building was checked using a computer model created using RISA3D. The deflection was then compared to the industry standard of H/400. Through this report I have determined that Parkridge 6 falls well within the H/400 limitation with a deflection of H/650 in the N-S direction and H/900 in the E-W direction.

A member check at the base of Frame 5 indicated that an HSS 8x8x5/8 should be used to resist the applied loading. The original design calls for an HSS 8x8x1/2 the variation in size could have been caused by inaccuracies in my torsion calculation,

inaccuracies in my calculation of resultant lateral load caused by the sloping columns, or over estimation of loads.

The overturning moment caused by the worst case lateral load was also calculated. It was determined that the buildings self weight is adequate to resist the overturning moment resulting in a net compression in the shallow foundation system.