Summary and Conclusions

The Upper Campus Housing Project could be designed as either a one-way hollow-core plank system or a two-way flat-plate system. Designing the structure as a one-way system will allow for easier construction and less cost. However, the two-way system will allow for the conversion of the structure to another use if needed by the University of Pittsburgh in the future. This conversion would be possible because of a more flexible floor plan and the ability to carry higher floor loads.

The existing conditions for this building consist of one-way hollow-core concrete plank (8" + 2 ½" topping), filled in solid where needed. This system has reinforced concrete masonry bearing and shear walls located at every exterior wall and most interior walls. These shear walls are of varying thicknesses and reinforcement. The hollow-core plank system, because of its nature, allows for considerably easy and quick construction. This system however, causes the structure to be defined only as a dormitory structure. Dormitory structures can only withstand a 40psf live load. Also, because the interior walls are also bearing and shear walls they cannot be moved to accommodate a new floor layout.

The proposed two-way flat-plate system consists of 10" slab with 26" x 26" reinforced columns. This system will have 10" reinforced concrete shear walls located at various places along the exterior of the building. The new system will also have a new building envelope consisting of light gauge metal stud walls with a brick façade. This system will allow for a flexible floor plan because all interior walls will only be partitions and can be moved if needed for future development of the structure.

This system also provides large bays (approximately 27' x 27') and higher floor loads (80psf).

Overall it is more important for developers to consider lower cost and not worry about the possible future development of the building. Therefore, the one-way hollow-core plank system is a better system overall for the structure of the Upper Campus Housing Project. This makes sense because it is unlikely that the professional engineers and developers would choose a system that was not the best choice. Below is a summary of the cost and duration of a typical bay for each system, proving that the one-way system is a better choice. However, the two-way system is a possibility for the structure and could be used in a similar design.

System	Cost/Typical Bay	Manhours/Typical Bay
Two-Way	$22,113	353
One-Way	$11,058	92

Acknowledgements

I would like to say thank you to everyone who has helped me during my time in Senior Thesis. First and foremost, Dr. Hanagan has been a wonderful advisor. She has helped me not only with senior thesis, but along the way during my time here as a Penn State AE. She has been a steady and consistent source of knowledge and experience. The knowledge I have gained from her will help me greatly in my path to success as a professional engineer. Second, I would like to thank my fellow AE students. We were all going through this together and managed to help each other along the way. Third, I would like to thank the entire AE faculty. The teachers in this department care a lot about their students and are truly interested in helping us succeed. Last, but certainly not least, I would like to thank everyone from Atlantic Engineering Services. My work there last summer provided me with a vast knowledge of information that will help me throughout my career and has helped me greatly during thesis.

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