

## Executive Summary

The redesign of the Residences compared a Two Way Concrete Slab (TWCS) design to a One Way Concrete Slab (OWCS) design. The slab thickness for the OWCS was determined to be 5" and was 10" for The TWCS. The OWCS was able to be integrated with the existing architectural design with minor architectural impact. As for the TWCS, to try and keep a square and regular bay, the system had more problems integrating with the existing architectural design. With keeping the floor to ceiling height as 24" as originally designed, the beams' minimal depth for the OWCS design reduced the space that could be utilized by other disciplines. Concrete shear walls were designed using the provisions and requirements from AIC 318-08. For the current location, ordinary reinforced concrete shear walls were designed, and for the high seismic location, special reinforced concrete shear walls were designed.

The use of Autodesk Robot Structural Analysis program was used throughout this thesis to analyze the redesign. This program was compared to SAP and was found that ARSA was similar in their basic elements but lacked the more advance features that SAP had.

For the green roof design, it was determined that most green roofs are comprised of three major layers: Vegetation, Growing Media, and Drainage. It was determined that grass would be able to resist the temperatures and the impact from occupants walking on it. The growing media was comprised of 50% -70% lightweight aggregate, 10%-20% organic material, and 20%-30% sand. A 2" drainage layer was determined to take any water that was not absorbed by the soil. Once the excess water was drained away, it could be collected and used for alternative uses.

A cost and schedule comparison was conducted for the OWCS and TWCS designs. It was determined that the OWCS would cost about \$170.08 per s.f. and could be constructed in 375 days. The TWCS was found to be \$162.78 per s.f. and could be completed in 262 days. This was compared to the original design of \$182.96 per s.f. and 267 days, and found that the Two Way Concrete Slab was cheaper and could be constructed in the same time frame.