

The Kettler Capitals Iceplex is the practice facility for the NHL franchise, Washington Capitals. It is located in Arlington, Virginia just outside Washington D.C. The Iceplex was constructed on top of the existing parking structure for the Ballston Mall in Arlington. The original parking structure consists of concrete two-way slabs and post-tensioned concrete. The Iceplex was constructed using a composite steel system.

When the Iceplex was constructed on top of the existing parking structure, the gravity system, the lateral system, and the foundation system all needed to be reinforced. This was proven to be the most complicated part of the design.

A solution to this problem would have been to tear down the parking structure and construct the new building from scratch. This thesis examines this possibility in order to determine if this is indeed a feasible solution. The Iceplex and parking structure will be completely redesigned. The two ice rinks will be moved to the first level on a slab-on-grade, which will help limit deflections of the ice surface. The parking structure will then be designed as a separate structure constructed of precast concrete and will span over the ice rinks. This will create the need for a large transfer system.

In addition to the complete structural redesign of the Iceplex and parking garage, three additional design changes are discussed. First, a civil/site design examines the most efficient way of laying out the building and includes any changes in the locations of entrances and exits. Second, an architectural redesign accounts for any changes in the architectural layout of the spaces. Finally, a construction management assessment compares the cost and schedule of the proposed design to the actual design.

Based on the structural redesign and the three breadth topics, it was found that the proposed design is *not* a feasible solution. Although it was possible, the design of the transfer system proved to be very complicated. Extremely large steel member sizes were required to take the large loads from the parking garage above. Also, the estimated cost of the proposed design was 24% more than the actual cost of the original design. Since cost is a very important factor to building owners, it should be considered in the final decision. Finally, the estimated project schedule was about twice as long as the original project.