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By Rick Jensen-Renovations/restorations - Expecting the unexpected - part 2

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Implementing the Plan - Project Examples

The following two case studies exemplify how a comprehensive project-specific plan can play a significant role in the success of an intricate renewal/restoration project.

Andover Inn at Phillips Academy - Andover, Mass.

In 2008, Erland's design/build team (with architect, Arrowstreet) was hired to renovate the historic 30-room Andover Inn. After more than a year of intense preconstruction, work began in earnest during the fall of 2009. The inn, originally built in 1930, was in desperate need of a complete overhaul, but Phillips Academy - the inn's owner - was concerned that construction would destroy the historic value of the building. One of the major challenges for Erland was to update the hotel while maintaining its historic look and feel. In preconstruction, working with the school and architect, it was decided that the building should be completely gutted and rehabilitatedâ€”with the exception of the main lobby and dining areas, which were preserved because of the richness of their architectural detailing. Finished in late summer 2010, Andover Inn now features new mechanical and electrical systems, as well as a modernized look that blends contemporary style with the historical flavor of the inn.

Andover Inn remained in operation up until the day Erland started construction, severely limiting our access to the building to analyze the existing conditions. In addition, like many historic structures, there were no records or as-builts available for review. Our team had to make many design assumptions about the framework and layout of the structure - like what might exist behind the walls and how much space there was above the ceilings - in order to move forward with developing and finalizing the design. Unfortunately, once construction began, we discovered many unforeseen impediments.

At the start of the project, we had not intended to create a BIM model but, as we began to open up walls and discover more about the conditions of the building, we realized that our initial design assumptions would not hold. The space inside the walls and ceilings was much narrower than we had anticipated. There were several structural columns that occupied space we had intended to use for mechanical systems. Luckily, our team had completed a Risk Assessment Matrix during preconstruction that identified the unknown layout of the building as a potential problem, so we had built extra time into the schedule to account for time to solve this issue.

Despite our preplanning, there wasn't an inordinate amount of time to problem solve. In order to maintain the construction schedule and expedite the necessary modifications to the design, we built a partial BIM model to determine how to move forward. One of the new features to be included in the building was a four-pipe HVAC system, which, as the name implies, uses four pipes in two self-contained systems - two pipes (one for supply and one for return) for hot water and two more for

cold water.

Fitting all the piping into Andover Inn's tight space was a huge challenge because, at first glance, it seemed as though the system was entirely too big for the amount of space available. The BIM model, built using the exact dimensions of the existing building, allowed us to evaluate different options and ultimately find a way to fit this spatially challenging HVAC system into the small building. Some modifications had to be made to accommodate the four-pipe system. We were forced to lower ceiling heights in certain areas of the inn to allow for the additional pipes. Erland's BIM coordinator, John Cormier, said of the project, "I don't think we could have found a way to fit that four-pipe system into that building without the BIM model. We had to rework the layout so many times to ensure a perfect fit and I don't see how we could have done that in the field and still maintained the project schedule.

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