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# Unconventional Solutions

*When a given design method for MRI equipment doesn't work*

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When designing a healthcare facility, there tends to be quite a few “givens.” It’s a given that mechanical equipment will be located on the roof, or that heavy and large equipment will be on the lowest floor or that the lobby is always on the ground floor. But sometimes, for reasons not always within one’s control, certain decisions need to be made about layout of rooms, placement of machinery or access to adjacent departments, which require rethinking even the most given of design standards. Yet despite these design modifications not typically being thought of as a best practice, or even simply the norm, the results of these requirements can be unexpectedly positive.

Typically, imaging departments are located on the

ground floor of a healthcare facility. One reason why is the weight and the cost of the structural steel to install them on a composite metal deck. The sounds and vibrations of these machines also travel more easily to a space below, which then requires additional acoustic and anti-vibration solutions. The

drawback of this location is the quench vent from each MRI takes up space in intermediate floors and requires more maintenance.

**Location, location, location**

In the case of Winchester Hospital Imaging at Unicorn Park in Woburn, Massachusetts,





At Winchester Hospital Imaging at Unicorn Park in Woburn, Massachusetts, the unconventional decision was made to place the imaging center on the top floor of the four-story building.

the only choice was to place the imaging department on an upper floor. The ground floor of the existing building was only a few thousand square feet because it was designed on stilts to allow for ground-level parking. Only the main lobby and check-in could be located in the available space. In addition, the floor-to-floor height would not allow for the healthcare-sized mechanical ductwork to be installed around the shielding.

The unconventional decision was to place the imaging center on the top floor of the four-story building, which allowed the roof to act as the mechanical plenum with the ductwork running on the outside and the quench vents subsequently shortened to a single story. The MRIs were installed on vibration pads and special insulation

and ceiling materials were used on the floor below to prevent sound transmission. The happy consequence of these structural and facility decisions was that the space had high ceilings, with bright windows and a beautiful view of the surrounding landscape. The MRI rooms themselves have windows and natural light.

During the design process with the Cancer Center at Beth Israel Deaconess Hospital-Needham in Massachusetts, it was important to the director of the cancer program that the oncology and radiation treatment occur on the same level, so that real-time communication between both types of treatment could be offered. Typically, the linear accelerator used for radiation treatment is located on the ground floor or basement level. The infusion bays, however, are usually located on a higher floor to take advantage of the natural light and garden view. Moving the infusion bays to the ground floor was not an option because of the patient-focused design that both the owner and architect wanted to achieve, so the architect suggested the unthinkable: that the LINAC be located on the upper level, directly adjacent to the infusion bays.

To allow for this unconventional decision, an above-grade LINAC vault was designed with three- to six-foot-thick poured concrete walls and a seven-foot-thick concrete slab to provide the necessary shielding. While the space below was not usable due to the seven-foot clearance left over after the slab was installed, the trade-off was worth it in the end. The design created a Lean and positive patient experience and the time saved during each appointment allowed the facility to see additional patients each day. Although this was a cost item to the budget, the center soon started recording outstanding patient satisfaction.

## Going mobile

Another typical installation solution for heavy MRI equipment is to locate them in a mobile trailer accessed via a bridge or mobile stairs. These move from site to site if not required for use every day. This solution, however, is not ideal long term in a large hospital with regard to patient satisfaction and efficiency. Officials at Lahey Hospital and Medical Center in Burlington, Massachusetts were looking to install a fixed MRI to improve this situation for their patients. To achieve this on schedule, they needed an unconventional solution that did not necessitate a lengthy zoning and permit process for a new addition.

Rather than adding on a new MRI space, they sunk the existing trailer into a pit that lowered the floor to be level with the main hospital.

a Civil War-era cemetery in Gloucester, Massachusetts, the scenery was the issue. For some patients and visitors, depending on what room they were in and on what side of the hospital they were located on, their view gazed out on the well-maintained yet still foreboding graveyard — not quite the view one usually wants to picture, especially as an oncology patient. However, through some thoughtful but straightforward design modifications, the placement of the infusion chairs was repositioned so that the angle of the view was raised just slightly, enough that instead of the cemetery, people gazed at the idyllic coastline of the North Shore of Massachusetts.

The “given” solution is not always best in a healthcare environment where a greater emphasis is put on the patient



The decision to move the linear accelerator (pictured here) at the Cancer Center at Beth Israel Deaconess Hospital-Needham to an upper level was unconventional, but resulted in outstanding patient satisfaction. > **Left:** An existing mobile MRI trailer was sunk to be level with the main hospital at Lahey Hospital and Medical Center in Burlington, Massachusetts.

A heated concrete slab was required for snow melt in the hearty New England winters, but the benefits of this solution far outweighed the unusual requirement.

Sometimes, the design solution to a potential issue can seem so simple, yet take time to reveal itself. In the case of Addison Gilbert Hospital, which was built adjacent to

experience and Lean methods. An unconventional design decision implemented at the beginning of a project can have a lasting impact over the many years that a facility is serving the community.

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