

FITZEMEYER & TOCCI

Mechanical / Electrical Engineering Solutions

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Fitzemeyer & Tocci Completes Computer Infrastructure Upgrade

Fitzemeyer & Tocci Associates, Inc. has completed our computer infrastructure upgrade to support our technology goals. We consider computer technology as a key component of consulting engineering that we use to achieve a competitive advantage. We are dedicated to the use of the latest technologies to improve building performance, improve coordination, reduce change orders and RFI's, and improve design efficiency.

Accomplishing these goals requires the use of Building Information Modeling (BIM) software. We selected AutoDesk Revit as our BIM platform in 2008. As our capabilities have grown, the complexity of the projects we design using BIM has grown. We initially only used BIM on projects smaller than 20,000 sf, where new construction - and where the client - had a preference for BIM. As we have become more proficient with the software, we have been able to design nearly any project type, size or complexity.

The limiting factor for BIM became the processing power of our computer infrastructure. Our goal is to use BIM on more than half of our projects. Our new infrastructure and 64-bit workstations are a significant step in improving our BIM capabilities to grow and serve our clients.

Dartmouth Hitchcock Medical Center Outpatient Surgery Center Lebanon, New Hampshire Client: Shepley Bulfinch

The scope of this project included the design for a new 35,000 square foot outpatient ambulatory surgery center. The new facility includes eight state-of-the-art operating rooms, a 24-bed prep/recovery suite, sterile processing area, and associated support spaces. The facility is constructed on two levels with primarily mechanical/electrical and support spaces on the lower level.

The design challenge was to provide energy efficient and reliable mechanical and electrical infrastructure systems to support demanding critical care environmental requirements. In addition, the incorporation of sustainable and flexible infrastructure systems was a major design goal.

The solution was to provide high efficiency, partially redundant and easily maintainable infrastructure system components throughout.

Primary heating is provided by condensing style gas boilers and a variable volume hydronic hot water heating system. Primary cooling is provided by low maintenance, multi-compressor/circuit scroll chillers, coupled to variable primary chilled water pumping. Air distribution is provided by a pair of custom, rooftop mounted air handlers sharing a single enclosed service corridor. The two air handlers are connected within the service corridor with supply and return plenum bypass connections; this feature enables either unit to provide backup service to the operating room suite area.

Domestic hot water heating is provided by dual, condensing style, gas-fired hot water heaters. Plumbing fixtures are sensor operating, low-flow style throughout. Domestic and fire protection water services are fitted with redundant back-flow preventers.

The new electrical service to the building is backed up by an internally mounted emergency generator. Infrastructure is provided to enable partial facility cooling on backup power as well. Operating rooms are provided with isolated power systems that incorporate load monitoring for large devices such as lasers and imaging equipment. Interior lighting is efficient fluorescent throughout; exterior lighting is efficient and low maintenance induction technology fixtures. The majority of lighting is interfaced to a lighting control system to automatically enable and shut-off lighting during unoccupied periods.



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**Brown University
Fauce Hall Student Center
Providence, Rhode Island
Client: Schwartz/Silver Architects, Inc.**

The scope of this project included a complete “gut” and restoration of a 110-year-old student center to its original historic interior and exterior charm while at the same time providing all of the modern MEP conveniences. The last of the three major renovations in the building’s history included interior finishes modern to the ‘80’s.

The design challenge was to fit the selected VAV system ductwork within the absolute minimum of newly created shaft space, and also to remove from the site and façade all reminders of unsightly mechanical systems required to reject heat from the several refrigerated beverage and sandwich coolers in the Student Sery adjacent to the Student Dining.

The solution to absolute minimal shaft space for ductwork was to forego the commonly applied 100% air-side economizing cycle and apply instead, the nearly as efficient water-side economizing cycle. Economizing cycles bridge the more expensive summer and winter mechanical cooling and heating cycles respectively, with free cooling acquired during the “shoulder” months (June and September) when the outside air is often cool enough to provide free chilled water or air for space cooling instead of the more costly mechanically-compressed and expanded refrigerant. By foregoing air-side cooling in lieu of water-side cooling, the lengthy exhaust and outside-air ductwork cross-sectional requirements were reduced by 66%. When the Brown University facilities department secured a plate heat exchanger for the water-side economizing function, it secured for itself the free production of chilled water from September to June. Essentially, it created a 365 days-per-year chilled water system which produces cooling for free for almost 10 months per year.

The plant’s 365-day-per year chilled water system was the key to the second solution – hiding from view, the heat rejection equipment serving the Student Sery coolers. By guaranteeing year-round chilled water, the compressor and condensing units serving the refrigerated coolers could be cooled by chilled water alone, without ventilation, and concealed in the few unused accessible void spaces of the building - instead of on the site or the roof.



**McLean Hospital
DeMarneffe Building—Second Floor Renovation
Belmont, Massachusetts
Client: Linea 5, Inc.**

The scope of this project was to design HVAC, plumbing, fire protection and electrical systems for approximately 13,000 SF of renovated office space. The new program included both private and shared offices, as well as conference spaces.

The design challenge was to provide cost effective HVAC, plumbing, electrical and fire protection systems that accommodate the existing architectural elements of the building while fulfilling the requirements of the newly renovated spaces, and re-using existing infrastructure where possible.

An additional challenge was a very aggressive project schedule. The MEP design was completed between late July and early October of 2009 with an early January 2010 project completion date. This challenge was overcome by a commitment to frequent and timely project communication from all members of the design and construction team.

Our solution included primary heating via an existing hot water boiler and new hot water circulator pumps. Primary cooling and ventilation was provided by a new rooftop unit, replacing the existing unit. Air distribution was provided by fan-powered variable air volume units with terminal hot water coils.

Electrical design included an extension and reconfiguration of the existing building power distribution and fire alarm systems. New lighting fixtures controlled by space occupancy sensors were also provided to minimize lighting energy.

The plumbing design consisted of providing a new sink on the second floor and new roughing for four additional sinks. Hot water to the new sink was provided with an instantaneous hot water heater, mounted underneath the counter. Cold water and waste were provided from existing services with minimal impact to the existing layout.

