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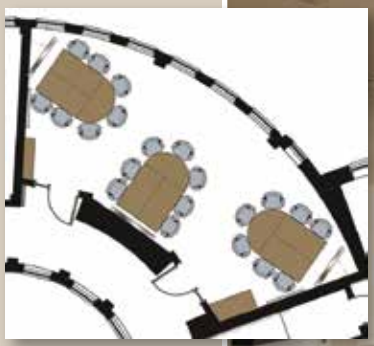


THE FUTURE OF ACADEMIC HOUSING

Extending Life Cycles for the 21st Century

Flexible common area arranged for conference use.

Flexible common area arranged for independent study.

WHAT MAKES A COLLEGIATE CAMPUS REALLY "WORK"?

Ask a range of potential clients (students) and you're likely to get a variety of responses. But what happens when you narrow that target audience to, say, the 16 to 22 year olds? Before you answer, remember that this group rests at the core of the millennials, America's largest-ever generation, which this year is reported to surpass even the baby boomers in both numbers and outright cultural influence.

What is non-negotiable to these children of the 1990s as they move through postsecondary academia? The experts[1] suggest that millennials are most interested in making certain their lives are optimized for convenience, flexibility, and access.

One can argue that there is no other university facility more influenced by the sum of these factors than the residence hall.

Even though America's stock of higher education housing has grown at an impressive rate to meet the needs of growing student populations[2], this growth has not necessarily occurred through simple "architectural attrition." The demand for on-campus housing has simply not allowed for the wholesale replacement of existing and aging facilities. Although the enrollment forecast[3] seems to predict a somewhat slower growth rate through 2022, there is no foreseen reversal in the trend of ever-expanding collegiate enrollment.

As a result, institutions are being forced to manage real estate assets that range from new construction to mid-20th century and pre-World War II housing. That's a pretty wide slice of collegiate homesteading, and the task presents some unique challenges. Architectural diversity is a phenomenal thing, so long as 50-year-old dormitories can still meet the demands of incoming students, maintain the requirements of facilities management, and keep pace with a culture focused on sustainability. In many ways, the mandate to optimize energy efficiency flies directly in the face of the day-to-day need to maintain and repair existing building systems.

What does this mean for institutions from Albright College to Zane State? There's a critical choice to be made:

Demolish and Rebuild or…*Commit to Extending Life Cycles in Existing Facilities.*

Bringing new life to buildings requires a thoughtful approach and mandates a hard and holistic look at how best to transform existing housing into something exciting, efficient, attractive, and, most of all, useful for the *next* 50 years. The extra planning and design effort is worth it! The opportunity for institutions to effectively and affordably reinvigorate these facilities is real—the key is knowing where to look and understanding what to avoid.

TRENDS IN INSTITUTIONAL HOUSING

It should come as no surprise that the current trends in academic residential design and programming are a balanced mix between the market demands of the millennials and the preferences and opinions of the institutions. Largely, this influence has fueled a move toward the *integration of living and learning*.

While traditional study spaces have been centered in classroom buildings, libraries, student unions, and other formally designated areas, enhancement of residence halls to accommodate current needs is becoming the model rather than the exception.

The merging of student life and academics with residence halls has become a universal constant; this combination increases convenience for students and creates vibrant, exciting, "totally student" environments. Promotion of learning through group study is another obvious goal of this program, and with the addition of technology support, flexible building systems, and movable furnishings, modern housing can adapt to suit a wide range of learning and social situations.

Potential uses for these flexible spaces include: group study, club meetings, tutoring, social events, independent study, and even scheduled uses by campus entities beyond the housing

Left and Below: University of Mary Washington common space connector "The Link" in construction and after completion."

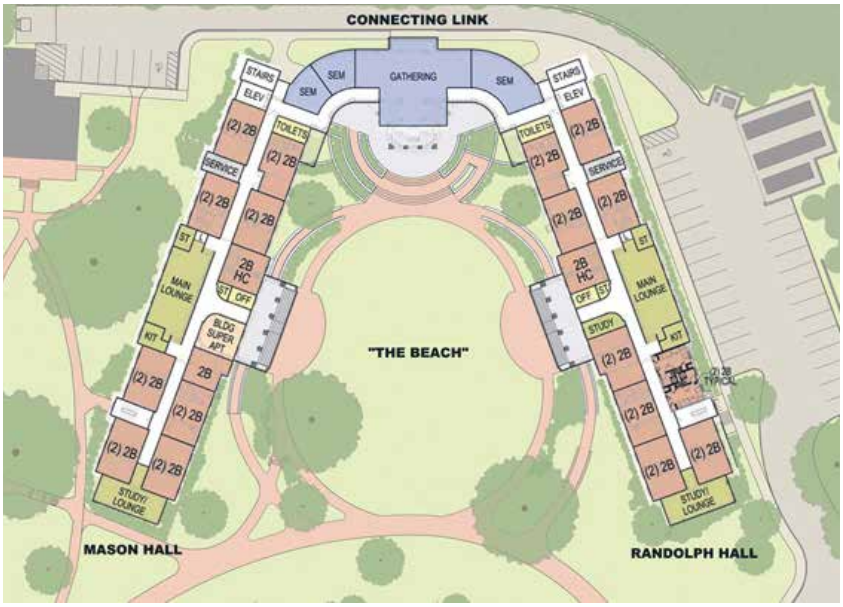
community. Providing this level of flexibility has impacts well beyond interiors and space planning, as it directly influences the design and engineering of mechanical, electrical, lighting, and data infrastructure as well. When incorporated effectively, these flexible spaces provide a greater opportunity for resident interaction and increased connectivity between residents and remote campus elements.

When a building becomes recognized for providing a unique campus function, it can actually influence and invigorate campus culture as it becomes as much a destination as a home.

VERTICAL TRANSPORTATION—MAKING ALL THE RIGHT MOVES

There is every possibility that vintage housing is ill-equipped to manage the necessary vertical transport of people and systems required in a modern building. When a plan is identified to increase the allotment of public areas, how do these spaces begin to communicate and relate to the base program (living quarters)? Egress is a major issue, and it's frequently found not to be compliant with the current code. Some expected shortcomings such as noncompliant stair handrails, lack of elevator support, and issues with the Americans with Disabilities Act (ADA) are common, too.

Frequently, older buildings lack vertical chase space, making the routing of building infrastructure systems a real challenge. The good news is



University of Mary Washington Randolph and Mason Halls site redevelopment plan.

that the need to create better vertical pathways for systems and occupants can sometimes result in unique opportunities. These moments can not only improve building utilization, but can also enhance a sense of "inter-floor community" for residents.

Sacrificing lease space. This is the notion of losing some stacked, leasable occupant space to incorporate new vertical service cores. If this is an option, there remains a concern that the existing structure may not allow for the simple removal of floor plates where most needed. Necessary structural alterations may affect the project budget, rendering this "cut-new-openings" concept a nonstarter. Beyond the structural pitfalls, locating new vertical elements requires coordination with existing site utility entrances, fire protection systems, and public spaces. Often this involves the creation of new fire-rated assemblies.

Incorporating a new addition. Integrating the vertical necessities into a new addition to preserve lease space may be the best solution. If this solution is feasible, caution should be exercised to assure that the new element is complementary to the character of the existing building, which may have partly inspired the renovation in the first place.

Assuming that the aesthetics can be addressed, there are real benefits to be had: ancillary vertical transport (e.g., plumbing, outdoor air ductwork, power, fire protection) can be integrated into this new construction easily; new construction can be designed without structural compromises; and there is minimal impact on the base building. This approach can also improve accessibility, egress, and safety by adding new elevator towers, ramps, and connections that better integrate new spaces while improving functionality.

MATERIALS—OUT WITH THE BAD AND MAINTAINING WHAT'S GREAT

Although a renovation can strongly enhance a building's appeal and even contribute to the general and historic character of a campus, this undertaking may also trigger the need to abate harmful, existing materials or to perform costly façade improvements or window replacements.

Ensuring the building is free of hazardous materials is an obvious mandate and can be a costly undertaking. With luck, the building has already undergone full or partial remediation at some point in its history. Before suffering "sticker-shock" at added remediation costs, consider that

University of Mary Washington addition facilitating new vertical transport.

College of William & Mary Barrett Hall—HVAC infrastructure and window replacement to original 1937 construction.

the cost of abatement likely totals far less than the cost of total demolition of the building and clearing and preparation of the site for a new construction.

In terms of existing glazing systems, a full and proper assessment is the best course of action. If glazing systems are marginal in terms of operation, sash/frame condition, or even materials type, an upgrade is money well spent. Benefits to overall energy and comfort are significant, especially when viewed in parallel with capital costs for new mechanical systems. Reasonable paybacks can be demonstrated in most cases as a highly improved building envelope drives the coincident downsizing of HVAC equipment. Even in the most stringent historic environments, suitable and accurate window replacement materials can be successfully sourced and specified.

OPTIMIZING OCCUPANCY—THERE ARE NEVER TOO MANY BEDS

Residence halls greater than 30 years old comprise, in high percentage, double occupancy rooms on double-loaded corridors (sometimes with individual lavatories, often with communal showers). Due to window rhythm and placement, there is little opportunity to rearrange these two-student rooms in a more efficient manner. Sometimes it is easy to create a more efficient plan by morphing standard two-student rooms into higher occupancy suites.This is especially true when common space and amenities such as communal bath and shower facilities, study areas, and kitchens can be moved to new, adjacent additions.

University of Mary Washington: new amenities located, contextually, in original porch locations.

Original attic space with great potential for an adapted reprogramming/occupancy.

UNDERUTILIZED SPACES—THE DARKEST CORNERS ENLIVENED

Aging dormitories often have an incredible amount of underutilized space. These areas are often designated as "storage" or "utility" and can house decades of forgotten materials. Found program spaces like these can be vital to the success of any dormitory renovation.

When these spaces are at attic and basement levels, converting them to common-use space is a challenge, but it is possible to capture these spaces as living quarters and therefore increase bed counts. In attic locations, natural daylighting, campus views, and even premium housing opportunities are all potential benefits. In basement spaces (subgrade or semi-subgrade), manipulating the grade to achieve better daylighting and realizing direct

Energy dashboard interface provides a visible teaching moment at UMW for students and faculty alike.

access is a great strategy. The grade-revision concept lends itself especially well to faculty residence quarters as well as to indoor-outdoor, common gathering spaces. Whatever the program, improving staff interaction and campus access for residents is a key strategy.

REACHING FOR SUSTAINABILITY—BENCHMARKING MANDATES VS. TRUE EFFICIENCY

As the International Energy Conservation Code (IECC) has been ratified by 48 U.S. states[4], the District of Columbia, New York City, and a handful of other jurisdictions, the adoption of the International Green Construction Code (IgCC) is similarly spreading across the United States, with 13 states now having full or limited enforcement. Beyond this, many jurisdictions have now mandated a minimum LEED requirement for all publicly funded constructions. No matter what sustainable benchmarking tool[5] might be utilized, the message is clear: our buildings need to run lean in terms of energy consumption.

The opportunities to achieve sustainable design are plentiful and attainable.

The following are favorable existing building attributes:

- **Heavy architectural mass** provides thermal benefits in terms of heat transfer through the building envelope, and can significantly reduce HVAC demands. Energy costs can often be curtailed by controlling the peak HVAC load, thus reducing either internal or utility-provided demand charges.
- **Large punched window openings** enable extensive use of daylighting controls where ambient light can be used to supplement powered lighting systems.
- **Existing building construction materials (reuse)** recycles a percentage of materials that would otherwise be produced, packaged, shipped, unloaded, and installed on (or hauled away from) the site. This reuse of existing materials can result in huge reductions in fuel usage and carbon footprints during construction. Further, the project's impact on storm-water runoff due to the addition of impervious pavement can be minimized.
- **Operable windows** allow the ability for partial mixed-mode[6] HVAC operation and for a code-allowed alternate to mechanical ventilation. If the outdoor ventilation air volume (cfm) is governed by a need to maintain building overall positive pressure and not by an ASHRAE 62.1-mandated fresh air volume, there is opportunity to downsize outdoor air systems and to reduce fan energy consumption. Adding Building Automation Systems (BAS) monitoring of window position (open/closed) can yield even greater savings.

LEED certification can present some challenges. One hurdle is compliance with the basic requirements for the LEED Energy & Atmosphere category, which is now a prerequisite to project registration with the U.S. Green Building Council (USGBC) for LEED consideration.

One LEED option is to pursue certification of a major renovation under LEED Building Design & Construction (BD+C). This path will lead to mandatory compliance with Energy & Atmosphere Prerequisite 2 (EA2) under which a major renovation's energy performance must improve 5 percent beyond that described for a typical dormitory per ASHRAE 90.1-2007 (comparison of a "base" and an "as-designed" energy model). This path requires significant documentation but is wholly attainable, especially when the renovation is a comprehensive one.

A second avenue is to pursue LEED certification under LEED BD+C (or ID+C) by prescriptive energy compliance, which must be in accord with the *Advanced Buildings Core Performance Guide*. This approach is available as an alternative to complete, comparative energy modeling, assuming the fulfillment of criteria including stated minimum equipment efficiencies and a total building area not exceeding 100,000 square feet.

Whether the building ultimately wears a LEED shield or not, a goal of true and verifiable energy performance is always paramount. Operating efficiency is not only about producing reams of data for facility managers to utilize, but can also be about providing a real opportunity for a visible teaching moment. Real-time energy "dashboards" with interactive features for students and faculty are an effective way to advertise building energy performance enhancements. Typical dashboarded metrics include live reporting of HVAC, lighting, and convenience energy consumption and even current building occupancy. The best of these metrics can actually compare a building's live energy consumption versus nearby buildings, creating a bit of a rivalry for residents and a coincident reminder that learning doesn't always have to occur in the classroom!

SUMMARY/CONCLUSION

The demand for academic housing is ever-present and on the rise. There is clearly the potential to fulfill the demand in an ordinary way or in an extraordinary way.

Bringing new vitality to cherished campus buildings—even those that may have already been "written off"—is an exciting, economical, and sustainable way to meet this need. The planning and execution of "the extraordinary dormitory renovation" demands skilled decision making and careful consideration, but the effort can be enormously rewarding both for residents and for the institution.

Even the U.S. Green Building Council will concede that "the greenest building is the one already built," and we completely agree.

ENDNOTES

1. William Draves, author, *Nine Shift*; Jean Twenge, author, *Generation Me*.
2. Up 45% from 1997 to 2011, according to the U.S. Department of Education.
3. Predicted 17% from 2011 through 2020, according to the U.S. Department of Education.
4. Current "hold-outs" are California, Indiana, Minnesota, and Oklahoma.
5. Sustainability watchdog Environmental Policy Alliance recently reports (Mar 2014) that many LEED certified buildings in Washington, D.C. actually perform below the national average in terms of total energy consumption.
6. "Mixed-Mode" refers to a building's ability to operate with or without the benefit of a mechanical HVAC system based upon outdoor air conditions.

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