

# Designing for Reopening Student Housing

By Maclay Architects in response to the COVID-19 pandemic.



Photo © Maclay Architects

## Hierarchy of Controls for COVID-19

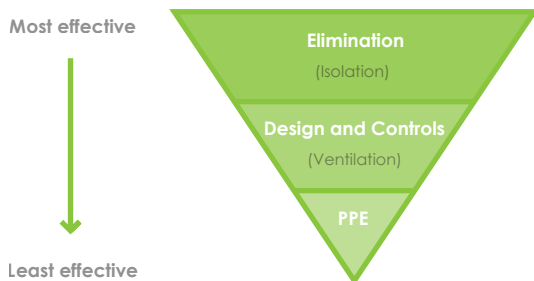


Figure 1: Hierarchy of effective controls for COVID-19. Derived from AIA graph based on CDC framework of the "hierarchy of controls" for controlling workplace hazards.

There's no doubt that COVID-19 has changed the world, and we are just starting to see the beginning of these transformations. As our society starts to reopen, creating safe, healthy spaces is more important than ever. Looking toward a post-COVID-19 world, designers are reexamining current practices to ensure healthier environments. With more consciousness toward hygienic spaces we are sure to see an immense shift in the built environment. As architecture adapts to this need, there are opportunities to design safer, healthier spaces centered on occupants' physical, emotional and social needs. While looking toward new developments and opportunities in our built environment it is important that we keep the people we are designing for at the forefront of our focus.

With boarding schools, colleges, and universities looking to reopen in the fall, major adjustments will need to take place. In addition to new CDC guidelines and local protocols, proper design modifications will be crucial for a smooth transition back to on-campus life. Students spend a large majority of their time on campus in student housing and it becomes the place that students call home. Design will be crucial in creating safe living conditions, implementing new physical distancing practices, and easing student anxiety. Design strategies for reopening range from temporary fixes to long-term shifts in planned development. Student housing will see major transformations – from added sanitation measures, new student conduct procedures, limited occupancy, and additions and renovations, necessitating a reorganization of their internal structures.

According to research from the AIA, the hierarchy of controls for COVID-19 show that isolation is the most effective measure in controlling COVID-19 (See Figure 1). Other important measures include engineering controls such as physical barriers and ventilation, administrative controls, and PPE. While utilizing all possible preventative measures is key for reopening student housing, design is the first step in combatting COVID-19 during reopening.

## Elimination

The most effective measure schools can take to ensure a safe reopening in student housing is isolation. The vibrant student life of student housing will need to be restructured to encourage isolation practices. Providing individual spaces and distancing for students is paramount to their health and well being. Schools should look to redesign facilities to encourage new norms of isolation, such as limiting occupancy, single dorm rooms, and posting signage indicating new student housing guidelines.



Photo courtesy of College Fashion

### Steps for Isolation:

- Provide separate bedroom(s) with bathroom for quarantine or self-isolation
  - Temporary facilities may be tiny homes or trailers that can be repurposed later
- Limit student housing rooms to single occupancy
- If doubles must be used, create a split-double with a partition dividing the space
- Post signage:
  - Notices that no one may enter if they have a fever or other symptoms of a respiratory illness
  - Instructions for physical distancing throughout facility
  - Markings/signage to encourage one-way traffic where practical

### KEEP EVERYONE SAFE!



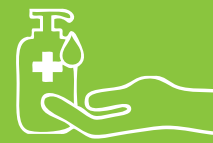
SCREENING CHECKPOINT



ALWAYS WEAR A MASK  
IN THIS FACILITY



MAINTAIN A PHYSICAL  
DISTANCE

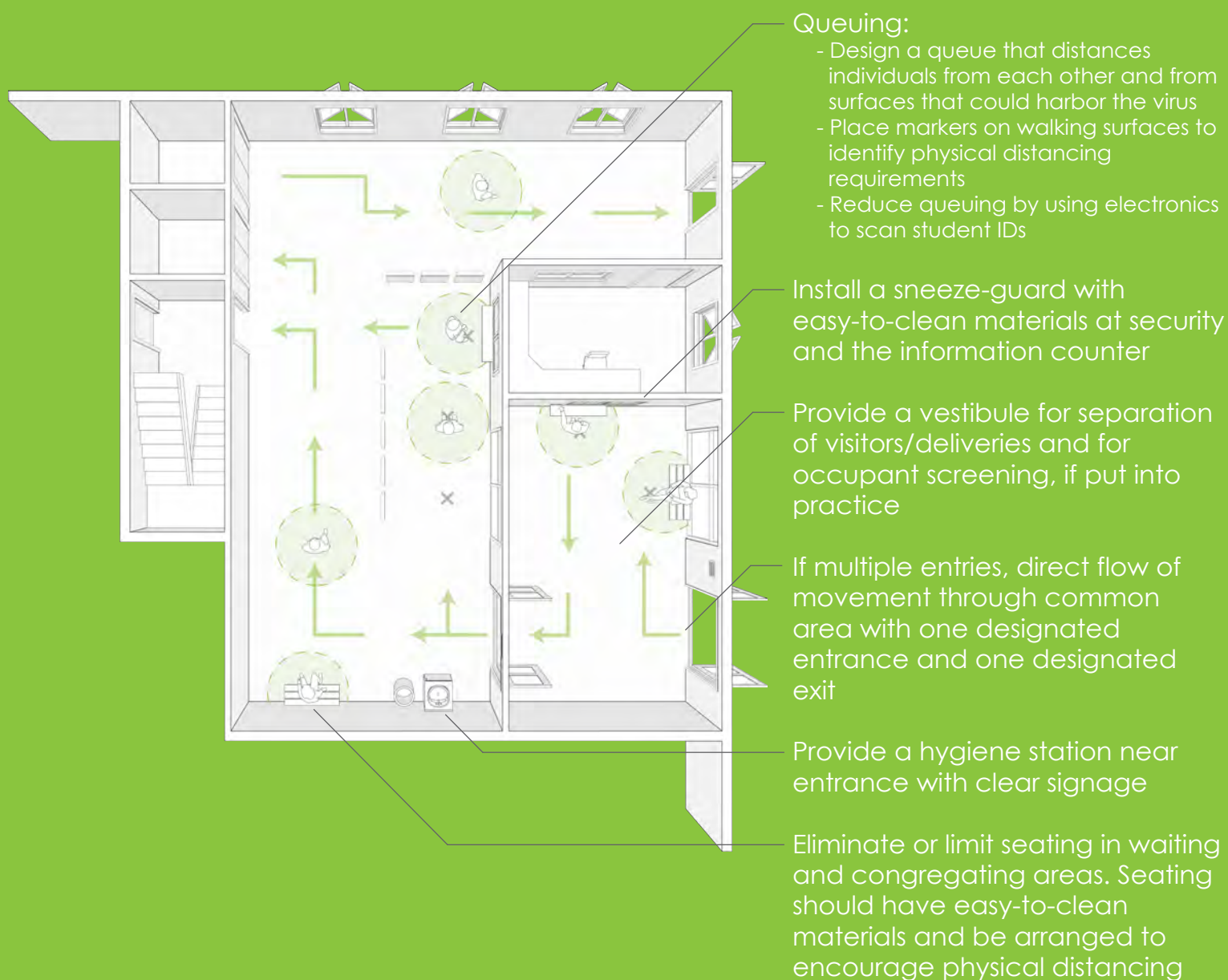


WASH OR SANITIZE  
HANDS OFTEN

## Design: Program Types

Student housing holds many different daily activities for students. With multiple program types there are many different measures that need to be considered. Breaking down the different measures by program type will ensure the healthiest possible environment for on-campus life. Common areas in student housing are one of the largest areas of concern for reopening campuses. Common areas that used to promote student interaction will need to be rethought to accommodate physical distancing while still maintaining a sense of community for students.

### Entrances & Circulation



## Common Areas



Provide a hygiene station near entrance with clear signage

Limit occupancy

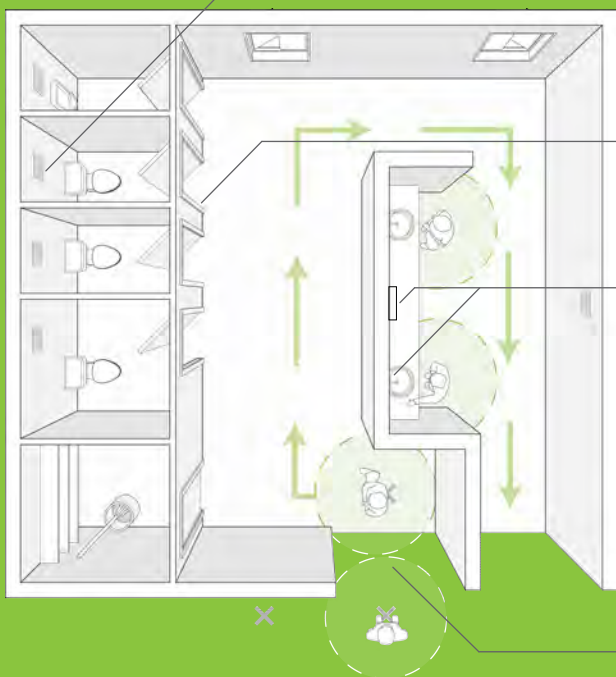
Install touchless devices wherever possible

Eliminate or limit seating and arrange to maintain physical distancing

Encourage socializing in outdoor "rooms" with seating, tables, shade and rain protection, fire rings, etc.

Install touchless entry, where feasible, or keep doors open if acoustic, fire, or hygienic considerations permit.

## Bathrooms



Provide separate facilities for individuals wherever practical

Provide fully enclosed toilet stalls with separate exhaust ventilation

- Multiple stalls (can be non-gender-specific) may share washing facilities

Replace or modify stalls and partitions so that they extend to the floor or lock every other stall to provide minimum six-foot spacing

Provide touchless devices if possible (toilets, hand dryers, faucets, trash cans, kick plates on doors), place devices strategically to distance users

Limit the number of people allowed in the restroom at one time

Provide and enforce closure of seat covers before flushing

If possible, configure restroom entry to have no door, provide entry sequence blocking line of sight

Provide composting toilets (foam-based systems) to eliminate mist dispersal from flushing toilets



## Controls: Ventilation

As we recover from a global health crisis, designing healthy buildings is of the utmost importance. Engineering controls are vital for creating healthy indoor environments. ASHRAE has stated that, "Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air."<sup>1</sup> Ensuring that current ventilation systems are functioning according to manufacturer instructions (including cleaning and changing of filters) along with looking into implementing additional systems to improve ventilation and filtration will be important for maintaining healthy student housing for student life (absent other health concerns).<sup>2</sup>

### Steps for Ventilation:

- Provide operable windows
- Use hot water radiant heat vs. systems that recirculate air that is mixed between spaces
- Install a balanced heat (or energy) recovery ventilation (HRV or ERV) system with dedicated fresh outside air. Have a professional design it in consultation with local public health officials.
  - Each room should have balanced supply and exhaust air
- If no dedicated, balanced heat recovery ventilation system is installed, consult a professional who can recommend a system that will provide properly conditioned, dedicated outside air
- Provide dispersed standalone air filtration units where central systems are not feasible or desired
- Provide separate systems for quarantine or isolation spaces
- Where generators are provided for emergency power, include backup power for ventilation systems as essential systems

### For Ducted Ventilation:

- Clean ducts before dormant buildings are reoccupied and regularly when occupied
- Balance systems to provide negative pressure
- Maximize outdoor air and eliminate recirculated air (dilution ventilation)
- Air filtration - use maximum MERV rating feasible and modify existing systems that cannot handle MERV 13 or higher
- Use constant fan setting to optimize volume of air filtered
- Provide UV germicidal radiation (UVGI)
  - In mechanical ventilation paths where air velocity is low enough to make feasible
  - In upper-room applications to indirectly treat air through convective air movement with UV irradiation equipment that treats the air within a space



Exposed spiral ducts can be installed in existing spaces or new construction. Photo © Maclay Architects

<sup>1</sup> ASHRAE. 2020. ASHRAE Position Document on Infectious Aerosols. April 14, 2020. The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA.

<sup>2</sup> ECDC. 2020. Heating, Ventilation and Air-Conditioning Systems in the Context of COVID-19. June 22, 2020. European Centre for Disease Prevention and Control, Solna, Sweden.

## A Post-COVID-19 Architecture



Where increased separation or circulation dividers are needed, biophilic walls can enhance occupants' experiences. Photo © Maclay Architects

While schools plan for the upcoming semester it is important to be cognizant of the ways in which these changes in design will affect life on campus. For many students the transition back to campus after a global pandemic is going to produce high levels of anxiety and stress. With the heightened sanitation and distancing measures in student housing, schools can implement other design strategies to make students feel more at home.

### Long-term Design Goals

- Provide additional building space(s) to facilitate reduction of occupant density
  - Provide temporary buildings for short term
  - Provide private indoor spaces
- Provide private outdoor spaces: terraces, decks, balconies
- Limit common traffic areas and provide single-loaded corridors with operable windows on one side
- Provide exterior doors from dorm rooms where feasible, to minimize travel in corridors
- Design calming spaces to reduce anxiety and stress levels
  - Bring the outdoors in -- Biophilic design has been shown to lower anxiety
  - Use color to brighten up the space
  - Ensure access to operable windows and ideally views to nature

Current CDC and Local guidelines should be followed in addition to the design strategies noted here. Schools should consult with HVAC and health professionals who are well-versed in strategies for disease control on all design changes.

#### References:

AIA. 2020. Re-occupancy Assessment Tool V2.0. May 28, 2020. The American Institute of Architects, Washington, D.C.

ASHRAE. 2020. ASHRAE Position Document on Infectious Aerosols. April 14, 2020. The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA.

ECDC. 2020. ECDC Heating, Ventilation and Air-Conditioning Systems in the Context of COVID-19. June 22, 2020. European Centre for Disease Prevention and Control, Solna, Sweden.