



WORKING TOGETHER TO REOPEN A HEALTHIER BUILT ENVIRONMENT

*Assess Your Building
Strategize Solutions
Reinvent Shared Spaces
Face Tomorrow with Confidence*

AUGUST 2020

LAN
ASSOCIATES

As restrictions to mitigate the spread of COVID-19 are gradually lifted, the lasting impact of the virus has become apparent. Houses of worship will be opening to a new reality, and LAN is prepared to help our clients face the challenges ahead.

Since the start of the COVID-19 pandemic, LAN has been researching the relevant data and partnering with industry leaders to prepare interim and long-term solutions that will meet our clients' needs in a post COVID-19 world.

Whether you have already started indoor services, or are serving your congregation virtually, LAN is able to assess your needs and provide options that will help you plan for your religious institution's future.

+ HOW LAN CAN HELP

As a full-service architecture and engineering firm, we have the knowledge and staff to develop communication strategies, perform a furniture and physical distancing evaluation, enhance technology concepts, and more wellness focused initiatives. From a mechanical system standpoint, our team is available with a variety of recommendations to improve air and water quality and ensure that building environments and the occupants remain healthy.



**HVAC
MITIGATION
STRATEGIES**



**RESTORING
INACTIVE BUILDING
WATER SYSTEMS**



**ARCHITECTURAL
PREPAREDNESS**

+ HVAC MITIGATION STRATEGIES FOR COVID-19

Social distancing, face masks, shelter in place orders, rigorous hand washing; we are all well aware of the steps to mitigate the spread of COVID-19. While thorough hand washing and face masks may be with us for a while longer, shelter in place orders and social distancing are short-term measures that are not intended as a permanent solution. As stay at home orders are lifted and people resume occupying shared spaces, engineers must consider long term solutions that can diminish risk in large buildings. COVID-19 is an airborne illness, so naturally a building's HVAC system can play a vital role in reducing the spread of the coronavirus.

“Transmission of SARS-CoV-2 (COVID-19) through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures.”

– ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers.



What are the experts saying about HVAC and COVID-19 transmission?

Properly applied, HVAC has the potential to break the chain of transmission of a virus as it attempts to move from host to host. Therefore heating, ventilating, and air-conditioning can have an impact on the number of people exposed to COVID-19. When applied properly, ventilation-related strategies such as dilution, airflow patterns, pressurization, temperature and humidity regulation and control, filtration, and UV and bi-polar ionization can mitigate, but not eliminate, the risk of transmission of infectious diseases through aerosols.

Should I leave my HVAC system on to prevent the spread of COVID-19?

The consensus is that the ventilation and filtration provided by your building's HVAC system will reduce the concentration of COVID-19 particles in the air and that thermal stress of unconditioned spaces may lower resistance to infection. For these reasons it is recommended you leave your HVAC system on. Making sure the building is positively pressurized ensures that all air in the building is being treated through the HVAC filtration system and not pulling in untreated outdoor air through windows, doors, or leaks in the building. Running the HVAC system 24/7 will ensure better dilution of any pathogens in the air.

It is also recommended that you increase filter efficiency (minimum efficiency reporting value (MERV)), if possible. Increasing your filters above the code required minimum will reduce the amount of particulates in the air-stream. However, increasing filter efficiency may have a negative effect on your HVAC system. Your air handling equipment should be evaluated prior to increasing filter performance to ensure the equipment can handle the higher pressure drop of these higher efficiency filters.

Prior to reoccupying any building, it is recommended that the building is fully flushed through the HVAC system and all filters are replaced.

Can temperature and humidity level help fight coronavirus?

There is evidence to suggest that temperature and humidity can have an impact on the transmission of infectious agents such as COVID-19. However, the practical challenges and potential drawbacks raised by setting a uniformed climate setting in a building deserve careful consideration. Humidity between 40%-60% reflects the most unfavorable survival levels for microorganisms, so HVAC systems should remain on and operational as though the building is occupied to maintain optimal temperature and humidity levels.

Will HVAC systems need to be redesigned to fight COVID-19?

Technologies such as UV Light and Bi-Polar Ionization (BPI) have been shown to kill and control viruses including SARS-CoV-2 (novel coronavirus) that causes COVID-19, because it destroys the viruses' DNA Bond (Larry Clark, HPAC Engineering 4/9/20). This is a relatively inexpensive technology that could be applied to new and existing air handling equipment to treat and kill the pathogens in the air-stream.

A digestible yet overly simplistic explanation of the process would be that through your HVAC system bipolar ionization works on a molecular level surrounding, clustering, and interacting with microparticles. In the process, it neutralizes hazardous airborne substances like pathogens and viruses by robbing them of their life-sustaining hydrogen and clustering expelled breath droplets that can transport viruses and other fine particles allowing them to be caught by the equipment's standard filters. Taken together these benefits provided continuous disinfection and increased air quality for your building. A recent study concluded this process can result in 99.4% of COVID-19 viral particles becoming inactivated on a stagnant surface at 30 minutes.

Is this topic still being studied?

New information is coming out almost daily as we learn more about this virus. As this develops, LAN will constantly update this list with the newest and best recommendations by the CDC and ASHRAE. HVAC mitigation factors should be viewed as part of a comprehensive strategy that includes common measures to protect against the spread, such as rigorous surface cleaning and limiting unnecessary contact.

+ RESTORING YOUR BUILDING'S WATER SYSTEM AFTER PROLONGED INACTIVITY DUE TO COVID-19 SHUTDOWN

As national, state, and local governments begin to ease social distancing restrictions, their guidance naturally comes with an abundance of caution and a warning to both take things slowly and go in with a plan. The first question that comes to mind is inevitable; how do we safely repopulate houses of worship and continue to minimize the spread of COVID-19? However, this is not the only relevant safety concern. The necessity to shelter in place at our homes has left many churches and their plumbing systems abandoned for months. This abandonment will need to be addressed before they can be safely reoccupied.

Pipes left with water sitting for long periods of time could contain scale build up, excessive amounts of heavy metals, and high concentrations of microbial growth. Additionally, any hot water that was generated by heating equipment will decrease in temperature; when this happens your building's water temperature can reach levels that allow biofilm-associated bacteria such as Legionella to grow and spread.

Regular water use also prevents a host of water safety issues. It draws disinfectants into the building and if you have lead pipes it prevents a buildup of lead in the water by flushing it out through the system's normal functions. If your building has not been in use due to COVID-19 shutdowns these processes have been interrupted.

If you are getting ready to reopen your house of worship after prolonged inactivity, here are the steps you need to take to restore your building's water system safely:

1. *Contact local health department or water utility for advice about your local water safety.*
2. *Consider flushing fixtures weekly during the shut-down.*
3. *Complete a full plumbing system flush several times prior to reoccupying the building. This should be coordinated with the town or water utility to be completed when they are using higher levels of disinfectants.*
4. *Remove aerators, shower heads, mixing valves, and filters prior to flushing.*
5. *Rent or purchase chlorine monitoring devices to monitor disinfectant levels in the system.*
6. *Replace all filters just prior to re-occupying the building.*

COVID-19 has forced our buildings and infrastructure into an unprecedented condition. These circumstances bring with them some risks, but this risk can be alleviated through careful planning and well thought out action. As we reboot our country, it's important that we take the right steps to reopen our buildings to ensure water systems are safe to use after a prolonged shutdown.



+ ARCHITECTURE AND COVID-19: RE-ENTERING THE BUILT ENVIRONMENT

COVID-19 has already caused a massive shift in people's ability to practice their faith. Church attendance has shifted to a virtual experience as millions of people log on from home to online services. Despite this disruption, people of faith have come together through innovation and collaboration to adjust to this new reality in an impressively short amount of time.

As we reopen our buildings, we face a new set of challenges and adjustments. However, in time and with careful planning, we will safely return to in-person religious practices. To achieve this goal, we must adapt our built environment and re-examine the layout and structure of buildings which have the expressed purpose of mass congregation.

So how do we start to tackle this shift? The answer is one step at a time. Our team of architects and engineers at LAN Associates have been studying everything from [HVAC strategies to fight COVID-19](#) to [how to safely restore water to your building as you reopen](#), and most recently how to incorporate preventative measures like those outlined in the CDC guidelines for the coronavirus, into workplaces and other shared spaces.

Below are recommendations for the immediate, near-term, and long-term solutions to reopening your building in the age of COVID-19.

#1 Now: Retrofitting

We recommend that you proceed incrementally and in accordance with state guidelines when reopening your house of worship. Your immediate goal should be to bring back smaller, socially distanced, services that follow state guidelines for maximum occupancy. The following checklist should help you comply with the latest guidelines when you decide to open your doors.

Plans and strategies to develop before you open your doors:

- *Establish access protocols for safety and health checks that include plans for building reception, shipping/receiving, elevators, and visitor policies.*
- *Reduce density in the main worship hall and areas of congregation.*
- *Establish protocols for the number of people who can occupy an enclosed space.*
- *Take a detailed assessment of shared items like Bibles and hymn books and try to minimize their use.*
- *Execute a plan to install increased sanitizing areas.*
- *Develop and implement new safety protocols based on the CDC guidelines.*
- *Consider using UV disinfection and/or hydrogen peroxide fogging.*
- *If your church offers multiple services, consider scheduling services far enough apart to reduce risk.*
- *Create physical guides, such as tape on floors to ensure parishioners remain at least 6 feet apart.*
- *Alter the procedures used to receive donations, think about using a stationary collection box or electronic methods of collection for financial contributions instead of shared collection trays.*

#2 Near: Reconfigure

When state and local guidelines permit, you will need to make changes to get your church to get back up to 75%-90% capacity. At this stage you should be monitoring space usage and developing a long-term plan based on congregation patterns.

Plans to implement before your building can handle near full capacity:

- *A full furniture plan that supports social distancing as specified by the 6-foot CDC protocol.*
- *Map out and specify standard seating assignments for all worshippers.*
- *Consider investing in mobile seating accommodations in the main worship hall. This will give attendees the ability to move around to support social distancing guidelines.*
- *By now you should understand your ability to meet the new demands on your video/audio capacity and you should execute a plan to enhance them as needed.*
- *Install physical barriers in areas where it is challenging for worshippers to remain at least 6 feet apart and in reception areas and distribution counters.*
- *When purchasing new furniture, surfaces, and equipment, you should deliberately seek out materials that will not degrade when continuously disinfected.*

#3 Future: Reinvent

The shared indoor spaces of tomorrow will look fundamentally different from what we left behind in March of 2020. The built environment will require reinvention as the science points us in new directions and emerging technologies offer new solutions to the challenges posed by threats like COVID-19.

Interior renovations and technologies that help decrease the spread of infectious diseases will be common. Touchless doorknobs and light switches, voice activated elevators, and temperature checks via thermal scanners could become common, as could doorless bathrooms and the use of natural anti-microbial materials for commonly used surfaces. The healthy building movement was already gaining momentum before COVID-19, and the virus will likely speed up the adoption of its principles. This means buildings will be designed with a greater emphasis on natural light, ventilation, and reducing toxic substances.

LAN is uniquely qualified to help you plan for the short and long-term solutions needed to reopen and redesign for the future. Information on how to prevent the spread of COVID-19 is evolving at a rapid pace and LAN's recommendations will continually be updated to reflect the latest best practices, information, and guidelines.

+ WE'RE HERE TO HELP

LAN has over 55 years of experience offering full service architectural and engineering services, and we are confident in our ability to support your needs during this time. We encourage you to contact our team with any inquiries. Visit our [COVID-19 services page](#) for additional information.



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