
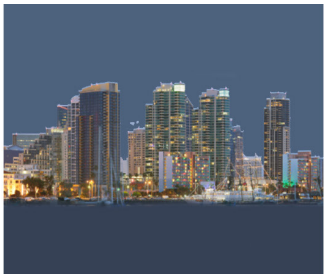

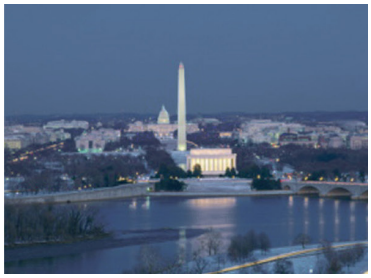

THE BROAD DIMENSION

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In this Edition:

Biophilia in Building Design

Biophilic design might sound as if it could be an enhanced version of green design, but the two really have different focuses. Green building design is centered mainly on sustainable construction and buildings that are good for the planet, or at least better than 'traditional' construction. Biophilia means "love of life" and suggests that we humans seek a connection with nature and that such a connection benefits us. Consequently, biophilic design is centered on the building's effect on the health and well-being of those who interact with it. The idea is to build up connections

between people and their environment and, to achieve that, the features in the building should tie in with the local natural environment.

Despite the different goals of the two design principles, there will be considerable overlap in the implementation of them, and the interconnection of the affected systems emphasizes the need for early and ongoing coordination between the various design disciplines.

Being out in nature is something that most people find enjoyable and to be an ideal way to reduce stress levels, so incorporating a 'living landscape' into the building is a common feature of biophilic design. That might include such things as living walls, rooftop gardens, and planters and pots throughout the building. One of the first green roofs that this writer worked on was what might be called a brown roof because it relied on natural rainfall for irrigation. During Sacramento's long hot summers the vegetation would die back and regrow when the rains came in autumn. Although wildfires might be seen as an aspect of nature, having dead, dry, vegetation on your roof is probably not a great idea in this current climate. Also, the idea of introducing nature into the building is meant to create a more relaxed environment to work in, but, for some people, seeing a spider walking across the floor towards them can raise stress levels substantially.

Bringing the feel of nature into a building does not necessarily mean turning the building into an indoor botanical garden. The use of natural building materials, such as wood or stone can have similar effects, especially if the material is locally sourced so that it gives a tie-in to the surrounding landscape. Incorporating features seen in nature, such as Fibonacci-series curves, water features, or structural elements that branch out like trees can also give that feeling of the natural world. Adding paintings of nature scenes can also work. Bringing in, or reproducing, the sounds and possibly the smells of nature is another method that can be used to good effect, and you might achieve some natural ventilation into the bargain.

Natural daylighting ties in with our biorhythms and gives health benefits, and if the windows that facilitate this daylight also allow views of nature, that's a double benefit. Natural daylighting tends to be the most requested feature

when surveys have been conducted. Not every room may be able to achieve a decent level of natural daylighting but, if the artificial lighting can replicate some of the changing conditions of daylight, benefits can still accrue.

Such biophilic features have been shown to reduce the stress levels of people working in the building, and to increase their productivity (around an 8% increase, according to some studies). That adds benefit to the company using the space and can add value to the building. Adding 'eye appeal' to the building by the incorporation of biophilic features will likely increase its value anyway.

The cost impact of biophilic design can obviously vary substantially depending on what is done, and the life cycle costs really need to be assessed. For instance, adding more plants into the design is going to be a noticeable upfront cost, but that is at least partially offset by the potential increase in value of the building. Of course, those plants will need additional ongoing maintenance, but the sights and aroma of the plants, and the improved air quality, can create a less stressful and consequently more productive work environment. Increasing the natural lighting will most likely add to the cost of the building's enclosure, but the building owner will be getting savings in energy costs for lighting for the lifetime of the building.

This article has been written before the final version of LEED 5 has been published but, based on the discussion document, biophilic design can apply to a number of credits and prerequisites. These include the Carbon Assessment prereq, the Integrative Design Process credit, the Heat Island Reduction credit, and the Indoor Environmental Quality category generally and specifically the Connecting with Nature credit.

Healthcare Facility Design Post-Covid

The sudden spread of Covid-19 in 2020 put an unexpected load on the healthcare system and, while hospitals and other medical facilities adapted remarkably quickly and effectively to the new challenges, the pandemic highlighted a number of areas that could use improvement.

The number and type of patients that hospitals had to handle suddenly changed, and there was a need to adapt existing facilities rapidly. That led to a flurry of alteration work as hospitals had to adapt under pressure, and it has spurred the use of modular and demountable construction methods for new construction, in order to make it easier to adapt to future unexpected events. The use of portable HEPA recirculation pumps and other easily deployable equipment makes it easier to adapt the building to changing needs. If a patient is going through a series of different treatments, portable equipment may mean that the patient does not

have to be moved to different rooms, making their hospital stay more comfortable. Social distancing to minimize the spread of the virus was implemented during the pandemic, but with new construction, if it is possible to create a unidirectional flow for people through the building, that should be even more effective at minimizing the potential for cross-infection. Of course, many supermarkets tried to implement such a one-way system in their aisles with only limited success because people tended to ignore it.

The ease with which the SARS-CoV-2 virus could spread emphasized the need for improved flow-control of air throughout the buildings. Improving air filtration and increasing the number of air changes helped remove pathogens as efficiently as possible before they could spread the infection, and the use of safe UV (indirect UVC) lighting helped keep pathogen numbers low. Humidity levels can also affect how well microorganisms survive. The use of negative air pressure and cleanroom technology for isolation rooms and the like, became more common to stop contamination spreading to other areas of the building. There may be a need to switch between positive and negative air pressure for a room, depending on whether you need to prevent a pathogen entering the room or getting out.

The use of technology, with motion sensors and voice activation being used for lighting, to open and close doors, activate faucets, hand sanitizers, etc., and the use of anti-microbial materials minimized the likelihood of infection spread through contaminated surfaces. Technology has also developed in its abilities to analyze and optimize patient care needs and assist doctors in assessing the results of X-rays, CT scans, and the like. The need to minimize the spread of Covid led to a rapid increase in the use of telemedicine, with video calls and phone calls becoming the preferred method of consultation, and that has continued as a common practice. Such telemedicine also helps somewhat to alleviate the shortage of available doctors and other healthcare practitioners. The use of websites and apps to enable pre-visit questionnaires to be completed and online check-in to occur has also become common.

The concept of biophilia, mentioned in our leading article, has naturally become part of the design of new hospital construction, since it centers on the wellness of the occupants. Designated walking routes on the site, to encourage a bit of exercise while leading patients and visitors through ‘healing gardens’ and other landscaped areas, has also become a feature. Resilience, adaptability, and the health and comfort of patients and staff have been among the lessons learned from the pandemic.

The pandemic resulted in the emergence of local Covid-testing clinics that frequently made use of vacant commercial properties. That kind of local facility has been morphing into local boutique clinics, providing longer and more readily available appointments while specializing in particular healthcare needs, such as weight-loss, acupuncture, or women’s health, and the list is growing. These facilities need to meet all the same kind of requirements against infection spread, etc., as regular healthcare facilities do, but they present more of the look of a hospitality or health-spa unit, with plush furniture and bright colors.

Tariffs and Other Changes

The new Trump administration has been implementing policies that potentially will have long-term effects on the construction industry. For instance, the changes in immigration policy are putting even more pressure on what was already a labor shortage issue. That is likely to give additional incentive to the adoption of AI and the use of prefabricated units, and more immediately it is increasing the need for affected contractors to offer higher wages in order to attract workers, adding to the cost of construction.

The new tariffs, especially those affecting steel, timber, and aluminum, are what has been making the bigger headlines at the time this article is being written. The tariffs had been used initially as a kind of bargaining tool, and currently they are still being implemented one day and then put on hold a day or so later. However, if they do settle down and become a reality, they turn into a source of revenue for government which can be hard to let go of, especially when the national debt is so high. If the declared incentive for the tariffs actually worked as advertised – to encourage the use of home-grown and home-manufactured products rather than imported ones – then the revenue stream from tariffs would fade away. However, ramping up home production takes time and might be seen as a risky investment. Consequently, the result for construction will be increases in affected material prices, and such increases may not be claimable under a construction contract, unlike with a tax increase. Also, some disruption to the supply chain can be expected, resulting in schedule delays and claims. Probably around ten percent of construction materials overall are imported, but some items, such as lumber, structural steel, aluminum, cement, and gypsum, have a considerably higher percentage of imports, plus those imports are largely from the nations most directly affected by the tariffs.

The administration has also been relaxing regulations, particularly related to environmental issues, and that can get new developments moving faster. However, this flurry of administrative orders, such as the on-again off-again implementation of tariffs, has created a fair amount of confusion as to what the future portends. That uncertainty is causing developers to be wary of committing too many resources when the economic climate is questionable. It also means that the previously expected reductions in interest rates is likely to slow, keeping financing costs high.

The result of these issues means that some projects are being put on hold or moving forward at an unhurried pace. The uncertainty will also be affecting the planning of future developments because it is hard to predict what conditions are going to be like by the time construction will be getting underway. Risk assessment will become a more essential part of the planning. Infrastructure projects may see an additional boost, since they were a focus of the first Trump presidency and seem to remain so in the current one, but Congress will need to find a means of financing any such initiative.

More generally, the uncertainty is affecting consumer and business confidence which can lead to a slowing or reduction in economic activity. Pair that with inflating prices fueled by the tariffs and you have the Federal Reserve's worst fears - stagflation. That becomes very difficult for them to bring under control, because raising interest rates might help bring inflation under control but it hurts the economy, and lowering rates helps the economy but pushes inflation the wrong way.

Geoff Canham, Editor, TBD San Francisco