WOOD CITY
Timberizing the City's Building Blocks

University of Arkansas Community Design Center for Weyerhaeuser Giving Fund
Fifty percent of the global built environment projected to exist by 2060 has not yet been constructed. Planning decisions made today pose the prospect of getting livability either very wrong, or very right. Planning will either accelerate livability declines presently occurring from climate change or, conversely, promote regenerative cities that benefit the planet ecologically and socially. The early effects of climate change have moved proactive markets to develop green cities toward low-carbon futures. What if cities, then, were built using the only building construction system engineered to sequester carbon in achieving “energy positivity”—wood?

The U.S. building sector is responsible for 40 percent of the nation's carbon emissions generating climate change. The top 19 common real estate products shaping our cities—including among others, tenant offices, fast food restaurants, warehouses, big-box stores, garden apartments, single-family houses, hotels, storage facilities, assisted living facilities, and neighborhood shopping centers—consume tremendous amounts of non-renewable resources in their construction, while squandering embodied energy investments through short building lifespans. This throwaway building economy constitutes the built environment for the 85 percent of Americans not residing in the nation's top 50 downtowns.

*Wood City* rethinks these common building types through the application of factory-based timber-engineered technology—popularly known as “mass timber”—an alternative to concrete, steel, and light-framed wood construction. However, the objective is not limited to the retrofit of building prototypes with a sustainable
material. Equally important is the elevation of more productive building pattern languages supportive of densification and human-centered design in metropolitan sprawl. *Wood City* aims to find new expressions of publicness, renewed senses of beauty, and enhanced responsiveness to changing conceptions of livability and function in vernacular commercial building forms. Uncomplicated forms that learn and thus anticipate their own adaptive reuses over time are the true smart buildings.

Innovations in timber-engineered buildings to date have been associated with signature projects involving premium tall buildings, institutional and commercial structures, and custom homes—bespoke architectural projects. Yet, the key to revolutionizing the nation’s carbon footprint lies in the transformation of ordinary low-rise building typologies and their culpability in maintaining low-density auto-centric planning. These real estate products collectively underwrite the auto-centric environments comprising most of the U.S. *Wood City* diffuses design innovation, arising in the well-capitalized bespoke sector at the top, to common building types mindful of the latter's cost structures. Meanwhile, shape-shifting disruptions beyond the COVID-19 pandemic are reconfiguring many of these real estate sectors. Interventions from venture-capital investment new to the building industry, coupled with next-generation market innovations, will displace entrenched operators in each property class. The timber industry itself is changing, due in part to construction innovations associated with mass timber.

How might innovation foregrounding mass timber work within the lean economies of the ordinary enhance civic beauty and responsiveness to climate change? Within the rapidly changing business models of an ordinary real estate economy, *Wood City* triangulates technological discourse with new social and lifestyle formations, and mass timber systems, toward the possibility of creating resilient urban building blocks.
The Nineteen Standard Real Estate Product Types

Content adapted from Leinberger, Christopher. *The Option of Urbanism: Investing in a New Urban Dream*
Wood City: Timberizing the Standard Real Estate Product Types

office
- tenant office
- medical office

industrial
- metal warehouse

retail
- strip shopping center
- fast food restaurant
- big-box grocery

hotel
- hotel

apartment
- garden apartment

miscellaneous
- self storage
- mobile home
- gas station

housing
- accessory dwelling unit
- single-family residence
- live/work
- assisted senior living
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See buildings as real estate products rather than as projects.

- Tie innovation in real estate products to innovation in mass timber.

- Internalize developers’ business models in product development.

- Develop vocabularies of wood-based building prefabrication.

- Socialize real estate product sectors to create vibrant places.

- Manage forests ecologically.

mass timber in structures of the ordinary

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Exogenous forces are reshaping building markets among the 19 real estate product sectors comprising most of America’s built environment. The real estate development value chain is being recast in sectors like fuel retail, fast food, grocery, and warehousing, while new venture-capital interventions are hybridizing housing, hospitality, healthcare, and the senior services markets in value-adding ways. Meanwhile, pockets of low-density metropolitan fabrics—the non-downtown environments encompassing suburbs, small towns, villages, edge cities, exurban areas, and rural areas, which house 85 percent of America’s population (Kotkin: 16)—are densifying in response to consumer demand for walkable, mixed-use
environments. Disruptions are driving innovation in each of these 19 real estate product sectors, but they are primarily technological and social. Building outcomes conspicuously lack best sustainability practices necessary to build a next-generation green economy. Mass timber technology can play a key role in ensuring that the massive levels of resources the U.S. will allocate to building the next generation of human settlements—close to $1.5 trillion just in 2020—are not squandered by poor practices in energy conservation, carbon reduction, ecosystem stewardship, nonrenewable resource conservation, and climate change mitigation. More than ever, the resiliency of critical human support systems is based upon the competent modeling of climate unknowns in future development.

Mass timber technology can play a key role in ensuring that the massive levels of resources the U.S. will allocate to building the next generation of human settlements—close to $1.5 trillion just in 2020—are not squandered by poor practices in energy conservation, carbon reduction, ecosystem stewardship, nonrenewable resource conservation, and climate change mitigation.

In his book The Option of Urbanism: Investing in a New Urban Dream, real estate development expert and educator Christopher Leinberger addresses the shaping of our cities by investment dynamics underwriting the 19 standard real estate products (offices, fast food restaurants, warehouses, big box grocers, garden apartments, single-family houses, hotels/motels, self-storage facilities, assisted living facilities, neighborhood shopping centers, etc.). The private construction market comprises 78 percent of annual capital expenditures on buildings, of which the 19 commodity building sectors are collectively the majority subset. Real estate products’ underwriting by the finance and insurance sectors is based on market liquidity or resale velocity, otherwise known as exchange value (versus use value or utility). The commodification of real estate products results in the total conventionalization of floor plans and operations models within each sector—ideal conditions for the application of prefabricated construction. Exchange value routinely rewards short-term investment horizons including the use of cheap construction systems with high embodied energy costs and swelling negative externalities (pollution, waste, sprawling land consumption, building abandonment, planned obsolescence, etc.) that eventually become public costs. Liquidity and its “impatient capital” generate negative environmental consequences no longer possible for the public to ignore or leave unmonitized. However, vertical integration in more venture-driven sectors is shifting real estate from a commodity to a service, signaling stronger opportunity for formulating holistic development approaches that align with shifts to turnkey solutions.

Markets generate order without design. The goal of Wood City, then, is to showcase design applications of mass timber construction among these standard real estate products—the architectural building blocks of America’s built environment. The objective is to situate the use of wood-based value chains in building markets already undergoing creative disruption by multiple forces, including the COVID-19 pandemic and technological rationalizations within the construction industry itself. Yet, the big questions framing explorations in Wood
City are: can mass timber be feasible in building markets with low profit margins? How might markets and design culture collaborate to address looming and interconnected environmental challenges? The good news is that mass timber converges with other secular trends presently driving new demand for high-quality building environments, notably rising investor concern over social responsibility, wellness, and authenticity in development outcomes. Wood City aims to find new expressions of publicness, renewed senses of beauty, and enhanced responsiveness to changing conceptions of livability and function in vernacular commercial building forms.

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From Project-Based to Product-Based Implementation of Buildings
In its 2020 report "The next normal in construction: How disruption is reshaping the world’s largest ecosystem", management consultant McKinsey & Company assesses the construction industry as being one of the worst performing economic sectors of the last century despite encompassing 13 percent of global gross domestic product (McKinsey & Company: 2). Building construction is a fragmented underperforming economic sector with an anemic 1 percent annual growth rate over the last two decades (compared to 2.8 percent for the global economy). Unlike other industrialized sectors, construction industry processes remain artisanal, rooted in project-based or “blacksmithed” implementation, and therefore unable to fully optimize the promise in digital and manufacturing technologies, according to the report. Shifting to product-based construction processes involving higher orders of standardization in building components and whole-building units would release new efficiencies and levels of quality in building development outcomes. But this shift requires a crossover in professional interests between a majority building sector framed entirely by instrumental purposes and a minority that delivers bespoke architecture celebrated for its perceived autonomy from strictly commercial forces. Historically, notable ordinary or vernacular building cultures (like the early 20th century American main street) derived their pattern languages from innovations formed in the bespoke wings of the architecture discipline. Diffusion of innovation at the top across recipient real estate product sectors in the ordinary—the modules of our cities—scales innovation to tipping points that change large-scale development markets.

Markets view buildings as products, the means to conduct business in servicing their respective sectors, whereas architectural culture views buildings as projects—unique moments of professional expression integrating material, spatial, and functional systems. Former WeWork architecture executive, Michael Caton, suggests that engineering and architecture teams can break through old professional delivery models by focusing less on project-based alliances and instead “focus more on claiming ownership of even broader segments of the value chain, stretching downstream toward manufacturing and construction, upstream toward property development and asset management, or both” (Caton). According to Caton, architects can gain new expertise since product-based approaches “offer architects an invaluable
resource long sought in project-based practices: performance feedback on built environments that can be leveraged to improve future outcomes.” Citing the McKinsey report mentioned above, Caton reiterates the prediction that stand-alone professional services firms will be further integrated, if not subsumed, as R&D components into larger value chain organizations controlling prefabrication, real estate product development, and other specialized contractors.

For instance, public, cultural, and mid-and-high-rise structures are signature building types shaped by project-based processes celebrated for manifesting high architectural principles. Their measures of success are driven by use value and its attendant long-term horizon in assessing worth. Employment of mass timber systems in signature buildings may secure a reasonable return on investment due to project scale, or more notably the symbolic capital raised from cultural norm-setting where aesthetics and sustainability matter. The latter is important among public-and-cultural-sector project sponsors, often the early-adopter class aiming to socialize new practices. Notwithstanding important innovation at the top, signature buildings are a very minor subset of the building industry, and as bespoke projects will not structure economic and ecological futures on their own.

Conversely, real estate products (the investment community does not even call them buildings) are functions of decision making among operators governing industry supply chains. Real estate products as buildings are essentially logistical expressions of space untethered to place, history, and monumentality, but amenable to productization and its own measures of performance and quality. Such recalls Walmart’s internal adage that the store is simply the last warehouse in a chain of warehouses. Any prospective return on investment among the 19 real estate product sectors lies with the integration of technique—here, prefabricated mass timber building systems—into their respective business models, all which include readily replicable building systems as the primary asset in far-reaching franchise operations or industry-wide development templates.

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Supply chain innovation within these Wall Street investment-grade real estate product sectors reflect the workings of the nation’s largest holders of equity: publicly-held corporations, pension funds, real estate investment trusts, venture capitalists, and hedge funds. Similarly, forms of creative disruption are already changing the timber industry itself as it hybridizes its own business models in the development of new products and services. The recent entry of venture-backed building manufacturer Katerra dedicated to mass timber building production, opens the prospect of an entirely new value chain that may very well alter the real estate product economy. Katerra is targeting ordinary real estate products through vertical integration of the building industry’s services providers—including acquisition of architecture firms—around the life cycle of wood from "forest-to-frame" (Curtis, et al.).
Benefits of Mass Timber Prefabrication

Wood’s renewability makes it a highly sustainable building material in this Age of the Anthropocene—an era in which the greatest challenge to design and planning is the design of cities within human-dominated ecosystems. In addition to the traditional delivery of urban services, next-generation buildings and infrastructure will be obligated to deliver the 17 ecosystem services provided by healthy ecologies (Costanza, et al.). This, of course, includes atmospheric regulation entailing reductions in the flow of greenhouse gases into the atmosphere, including carbon. Fifty percent of wood is carbon, “mostly ossified air” (Moe: 84), a counterintuitive insight first articulated 40 years ago by Nobel laureate Richard Feynman. Wood is a carbon pool, capable of transferring the forest’s stored carbon into buildings. When carbon is released back into the atmosphere upon demolition of timber components—a problem with throwaway light-weight wood frame construction—the benefits of carbon sequestration are lost. Longevity in wood buildings, then, is a socio-environmental asset or a public good. At the other end of the spectrum among socio-cultural services offered by ecosystems, wood buildings promote biophilic design (design which increases occupant connectivity to nature, directly or indirectly) through a sensorial interior landscape that advances health and wellness.

Indeed, design culture’s underlying social imperative now demands solutions for “coupled human and natural systems” known as CHANS. Tree thinning, for instance, strengthens nutrient cycling and optimizes other ecosystem services within forests including fuel reduction to eliminate the chance of catastrophic fire, or “disturbance regulation”. Restorative thinning costs can be countered through revenue gained from the sale of low-grade trees as new feedstocks for mass timber buildings, since forest managers across the U.S. need to find markets for one billion cubic feet of wood per year (Nechodom, et al.: 94). Just the wood from forest thinning is more than enough to supply the nation’s annual count of single-family housing starts. In his opening remarks at the 2019
Timber! Design Excellence Symposium sponsored by the Fay Jones School of Architecture and Design at the University of Arkansas, U.S. Congressman Bruce Westerman (AR)—the only U.S. Representative who is a forester—observed that: “When you have markets for wood, you have healthier forests”. Likewise, we can also grow healthy and regenerative cities: a point roundly made by architects pioneering connections among mass timber construction, urbanism, and forestry (ARUP; Dangel; Ibanez, et al.; Jones; Kaufmann, et al.; and Gray Organschi Architects).

Factory-based mass timber construction premised on the lamination of wood members in the form of wall and roof panels, structural beams and columns, or whole building units has become cost competitive with concrete and steel systems.

Building with wood supports other multiplier ecological effects. The embodied energy (the sum of all energy consumed in the production of materials from their mining to processing and transportation) in mass timber is orders of magnitude lower—up to 60 percent—than concrete, steel, and other building materials (UC Timber Innovation Center: 356; ARUP: 14–23). A lower embodied energy footprint based on renewable materials reverses ecosystem and natural resource depletion, a global environmental problem equally as critical as climate change. Wood is also a healthier option among the spectrum of finishing materials used for building interiors, many which still contain known volatile organic compounds harmful to human health. Thus, to solve for circularity that links stewardship of ecosystem services, decarbonization of development, and development of a renewable resource-based economy, the building industry will have to engage such “wicked” problems through value chain thinking beyond the tame problem that is the building. Here, design entails a new metabolic consciousness.

Timber is easily machinable given its lightness in weight and ease in splicing, lamination, and assembly that support CNC-based prefabrication processes (ARUP: 42). Factory-based mass timber construction premised on the lamination of wood members in the form of wall and roof panels, structural beams and columns, or whole building units has become cost competitive with concrete and steel systems. Unlike traditional wood products, including dimensional wood used for light framing, laminate manufacturing leverages timber components to become high-quality structural and cladding systems despite the sourcing of their raw material from low-grade trees. While glue-laminated (glulam) technology has been around for most of the twentieth century, an equally common but newer form of mass timber—cross-laminated timber (CLT) with laminate variations involving nailed or doweled connections instead of glue—offers comprehensive cladding and structural architectural solutions. Lamination affords wood new structural properties comparable to concrete and steel without either’s heavy weight (costlier) or negative environmental externalities. The world’s tallest mass timber building was recently completed in Norway at 18 stories with proposals for much higher structures in the works (Roberts: 3).

Despite laminate planks’ limits in flexibility and form (they are inherently flat, structural, and unbendable), CLT kit-of-parts and whole-building systems are well suited to the economy of means demanded in commercial building design. Whether for a retrofit or new construction, mass timber prefabrication
practically eliminates material waste, and "buildings are 25 percent faster to construct than concrete buildings and require 90 percent less construction traffic" (Roberts: 10). Moreover, prefabrication and technological innovation generally are indispensable solutions to the nation’s permanent shortage in skilled construction labor due to an aging workforce and fewer younger workers pursuing careers in the construction trades. According to an industry trade group, 80 percent of construction firms will be unable to fill hourly and salaried positions while 72 percent of firms identify labor shortages as their top hurdle ongoing (Associated General Contractors of America). While most contemporary building components exhibit some form of standardization, prefabrication shifts entire building processes away from the site to the factory and is the industry’s future for many reasons. Wood offers the best value proposition as a primary material base in establishing sustainable prefabrication construction economies.

The Value Proposition of Wood in Future Real Estate Markets
Real estate represents more than one-third (35 percent) of the U.S. economy with housing constituting 56 percent of the built environment, non-residential 28 percent of the environment, and infrastructure 16 percent of the environment (Leinberger: 33, 47). The Urban Land Institute’s (ULI) annual status report on real estate, *Emerging Trends in Real Estate 2020* (purposely consulted to chart pre-COVID-19 secular trends) chronicles ongoing sector disruptions in logistics/storage, manufactured housing, shopping centers, multifamily housing, and senior assisted living. Notably, rising investor interest in the “environmental, sustainability, and governance” (ESG) movement, renewable energy, and fleet electrification is changing building landscapes and promises to reset future risk assessment, capital deployment, and community relationships. According to the ULI, ESG consciousness is skewed generationally with 55 percent of millennials factoring ESG policies into their investment decisions, whereas 25 percent of generation X does so, and only 11 percent of baby boomers consider such principles in allocating investment dollars (PwC and the Urban Land Institute: 17-18).

**Mass Timber Components**

- **up to 100’**
- **up to 10’**
- **up to 6’**

**glulam beam assembly**  **clt panel assemblies**

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Consumer demand for placemaking and walkability where they live, and work, are also changing capital markets in real estate. Over ten years ago Leinberger predicted that the "metropolitan area that does not offer walkable urbanism is probably destined
to lose economic development opportunities” (Leinberger: 91). The ULI report confirms this as land-use changes favoring densification and the mixing of uses in suburbs are re-working fundamentals in the various product classes, formulated since the 1950s to serve auto-oriented environments. Thus, building product proposals illustrated in Wood City are designed to accommodate more diverse living arrangements, including the option of walkable urban development within low-density metropolitan landscapes.

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Aside from realignments in technology and development, one of the more impactful disruptors in real estate are the capital markets themselves. An abundance of idle debt and equity capital—by many estimates more than one trillion dollars—is looking for long-term returns in venture-driven investment associated with new kinds of real estate products (PwC and the Urban Land Institute: 4). Notwithstanding the obstinance of an inefficient building industry to change, innovation is now crucial in “bending the cost curve” to counter development cost escalations that continually outpace inflation. A growing number of investors including retirement funds are privileging patient capital models over short-term liquidity needs; a shift in benchmarking which bodes well for the intersection of wood-based prefabrication with other trends. These market resets are powerful, and constitute what the ULI calls the “the real estate of the future” (PwC and the Urban Land Institute: 8).

This real estate future portends both positive and negative trends, the latter including the nation’s structural housing crisis as we continue to build “90 percent of our housing for 10 percent of our households” (PwC and the Urban Land Institute: 11). Labor shortages, unpredictable material supply chains, and outsized increases in construction costs diminish margins for anything but premium housing. This unprecedented supply inequity is creating a sharp rise in demand for manufactured homes, a prefabrication-based industry ripe for mass timber applications as large-scale capital is moving into the development of manufactured home communities for all income groups (Pacurar). Falling homeownership rates to levels not seen in 60 years has created a pressing need for multifamily housing particularly in costly strong-market regions plagued by construction labor shortages. Such a convergence of challenges has already nudged some housing production to prefabrication.

A positive real estate trend involves the incorporation of community values into product sector development from offices to retail and housing, exemplified in the burgeoning popularity of co-living and co-working developments. Impacts of the sharing and gig economies are becoming apparent in property development, particularly in tenant office sector where networking and socializing have become essential aspects of work (PwC and the Urban Land Institute: 13). Hotels are getting into the game, making their conference facilities and public spaces available for co-working tenants, especially digital nomads. Ample research shows that wellness and biophilic design in work environments through incorporation of natural materials like wood (given its visual and thermal
effusivity or warmth), landscapes, and natural light, directly affect enterprise productivity according to a keynote industry report Human Space: The Global Impact of Biophilic Design in the Workplace. The move to quality will lead to greater selectivity among office sector tenants post-COVID-19 as one-third of office workers before the pandemic indicated that office design would impact their decision to join a company (Cooper and Browning: 12).

Retail and warehouse operations are converging in response to urbanization processes and the influx of frictionless omnichannel retail: multi-dimensional shopping experiences synergizing online, in-store, and various fulfillment modalities. Both parcel fulfillment facilities in last-mile logistic chains and self-storage complexes are incorporating mixed uses as their operators locate facilities closer to population centers. Yet, logistics real estate products are ill-equipped to comply with ever more stringent design regulations governing incorporated areas. Packaged metal buildings housing light-manufacturing functions mixed with retail uses like coffee roasteries, micro-breweries, food production, and durable goods retail (let’s throw in fitness centers and mixed-use megachurches—the newest “third places” and large users of prefabricated metal buildings) are no longer able to get away with standard metal warehouse shells lacking good public frontage and environmental ambiance. In the high-growth logistics sector, mass timber construction would better serve building markets already parameterized around prefabricated building but now tasked with delivering higher levels of aesthetic and environmental quality than current packaged warehouse systems.

Even once “category killer” big-box grocers that eschewed stores for warehouses, are integrating fulfillment strategies, experience economies, and educational outreach into the warehouse, creating destination experiences. Grocers, especially the growing community of food co-ops now numbering over 200 with 1.3 million members in the U.S., are becoming merchant oriented again as they deliver new forms of "collaborative consumption" that integrate "platforms of products, services, and experiences" (PwC and the Urban Land Institute: 14). Thus, real estate based in placemaking and expressions of wellness and authenticity, particularly appealing to millennials and generation Z as underscored in the ULI report, are important secular trends. Collectively, these qualitative-based trends premised on combined aesthetic and environmental performances make a great case for mass timber construction.

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Real Estate as a Service (REaaS)
Due to novel forms of demand, scale, and returns on investment converging around select property classes, some product sectors will be further rationalized as services, mostly through interventions by large-scale venture capital. Real estate products are undergoing the same shifts in property tenancy as those for cars and homes: from traditional ownership models to subscription-based consumption of services on demand (vacation time share was an early form of this). Care services for aging populations is one such sector.
Between 2010 and 2030, 10,000 people will turn 65 every day, leading to a quadrupling of octogenarians by 2030. Longevity is increasing, aided by advancements in the life sciences, which places considerable pressure on an already stressed housing market. The current national housing stock does not adequately accommodate aging, let alone the looming scale of need by a senior population projected to double from 40 million in 2010 to 79 million in 2030—one-fifth of the nation’s projected population (Cohn and Taylor). Special-interest housing will likely be supplied through diverse congregate-living channels—multifamily, manufactured housing communities, co-housing, independent living-based pocket neighborhoods, assisted living, and costly medical-based institutional housing—all favorable to prefabrication construction economies given the complexities in integrating healthcare services, artificial intelligence, and real estate products into a singular platform.

In its discussion of senior needs as they pertain to real estate the ULI report observes, "Senior housing is increasingly recognized as a critical part of the solution for population health management and health care cost containment—a growing social, economic, and political reality. Indeed, operators are increasingly becoming involved with or creating their own managed Medicare organizations" (PwC and the Urban Land Institute, 56) as capital vertically integrates real estate markets for the aging.

Senior housing properties enjoy superior returns as this market class is recession-resistant, lacking cyclical due to immutable demographic trends formed over generations. On a ten-year basis, equity returns on senior housing was 11.73 percent, over a third higher than the overall property index of 8.61 percent and returns on apartments of 8.64 percent (NPI). Likewise, co-living and co-working products follow a similar customer-centric mindset by offering on-demand subscription to combinations of beds, workspace, community, and amenities that are scalable and flexible. Particularly in the living sector, consumers want access to different forms of housing bundled with various kinds of services as their lifestyles evolve. In delivering turnkey solutions of greater complexity, all space may eventually become leasable, relieved from having to be sold through retail exchanges. As real estate products undergo novel mixings of space, services, technologies, and experiences toward integrated but flexible platforms, a new architecture of the ordinary will emerge, which Wood City anticipates.

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Markets dominated by industrialization and bureaucratic control provide order without design. However, capital responsive to a new order of interests is driving innovation among real estate product sectors. Wood City explores new intersections between markets and design to find opportunity in the economy of means defining ordinary commercial building products—sectors that despite their “modernity”
have abandoned architectural and urban design ambition. The challenge is to diffuse innovation in sustainable mass timber technology to common building types within their respective cost structures. The stakes are high, as the equivalent of 92 percent of nonresidential space that existed in 2010 will be built or rebuilt by 2030 (Nelson: 80). By 2030, the U.S. will practically double its built environment in a generation. How might design innovation fulfill functional and economic obligations for which an ordinary real estate product is financed and built, while offering collateral benefits—expressions of publicness, renewed senses of beauty, and enhanced responsiveness to livability and context typically missing in these building products? Both ESG investors and property users seek from real estate new integrations of services, experiences, social resiliency, and environmental sustainability—a new metabolic consciousness. Investors, operators, and users are recognizing that holistic approaches entailing life cycle considerations can solve for large challenges in the delivery of products and services. Wood City recasts ordinary building products within a resilience-oriented value chain that allows human support systems, including our cities, to grow stronger amidst shocks, chronic stressors, and disruptions—the unknowns that we know are coming our way.

By 2030, the U.S. will practically double its built environment in a generation. How might design innovation fulfill functional and economic obligations for which an ordinary real estate product is financed and built, while offering collateral benefits—expressions of publicness, renewed senses of beauty, and enhanced responsiveness to livability and context typically missing in these building products?
tenant office

Post-COVID-19, the quality of the workspace will become more important to tenants. Provision of shared meeting space and improved indoor air quality will rank as the top needs.
medical office

Despite telehealth delivery, this sector continues to boom due to an aging population, expanded health insurance coverage, and a shift in patient services away from hospitals. One trend is the need for space that accommodates multiple practice specialties within one facility.
Flexible real estate products combining retail and light manufacturing/fulfillment functions are in high demand, especially for buildings with high-quality public frontage despite using packaged building systems.
strip shopping center

As retailers flee malls, some transferring over to strip centers, this enduring neighborhood retail model is popular again due to convenience and its proximity to rooftops—even becoming a community entertainment hub.
fast food restaurant

This sector is hybridizing formats to include fast casual dining and food halls with food trucks and micro-cuisine franchises toward enriching the on-premises dining environment and overall customer experience.
big-box grocery

Windowless, large-format retail has become more porous, driven by new consumer interfaces involving casual fast dining and bars, various click-and-collect fulfillment operations, and allied vendors delivering complementary services.
Millennials are now the largest workforce and they are demanding that hotels go green and provide a holistic guest experience centered around multi-purpose spaces that promote health and wellness.
garden apartment

Constituting one-third of the market for apartments, three-story "breezeway apartments" can offer unit-extending outdoor space amenities related to health and wellness unachievable in high-and-mid-rise buildings.
self storage

In exchange for municipal zoning approvals in visible locations, cities are requiring improved curb appeal in storage development through architectural detailing and other design features including commercial-grade lighting control.
mobile home

With the secular rebound in manufactured or mobile home sales—far beyond that in comparable site-built construction—large-scale investment in manufactured home communities is yielding high-quality living environments with resort-style amenities inside and out.
gas station

Given future uncertainty in fuel retail, profitability in their real estate holdings will rely on facility branding and diversification of services. This includes mobility/recharge platforms, casual fast food dining, and nonvehicle-centric businesses such as banking, laundry, fitness, and fulfillment/last mile logistics.
accessory dwelling unit

Known as the mother-in-law apartment, this 150-800-square-foot housing type is popular again due to the liberalization of municipal codes permitting secondary units on single-family parcels. ADUs provide affordable housing while doubling density in low-density communities.
single-family residence

The post-Great Recession high in housing starts has been led by single-family starts. Post-COVID, there is strong market demand for open floor plans, but with defined spaces including flex space for Zoom rooms and integrated screened porches to accommodate mixed-use functions.
This popular “swing” space product accommodates live, work, or both uses in response to changing local market demand. A 1,000-square-foot apartment designed to office use codes will accommodate the standard American small business of 10 or fewer employees.
assisted senior living

As hoteliers move into this congregate housing market, next-generation facilities will merge hospitality industry standards with enhanced healthcare continuum services connected to hospitals, clinics, and other support providers.