

Climate Justice in Architecture

Design centering both the environmental and social aspects of climate change.

Climate justice in architecture refers to engagement, advocacy, planning, and design that draw down emissions; build resilience and capacity; support human, cultural, and ecological health; and protect all communities in the era of climate change.

Committee on the Environment

AIA Knowledge Community



Santa Monica City Hall East, aerial view
Image Credit: Alex Nye, courtesy of Buro Happold

Santa Monica City Hall East

This case study shares an exemplary architecture project that centered both the environmental and social aspects of climate change in the design process, approach to community engagement, and final design. It touches on many aspects of the AIA Climate Justice in Architecture Taxonomy at the building, neighborhood, regional, and global scales.

Santa Monica City Hall East (CHE)

Santa Monica, CA



Santa Monica City Hall East Section Render
Image Credit: Frederick Fisher and Partners

Summary

Santa Monica City Hall East (CHE) is the first-ever municipal building to achieve certification under the Living Building Challenge (LBC). CHE is a 50,200 sq. ft. building that increased the square footage of city hall to accommodate city services in a single campus location. The building both celebrates the history of Santa Monica—reflecting the landmark 1938 art deco city hall in its glass façade—and exemplifies the city’s contemporary vision of modernizing city governance, improving transparency and wellness for everyone in the city, and working toward equilibrium with local ecosystems.

Located in Santa Monica, California, an eight-square-mile city surrounded by Los Angeles on three sides and the Pacific Ocean on the fourth, the building takes advantage of the sunny, mild climate and sea breeze to meet the LBC’s net zero energy requirements. Achieving net zero water was more difficult, given the drought-prone climate and small site footprint. City staff rose to the challenge, turning the building into a test case for new alternative compliance pathways for composting toilets and rainwater purification systems for potable water use. CHE is a symbol of the city’s desire to partner with permit seekers and reduce barriers to new, high-performance building technologies for all income levels and building types. This building is meant to be a demonstration of what is possible in the Southern California climate zone and encourage others to seek environmental and social balance.

Project overview

BUILDING PROGRAM TYPE(S):

Civic (Office)

PROJECT TYPE:

New Construction/Addition

TOTAL FLOOR AREA:

50,200 sq. ft.

TOTAL USERS:

244

SITE AREA:

46,152 sq. ft.

NUMBER OF FLOORS:

4

PROJECT CLIMATE ZONE:

ICC Climate Zone 3B

PROJECT SITE:

Previously developed land

PROJECT SETTING:

Urban

YEAR OF SUBSTANTIAL

COMPLETION:

2020

COST OF CONSTRUCTION (EXCLUDING FURNISHING):

\$60 million

THIRD PARTY RATING SYSTEM:

Living Building Challenge 2.1

Project team

OWNER:

City of Santa Monica (Amber Richane,
Principal Design & Planning Manager)

ARCHITECT:

Frederick Fisher & Partners (Joseph Coriaty,
FAIA, Managing Partner)

MEP ENGINEERS:

Buro Happold

STRUCTURAL ENGINEER:

JAMA

CIVIL ENGINEER:

KPFF

GENERAL CONTRACTOR:

Hathaway Dinwiddie

“The project’s goal was to make the Santa Monica City Hall a more generous, useful place for the citizens of Santa Monica.”

— Joseph Coriaty, FAIA, Managing Partner, Frederick Fisher & Partners Architects



Santa Monica City Hall East, public permitting counter
Image Credit: Billy Hustace

Design Process

Santa Monica is proud of its history as one of the first cities in the world to publish a sustainable city plan in 1994. Starting with that first plan, the city has set measurable goals for improving the environment and used data to track progress.

When it became clear in the early 2010s that adding an addition to the landmark 1938 city hall building would make it possible to consolidate all city services in a single location—thereby eliminating annual leasing expenses and improving customer service—the city set a stretch goal: building the first municipal building certified under the Living Building Challenge (LBC). The new building was intended to increase awareness of Santa Monica’s commitment to fiscal, environmental, and social sustainability.

Three elements of the design process lay the foundations for meeting such an ambitious goal. First, Santa Monica benefits from strong civic engagement and a value system that includes a deep appreciation for the environment and commitment to social equity. Second, the city structured the contract as design-build, which required the architect and general contractor to work hand in hand starting with their response to the design competition. Given the challenges associated with achieving the LBC Materials Petal, it was essential for the design and construction team to start educating suppliers and subcontractors about the importance of using nontoxic products as early as the programming and site analysis stage. Third, the city leaned into its expertise as a public sector developer and regulator to lead conversations about alternative compliance pathways with regulators at the California Water Resources Control Board (SWRCB), the California Coastal Commission, and Los Angeles County’s departments of public works and health. The city council had recently passed legislation requiring net zero energy, net zero water, and resilient

construction practices. So, CHE became a demonstration project to educate the design and construction community on technical strategies and convince the development community that such a building was financially feasible in the Southern California climate.

The project’s guiding design principle was to create a space that improved city services in practice while also evoking democratic ideals of transparent and nonhierarchical local governance. During the first nine months, the architect, contractor, and city staff worked with community members and city departments to study the best way for city departments to co-locate so they could provide the highest level of service to their constituents. A primary example of the design goals was the improved experience of construction permit seekers in the new building. Previously, permit seekers were often sent to multiple locations to meet various requirements before pulling the permit in a dark, unfriendly room. The new building co-locates all relevant offices and places the permit counters in a light-filled lobby with a view of the outside courtyard.

“There are a lot of developments in Santa Monica that the city takes on. So, in some ways, they are practically professional developers. I think they understood that if you could have a cohesive team, ... you would share rather than be up against each other. [Our firm] had 3–4 project experiences with [the contractor]. ... We used that relationship of trust, level of expertise, and shared ethos of taking care of the client [to come together to create] something that helps Santa Monica. ... When we built the team, we told the story of how we would work with the city to not just do the project but also to figure out how we were going to get to the path of what was the right project for everybody. ... The effort of figuring out what the project was going to be was almost harder than doing the project. Not that it was that easy to do either.”

— Joseph Coriaty, FAIA, Managing Partner, Frederick Fisher & Partners

“People always say it’s bad to be a ‘yes person,’ but on a project like this, you need someone who’s always fighting for ‘yes’ when the obstacles start piling up. As the owner, we had to be certain the building would truly work — and it does. This project succeeded because everyone had a clear purpose and worked together to deliver a building that’s not only beautiful and high-performing, but also came in on time and under budget.”

— Amber Richane, Principal Design & Planning Manager, City of Santa Monica

Demonstration project

The process of permitting CHE took two to three times longer than normal because the team needed to seek alternative compliance pathways—particularly for the composting toilet and rainwater purification system. Approvals were required from the city, State Water Resources Control Board (SWRCB), the California Coastal Commission, and Los Angeles County’s departments of public works and health.

Navigating these multiple regulators required diplomacy and never taking no for an answer. The project team reached out to officials very early in the process to answer questions and make changes that would remove barriers to approvals. Officials from agencies with overlapping mandates also coordinated with each other, not just the design team. The design team also scheduled a tour of the Bullitt Center, a Living Building in Seattle, Washington, and facilitated opportunities for California officials to meet with their counterparts in Seattle who approved that building’s composting toilet system. It was important to demonstrate that the proposed systems would not allow cross-contamination—including in the greywater system. The fact that the project was owned by Santa Monica also made it easier to work with the public water utility to find a workaround to the fact that rainwater is not identified in California regulations as a potential source of potable water.

The city continues to push the boundaries of traditional environmental health regulations in the direction of circular energy and water systems. For example, a municipal sustainable water infrastructure project has been approved to treat 10% of the black water that Santa Monica produces to a potable standard. Currently, that water is distributed through the purple pipe (reclaimed water) system. But the long-term goal is to integrate it into the municipally supplied potable water system.

While the alternative compliance pathways approved for CHE have not been codified into local regulations yet, they set a precedent for private sector projects seeking to meet Santa Monica’s increasingly stringent requirements for energy, water, and resilience. The city has uploaded technical guidance and educational materials to its website. And building tours offer additional, hands-on orientation to how low-tech and high-tech design strategies were integrated into the final design.

The city is also applying the lessons learned from CHE to publicly funded projects serving low-income residents. For example, plan review officials ask design teams working on affordable housing, permanent supportive housing, and homeless shelter projects to create a health and wellness plan for future users. They encourage design teams to use projects like CHE as a guide to integrating daylight, green spaces, and biophilic elements into their proposals without running over budget.

“City Hall East taught us that good design isn’t just about performance — it’s about people. We’ve carried those principles forward into every project, especially those serving our most vulnerable communities. We now ask teams to demonstrate how they’re supporting health and wellness through daylight, green space, and biophilic design and not by checking boxes, but by truly thinking about how people will feel in these spaces. It’s not about building the cheapest building, it’s about building the right one.”

— Amber Richane, Principal Design & Planning Manager, City of Santa Monica

“As a team, we believe [the lessons we learned from the project are] not our proprietary information. ... It is a demonstration project for all of Santa Monica. ... Commercial developers I know who have [toured the building] say, ‘Oh, it makes sense. It doesn’t look that complicated.’”

— Joseph Coriaty, FAIA, Managing Partner, Frederick Fisher & Partners

LBC Materials Petal

The general contractor took the lead in managing the LBC Materials Petal, which is notoriously difficult to achieve. That approach seamlessly integrated materials selection and procurement into the larger construction budget and schedule. Because of the focus on the Materials Petal, the design process emphasized “dematerializing,” or eliminating materials (particularly finishes), whenever possible to reduce the number of products and assemblies evaluated for toxic ingredients.

The contractor’s workflow was as follows:

1. The contractor prescreened potential products through a “pre-submittal” rather than relying on subcontractors to provide documentation for products not explicitly called out in the specifications. This workflow reduced friction with subcontractors by using products they were already familiar with, shortening the review and documentation process.
2. The contractor onboarded subcontractors to train them in the Materials Petal and documentation requirements, including providing a submittal cover sheet template and asking them to fill out the pre-submittal template and provide backup documentation for the products they planned to install on the project. LBC submittals were often reviewed within 24 hours of receipt.
3. The contractor conducted field training on the key differences in an LBC project for construction workers, including the need to enforce documentation for all products installed in the building, approve hardware store runs, and follow construction waste protocols. All construction workers signed a training completion form and displayed an LBC training sticker on their hard hat.

“This was a design-build project ... so the general contractor had a big part to play. I think it was really critical to the success of the project that we were all involved from day one, and we were involved in the feasibility and began our research into material options and ingredients as the design was being formed. We started that process incredibly early. Explaining things to our subcontractors as we onboarded every single one, they were able to connect with the health aspect of sustainability. A lot more than some of them are able to connect on the environment side. I think that was really, really helpful to get their buy-in to get everyone on the same page.”

— Jessie Buckmaster, Hathaway Dinwiddie

LBC Water Petal

The design process began in 2015 when the city adopted a water neutrality ordinance, which came into effect in 2017. The ordinance prohibits any new buildings to consume more water than what was previously being used on the site unless developers pay a fee to offset the cost of building water-saving infrastructure in another part of the city. The project team worked with the local health department to develop and pilot test an Alternative Means and Methods Application (AMMA) to meet potable water, sanitary sewer, and stormwater regulations. It took advantage of a 2018 California law calling for the development of regulations for reusing water captured on-site.

The process involved more than 30 meetings with officials at all levels of government to find workarounds for antiquated regulatory language and conservative readings of current requirements. The project lead engaged a nutrient recovery specialist and a certified industrial hygienist to educate regulators about composting toilets, respond to their questions, and revise the design in response to the conditions they set for approval.

The county environmental health regulators were particularly concerned about operation and maintenance of the composting toilets. They had recently rejected a request to permit composting toilets at a campsite on Catalina Island for those reasons. Input from regulators and an industrial hygienist resulted in additional safeguards to the system, such as raising the height of the discharge stack and installing an odor-control system, ultraviolet lights, CO₂ sensors, safety equipment, a clean room vestibule,

and fan systems that function on emergency power. Before requesting a final building inspection from the city, the project received approvals from a third-party certified industrial hygienist as well as inspection reports from the building engineer and composting toilet manufacturer. An industrial hygienist was required to perform quarterly inspections for the first two years after the facility received its certificate of occupancy.

The project was required to demonstrate that the rainwater purification system produces water that meets federal and state drinking water requirements. The team used the LBC-certified Bullitt Center’s NSF P151 testing results measuring the quality of water collected from that project’s solar photovoltaic array. The manufacturer of the TPO roofing agreed to get the product tested according to the NSF P151/61 protocol, verifying that the material will not leach contaminants into the rainwater. Future projects going through Living Building certification can take advantage of that testing.

A 40,000-gallon cistern was installed beneath the building and includes a system that does not allow the water to stagnate. Regulators also required one year of testing before allowing anyone to consume water from the cistern that had been run through the water treatment system. The project also requested a waiver from the Living Building Challenge Red List, which considers chlorine a toxin, because public health regulators required the addition of chlorine to disinfect water moving from the cistern, through the water treatment system, and then to faucets.

Project financing

To attain the Living Building Challenge, it was estimated that construction costs would only increase by 9%.

Prior to building CHE, the city of Santa Monica leased office space downtown for services that could not be accommodated in the main city hall building. The city’s budget office estimated that the financial burden associated with leased office space would increase to \$10 million annually over the next 30 years. Building a city hall addition would eliminate those expenditures.

The city issued \$76,760,000 in bonds to pay for construction. The contract structure, a “progressive” design-build with three phases (design-bid-build, design-build, and a guaranteed maximum price (GMP) phase), minimized the city’s cost risk and brought in both design and construction expertise from the start of the project. The projected utility cost savings associated with the Living Building Challenge’s net zero energy and net zero water requirements helped the city make the

financial decision to build the addition. Furthermore, as an emergency services building (ESB), CHE was designed to function for 100 years, which puts its estimated 16-year payback period within the first 20% of its estimated useful life.

Essential climate justice design components include:

- 1. Design-build contract with a hands-on owner:** The contract structure required by the design competition set expectations for a highly integrated design and construction team. Adding a sophisticated and hands-on client created the conditions for an integrated team that was able to meet highly ambitious stretch goals for sustainability, health and wellness, beauty, and social equity while staying on budget.
- 2. Project vision linking equitable local governance with resilient design:** The project vision called for a design that would use green and healthy building strategies to create a space that would both support staff in delivering the best possible service to community members and become a gold standard for equitable and transparent local governance.
- 3. Leveraging a public sector owner to trailblaze new compliance pathways:** The city of Santa Monica used CHE to create regulatory precedents for alternative compliance pathways that would lower barriers for private development projects aiming to meet the city’s increasingly stringent energy, water, and climate resilience regulations without increasing construction costs.

AIA Climate Justice in Architecture Taxonomy

Climate change both creates new and amplifies existing environmental and social challenges across seven themes or categories: social determinants of health, cultural connection to place, economic development without displacement, environmental justice, ecosystem health, climate change health and resilience, and decarbonization. The Climate Justice in Architecture Taxonomy addresses both the environmental and social dimensions of climate change, guiding teams to design architectural responses that impact these themes at three scales: building occupants, the surrounding neighborhood, and regionally and globally. The taxonomy aligns and connects with the AIA Framework for Design Excellence, which represents the defining principles of design excellence in the 21st century. The framework is comprised of 10 principles and informs progress toward four outcomes: a zero-carbon, healthy, resilient, and equitable built environment.

Santa Monica City Hall East addresses all three scales in the framework, with particular emphasis on the building and regional/global scales.

Climate Justice Taxonomy	Impact of Design Features by Spatial Scale			Alignment with Framework for Design Excellence				
	Building	Neighborhood	Regional/Global					
 Social Determinants of Health				 Integration	 Equitable Communities	 Economy	 Energy	 Well-being
 Cultural Connection to Place				 Integration	 Equitable Communities	 Economy		
 Economic Development without Displacement				 Equitable Communities	 Economy			
 Environmental Justice				 Resources				
 Ecosystem Health				 Ecosystems	 Water	 Well-being	 Resources	 Change
 Climate Change Health & Resilience				 Equitable Communities	 Water	 Well-being	 Change	
 Decarbonization				 Integration	 Equitable Communities	 Economy	 Energy	 Resources
				 Change	 Discovery			

Overview of AIA Climate Justice in Architecture Taxonomy themes and spatial scales: Santa Monica City Hall East. Source: Biositu, LLC



Santa Monica City Hall East, tour of the courtyard
Image Credit: Joseph Coriaty, FAIA, Frederick Fisher & Partners

Social determinants of health

Creating a healthy and productive workplace for all city staff: The open, daylight interior layout is designed to facilitate communication and collaboration across city departments, both to reduce the number of stops community members need to make to get their business done and to improve the staff work experience.

Reducing the risk of airborne infection: The natural ventilation and open floor plan made it possible to flush the building with outdoor air during the COVID-19 pandemic. As a Santa Monica official reported, “Four years [after occupancy], we have not had a single case of transmission of COVID in the building, and we attribute a lot of that to being able to open the windows. You can’t do that in a lot of office buildings. ... We also programmed in an extra flush during the day ... — [one] at 10 o’clock, and ... [another] at 2 o’clock. ... And I was one of those people that when the windows were open ... my whole body felt better.”

Promoting the mental health of staff and visitors by creating visual and physical connections between the indoors and outdoors: Abundant daylight, manually operable windows at desk height, and views of the courtyard garden and Pacific Ocean create a sense of connection with the outdoors from the interior of the building. The open office plan facilitates natural ventilation throughout the building.

Facilitating fresh food prep for staff: Each floor includes a kitchen that doubles as a meeting space, which makes it easier for staff to prepare fresh and healthy meals.

Creating an outdoor living room for both the historic city hall and occupants of the addition: The new building closed in the fourth side of an outdoor space behind the historic city hall, converting it from unused exterior space into a highly used indoor/outdoor space that people in both buildings enjoy.

Adding pedestrian and cycling paths that cut through the property:

A pre-design occupant survey found that a high percentage of staff bike to work. Neighborhood residents report a slightly higher average of commuters using public transit, walking, or cycling compared to the city average (14.1% compared with 11.3% in Santa Monica) and a markedly higher percentage than in LA County (7.7%), California (8.7%), and the U.S. (6.7%). The building property is also located one block from high-risk intersections along the beachfront. Installing pedestrian and cycling paths separated from the street helps expand the network of pedestrian- and cycling-only infrastructure that is being built out throughout the city.

Co-locating services for older adults and housing-insecure residents alongside free educational materials and amenities like edible plants and a safe outdoor gathering place:

Santa Monica is home to a higher-than-average percentage of adults over age 65 (18.4% compared with 14.2% in LA County, 14.9% in California, and 16.5% in the U.S.). Roughly 700 community members are unhoused, a high percentage for such a small city. The estimated prevalence of food insecurity in the CHE neighborhood and surrounding neighborhoods ranges from 7% to 22%, compared with 8.5% in the city of Santa Monica, according to CDC Places. The city uses the CHE building and landscaping to demonstrate low-cost strategies that can help reduce housing and food insecurity. In addition, the fruits, vegetables, and herbs cultivated in the courtyard are harvested and made available for free to visitors.

Demonstrating transparent and welcoming governance through the building design and operations:

The building encourages civic engagement by co-locating related services, such as permitting, in an open, welcoming space that is a pleasure to visit.

“People used to have to go to two or three different places to get their business done, and that’s frustrating for folks, right? By the time they got to the counter, they were already short-tempered. ... It was in a dark area. It was loud. There were a lot of things that made it really challenging. And so, ... when you walk into the [new] space, especially if you’re hitting the light when it’s coming over the building, ... you look at the light, [and] your brain ... calms down. It is not in that fight-or-flight mode. It makes everybody feel better.”
— Amber Richane, Principal Design & Planning Manager, City of Santa Monica



Santa Monica City Hall East, interior view with biophilic elements
Image Credit: Undine Prohl, courtesy of Frederick Fisher & Partners

Economic development without causing displacement

Creating a demonstration building for all income levels: The city used the building as a test case to increase the flexibility of outdated regulations to reduce the cost and amount of time that individuals with private projects would have to expend to meet increasingly stringent green and healthy building requirements. Keeping construction and operations costs down is particularly important for affordable and mid-income housing due to the high percentage of income that goes toward housing and transportation: 49% in Santa Monica and 48% in LA County.

“Is everyone going to do a Living Building? Absolutely not. But they can learn something from the building? Absolutely. We have had community members, developers, and others come through; public officials come through and say, ‘Oh. That’s what you were talking about’ or ‘Oh. That isn’t so scary’ or ‘Can I talk to your maintenance person? What on earth is a composting toilet like?’ Those are the types of conversations we want to lean into.”

– Amber Richane, Principal Design & Planning Manager, City of Santa Monica

Reducing the tax burden on Santa Monica residents: The building is designed to save taxpayers’ money (roughly \$10 million per year in savings from leases + \$0 utility bill), which is part of an overall effort to make Santa Monica more affordable.

Reducing the cost of doing business in the city of Santa Monica: By bringing all city services under a single roof, the new wing lowers friction for residents and businesses in need of city services to advance their economic aims.

Cultural connection to place

Enhancing the visibility of the landmark art deco city hall through design: CHE enhances appreciation for the landmark 1938 art deco Santa Monica City Hall by reflecting the historic building in its façade and by reactivating an existing courtyard that previously many occupants overlooked.

Linking design elements promoting daylight with Santa Monica’s tradition of strong civic engagement: Public areas are intentionally designed as welcoming spaces, including transparency across the floorplate and installations of local art. The entrance courtyard is designed to function as an outdoor room with full visual connections to the services that are provided on the other side of the glass. It presents a functional example of transparency in local government.

Creating a community gathering space in downtown Santa Monica:

The courtyard is designed to act as a community gathering space. In the courtyard, people from different backgrounds can sit, talk, pick fruit, hold meetings, and enjoy each other’s company a block from the beach.

Starting a conversation to right historic wrongs: The public art in CHE counterbalances murals in the historic city hall that trouble members of the Santa Monica community whose ancestors were marginalized. The CHE lobby, which is accessible during the work week, displays an art exhibit called “Lives that Bind,” which highlights the works of underrepresented populations tied to Santa Monica and their histories.

“Much of what we need to do is common sense. We enjoy a really wonderful, benign climate in Santa Monica. ... We have a prevailing breeze off the ocean from Santa Monica Bay and abundant light. [Harnessing those environmental benefits using] common sense principles doesn’t take a lot of money. We just have to think about it as designers and builders.”
— Joseph Coriaty, FAIA, Managing Partner, Frederick Fisher & Partners

Environmental justice

Influencing building product manufacturers to rethink the ingredients in their products: The project team’s advocacy led the CEO of Aeroflex, which makes elastomeric insulation, to publicly commit to creating a Red List-free product. R&D around eliminating HFRs from the insulation product also ramped up.

Educating subcontractors about the health benefits to their installers of switching to nontoxic materials: This quote from a subcontractor illustrates the ripple effect of the CHE project on the local construction community: “We’re going to make sure we use [LBC] Red List-free [materials] for every project from now on. Now that we know, why would we go back?”

Paying it forward: The project team relied on publicly available information about Red List-free products that had been used on previously certified Living Buildings. To reduce the burden on future projects, the Santa Monica team has made their extensive materials research available to others seeking Living Building Certification.

“I spent about five years researching and verifying and validating materials. We talked to hundreds of manufacturers. And the vast majority were very much on board. A lot of them just didn’t know what was in their product. ... It was really a partnership and education with the manufacturers. We’ve learned a lot of chemicals show up in products that you would never expect.”
— Jessie Buckmaster, Hathaway Dinwiddie

Ecosystem health

Centering biophilia in the design: CHE is located on a property with an extensive park across the street and is three blocks from the beach and the Pacific Ocean. However, the main city hall blocks most of the view from the addition. And the surrounding neighborhood is covered with 80–100% impervious surface. Integrating biophilic elements in the building’s interior and creating strong sight lines to the tree-shaded courtyard outside turn CHE into a mini garden oasis in the middle of downtown Santa Monica.

Creating a site-specific ecosystem: The city talks about the building having its own ecosystem, with the roof as its watershed, an underground cistern as the reservoir, and the on-site water treatment skid as a decentralized water treatment plant.

Infiltrating stormwater into the site: The site captures, filters, and uses or infiltrates all stormwater coming onto the site to prevent it reaching the ocean. In this way, it helps protect nearby marine ecosystems by reducing the volume of nonpoint-source water pollution introduced to the Pacific Ocean, which borders Santa Monica. Stormwater is mostly infiltrated on-site, contributing to the underground aquifer, which remains depleted after years of historic droughts.

Balancing native ecosystem restoration with cultural heritage: The landscaping and civil engineering design seeks to balance a recycled grey water irrigation system with native habitat restoration, the historic code overlay, the LBC requirement to introduce urban agriculture to the site, and the need to minimize maintenance costs.

Contributing to city composting: The biosolids collected from the composting toilets are anticipated to be used as compost and used through the city to replenish nutrients in local soil.

“We have a beautiful building that has a lot of biophilic elements, connects with nature, ... [connects] daylight to fresh air and natural ventilation. We’re also trying to bring in those pieces where we can talk about our histories in a productive way and ensure that this is a building for the people.”
— Amber Richane, Principal Design & Planning Manager, City of Santa Monica



Santa Monica City Hall East, cistern installation
Image Credit: Frederick Fisher and Partners

Climate change health & resilience

Designing with the future in mind: On-site water use and exposure to drought and flooding were analyzed within the context of climate change projections and the carrying capacity of the site and its surroundings.

Respecting water as a precious resource in a drought- and flood-prone region: Santa Monica averages 14 inches of rain each year, mostly in the winter (December–March). The city has a goal of becoming water self-sufficient and this building helps prove that model. The net zero water design, including a 40,000-gallon cistern underneath the building, and the project’s leadership in increasing the flexibility of environmental health regulations support the city’s goal of achieving water independence.

Mitigating occupant exposure to traffic-related air pollution: The building site is adjacent to the terminus of Interstate 10. As a result, it experiences high exposure to traffic-related air pollution (80th and 90th percentile exposure to particulate matter and ozone in California, respectively). Diesel particulate pollution, a known carcinogen, is estimated to be 20.39 kg/day. Enhanced filtration media required by the LBC, orienting the building away from the freeway, and funneling ocean breezes through the building help mitigate occupant exposure to the outdoor air pollution. Air quality is monitored both inside and outside before the windows are opened by the building management system (BMS).

Designing for earthquake resilience: According to the FEMA Hazard Risk Index, Santa Monica City Hall is located in the 99th percentile of earthquake risk. As an essential services facility, CHE was designed to function after a major earthquake. The structure meets seismic code requirements 1.5 times above the normal California code. A 15,000 sq. ft., 240-kv solar array works in tandem with the net zero energy design to allow the facility to operate during power outages.

“The composting toilets work if the power goes out, although they might not smell as good. We have an on-site water treatment plant, so we can process water if there is a water main break. We can adjust the temperature using the operable windows. And the systems furniture could be taken out to convert the building into an emergency shelter.”
— Amber Richane, Principal Design & Planning Manager, City of Santa Monica (Common\Edge)

Mitigating the site’s contribution to introducing polluted stormwater to Santa Monica Bay: The site is several blocks from the Pacific Ocean in a metropolitan area with high percentages of impervious surface (roughly 60%). It is therefore at risk of contributing to nonpoint-source water pollution in Santa Monica Bay. The roofs, landscaping, and civil engineering design ensure that no stormwater leaves the site.

Mitigating neighborhood exposure to extreme heat: The CHE neighborhood falls within the 93rd percentile in California for disparities in heat vulnerability, a particularly troubling statistic given the high percentage of older adults and unhoused individuals living in the neighborhood— both of whom are more sensitive than the general population to heat-related illness. The net zero energy design, publicly available lobby, and shaded courtyard work hand in hand with city services aimed at reducing disparities in exposure during heat waves.

Mitigating wildfire risk: While the trajectory of wildfires is notoriously unpredictable, Santa Monica is estimated to experience greater wildfire risk than 92% of communities in the U.S. and 64% of communities in California, according to the U.S. Forest Service. The concrete structure, minimal flammable materials on the building’s interior, hybrid ventilation system design, and drought-resistant landscaping all reduce the risk of wildfire disrupting building operations. They also demonstrate strategies for community members working to reduce their own property’s exposure to wildfire risk—including protecting occupants from poor air quality when downwind from active fires.

Decarbonization

Achieving net zero energy use: CHE meets the LBC requirements for net zero energy use through a combination of building design, high-efficiency insulation, natural ventilation, high-efficiency HVAC, and on-site solar power. It also acts as a demonstration building supporting the city of Santa Monica’s goal of becoming a carbon neutral city by 2050.

Balancing transparency with energy efficiency: The glass curtainwall includes a low-e coating and ceramic frit. From the outside, it looks like an entirely glass façade, but from the inside it reveals its 40% window-to-wall ratio, which is typical of net zero energy buildings.

Windows and the building mass work together to maximize the passive cooling system: Automatic windows controlled by a weather station to capture sea breezes are located near the ceiling. Windows automatically open at night to draw in cool air, which is absorbed into the mass of exposed concrete decks. The concrete building mass passively cools the building for the first part of the workday, eventually shifting to active radiant heating/cooling, which provides uniform thermal comfort and can cover about 50% of peak load. A ducted variable air volume system kicks in on very hot and very cold days.

“Really crucial to our project was being design wise. The architecture team was very intentional. We called it ‘dematerializing’ — [deciding] what is absolutely necessary for the building? And what can we ... leave out?”
— Jessie Buckmaster, Hathaway Dinwiddie

Testing new technologies to provide passive auxiliary cooling: The building uses 40,000 square feet of PCM (phase change material) sheets in the curtainwall spandrels, interior stud frame walls, and acoustical ceiling clouds. PCM are filled with a vegetable oil-based material that absorbs heat to cool its surroundings during the heat of the day and re-radiates it when the ambient air cools at the end of the day.



Supplying electricity using on-site solar power: A 15,000 sq. ft., 240-kv solar array works with the net zero energy design to eliminate scope 1 and 2 greenhouse gas emissions through facility operations. Scope 1 emissions refer to direct emissions generated by burning fossil fuels on-site. Scope 2 refers to indirect emissions from electricity, steam, or other building systems.

Reducing the operational carbon footprint associated with water use by meeting LBC net zero water goals: The project reduced demand for potable water by installing the greatest number of composting toilets in a single property in California. The foam-based composting toilets reduced the building's water demand by 70% (270,000 gal/yr). A 40,000-gallon cistern under the building captures rainwater, and an on-site well that penetrates 50–60 feet beneath the building can supplement the water supply during droughts. Rainwater and well water is purified using cartridge filters and granulated active-carbon filters. Greywater is captured from air handling unit condensate, showers, and lavatories. It is treated using a moving bed-membrane bioreactor and used for on-site irrigation.

“One of the reasons we chose the Living Building Challenge is that it’s not just about net zero energy or ... water. You’re not checking boxes. ... The Living Building Challenge really looks holistically at how the building lives within the means of the site. And how it supports the human health and wellness of its occupants, including construction and kind of all the way through. It really was a paradigm shift.”

— Amber Richane, Principal Design & Planning Manager, City of Santa Monica

Reducing the building’s construction embodied carbon by diverting almost all of its construction waste: The project worked with a construction waste management company to divert waste for recycling and reuse, such as grinding gypsum scraps into dust that was sold as agricultural amendments. Final diversion rates demonstrated that city of Santa Monica’s goal of zero waste production by 2030 is feasible: 95% of paper and cardboard, 100% of soil, 90% of rigid foam/carpet/insulation, and 80% of combined construction waste were diverted from landfills.

Leveraging the decarbonization goal to benefit local businesses: The city actively encouraged the design team and contractor to source products that combined a small carbon footprint with supporting local businesses and integrating local materials and cultural references into the design. For example, several of the tables in CHE were made from trees that came down in a windstorm, were dried, milled, and fabricated all within a 15-mile radius of the site.

“There was a big windstorm in Los Angeles in the period that we were designing the building, and we came across a company called Angel City Lumber that [recycles] trees that had fallen down, and a bunch of the millwork in the building are those trees from Santa Monica. ... The story [is] that as much as possible the city was conscious and pressing us all the way.”

— Joseph Coriaty, FAIA, Managing Partner, Frederick Fisher & Partners

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