



Sustainability & Resilience

Optimize performance. anticipate and address stakeholder needs with tailored solutions.

As a trusted national consultant for over 40 years, Marx Okubo provides sustainability and resilience services to improve new builds and existing structures as well as consider adaptive reuse. Our proactive, multidisciplinary teams can customize reliable, impactful advancements that reduce operating costs while maximizing returns, reducing emissions, improving efficiencies, and aiding in occupants' well-being.

SERVICES ACROSS
THE LIFECYCLE

Owner's Representation
Property Condition Assessment
Project Management
Constructability Reviews
Repair & Reconstruction
Facility Condition Assessment
Construction Loan Monitoring

Accessibility
Building Enclosure
Fire Protection/Life Safety
Mechanical/Electrical/Plumbing
• **Sustainability & Resilience**
Structural Engineering
ASAP®

Sustainability & Resilience Services



Attached to every building and portfolio are important, distinct investment goals and opportunities—and high on the list these days are needs to improve building performance, protect from natural hazard impacts, or how to fulfill local jurisdictional and state mandates. Providing thorough and thoughtful sustainability and resilience consulting, Marx Okubo tailors services and programs that incorporate best practices and anticipate/address real estate owner, investor, and other stakeholder needs and concerns around the lifecycle of a building.

ADVISORY SERVICES

- > Net-zero carbon emissions strategy
- > Sustainability and Resilience property benchmarking analysis
- > Regulatory compliance assessments
- > Environmental management systems
- > EHS policy and compliance
- > Physical and transitional climate-risk analysis and mitigation
- > Reporting framework advisory services
- > Adaptive reuse consulting

ZERO NET ENERGY

- > Energy analysis and studies
- > Design consulting
- > Documentation support

BUILDING CERTIFICATIONS

- > LEED Certification
- > Energy Star Certification
- > WELL Certification
- > FitWel Certification

BUILDING EFFICIENCY

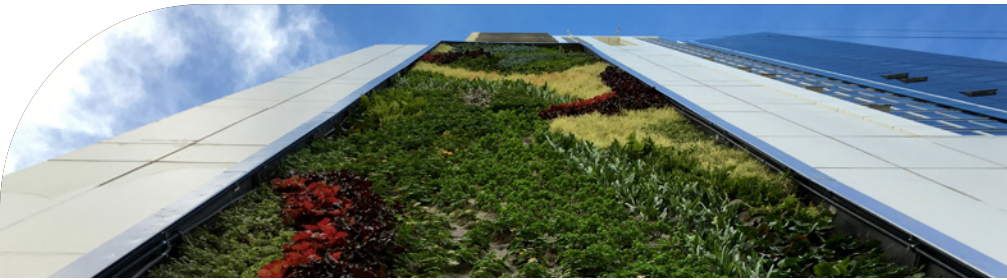
- > Energy auditing and modeling
- > Energy and water benchmarking
- > Commissioning/retro-commissioning
- > MEP Assessments
- > Carbon footprint analysis
- > Carbon Risk Real Estate Monitoring (CRREM)
- > Water and waste management
- > Sustainability and Resilience property analysis

OCCUPANT HEALTH AND WELLBEING

- > Industrial hygiene services
- > Hazardous materials testing/abatement
- > Indoor air & environmental quality assessments
- > Air and water permitting
- > Development of facility wellness criteria



We consult to limit your exposure now, giving you greater confidence in your decisions for the future.



Sustainability

Smarter properties: Building increased value.

Whether you are looking to address long-term ownership and operational efficiencies, get assistance with development design, improve portfolio sustainability metrics, or boost investment ROI, Marx Okubo's sustainability solutions go beyond traditional engineering to consider all elements of sustainability and their relation to current and future code requirements, industry trends, building operations, durability, and ultimately, value.

Marx Okubo understands the intricacies of buildings and how they often end up wasting energy and money. While green design is becoming a more standard practice and solution, it's critical to have guiding expertise in this process to reduce the long-term operating costs of a property as well as add greater efficiencies and value to the built environment for the next generation.

The Marx Okubo team includes architectural and engineering professionals with additional LEED, WELL, Fitwel, Certified Energy Modeling, and Certified Indoor Air Quality Professional accreditations. Providing sustainability consulting on both new construction and existing property projects, Marx Okubo's teams help owners, investors, lenders, and tenants determine the sustainability potential of a property and lifecycle cost benefits; navigate government regulations and environmental certifications; and comply with/prepare for sustainability benchmarking and reporting initiatives, such as Global Real Estate Sustainability Benchmark (GRESB) and Global Reporting Initiative (GRI).

KEY SUSTAINABILITY SERVICES:

- > Sustainability reviews: baseline, enhanced, customized sustainability, management reports
- > Net-zero energy studies
- > Whole building life cycle analysis (WBLCA)
- > Certification gap analysis
- > Solar and battery storage feasibility studies
- > ASHRAE Level I, II, and III energy audits
- > Carbon Risk Real Estate Monitoring (CRREM)
- > Building commissioning: new building, building envelope, LEED, and code-required
- > Healthy building services: WELL & Fitwel certifications, indoor air quality testing/monitoring
- > Electric vehicle charging station reviews
- > Governmental, code and local jurisdiction regulations and incentive programs

Connect with a
sustainability specialist.



OUTCOME

The energy audit identified energy conservation measures that could result in approximately \$594,743 in potential energy cost savings.

UBS Energy Audit Portfolio

Various cities and states throughout the US

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UBS Realty Investors

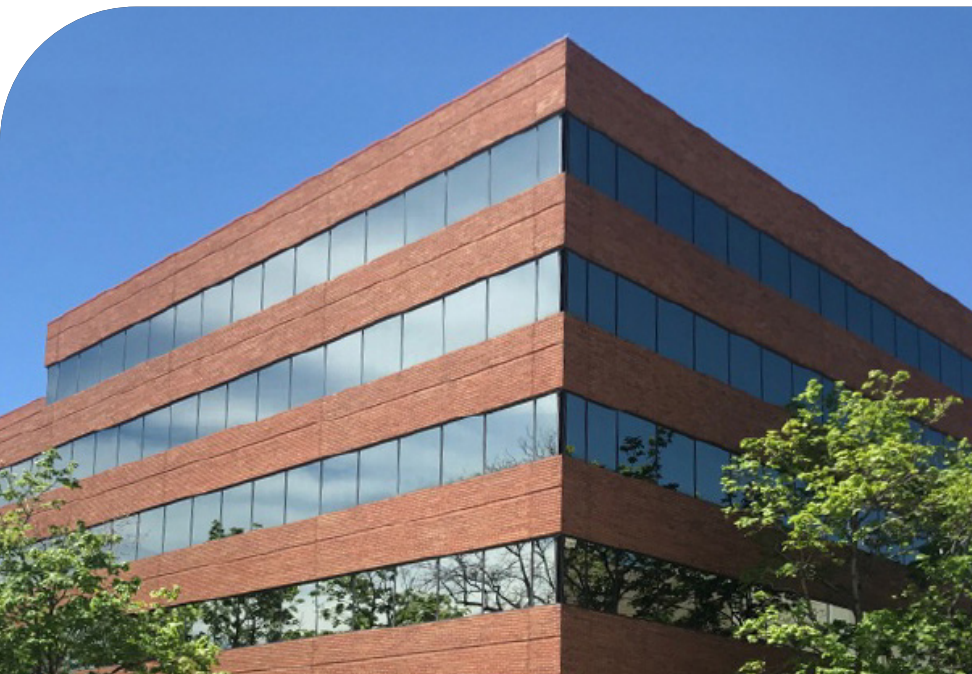
SERVICES

Sustainability,
Mechanical/Electrical/Plumbing

Our team worked with UBS Realty Investors, LLC, to complete seven ASHRAE Level II energy audits on 39 buildings, spread out over seven properties, totaling more than 2,209,325 square feet. Our survey included a review of the physical conditions related to systems, equipment, and components of the building infrastructure to determine recommended energy conservation measures (ECMs), water conservation measures, and how to improve building operations.

The energy audit identified energy conservation measures that could result in approximately \$594,743 in potential energy cost savings from reduced annual energy consumption and annual maintenance savings.

The audit also identified low-cost measures such as lighting upgrades as well as capital improvement measures that include HVAC equipment upgrades. In general, the results of an energy audit tend not to recommend replacing HVAC equipment because the high cost outweighs the relatively low annual savings. However, our evaluations considered the incremental cost of replacing equipment that is at the end of its useful service life with high-efficiency equipment, and thus installation of this equipment was included with our recommendations.



455 Sherman Street

Denver, Colorado

CLIENT

Sherman Joint Venture

SERVICES

Sustainability

Built in 1983, this project consisted of a Class A, five-story, 117,305-square-foot office building with an upgraded conference room, showers/lockers, covered parking, and onsite ownership/management.

Marx Okubo performed an ASHRAE Level II energy audit of the property to identify and provide a savings and cost analysis of practical measures that met the owner's constraints and economic criteria as well as discuss effects on operation and maintenance procedures. Our assessment included a review of the existing building envelope (windows, doors, roofing, insulation, wall systems, etc.) together with the mechanical, electrical, and plumbing systems as they relate to the building energy and water usage.

In performing the energy audit, Marx Okubo recommended two capital improvement options including replacement of the obsolete air distribution system with a variable air volume system, and a shift from the pneumatic control system to electronic controls with direct digital control (DDC) logic. Marx Okubo assisted the client in performing owner's representation services for these capital improvement projects by creating performance drawings and specifications, providing bid process oversight with three design/build contractors, selecting the contractor, and providing design construction administration throughout the construction.

With work completed in 2021, the building shows increased efficiency, in time for the latest energy efficiency requirements through the Energize Denver ordinance.



Multifamily Residential in New York

Westchester County, New York

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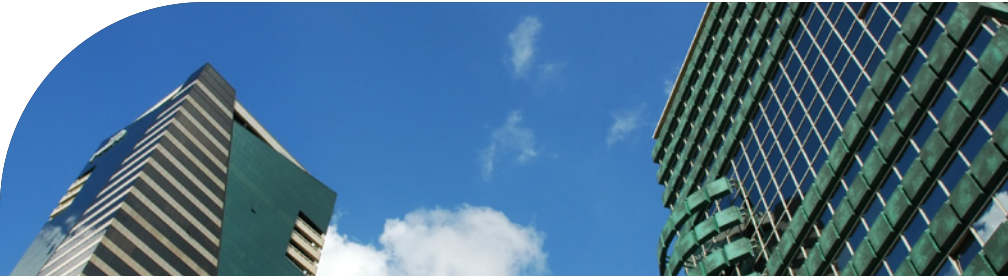
SERVICES

Sustainability,
Owner's Representation,
Accessibility

The client engaged Marx Okubo to provide owner's representation services for the ground-up development of a senior living facility with 26 memory care units and 74 assisted living units in Mt. Pleasant, New York. During the design phase, our team identified multiple indoor environmental quality risks and opportunities, including potential radon risk for dwelling units proposed at grade level, substandard acoustic assemblies, opportunities to improve HVAC filtration, and vulnerabilities in the building enclosure design that presented a water intrusion risk. Marx Okubo also led studies to assess potential costs and benefits of a ground source heat pump system and rooftop solar arrays, and our team identified opportunities to add electric vehicle charging stations to the project. Among other design modifications that resulted from Marx Okubo's analysis, the development team added a radon mitigation system, electric vehicle charging stations, and rooftop solar arrays to the project.

During construction, our team conducted detailed reviews of waterproofing and roofing systems to ensure these systems were installed in conformance with the approved construction documents and manufacturer's installation requirements. In addition, the team performed thorough accessibility reviews to verify compliant access for occupants with mobility challenges.

Marx Okubo also performed comprehensive solar consulting services, including solicitation of bids from qualified contractors, bid leveling, an interconnection study with the local utility, a review of state and federal financial incentives, an analysis of electricity demand and estimated solar production, a review of carbon avoidance impacts, and contract negotiation for a 160,000 kWh rooftop solar electricity system. The client executed an agreement with a solar contractor, and energy savings are anticipated to result in a payback period of less than five years, with an anticipated 15% reduction of total operating carbon emissions from the project.



Resilience

Dedicated to identifying and minimizing natural disaster risks, while maximizing continuity of operations.

Marx Okubo works with investors, owners, tenants, and property managers during site selection, design, construction, operations, and event response activities to identify property risks, understand how to reduce risks and repair costs, and maximize the continuity of operations of a property. With our in-house resiliency specialists, we are committed to evaluating and improving the built environment's response to climate-related natural disasters and assisting clients to ultimately create assets that are passively survivable and supportive of the surrounding communities.

Through an understanding of climate risks and building science and operations, Marx Okubo can help determine how a building will likely respond to potential hazard events. Our team works with a client to determine an acceptable level of physical, operational, and transitional risk and provide recommendations on how the property or operations can be altered to future-proof their properties or meet portfolio-specific goals.

Our in-house resiliency team is a dedicated group of professionals, including licensed architects and engineers, who specialize in identifying potential physical and social vulnerabilities of the built environment, as caused by natural hazards. Physical hazards include earthquakes, flooding, hurricanes, wildfires, severe winter storms, and tornadoes.

We consult on all phases of a building's lifecycle to anticipate and develop solutions for a variety of natural events. We are focused on how the design and construction, pre-event operations, and post-event response can reduce repair costs and maximize the continuity of a property's operations. Ultimately, as climate risk exposure levels can influence insurance costs, capital improvement costs, and overall integrity of buildings across a portfolio, clients need to perform more frequently a portfolio resiliency analysis to identify the properties that decrease the portfolio's overall resiliency rating while maintaining buildings' overall operational integrity.

KEY RESILIENCY SERVICES:

New Construction:

- > Property hazard assessment
- > Property resilience assessment (PRA): Site selection hazard screening, desktop-based vulnerability assessment of project documents, and mitigation strategy recommendation

Existing Building:

- > Property hazard assessment
- > Property resilience assessment (PRA): Site hazard screening, observation-based vulnerability assessment, and mitigation strategy recommendation
- > Post-disaster assessment: Observation-based damage assessment, repair recommendation, and mitigation strategy recommendation
- > Flood zone analysis and management: Evaluation to help prepare for/mitigate insurance issues.

**Connect with a
resiliency specialist.**



OUTCOME

Marx Okubo provided practical solutions to reduce exposure to potential damage related to high wind events, localized flooding, and loss of power. The insights that our team contributed enabled our client to negotiate with their development partner to mitigate risks to an acceptable level for all parties.

Climate Hazard and Property Physical Resilience Assessment

*Boston Metro Area,
Massachusetts*

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SERVICES

Resilience

An equity investor involved in a proposed multifamily project engaged Marx Okubo to conduct a climate hazard and property physical resilience assessment as part of the project's due diligence. The project comprised 259 residential units within three separate buildings with a total area of 320,000 square feet. As a requisite step to close on the deal, the client required that our team use the Munich RE hazard assessment tool for this project, with the assessment taking place within the client's limited due-diligence period.

Marx Okubo identified the climate hazards that presented the highest risk to the project, assessed vulnerabilities based on a technical review of the construction documents, investigated potential measures to mitigate risks, and submitted recommendations to the client and their development partner. Throughout this process, Marx Okubo provided practical solutions to reduce exposure to potential damage related to high wind events, localized flooding, and loss of power. The insights that our team contributed enabled our client to negotiate with their development partner to mitigate risks to an acceptable level for all parties.



Warehouse Facility

Miami-Dade County, Florida

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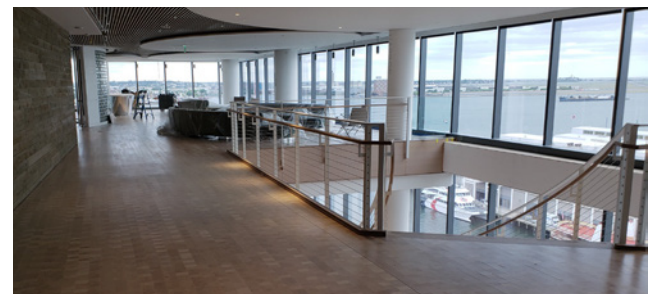
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SERVICES

Resilience

The client for this project, a warehouse facility located in an area subject to hurricanes, flooding, tornadoes and associated disruption to utilities, engaged Marx Okubo to conduct a preliminary site vulnerability assessment, which identified and quantified potential physical hazards and how they could affect the subject property. This assessment allowed the client to make an educated decision on whether to pursue the project and to ensure that hazards are discussed with the design team and vulnerabilities will be addressed.

Identifying risks prior to development streamlines design efficiencies and minimizes change orders during construction. Marx Okubo's evaluation allowed for a collaborative approach between architecture and engineering design professionals in order to provide the highest quality product without unnecessary costs.



Pier 4

Boston, Massachusetts

CLIENT

Commonwealth Partners

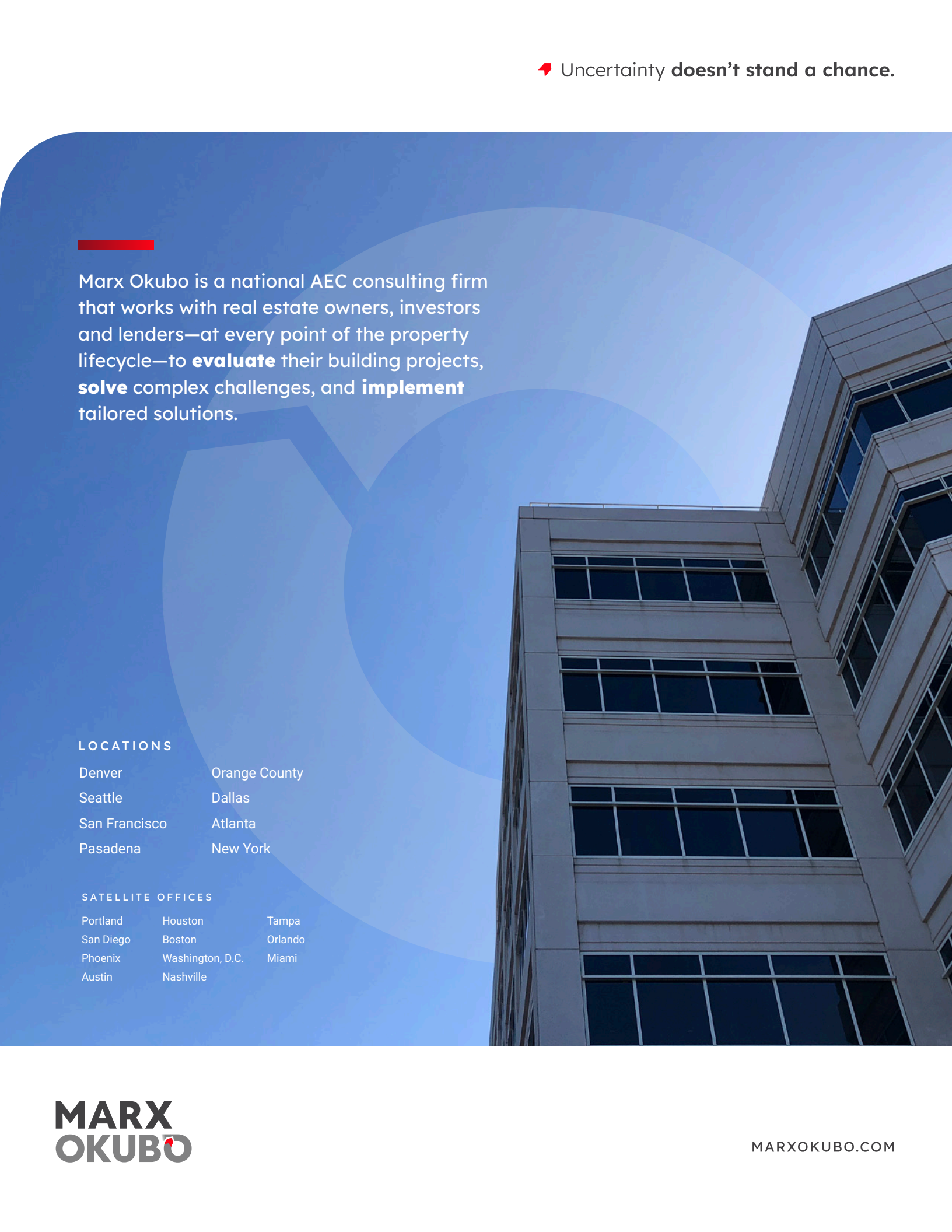
SERVICES

Property Condition Assessment,
Resilience

Marx Okubo's resiliency assessment included identifying key climate threats and assessing the property vulnerability. We made recommendations to reduce the climate hazard risk to the client's acceptable level appropriate to its unique resiliency protocols, property management relationships and capital improvement budgets.

As the property is located in an area with frequent hurricanes and also where rising sea levels threaten continuing development along the Boston Harbor, we incorporated strategies and tools to reduce the flood risk, including flood-resistant finishes, separated sub-grade vertical transportation, and implemented various methods of site detention and storm surge protection.

↗ Uncertainty **doesn't stand a chance.**



Marx Okubo is a national AEC consulting firm that works with real estate owners, investors and lenders—at every point of the property lifecycle—to **evaluate** their building projects, **solve** complex challenges, and **implement** tailored solutions.

LOCATIONS

Denver	Orange County
Seattle	Dallas
San Francisco	Atlanta
Pasadena	New York

SATELLITE OFFICES

Portland	Houston	Tampa
San Diego	Boston	Orlando
Phoenix	Washington, D.C.	Miami
Austin	Nashville	