



**SPUR**

**POLICY BRIEF**  
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# 120 Years After 1906

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San Francisco's progress toward  
earthquake-safe buildings — and what  
needs to happen next



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# Executive Summary

On April 18, 1906, San Francisco was struck by a magnitude 7.9 earthquake that destroyed homes, commercial buildings, and critical infrastructure. 120 years later, San Francisco continues to face a dilemma: The city's earthquake resilience is limited by the high number of buildings constructed before seismic safety codes, and retrofitting these buildings will require significant investments that will yield benefits to the city, occupants, and property owners only in the event of a major earthquake.

With about 60% of the city's buildings constructed before 1940, many homes and commercial structures standing today were built without consideration for modern earthquake codes. Those older buildings are foundational to the city's identity, economy, and community life. Without proactive intervention, these buildings will be vulnerable not only to seismic events but also to climate-driven extreme heat, flooding, and fire, posing risks to life, economic stability, and long-term community resilience.

This brief builds on two reports that pushed the city to substantially strengthen its older building stock: a 2009 SPUR report, *The Dilemma of Existing Buildings*, and a 2011 City of San Francisco report, *Community Action Plan for Seismic Safety*. Those publications helped lead to mandatory retrofit projects, technical studies, financing programs, and capital planning frameworks to protect San Francisco residents and maintain the city's critical services during and after a major earthquake.

While acknowledging the city's significant strides in retrofitting vulnerable buildings, improving emergency response infrastructure, and advancing policies to reduce seismic and fire risks, this brief highlights two realities: Thousands of privately owned and city-owned buildings remain at risk, and post-earthquake fire hazards are insufficiently addressed. In light of these vulnerabilities, SPUR recommends adopting mandatory retrofit programs for some at-risk building types, creating financial incentives for retrofitting and rebuilding and linking these incentives to the city's downtown revitalization efforts, developing a formal seismic safety policy for city-owned buildings, and integrating post-earthquake fire mitigation into the city's broader sustainability and resilience strategies.

In short, seismic investments today will increase San Francisco's resilience tomorrow.

# Introduction

On the 120th anniversary of the Great 1906 Earthquake and Fire, San Francisco continues to face a dilemma: The city's earthquake resilience is limited by the safety of its existing buildings, and the significant expense of retrofitting them will yield benefits to the city, occupants, and property owners only in the event of a major earthquake. To address this dilemma, SPUR believes that the next phase of seismic policy efforts must align earthquake resilience with other city priorities — including downtown revitalization, housing production, and building decarbonization — to ensure that older buildings support, rather than hinder, San Francisco's long-term resilience.

## The Quake That Still Reverberates

At dawn on April 18, 1906, San Francisco was rocked by a magnitude 7.9 earthquake that damaged buildings, ruptured streets, and fractured infrastructure across the city. The initial shaking destroyed many homes and commercial structures, but it was the fires — ignited by broken gas lines and difficult to suppress with broken water lines — that turned the disaster into an even greater catastrophe, burning for days and ultimately destroying roughly 28,000 buildings. What was then the largest city in California saw more than 3,000 people killed and a staggering number left without shelter. Between 225,000 and 250,000 people were rendered homeless overnight.<sup>1</sup> With whole neighborhoods reduced to ashes, survivors initially camped in parks and open spaces and later moved into interim “relief cottages” erected in neighborhood parks such as Jefferson Square, Precita Park, and Portsmouth Square while the long task of rebuilding unfolded.<sup>2</sup> The catastrophe reshaped not only the city's physical landscape but also its social fabric and planning priorities, underscoring that without safe buildings, recovery is slow and can cause long-term damage to the local economy.

The 1906 earthquake was also a key moment for our organization. SPUR, then known as the San Francisco Housing Association, was established in 1910 by a group of San Francisco city leaders who came together to improve housing quality in the wake of that event.

This policy brief focuses on the seismic safety of older buildings by revisiting the work of SPUR's 2009 report *The Dilemma of Existing Buildings*, which was part of a larger series of work on seismic safety and disaster preparedness known as SPUR's Resilient City Initiative.<sup>3</sup>

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<sup>1</sup> C. A. Kircher, H. A. Seligson, J. Bouabid, and G. C. Morrow, *When the Big One Strikes Again: Estimated Losses Due to a Repeat of the 1906 San Francisco Earthquake*, 2006, <https://www.1906eaconf.org/mediadocs/BigonestrikesReport.pdf>.

<sup>2</sup> These cottages were later given to the refugees to relocate them. Some are still visible around San Francisco. See K. Schwartz, “San Francisco's Historic 'Relief Cottages,' Built After the 1906 Earthquake, Are Hidden in Plain Sight,” *KQED News*, January 8, 2026, <https://www.kqed.org/news/12068602/san-franciscos-historic-relief-cottages-built-after-the-1906-earthquake-are-hidden-in-plain-sight>.

<sup>3</sup> D. Bonowitz, *The Dilemma of Existing Buildings: Private Property, Public Risk*, SPUR, February 2009, <https://www.spur.org/publications/spur-report/2009-02-01/dilemma-existing-buildings>. See also SPUR, “The Resilient City: Creating a New Framework for Disaster Planning,” <https://www.spur.org/resilientcity>.

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## Preparing for the Inevitable

Like sea level rise, earthquakes are inevitable. The difference, of course, is that earthquakes offer no warning. They could happen at any time, making action today critical to reducing loss of life, housing, and essential services.

A 1906-scale earthquake striking the San Francisco Bay Area today would cause extensive damage and disruption, despite the region being far better prepared than it was more than a century ago. A 2006 study by the Earthquake Engineering Research Institute estimated that a repeat of the 1906 earthquake could severely damage or destroy more than 7,000 commercial buildings, displace 160,000 households (approximately 400,000 people), and cause \$149 billion (2025 dollars) in total direct economic losses across the region.<sup>4</sup> These estimates include neither the potential for earthquake-related fires nor the environmental cleanup that would be required. For comparison, the January 2025 Los Angeles fires destroyed nearly 16,000 structures (including 11,000 homes), displaced 100,000 individuals, and caused an estimated \$130 billion in losses.<sup>5</sup>

According to the United States Geological Survey, in the next 30 years, the Bay Area has a 72% chance of experiencing a magnitude 6.7 or greater earthquake and a 20% chance of experiencing a magnitude 7.5 earthquake.<sup>6</sup> In quakes of these magnitudes, thousands of older buildings could suffer major damage, driving prolonged economic impacts and potentially triggering forced residential displacement in an already constrained housing market.

Seismically retrofitting buildings is not just about saving structures; it is about keeping people safe, maintaining stability for families and businesses, and sustaining critical functions to support emergency response and speed recovery — considerations raised in SPUR's 2009 *The Dilemma of Existing Buildings* report.

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<sup>4</sup> C. A. Kircher, H. A. Seligson, J. Bouabid, and G. C. Morrow, *When the Big One Strikes Again: Estimated Losses Due to a Repeat of the 1906 San Francisco Earthquake*, 2006, <https://www.1906eqconf.org/mediadocs/BigonestrikesReport.pdf>.

<sup>5</sup> Zhiyun Li and William Yu, "Economic Impact of the Los Angeles Wildfires," UCLA Anderson Forecast, UCLA Anderson School of Management, March 3, 2025, <https://www.anderson.ucla.edu/about/centers/ucla-anderson-forecast/economic-impact-los-angeles-wildfires>.

<sup>6</sup> E. H. Field and 2014 Working Group on California Earthquake Probabilities, "UCERF3: A New Earthquake Forecast for California's Complex Fault System," U.S. Geological Survey Fact Sheet 2015-3009, 2015, <https://dx.doi.org/10.3133/fs20153009>.

# Reducing Seismic Risks of Older Buildings

SPUR's 2009 report *The Dilemma of Existing Buildings* made six near-term recommendations for action on seismic safety in San Francisco:<sup>7</sup>

1. Mandated retrofit of soft-story wood-frame multifamily housing
2. Mandated retrofit or redundancy for designated shelters
3. Mitigation program for essential city services
4. Mitigation program for critical non-ductile concrete buildings
5. Mandated and triggered retrofit of gas lines and gas-fired equipment
6. Assessment of the unreinforced masonry program

This report, and the broader SPUR Resilient City Initiative that it was part of, influenced the city's development of the Community Action Plan for Seismic Safety (CAPSS), a plan to reduce earthquake risk in existing privately owned buildings and a set of guidelines for repair and rebuilding after an earthquake. The CAPSS report series *Here Today — Here Tomorrow: The Road to Earthquake Resilience in San Francisco* was completed in 2011. CAPSS proposed five long-term objectives to guide mitigation and priorities:<sup>8</sup>

1. Residents will be able to stay in their own homes.
2. Residents will quickly have access to important, privately run community services.
3. No building will collapse catastrophically.
4. Businesses and the economy will quickly return to functionality.
5. Sense of place will be preserved.

In December 2010, then-Mayor Gavin Newsom launched the Earthquake Safety Implementation Program, a 30-year work plan (2012–2042) for implementing CAPSS. The Office of Resilience and Capital Planning and the Department of Building Inspection are the main city departments tasked with implementing CAPSS.

This brief looks at efforts to address privately owned buildings with known seismic deficiencies and city-owned buildings providing fire, police, emergency response, health care, and other critical

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<sup>7</sup> D. Bonowitz, *The Dilemma of Existing Buildings: Private Property, Public Risk*, SPUR, February 2009, <https://www.spur.org/publications/spur-report/2009-02-01/dilemma-existing-buildings>.

<sup>8</sup> City and County of San Francisco, *Community Action Plan for Seismic Safety: CAPSS Earthquake Safety Implementation Program — Workplan 2012–2042*, 2011, <https://www.sfgov.org/sfc/sites/default/files/ESIP/FileCenter/Documents/9765-esiplan.pdf>.

services. San Francisco has taken steps to reduce seismic risks for both types of buildings, but further action is needed.

## Privately Owned Buildings With Known Structural Deficiencies

San Francisco has implemented a variety of studies and seismic safety programs to address vulnerabilities in privately owned buildings. In this section, we review these efforts and make four new recommendations regarding privately owned buildings.

### Seismic Efforts to Date

#### Screening Program for At-Risk Concrete Buildings (Adopted 2025)

*This action addresses SPUR's 2009 recommendation calling for a "mitigation program for critical non-ductile concrete buildings." The recommendation called for the city to develop a vulnerable building inventory.*

In 2025, San Francisco advanced its seismic safety efforts by adopting the Concrete Building Screening Program, which focuses on gathering structural information on two distinct types of older concrete buildings with different structural deficiencies: non-ductile concrete buildings and rigid-wall flexible-diaphragm buildings, also known as tilt-up buildings. In order to notify building owners that they are subject to the screening program, the city has gathered a preliminary list of concrete buildings by reviewing the property records, as well as occupancy and retrofit permits. Data from these sources are useful but can be inconsistent or incomplete. The screening program will help the city gather and confirm information on vulnerable concrete buildings — information that will help the city determine next steps. This mandatory screening program is paired with voluntary retrofit standards in the building code.

Non-ductile concrete (NDC) buildings — often mid-rise apartments, offices, or institutional buildings constructed before modern earthquake codes — use rigid concrete frames or walls that lack the flexibility to yield without breaking during intense earthquake shaking. During the 2011 earthquake in Christchurch, New Zealand, the collapse of two mid-rise NDC buildings led to 135 deaths, more than 70% of the total death toll.<sup>9</sup>

NDC buildings are predominantly located in San Francisco's downtown neighborhoods. Based on its preliminary list of concrete buildings, the city believes these buildings contain a critical portion of San Francisco's affordable housing stock, including single-room occupancy housing, which is concentrated in the Tenderloin, Chinatown, and the Mission. Some 40% of private schools may also be located in NDC buildings.<sup>10</sup> Retrofitting these buildings is expensive, structurally challenging, and logistically difficult because existing office or residential tenants will need to be

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<sup>9</sup> Weng Yuen Kam and Stefano Pampanin, "The Seismic Performance of RC Buildings in the 22 February 2011 Christchurch Earthquake," *Structural Concrete* 12, no. 4 (December 2011): 223-33, <https://doi.org/10.1002/suco.201100044>.

<sup>10</sup> "San Francisco Tall Buildings Safety Strategy," presentation to SPUR by D. Mieler, City and County of San Francisco Office of Resilience and Capitol Planning, August 20, 2019, <https://www.spur.org/sites/default/files/2019-09/2019.08.20%20Tall%20Buildings.pdf>.

temporarily relocated. Underscoring the life-safety risk posed by these buildings, San Francisco's *Community Action Plan for Seismic Safety*, published in 2011, established a goal of mandating retrofits for NDC buildings by 2031.<sup>11</sup> In the face of significant retrofit and replacement challenges, worsened by the economic downturn caused by the COVID-19 pandemic, the city has yet to mandate retrofits. However, it has been collaborating with the Concrete Building Safety Program Working Group and other partners to develop financing and technical assistance tools to create feasible pathways for compliance.

Tilt-up concrete buildings are typically low-rise industrial or commercial structures built with large pre-cast concrete wall panels cast on the ground and then tilted up on site. Before modern building codes, the buildings' walls were inadequately connected to one another and to the roof, causing them to separate during earthquakes. Retrofitting these buildings typically requires adding structural connectors between the walls and the roof. This work can be completed in phases, requiring minimal business disruptions. In San Francisco, several tilt-up buildings house grocery stores and distribution centers, which are important for supply chain recovery after an earthquake.

The city estimates that some 3,700 non-ductile and tilt-up concrete buildings (about 2% of San Francisco's building stock) were built before 1995, when new building codes addressed previous structural deficiencies (Exhibit 1).<sup>12</sup> The city likely owns as many as 116 of these buildings.<sup>13</sup>

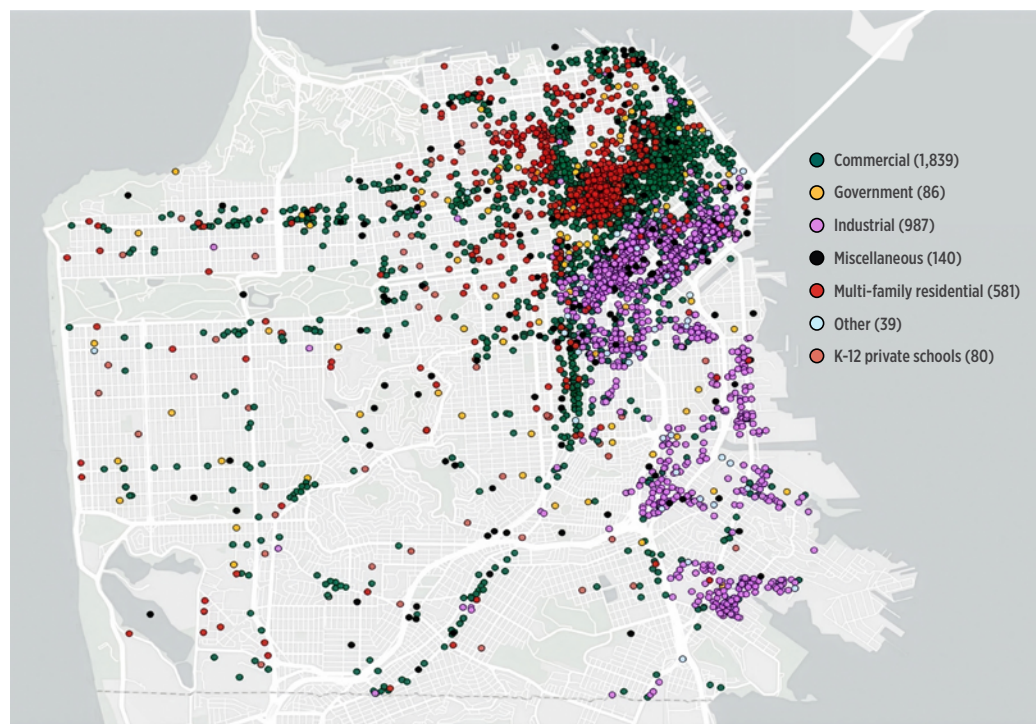
#### EXHIBIT 1

##### Location of Known Concrete Buildings Built Before 1995

This map shows tilt-up and non-ductile concrete buildings built before 1995 that may have seismic deficiencies based on certain known building characteristics. The city will provide an updated map of concrete buildings in 2026 as part of the rollout of the Concrete Building Screening Program.

Source: City and County of San Francisco, "Concrete Building Safety Program," presentation to SPUR, January 19, 2023, [https://www.spur.org/sites/default/files/2023-01/SPUR\\_20230119.pdf](https://www.spur.org/sites/default/files/2023-01/SPUR_20230119.pdf).

Note: Map includes concrete buildings built before 1995, public schools, colleges and universities, hospitals, SF Port buildings, state and federal buildings, and one- to four-unit residential buildings. The numbers in the map key are estimates. The Concrete Building Screening Program will provide the city with additional information on which buildings may be at risk and require retrofitting or replacement.



<sup>11</sup> City and County of San Francisco, *Community Action Plan for Seismic Safety: CAPSS Earthquake Safety Implementation Program — Workplan 2012-2042*, 2011, <https://www.sfgov.org/sfc/sites/default/files/ESIP/FileCenter/Documents/9765-esiplan.pdf>.

<sup>12</sup> City and County of San Francisco, "Concrete Building Safety Program," presentation to SPUR, January 19, 2023, [https://www.spur.org/sites/default/files/2023-01/SPUR\\_20230119.pdf](https://www.spur.org/sites/default/files/2023-01/SPUR_20230119.pdf).

<sup>13</sup> City and County of San Francisco, "Concrete Building Safety Program," presentation to SPUR, January 19, 2023, [https://www.spur.org/sites/default/files/2023-01/SPUR\\_20230119.pdf](https://www.spur.org/sites/default/files/2023-01/SPUR_20230119.pdf).

The city officially launched the Concrete Building Safety Program in 2023, bringing together engineers, property owners, tenant advocates, and other stakeholders to discuss the technical, economic, and social considerations and consequences of a concrete retrofit program.<sup>14</sup> SPUR participated in the Concrete Building Safety Program Working Group and remains engaged in the city's efforts to address the seismic risks of older concrete buildings. The screening program requires owners of concrete buildings to complete an initial seismic screening with a licensed engineer by June 2027.<sup>15</sup> The screenings will allow the city to better evaluate earthquake risks across building types and the city as a whole and to determine steps to reduce risks.

### **Mandatory Retrofit Program for Soft-Story Wood-Frame Housing (Adopted 2013)**

*This action was supported by SPUR's 2009 recommendation calling for a "mandated retrofit of soft-story wood-frame multifamily housing."*

In 2013, San Francisco launched a mandatory retrofit program for soft-story wood-frame housing with five or more units. These buildings were typically built between the 1910s and 1970s and have weak or "soft" ground floors with large openings at street level for garages, storefronts, or parking. Many buildings of this type have collapsed during major earthquakes, such as the Loma Prieta (1989) and Northridge (1994) earthquakes. After 1973, the San Francisco Building Code was changed to prevent soft-story weaknesses in new wood-frame buildings.<sup>16</sup>

The city's program required retrofits of soft-story buildings of at least two stories (one story over a weak ground floor) with five or more units. Today, about 95% of the at-risk buildings, or about 4,700 buildings, have completed retrofits, making an estimated 114,000 residents safer in the event of a major earthquake.<sup>17</sup> The 260 buildings that have not been retrofitted are in violation of the city's ordinance (Exhibit 2). A handful of other Bay Area jurisdictions have also adopted mandatory retrofit requirements for soft-story buildings, including Berkeley, Oakland, Albany, Fremont, and Mill Valley. In 2024, the San José City Council approved a soft-story retrofit ordinance, but the program's implementation was delayed a year to April 2026 due to the cancellation of a \$25 million Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities grant meant to support local building owners with retrofit financing.

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<sup>14</sup> In April 2024, the city released a report on findings and recommendations from the stakeholder working group. See City and County of San Francisco Office of Resilience and Capital Planning, Department of Building Inspection, Applied Technology Council, and CivicMakers, *Stakeholder Engagement for the Concrete Building Safety Program*, 2024, <https://onesanfrancisco.org/sites/default/files/inline-files/Stakeholder%20Engagement%20for%20Concrete%20Building%20Safety%20Program.pdf>.

<sup>15</sup> City and County of San Francisco Department of Building Inspection, "DBI Concrete Building Screening Program," <https://www.sf.gov/dbi-concrete-building-screening-program>.

<sup>16</sup> City and County of San Francisco, *Community Action Plan for Seismic Safety: CAPSS Earthquake Safety Implementation Program – Workplan 2012–2042*, 2011, <https://www.sfgov.org/sfc/sites/default/files/ESIP/FileCenter/Documents/9765-esiplan.pdf>.

<sup>17</sup> SPUR analysis of soft-story properties and compliance status data from DataSF, <https://data.sfgov.org/Housing-and-Buildings/Map-of-Soft-Story-Properties/iwdp-cqvc>.

## EXHIBIT 2

### Posted Warning Sign on Out-of-Compliance Soft-Story Housing

Soft-story buildings that have not completed a mandatory retrofit are in violation of the city's building code. These buildings now have a warning placard at their entrances.

Source: City and County of San Francisco, "Concrete Building Safety Program," presentation to SPUR, January 19, 2023, [https://www.spur.org/sites/default/files/2023-01/SPUR\\_20230119.pdf](https://www.spur.org/sites/default/files/2023-01/SPUR_20230119.pdf).



The soft-story retrofit program paired mandatory retrofits with extensive outreach, education, financial guidance, and technical support. San Francisco notified owners of potentially affected buildings; hosted public meetings and workshops with building officials, engineers, and Rent Board staff; and convened retrofit fairs where building owners could meet engineers and contractors.

### First-in-the-Nation Tall Buildings Study (Published 2018)

*SPUR's 2009 report did not specifically mention tall buildings.*

In 2018, the city commissioned the first-in-the-nation study of tall buildings, defined as buildings taller than 240 feet. San Francisco's tall buildings — many built decades before modern seismic codes — pose a unique challenge. Because of their height and complex structural systems, as well as the difficulties of access, evaluation, and retrofit, these buildings required a specialized study to understand how they might perform in a major quake and what technical and policy measures could improve their resilience. The *San Francisco Tall Buildings Study* examined the earthquake performance of existing high-rise buildings, assessed gaps in current policies, and recommended strategies for assessment, retrofitting, post-earthquake evaluation, and building code requirements. The study identified 156 buildings in San Francisco taller than 240 feet; 60% are primarily commercial or office buildings, and the rest are residential, including hotels.<sup>18</sup> Tall buildings comprise a significant share of the city's business sector (the Financial District and SoMA), making

<sup>18</sup> Applied Technology Council, *San Francisco Tall Buildings Study*, ATC-119-1, prepared for the City and County of San Francisco Office of Resilience and Capital Planning, 2018, [https://onesanfrancisco.org/sites/default/files/inline-files/ATC-119-1\\_SF\\_TallBuildingsStudy\\_FINAL.pdf](https://onesanfrancisco.org/sites/default/files/inline-files/ATC-119-1_SF_TallBuildingsStudy_FINAL.pdf).

their seismic safety critical to long-term economic resilience. The study led to changes to the San Francisco Building Code meant to support faster earthquake recovery:

- Update of AB-099, “Post-Earthquake Repair and Retrofit Requirements for Concrete Buildings,” to clarify the code section’s application to tall concrete structural systems<sup>19</sup>
- Draft of a new administrative bulletin, “Post-Earthquake Inspection and Evaluation of Welded Steel Moment Frames”
- Adoption of an administrative bulletin (AB-111) that presents requirements and guidelines for geotechnical site investigations and reports for the foundation design and construction of *new* tall buildings in the city<sup>20</sup>

In 2025, San Francisco applied for a FEMA Building Resilient Infrastructure Communities (BRIC) grant to conduct owner outreach and stakeholder engagement to advance a steel retrofit program. When the Trump administration canceled the BRIC program in April 2025, the city transitioned the grant to FEMA’s Hazard Mitigation Grant Program, though its future remains uncertain.<sup>21</sup>

### **Mandatory Retrofit Program for Unreinforced Masonry Buildings (Adopted 1992)**

*SPUR’s 2009 report recommended an assessment of this program. To date, no assessment has been completed.*

In 1986, California required cities in high-seismic zones to identify and report unreinforced masonry (URM) buildings — typically pre-1940 structures made of brick or other masonry with little or no reinforcing steel. These buildings are especially vulnerable to earthquakes because brittle masonry walls can crack, separate, and collapse outward, posing serious life-safety risks to occupants and the public. During the 1989 Loma Prieta earthquake, URM buildings experienced only light to moderate shaking because of the quake’s distant epicenter, yet 374 of the 2,400 URM buildings in the region were damaged.<sup>22</sup> Between 1992 and 2004, San Francisco completed a comprehensive retrofit program that addressed roughly 1,800 high-risk URM buildings, retrofitting the majority and demolishing about 200, dramatically reducing the risk of collapse in future earthquakes.<sup>23</sup> As part of this program, San Francisco voters approved a \$350 million bond to support the retrofit program; \$150 million was set aside for low-interest (2.5%) loans to retrofit URM buildings containing affordable housing, and the rest was used to offer loans to all other URM owners at an 8.5% interest rate.<sup>24</sup> While most other California cities stopped at identifying at-risk URM buildings, San Francisco went beyond state law by requiring retrofits.

<sup>19</sup> San Francisco Department of Building Inspection, “Post-Earthquake Repair and Retrofit Requirements for Concrete Buildings,” Administrative Bulletin 099, July 2, 2012, [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/sf\\_building/0-0-0-95728](https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_building/0-0-0-95728).

<sup>20</sup> San Francisco Department of Building Inspection, “Guidelines for Preparation of Geotechnical and Earthquake Ground Motion Reports for Foundation Design and Construction of Tall Buildings,” Administrative Bulletin 111, June 15, 2020, <https://www.sf.gov/sites/default/files/2022-08/AB-111.pdf>.

<sup>21</sup> S. Atkinson, “Financing Climate Adaptation and Hazard Mitigation, Part 1: Federal Cuts Increase Bay Area’s Risks,” *SPUR News*, July 21, 2025, <https://www.spur.org/news/2025-07-21/financing-climate-adaptation-and-hazard-mitigation-part-1-federal-cuts-increase-bay>.

<sup>22</sup> Degenkolb Engineers, “Unreinforced Masonry Buildings,” <https://degenkolb.com/projects/unreinforced-masonry-buildings/>.

<sup>23</sup> Information gathered by SPUR from the San Francisco Office of Resilience and Capital Planning.

<sup>24</sup> City and County of San Francisco Planning Department, “Review Process for the Seismic Retrofit of Unreinforced Masonry Buildings,” Preservation Bulletin No. 3, 2003, [https://sfplanning.org/sites/default/files/documents/preserv/bulletins/HistPre\\_whichs\\_Bulletin\\_03.PDF](https://sfplanning.org/sites/default/files/documents/preserv/bulletins/HistPre_whichs_Bulletin_03.PDF).

Many URM retrofits will prevent collapse, thereby protecting occupants, but they may not keep buildings usable after an earthquake, with some buildings likely requiring demolition due to earthquake damage. Although SPUR's 2009 *The Dilemma of Existing Buildings* report recommended assessing the URM program, no formal evaluation has been conducted. In light of the city's other seismic safety needs and amid a significant city budget deficit, SPUR no longer views this action as a top priority. Nonetheless, the city should still plan for the burden that these damaged buildings could place on emergency response and recovery. If the city were to assess the URM program, SPUR suggests examining the effectiveness of the 1992 low-interest loan program, which could provide valuable information as the city seeks to advance similar financing programs for other privately owned buildings with structural deficiencies.

## New Recommendations

San Francisco's seismic risk is concentrated in thousands of privately owned older buildings that are unlikely to be voluntarily retrofitted due to high costs and inertia. SPUR believes that mandatory retrofit programs are, generally, the best way to ensure sound, timely upgrades at the scale needed to meaningfully reduce citywide earthquake risk and improve resilience. However, under Assembly Bill (AB) 130, enacted in 2025, state and local residential building standards are frozen until June 2031, which could make the adoption of mandatory retrofit programs difficult.<sup>25</sup> The bill aims to accelerate the development of new housing through regulatory stability, yet it doesn't exempt existing housing.<sup>26</sup> Potential workarounds, such as post-2031 retrofit compliance dates, remain speculative until the California Building Standards Commission issues guidance.

SPUR recommends that the city pursue the following actions:

**1. Adopt a mandatory retrofit program for tilt-up concrete buildings.** In accordance with the recommendations from the city's Concrete Building Safety Program Working Group, the city should adopt a mandatory retrofit program for tilt-up buildings built before 1999 with footprints larger than 3,000 square feet.<sup>27</sup> Although tilt-up buildings do not pose the greatest life-safety risks, they are relatively simple and inexpensive to retrofit, and doing so can speed the city's recovery after an earthquake. According to the Community Action Plan for Seismic Safety, San Francisco has an estimated 200 to 300 of these buildings.<sup>28</sup> The Concrete Building Safety Program Working Group identified a 6.5- to 8.5-year compliance timeline for retrofitting tilt-up buildings. The recommended program should be adopted by 2028, a year after the city's Concrete Building Screening Program results are due.

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<sup>25</sup> CalMatters Digital Democracy, "AB 130: Housing (2025-2026)," 2025, [https://calmatters.digitaldemocracy.org/bills/ca\\_202520260abi30](https://calmatters.digitaldemocracy.org/bills/ca_202520260abi30).

<sup>26</sup> California Governor's Office, "Governor Newsom Signs into Law Groundbreaking Reforms to Build More Housing, Boost Affordability," June 2025, <https://www.gov.ca.gov/2025/06/30/governor-newsom-signs-into-law-groundbreaking-reforms-to-build-more-housing-affordability/>.

<sup>27</sup> City and County of San Francisco Office of Resilience and Capital Planning, Department of Building Inspection, Applied Technology Council, and CivicMakers, *Stakeholder Engagement for the Concrete Building Safety Program*, 2024, <https://onesanfrancisco.org/sites/default/files/inline-files/Stakeholder%20Engagement%20for%20Concrete%20Building%20Safety%20Program.pdf.pdf>.

<sup>28</sup> City and County of San Francisco, *Community Action Plan for Seismic Safety: CAPSS Earthquake Safety Implementation Program — Workplan 2012-2042*, 2011, <https://www.sfgov.org/sfc/sites/default/files/ESIP/FileCenter/Documents/9765-esiplan.pdf>.

**2. Adopt a mandatory retrofit program for non-ductile concrete buildings.** Non-ductile concrete (NDC) buildings pose significant life-safety risks to the thousands of San Francisco residents and office workers who enter them daily. The collapse of even one of these structures could greatly increase the death toll from San Francisco's next major earthquake. Retrofitting these structures presents significant technical, financial, and logistical challenges, such as temporary tenant relocation.<sup>29</sup> However, San Francisco should not use these challenges as an excuse to ignore the risks. Facing similar hurdles, the City of Los Angeles adopted a mandatory retrofit ordinance for NDC buildings in 2015.<sup>30</sup> The program has a 25-year compliance timeline for retrofits, giving property owners time to determine the best course of action (for example, retrofit, demolish, rebuild, or sell). About 10 years into the program, 72 of 1,194 buildings (6%) have been retrofitted. Although this percentage is not large, it represents 72 buildings that will protect lives in the event of an earthquake.<sup>31</sup> SPUR recommends that the San Francisco Board of Supervisors adopt a mandatory retrofit program, in tandem with a financing and incentives program, by 2028.

**3. Develop a menu of financial pathways and incentives for property owners to retrofit or rebuild non-ductile concrete buildings, especially in downtown San Francisco.** SPUR recognizes that adopting a mandatory retrofit program for NDC buildings will be ineffective without a financing and incentive plan to support compliance. With recent post-pandemic efforts to promote housing development through office-to-residential conversions downtown, and with the majority of NDC buildings located in downtown neighborhoods, a financing and incentive program should target these buildings in support of the city's downtown revitalization goals. As part of the retrofit program, the city should provide guidance and resources to help property owners determine whether to sell, retrofit, demolish, or rebuild. Seismic retrofitting must be incorporated into the city's overall strategy for downtown revitalization, given that seismic retrofit costs are already a major cost barrier to office-to-residential conversions.<sup>32</sup>

In February 2026, San Francisco adopted new legislation meant to incentivize housing development downtown. The new Downtown Revitalization Financing District provides annual incentive payments to eligible downtown commercial-to-residential conversion projects using tax increment financing, allowing the city to subsidize new residential development using future property tax increases that the city hopes will spark new housing density.

This plan will even allow some buildings to be demolished to build new housing — a critical pathway for NDC buildings that will require expensive retrofits, making the redevelopment pathway financially compelling.

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<sup>29</sup> Non-ductile concrete retrofits cost about \$50 to \$200 per square foot, compared to less than \$10 per square foot for tilt-up buildings; see M. Ellis, "Owners of Thousands of S.F. Buildings Will Have to Pay to See if Structures Are at Risk in an Earthquake," *San Francisco Chronicle*, May 2, 2025, <https://www.sfchronicle.com/sf/article/earthquake-risk-buildings-20306985.php>.

<sup>30</sup> Three other cities — Santa Monica, Beverly Hills, and West Hollywood — have also adopted mandatory retrofit ordinances for non-ductile concrete buildings in the last 10 years.

<sup>31</sup> Los Angeles Department of Building and Safety, "Non-Ductile Concrete Retrofit Program Status as of February 1st, 2024," <https://dbs.lacity.gov/sites/default/files/efs/pdf/publications/retrofit/non-ductile-compliance-report.pdf>.

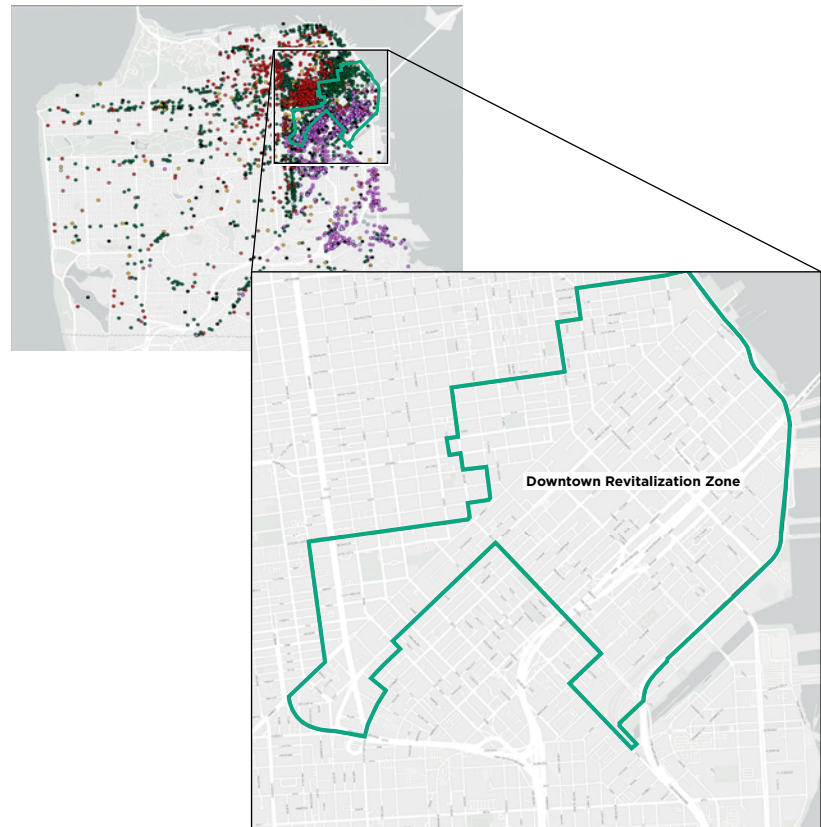
<sup>32</sup> S. Srivastava, B. Tranel, D. Render, K. Collignon, and C. Whitcomb, *From Workspace to Homebase: Exploring the Viability of Office-to-Residential Conversion in San Francisco's Changing Real Estate Market*, SPUR and ULI San Francisco, October 2023, [https://www.spur.org/sites/default/files/2023-10/SPUR\\_From\\_Workspace\\_to\\_Homebase.pdf](https://www.spur.org/sites/default/files/2023-10/SPUR_From_Workspace_to_Homebase.pdf).

## EXHIBIT 3

### Where Seismic Risk Meets Downtown Revitalization Opportunity

The new Downtown Revitalization Financing District provides annual incentive payments to eligible downtown commercial-to-residential conversion projects using tax increment financing, allowing the city to subsidize new residential development achieved through retrofits or rebuilding. Many of the city's concrete buildings are located in downtown San Francisco and are likely within the Downtown Revitalization Financing District. Pairing improvements to the city's seismic and disaster resilience with support for downtown recovery and housing development could prove beneficial.

Source: City and County of San Francisco, "Downtown Revitalization Financing District," <https://www.sf.gov/department-downtown-revitalization-financing-district>.



Also in February 2026, SPUR published *Reinventing Downtown*, a policy brief recommending that the city explore establishing a downtown authority to accelerate new real estate development, support small businesses, attract new employers, and finance workforce housing.<sup>33</sup> This new authority should also support the development of a financing incentive program to offset the costs of retrofitting or reconstructing non-ductile concrete and steel moment-frame buildings downtown.

Although SPUR promotes the reuse of older buildings to preserve history and minimize carbon emissions from demolition and new construction, continued investment in buildings nearing the end of their useful life may yield diminishing returns, particularly if they remain somewhat seismically vulnerable even after a costly retrofit.<sup>34</sup> In these cases, strategic replacement can advance other city goals, such as increasing housing supply, transitioning to all-electric buildings, and avoiding the far higher economic and carbon costs of emergency demolition and reconstruction after earthquake damage. SPUR recommends that a strategic financing and incentives program be in place by 2028, one year after the concrete screening program forms are due.<sup>35</sup>

<sup>33</sup> S. Srivastava, B. Rosenfield, and B. Gamble, *Reinventing Downtown: A New Model to Revitalize San Francisco's Urban Center*, SPUR, February 2026, <https://www.spur.org/publications/policy-brief/2026-02-04/reinventing-downtown>.

<sup>34</sup> Even energy-efficient new construction can take up to 80 years to recover the energy expended on demolition and the production, manufacture, and transportation of new building materials. See San Francisco Environment Department, *Climate Action Plan 2021*, 2021, <https://www.sfenvironment.org/media/14441>.

<sup>35</sup> A financing and incentive program could also support owners of vulnerable tilt-up concrete buildings for retrofits or demolition and rebuilding. SPUR did not include tilt-up buildings in this recommendation because they are less costly to retrofit than NDC buildings; therefore, less financial support may be necessary.

#### 4. Advance a voluntary seismic retrofit program for small multifamily wood-frame housing while advocating for state retrofit grant funding.

The Community Action Plan for Seismic Safety estimated that San Francisco has approximately 6,000 buildings with three or four housing units, a significant portion of which may be soft-story buildings built before the 1950s and in need of retrofitting.<sup>36</sup> A voluntary seismic retrofit program for soft-story wood-frame buildings with three to four housing units, combined with state grant funding, would incentivize safety improvements without imposing mandatory requirements on a relatively lower-risk building type. Still, retrofitting these buildings could protect more than 21,000 people from death, injury, or displacement due to strong earthquake shaking.<sup>37</sup>

To increase participation in the voluntary retrofit program, the city should develop an education and outreach campaign for property owners and tenants, along with meaningful financial incentives. City and state policymakers representing San Francisco should advocate for the state to fund a statewide multifamily seismic retrofit program — a program already established in the statute. In 2022, Assembly Bill 1721 created the state’s first retrofit grant program for multifamily residential buildings.<sup>38</sup> Although Governor Newsom initially allocated \$250 million for the program in 2022, funding was subsequently reduced and ultimately eliminated.<sup>39</sup>

The state has committed resources to retrofit grant programs that target single-family homeowners — including \$3 million for the Safe Homes wildfire mitigation grant program in 2025 (Assembly Bill 888) and two appropriations totaling \$6 million for the California Earthquake Authority (CEA) Brace & Bolt program — but less funding has been committed to retrofit grant programs targeting multifamily buildings.<sup>40</sup> The CEA began development of a multifamily retrofit program as part of its application for a FEMA Building Resilient Infrastructure and Communities (BRIC) grant. However, when the Trump administration terminated the BRIC program in April 2025, the CEA lost \$33 million in awarded funding. When the City of San José lost its \$25 million BRIC grant for soft-story retrofitting, it began developing a pilot financing program to incentivize soft-story retrofits of buildings with three or more units using low-interest loans.<sup>41</sup> In addition to advocating for state funding, the San Francisco Office of Resilience and Capital Planning should monitor the implementation of San José’s program to assess whether it is an effective financing model.

<sup>36</sup> City and County of San Francisco, *Community Action Plan for Seismic Safety: CAPSS Earthquake Safety Implementation Program — Workplan 2012-2024*, 2011, <https://www.sfgov.org/sfc/sites/default/files/ESIP/FileCenter/Documents/9765-esiplan.pdf>.

<sup>37</sup> This figure is based on a rough SPUR estimate assuming that half of the city’s 6,000 residential buildings with three to four units are seismically vulnerable (3,000 buildings x 3.5 housing units x 2 people per unit).

<sup>38</sup> California Legislature, Assembly Bill No. 1721, “Seismic Retrofitting: Soft Story Multifamily Housing,” 2021–2022 Reg. Sess., [https://leginfo.ca.gov/faces/billNavClient.xhtml?bill\\_id=202120220AB1721](https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1721).

<sup>39</sup> S. Atkinson, “Multifamily Seismic Retrofit Program Secures \$15 Million from State, But More Investment Is Needed,” *SPUR News*, August 7, 2023, <https://www.spur.org/news/2023-08-07/multifamily-seismic-retrofit-program-secures-15-million-state-more-investment>.

<sup>40</sup> L. Sumagaysay, “California Homeowners Could Qualify for Grants for New Roofs and Fire Safety,” *CalMatters*, January 1, 2026, <https://calmatters.org/economy/2026/01/california-safe-homes-grants/>; California Earthquake Authority, *Annual Report to the Legislature and the California Insurance Commissioner: Report for Calendar Year 2024*, August 2025, <https://www.earthquakeauthority.com/sites/default/files/documents/2025/annual-report-to-the-legislature-2024-final.pdf>.

<sup>41</sup> City of San José City Council, “Soft Story Seismic Retrofit Pilot Financing Program: Memorandum to the Honorable Mayor and City Council,” San José City Council Agenda, January 2026, <https://sanjose.legistar.com/View.ashx?M=F&ID=15089772&GUID=D17A0F84-4190-4DD0-A4E5-060C23CF4D92>.

With federal support waning, the state must step up. San Francisco representatives should advocate for a meaningful state-level appropriation to the multifamily seismic retrofit program. A state-funded grant program would encourage voluntary retrofits of the city’s remaining vulnerable soft-story housing and would increase housing resilience by spurring retrofits in other jurisdictions across the region and state. Although voluntary retrofit programs are not as effective as mandatory ones, a program grounded in owner and tenant education as well as a state funding partnership could help advance retrofits of this ubiquitous housing type — without placing the full cost burden on smaller property owners or vulnerable tenants.

## City-Owned Buildings With Critical Emergency Response Functions

San Francisco has made significant progress in strengthening city-owned buildings that are critical to emergency response, public safety, and public health, and it has prioritized city staff efforts to implement the Community Action Plan for Seismic Safety and the Earthquake Safety Implementation Program. In this section, we review this progress and make one recommendation regarding a model for San Francisco’s seismic safety policy.

### Seismic Efforts to Date

#### Identification and Risk Mitigation of Seismically Vulnerable City-Owned Buildings

*This action addressed SPUR’s 2009 recommendation calling for a “mitigation program for essential city services.”*

To better understand its portfolio-wide seismic risk, San Francisco conducted a HAZUS earthquake loss estimation study in 2013 and again in 2017 using updated methodology. HAZUS is a FEMA-developed standardized analysis tool for estimating individual building-level damages. The results help the city quantify the economic benefits of seismic retrofitting, including avoided structural and nonstructural damage and operational losses. The study also helps the city identify high-priority city-owned buildings that require further risk analysis, based on factors such as age and structure type. In tandem with HAZUS, the city has subsequently assessed and assigned seismic hazard ratings (SHRs) from SHR1 (best) to SHR4 (worst) to more than 200 public buildings since 1992 (Exhibit 4).<sup>42</sup>

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<sup>42</sup> City of San Francisco Office of Resilience and Capital Planning, “Earthquake Safety,” OneSanFrancisco.org, 2024, <https://onesanfrancisco.org/cap-plan-2024/earthquake-safety>.

## EXHIBIT 4

**Expected Building Performance  
by Seismic Hazard Rating**

The city's seismic hazard rating system assesses the expected performance of city-owned buildings and assigns a rating from 1 (best) to 4 (worst).

SHR	EXPECTED PERFORMANCE	DESCRIPTION
1	Negligible damage or minor damage	Occupants face minimal life-safety hazard. Damage can likely be repaired while the building is occupied. Low priority for pre-disaster seismic improvements.
2	Moderate damage	Structural or nonstructural damage is anticipated but with low life-safety hazard to occupants. Damage can likely be repaired while the building is occupied. Low priority for pre-disaster seismic improvements.
3	Major damage	Structural and nonstructural damage are anticipated, posing a life-safety hazard to occupants. Building will likely need to be vacated during repairs or may not be repairable. High priority for seismic improvements or other risk abatement strategies (such as vacating the property, demolition, or both).
4	Partial/total building collapse	Extensive structural and nonstructural damage poses a high life-safety hazard to occupants. Repairing damage may not be feasible. High priority for seismic improvements or other risk abatement strategies (such as vacating the property, demolition, or both)

Source: SPUR summary of SHR descriptions from the City and County of San Francisco.

San Francisco uses the SHR system to estimate the expected performance of city-owned buildings during an earthquake and to prioritize capital improvement projects. Today, about 33 city-owned buildings are designated as SHR3 or SHR4 (Exhibit 5).<sup>43</sup> According to San Francisco's 2026 10-year capital plan, the city will exit 5 and retrofit 13 of the 33 known buildings with SHR3 and SHR4 ratings. The other 15 buildings are in the planning, design, or construction phases of renovation or rebuilding. The city may own or lease other buildings with seismic safety hazards, but to the best of its knowledge, these 33 buildings are at the highest risk. One major accomplishment: The city designed and constructed three new high-seismic-performing buildings — the Office of the Chief Medical Examiner, the Public Safety Building in Mission Bay, and the Traffic Company and Forensic Services Division — to move most city staff out of the Hall of Justice, which has an SHR3 rating.<sup>44</sup> However, the Hall of Justice remains operational, and thousands of San Franciscans report for jury duty there each year.<sup>45</sup>

<sup>43</sup> City and County of San Francisco, *City and County of San Francisco Capital Plan: Fiscal Years 2026–2035*, April 15, 2025, [https://onesanfrancisco.org/sites/default/files/2025-06/CapPlan-Doc-Book\\_250531-Web.pdf](https://onesanfrancisco.org/sites/default/files/2025-06/CapPlan-Doc-Book_250531-Web.pdf).

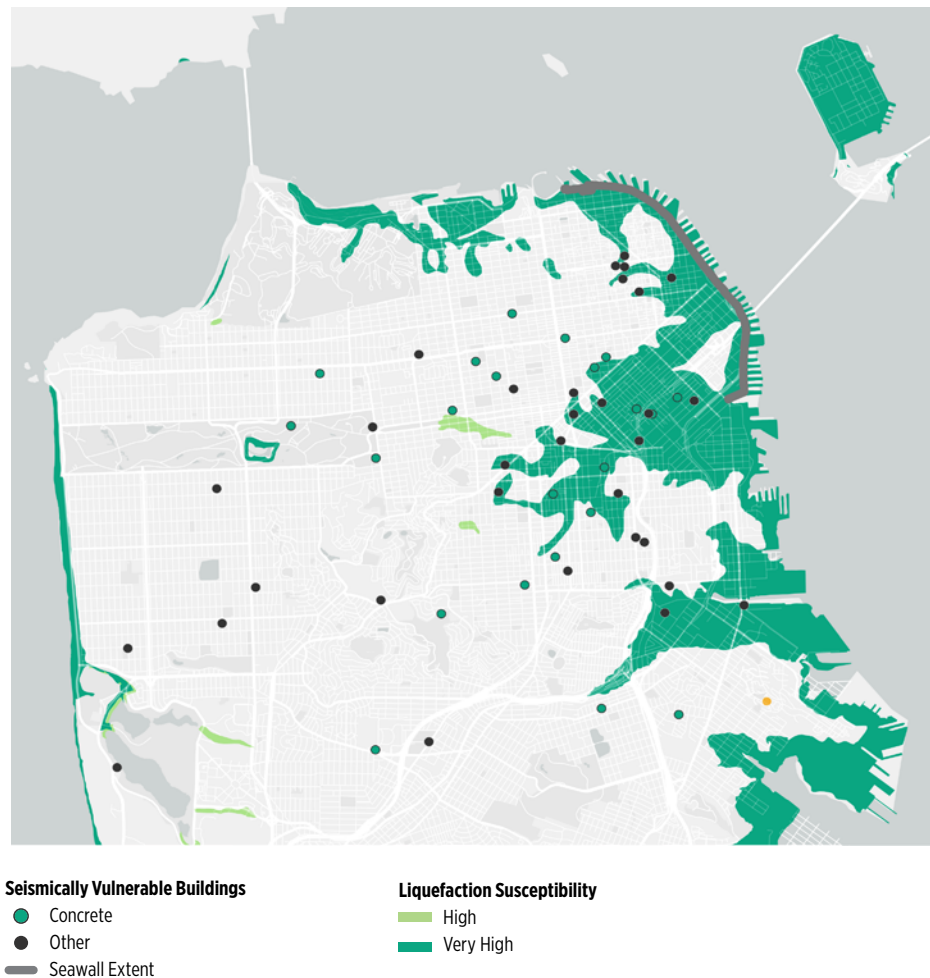
<sup>44</sup> Interview with staff from the San Francisco Office of Resilience and Capital Planning.

<sup>45</sup> M. Ellis and S. Devulapalli, "These 24 S.F. City Buildings Could Collapse in a Major Earthquake," *San Francisco Chronicle*, July 1, 2025, <https://www.sfchronicle.com/sf/article/earthquake-risk-buildings-20357863.php>.

**EXHIBIT 5****City-Owned Buildings With a Seismic Hazard Rating of 3 or 4 Overlaid With Liquefaction Risk Zones**

During an earthquake, liquefaction occurs when unstable soils temporarily lose strength and behave like a liquid, undermining building foundations and significantly increasing the risk of tilting or structural collapse. More than a dozen municipal buildings rated SHR3 or SHR4 are in or near liquefaction risk zones.

Source: City and County of San Francisco, *City and County of San Francisco Capital Plan: Fiscal Years 2026-2035*, April 15, 2025, [https://onesanfrancisco.org/sites/default/files/2025-06/CapPlan-Doc-Book\\_250531-Web.pdf](https://onesanfrancisco.org/sites/default/files/2025-06/CapPlan-Doc-Book_250531-Web.pdf).



Most of the city's major retrofit or new construction projects to address these seismically unsafe buildings are funded through general obligation bonds that must be approved by two-thirds of voters. Cities use general obligation bonds to borrow money to fund capital improvements that cannot be paid for through the General Fund. In San Francisco, bonds support a variety of city services, including parks, homeless/housing services, public health, schools, and emergency preparedness. Bonds are phased in as part of the city's 10-year capital planning process.

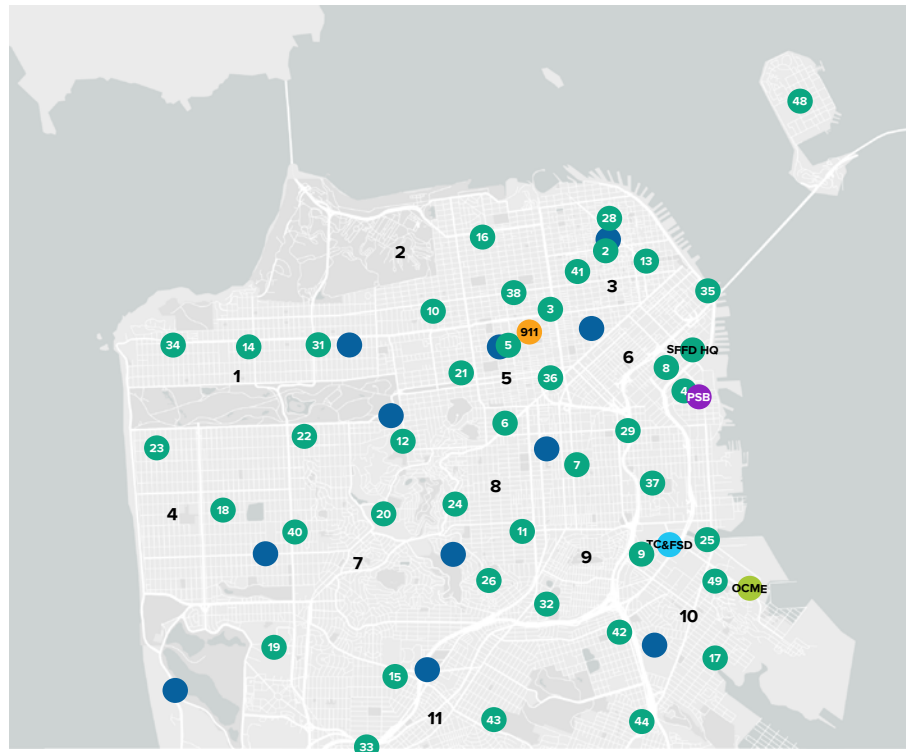
Since 2010, the Earthquake Safety and Emergency Response (ESER) General Obligation Bond Program has been the primary financing tool for strengthening public buildings critical to emergency response. Approved by voters in 2010, 2014, and 2020, the program has delivered \$1.44 billion to seismically retrofit and modernize fire stations, police stations, the Emergency Firefighting Water System, and other city facilities (Exhibit 6). For example, bond funding enabled the construction of several new fire stations that replaced seismically underperforming buildings, including fire stations 5, 16, and 49. Building on this progress, the Board of Supervisors has approved a \$535 million ESER bond for the June 2026 ballot.

## EXHIBIT 6

### Completed Retrofit and New Construction Projects Funded by the ESER Bond Program

Approved by voters in 2010, 2014, and 2020, the Earthquake Safety and Emergency Response General Obligation Bond Program has delivered \$1.44 billion to seismically retrofit and modernize fire stations, police stations, the Emergency Firefighting Water System, and other city facilities.

- Neighborhood fire stations
- District police stations
- Public safety building
- Motorcycle police and crime lab facility
- Office of the Chief Medical Examiner
- 9-1-1 Call Center



Source: City and County of San Francisco, 2026 Earthquake Safety and Emergency Response Bond, <https://onesanfrancisco.org/sites/default/files/2025-11/Agenda%20Item%204%20-%20ESER%202026%20Bond%20Report%2011.25.25.pdf>

Critical public health facilities have also been a focus of seismic retrofitting and replacement projects. San Francisco's 2008 Public Health Seismic Facilities (\$887 million), 2016 Public Health and Safety (\$350 million), and 2024 Healthy, Safe and Vibrant San Francisco (\$390 million) bonds have supported retrofit and replacement projects at Zuckerberg San Francisco General Hospital's Trauma Center and Building 3, Laguna Honda Hospital, the Castro-Mission Health Center, the Maxine Hall Health Center, and the Chinatown Public Health Center. These hospitals and health centers serve San Francisco's most vulnerable residents, providing mental and physical health services, as well as temporary shelter and support services. In the event of a major earthquake, these public health facilities will provide life-saving services to injured and distressed residents. Many of the city's upgrades go beyond seismic retrofits by modernizing HVAC systems, which can help protect against extreme heat and wildfire smoke events, further protecting the health and safety of patients and employees.<sup>46</sup>

### Dedicated City Staff to Implement the Community Action Plan for Seismic Safety

*SPUR's 2009 report did not specifically mention dedicated staff for earthquake safety program implementation.*

When the Community Action Plan for Seismic Safety (and the Earthquake Safety Implementation Plan) was launched in 2009–2010, the Office of Resilience and Capital Planning

<sup>46</sup> City and County of San Francisco Public Works, 2024 Healthy, Safe and Vibrant San Francisco General Obligation Bond, July 2024, <https://sfpw.org/sites/default/files/07.16.24-HealthySafeVibrantSF-BondReport%20%281%29.pdf>

was authorized to hire three full-time staff members to focus exclusively on implementation. These staff were key to advancing many of the accomplishments outlined in this brief, from the development of the mandatory retrofit program for soft-story wood-frame housing in 2013 to the recently adopted screening program for at-risk concrete buildings. In recent years, the city's budget deficit has led to staffing cuts, leaving a single full-time position dedicated to earthquake safety. SPUR believes that dedicated staff time is critical to advancing seismic safety policy and programs in San Francisco.

## New Recommendation

**5. Develop a comprehensive seismic safety policy for city-owned buildings modeled on the University of California's Seismic Safety Policy.** The University of California's Seismic Safety Policy requires the university to "provide an acceptable level of earthquake safety for students, employees, and the public...within a reasonable time frame."<sup>47</sup> The policy's signature features are as follows:

- All existing university facilities, new acquisitions, leased buildings, and new construction must be assigned a seismic performance rating, which guides prioritization in campus capital planning and funding decisions.
- All currently occupied buildings with a "very unsafe" rating must be exited or retrofitted by December 31, 2037. Buildings identified as "extremely unsafe" must be evacuated immediately.
- Each UC campus is expected to achieve a minimum average annual reduction of 4% in seismic risk, based on facility square footage, over three years.
- The university's Seismic Advisory Board, comprised of licensed structural and geotechnical engineers, provides advice to the university in accordance with the policy.

The UC Seismic Safety Policy's goals and risk-reduction requirements could serve as a model for San Francisco's seismic safety policy for city-owned buildings. SPUR recommends that San Francisco's policy include these elements:

- **A determination of an acceptable level of seismic performance across various building use and occupancy types.** The city must determine the level of risk it is willing to carry for individual buildings and its portfolio, answering questions such as "Under what circumstances are buildings with SHR3 ratings acceptable?" and "What level of life-safety risk should trigger immediate evacuation from a building?" For example, an SHR3 rating could be acceptable for an office building but unacceptable for a police or fire station.

<sup>47</sup> University of California Office of the President, "Seismic Safety Policy (Policy No. 3100156)," *UCOP Facilities Manual*, 2024, <https://policy.ucop.edu/doc/3100156/Seismic>.

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- **An expanded seismic hazard rating system.** An expanded rating system could incorporate subcategories within the existing SHR1 to SHR4 ratings based on performance targets by use or occupancy type. Further delineating the rating system could help prioritize projects in the city's capital planning process.
  - **A compliance date for retrofit, demolition, or exiting of leased or owned buildings with the highest seismic risks.** A compliance date for exiting SHR4 buildings would create urgency in prioritizing buildings for capital planning and funding allocations.
  - **Guidelines for assigning buildings a seismic hazard rating.** Assigning an SHR rating to all city-owned buildings is unnecessary and costly, at \$50,000 to \$140,000 per building.<sup>48</sup> However, the city would benefit from setting guidelines for assessing buildings based on building characteristics such as size, year built, and use/occupancy.

A clear seismic safety policy for city-owned buildings could help the city communicate the progress that retrofitted buildings represent across its entire portfolio. Communicating progress through tangible projects and portfolio-wide risk-reduction metrics will be crucial to securing continued voter support for the city's Earthquake Safety and Emergency Response bonds, as well as other bonds that support seismic safety improvements to city-owned buildings, such as the 2024 Healthy, Safe and Vibrant San Francisco bond.

Development of a comprehensive seismic safety policy for city-owned buildings will require the participation of the Mayor's Office, the Office of Resilience and Capital Planning, the Department of Building Inspection, and all departments that own or lease buildings with seismic safety risks. To support this process, Mayor Lurie could establish a seismic advisory committee, similar to the UC system's Seismic Advisory Board, to lend engineering expertise.

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<sup>48</sup> This estimate reflects information gathered through an interview with staff at San Francisco Office of Resilience and Capital Planning.

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# Preventing Post-Earthquake Fires

When strong earthquake shaking occurs, gas lines and water pipes can rupture, both igniting fires and limiting access to water to fight them. This dynamic has been illustrated during numerous earthquakes in California and globally. Gas ignition sources are considered more dangerous than electrical sources because gas lines are continuously pressurized and contain highly flammable natural gas, which can escape from damaged pipelines.<sup>49</sup> Until the gas supply is shut off at the source, gas-fueled fires will continue to burn — and even intensify. In contrast, an electrical fire typically diminishes once power is cut. In the 1906 San Francisco earthquake, fires burned for three days and destroyed around 28,000 buildings, accounting for most of the city’s building losses.<sup>50</sup> The 1989 Loma Prieta earthquake caused 31 fire ignitions in San Francisco, of which about 30% were attributed to gas appliances or infrastructure.<sup>51</sup> The 1994 Northridge earthquake in Southern California led to an estimated 110 earthquake-related fire ignitions, of which about half were gas-related.<sup>52</sup> Post-earthquake fires are particularly risky in older, densely developed cities with many wood-framed buildings and seismically vulnerable gas infrastructure, such as San Francisco.

In 2009, SPUR’s *The Dilemma of Existing Buildings* report recommended that the Department of Building Inspection advance a “mandated and triggered retrofit of gas lines and gas-fired equipment” — meaning that a building upgrade requirement would be activated when a building undergoes a specific action, such as a major renovation or change of use. The report recommended bracing gas equipment such as water heaters, updating aging gas lines with flexible connections, and requiring the installation of automated “excess-flow” or “seismic-triggered” gas shutoff valves for all new construction, at the time of building sale or during major renovations.<sup>53</sup> Nearly 20 years later, the city has yet to directly address the post-earthquake fire risk posed by gas lines and gas-fired equipment or to require the installation of building-level automated gas shutoff valves. However, the city, region, and state have advanced a variety of policies that will indirectly minimize post-earthquake fire risk.

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<sup>49</sup> FM Global, *Understanding the Hazard: Fire Following Earthquake*, 2025, <https://www.fm.com/-/media/project/publicwebsites/fm/files/resources/p0181.pdf>.

<sup>50</sup> San Francisco Public Utilities Commission, “A Look Back in History: The Great 1906 Earthquake and Fire,” 2024, <https://www.sfpuc.gov/about-us/news/look-back-history-great-1906-earthquake-and-fire>.

<sup>51</sup> California Seismic Safety Commission, *Improving Natural Gas Safety in Earthquakes*, 2002, [https://www.ssc.ca.gov/wp-content/uploads/sites/5/2020/08/cssc\\_2002-03\\_natural\\_gas\\_safety.pdf](https://www.ssc.ca.gov/wp-content/uploads/sites/5/2020/08/cssc_2002-03_natural_gas_safety.pdf).

<sup>52</sup> California Seismic Safety Commission, *Improving Natural Gas Safety in Earthquakes*, 2002, [https://www.ssc.ca.gov/wp-content/uploads/sites/5/2020/08/cssc\\_2002-03\\_natural\\_gas\\_safety.pdf](https://www.ssc.ca.gov/wp-content/uploads/sites/5/2020/08/cssc_2002-03_natural_gas_safety.pdf).

<sup>53</sup> D. Bonowitz, *The Dilemma of Existing Buildings: Private Property, Public Risk*, SPUR, February 2009, <https://www.spur.org/publications/spur-report/2009-02-01/dilemma-existing-buildings>.

**State-Level Action:** Following the 2010 San Bruno pipeline explosion, California required gas utilities to develop comprehensive gas safety plans (Senate bills 216 and 2011), prompting significant upgrades by PG&E, including automating shutoffs of the gas transmission system during emergencies.<sup>54</sup> Although automated shutoffs at all scales help improve fire safety, PG&E gas transmission shutoff devices still leave tens of miles of gas in pipelines available to leak out of breaks in buildings. Building-level shutoff devices, such as those recommended by our 2009 report, prevent ignitions caused by ruptured gas lines inside buildings. The city has yet to require building-level devices.

**Regional- and Local-Level Action:** Local and regional actions on building electrification and decarbonization to reduce carbon emissions and improve air quality will provide a long-term co-benefit of reducing the fire risks posed by gas infrastructure.<sup>55</sup> In 2020, San Francisco adopted the All-Electric New Construction Ordinance, and in 2025, it adopted the All-Electric Major Renovations Ordinance.<sup>56</sup> At the regional scale, the Bay Area Air Quality Management District adopted zero-nitrogen-oxide water- and space-heating appliance rules in 2023 that will phase out the sale of small gas water heaters and furnaces, with the first compliance date set for January 2027 for water heaters.<sup>57</sup> SPUR has been a strong advocate in the development of these rules, which will lead to the uptake of high-efficiency heat pumps — replacing gas equipment incrementally over the next few decades as old equipment reaches the end of its useful life. Transitioning to all-electric buildings locally and limiting the sale of gas appliances regionally will contribute to citywide reductions in post-earthquake fire risks.

Furthermore, San Francisco’s investments in the Emergency Firefighting Water System (EFWS), previously known as the Auxiliary Water Supply System, also support the city’s goal of preventing post-earthquake fires by ensuring access to a unique high-pressure water supply system to suppress ignitions when the domestic water system is compromised. In numerous fires across California, including the 2025 Los Angeles fires, firefighters were limited by municipal water systems not designed to fight urban conflagrations or multiple fires across a city.<sup>58</sup> San Francisco’s Earthquake Safety and Emergency Response bond program has provided sustained funding to seismically upgrade and expand the EFWS, as well as to upgrade fire stations critical to emergency response.

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<sup>54</sup> California Public Utilities Commission, “Gas Utilities Safety Plans,” <https://www.cpuc.ca.gov/regulatory-services/safety/gas-safety-and-reliability-branch/pipeline-documents>; Pacific Gas and Electric Company, *2017 Gas Safety Plan*, 2017, [https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc\\_public\\_website/content/safety/natural\\_gas\\_pipeline/plans\\_and\\_reports/2017-gas-safety-plan.pdf](https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/safety/natural_gas_pipeline/plans_and_reports/2017-gas-safety-plan.pdf).

<sup>55</sup> Gas appliances emit carbon monoxide, nitrogen oxides, formaldehyde, and fine particulate matter, which pose risks to public health.

<sup>56</sup> In 2019, the City of Berkeley became the first city in the United States to adopt an all-electric new construction ordinance. However, the ordinance was repealed in 2024 after a lawsuit challenged its legality. Similar ordinances in other jurisdictions have since been put on hold, but this pause didn’t stop the U.S. Department of Justice from taking Petaluma and Morgan Hill to court. San Francisco has avoided similar legal issues by adding an exemption for Energy Policy and Conservation Act-regulated appliances.

<sup>57</sup> S. Fishman and C. Corrigan, “The Bay Area’s Path to Clean Air: Zero-Emission Appliance Rules Are Primed for Success,” *SPUR News*, August 8, 2025, <https://www.spur.org/news/2025-08-25/bay-areas-path-clean-air-zero-emission-appliance-rules-are-primed-success>.

<sup>58</sup> R. E. Brown and E. Hanak, “The Challenges of Fighting Wildfires With Urban Water Systems,” Public Policy Institute of California, February 19, 2025, <https://www.ppic.org/blog/the-challenges-of-fighting-wildfires-with-urban-water-systems/>.

## New Recommendations

Despite the above actions, more needs to be done. To address post-earthquake fire risks in San Francisco, SPUR recommends that the city:

**6. Mandate the installation of automated gas shutoff valves in existing buildings.** The city should require the installation of these valves whenever gas lines are altered, mechanical permits are pulled, or building alterations or repairs exceed a value threshold. The Department of Building Inspection could further tailor the mandate by requiring that *seismic-triggered* automated gas shutoff valves be installed instead of excess-flow shutoff valves. Both are automated valves, but excess-flow shutoff valves are triggered only by high gas flow caused by major gas line breaks, not by minor leaks that could still fuel devastating post-earthquake fires.<sup>59</sup> Excess-flow valves are also more expensive than seismic-triggered valves. An automated gas shutoff valve (seismic-triggered or excess-flow) costs between \$500 and \$7,000 per building, including installation, making it a relatively inexpensive investment.<sup>60</sup> SPUR made this recommendation in our 2009 report, and we continue to believe that installing seismic-triggered automated gas shutoff valves would be a beneficial and low-cost strategy to reduce the risk of post-earthquake gas-ignited fires.

Several California jurisdictions have already adopted local mandates for automated shutoffs in both new and existing buildings. After the 1994 Northridge earthquake, the City of Los Angeles mandated the installation of seismic-triggered or excess-flow gas shutoff valves upon the sale of buildings and during renovations valued at more than \$10,000.<sup>61</sup> The City of Berkeley requires seismic-triggered shutoff valves in new construction with gas piping and in any existing building that undergoes repairs or renovations requiring a mechanical or plumbing permit.<sup>62</sup>

Assembly Bill 130, which freezes the statewide building code until June 2031, may impact this recommendation.<sup>63</sup> SPUR is working with sustainability and resilience advocates and municipal staff to develop amendments that would exempt existing housing from AB 130. San Francisco state representatives and city leaders could advocate for simple amendments to AB 130 to advance citywide and regionwide sustainability and hazard-resilience goals for existing buildings.

**7. Prioritize efforts to reduce reliance on natural gas systems through building electrification and decarbonization.** Continuing to reduce reliance on natural gas while advancing building electrification supports the San Francisco Climate Action Plan's goal of eliminating fossil-fuel emissions from buildings and achieving net-zero greenhouse gas emissions by 2040 through both electrification and 100% renewable electricity.<sup>64</sup> Electrification not only aligns with strategies to

<sup>59</sup> C. Scawthorn, interview by Sarah Atkinson, February 19, 2026.

<sup>60</sup> U.S. Department of Energy, Building America Solution Center, "Automatic Gas Shutoff Valves," 2022, <https://bascc.pnnl.gov/resource-guides/automatic-gas-shutoff-valves>.

<sup>61</sup> American Legal Publishing Corporation, Los Angeles Municipal Code SEC. 94.1217.0., Seismic Gas Shutoff Valves, [https://codelibrary.amlegal.com/codes/los\\_angeles/latest/lamc/0-0-0-186081](https://codelibrary.amlegal.com/codes/los_angeles/latest/lamc/0-0-0-186081).

<sup>62</sup> City of Berkeley, Berkeley Municipal Code § 19.34.040, Gas ShutOff Valves, <https://berkeley.municipal.codes/BMC/19.34.040>.

<sup>63</sup> CalMatters Digital Democracy, "AB 130: Housing (2025-2026)," [https://calmatters.digitaldemocracy.org/bills/ca\\_202520260ab130](https://calmatters.digitaldemocracy.org/bills/ca_202520260ab130).

<sup>64</sup> City and County of San Francisco Environment Department, *San Francisco's Climate Action Plan 2021*, 2021, <https://www.sfenvironment.org/media/14441>.

decarbonize the city's energy supply but also reduces post-earthquake fire risks associated with gas infrastructure. Furthermore, electrification has other significant co-benefits, including improved indoor and outdoor air quality, increased resilience to extreme heat as cooling is added to homes, and reduced energy costs through the use of high-efficiency equipment.

Preventing post-earthquake fires is likely to become more important with climate change because drier conditions and more frequent high-wind days may increase the likelihood that fires spread through urban areas or across green spaces, triggering a large-scale urban conflagration like the one seen during the 2025 Los Angeles fires.

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# Conclusion

San Francisco has made substantial progress in strengthening its older, seismically vulnerable buildings. Its seismic investments to date have reduced the likelihood of catastrophic collapses and will limit building damage after the next major earthquake. However, an earthquake of the magnitude of the 1906 quake would cause profound disruption, with long-term consequences for housing, social equity, and economic recovery across the region and the state. As outlined in this policy brief, SPUR sees opportunities to use seismic investments not just to mitigate the immediate impacts of earthquakes but also to shore up the city's long-term resilience.

Reckoning with earthquake risk requires a coordinated, multi-pronged approach that includes mandatory retrofits for at-risk buildings, strengthened policies for city-owned facilities, and proactive measures to reduce post-earthquake fire risks. The recommendations outlined in this brief provide a road map to reduce life-safety hazards, preserve housing, spur new downtown housing developments, and align seismic improvements with the city's existing decarbonization and building electrification goals. A comprehensive approach to earthquake resilience must account for these broader considerations, especially in a funding environment in which the city must make difficult trade-offs among core social services, capital investments, and other priorities.

Although this brief is focused on San Francisco, the city cannot meaningfully prepare for or recover from a major earthquake in isolation: earthquake impacts will cascade across shared infrastructure, housing, and lifelines throughout the Bay Area. To be truly resilient, the city must work together with neighboring jurisdictions and regional partners — aligning planning, policies, investments, and emergency response — so that the entire region is prepared to withstand and recover from the next major earthquake.



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