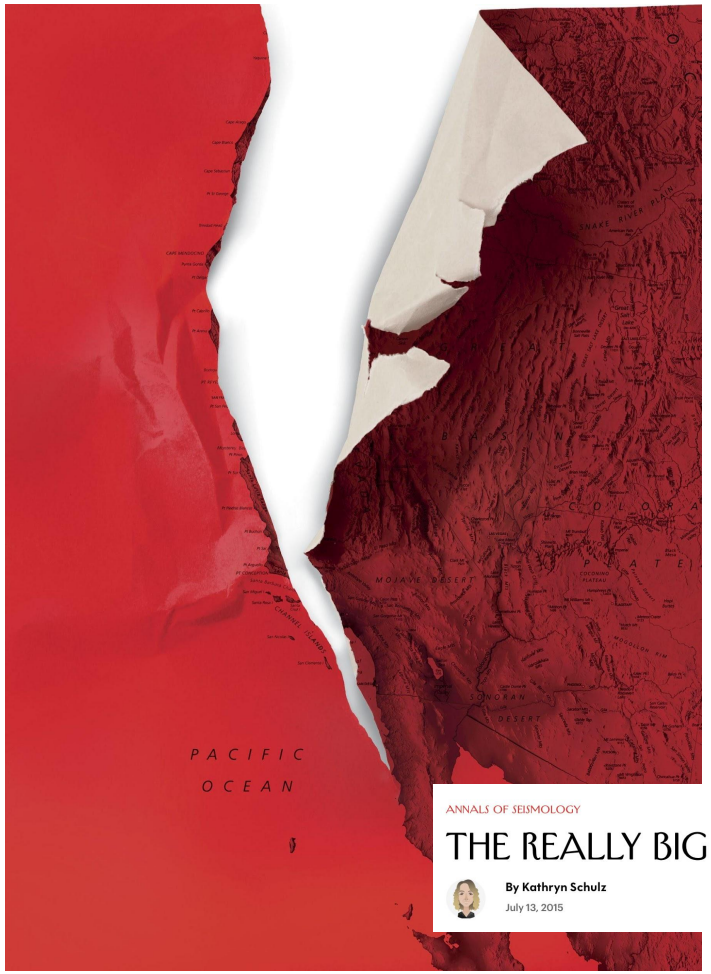
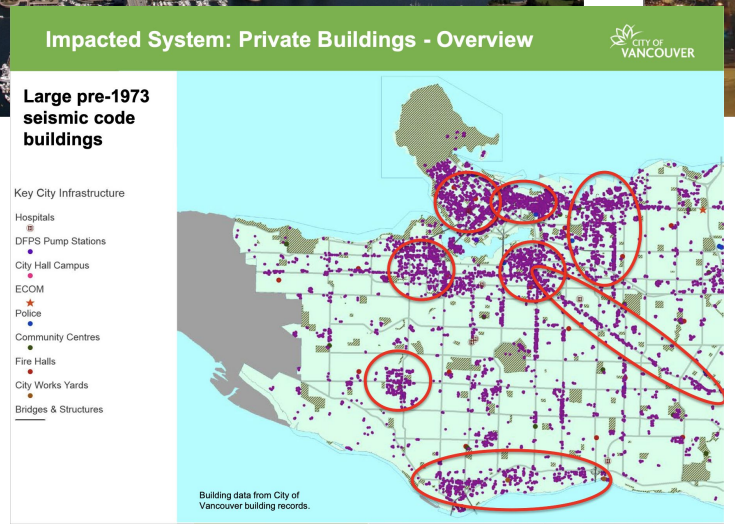
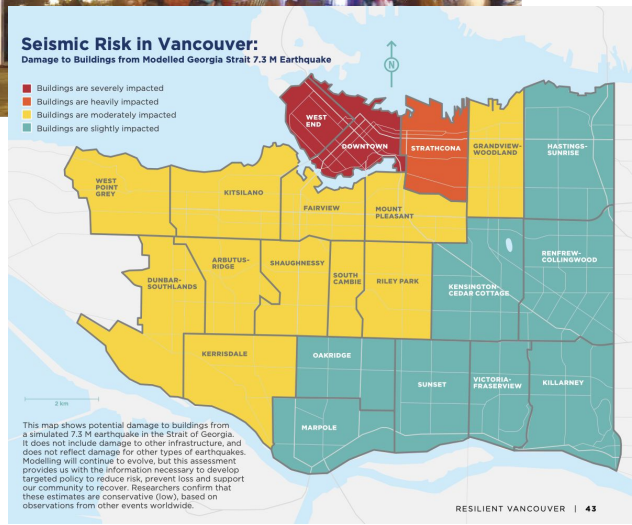

BC | Climate Resilience Summit 2025
Vancouver, Robson Square March 3rd/4th

The Really Big Problem







Understanding Seismic Risk

Council date November 12, 2024

APPENDIX A

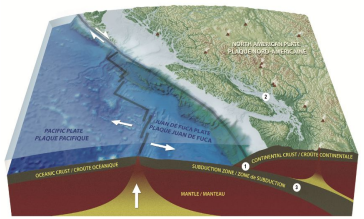
Seismic Risk in Vancouver, Canada's Existing Buildings

A Seismic Risk Assessment of Existing Privately Owned Buildings

Prepared by
Micah Hilt, City of Vancouver
Dr. Tiegan E. Hobbs, Natural Resources Canada

CITY OF VANCOUVER

1 Earthquakes



Source: Natural Resources Canada

Models show a 1 in 5 chance of a very strong earthquake in the next 50 years.

The NZ $40B 2010-11 Christchurch earthquake sequence occurred on a previously unknown fault line.

3 Buildings Seismic Risk

Modelled using the M7.2 Georgia Strait Planning Scenario Earthquake

6,080 heavily damaged buildings, leading to:

230,520 residents disrupted & displaced over 3 months

365,340 daytime building users disrupted & displaced over 3 months

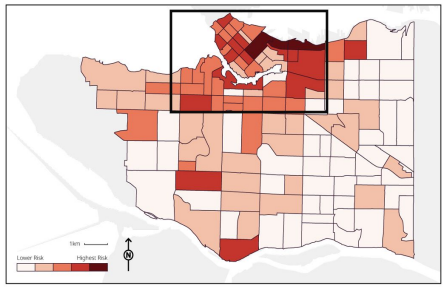
As many as **1,370** severe injuries & fatalities

$17B in direct financial losses

Modelling does not include the contribution of infrastructure failure, delayed emergency response and recovery, aftershocks, and fire following earthquake. Heavily damaged buildings are red and yellow-tagged buildings. Direct financial losses include only replacement values. Severe injuries are those requiring immediate hospitalisation. Population figures are estimates only.

3 Neighbourhood Seismic Risk

Modelled using the M7.2 Georgia Strait Planning Scenario Earthquake

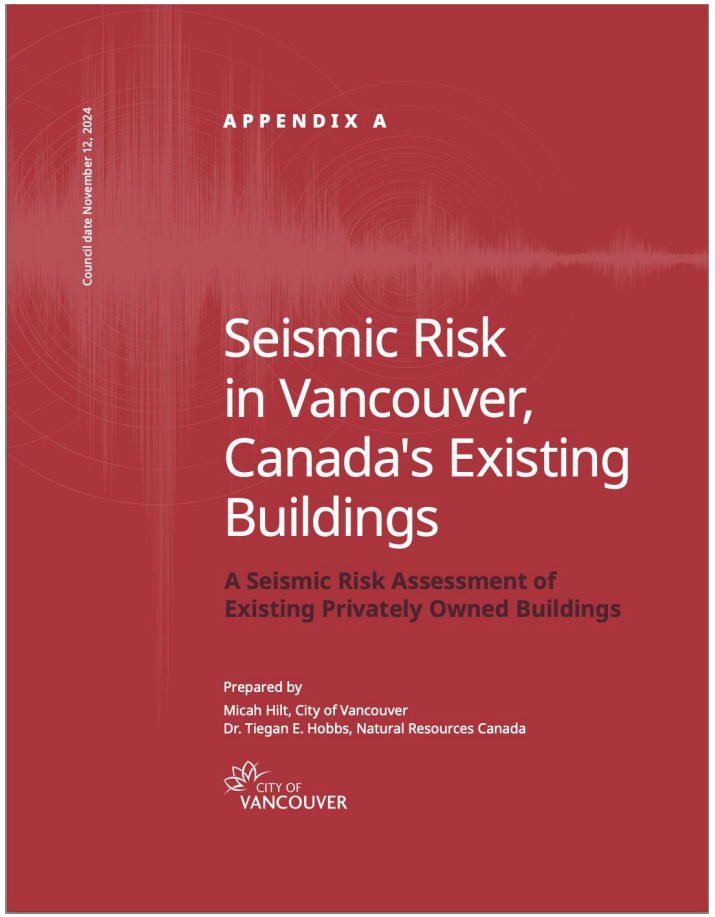


Six neighborhoods contribute nearly 65% of buildings seismic risk

Relative Seismic Risk Map
By Census tract, Modelled M7.2 Georgia Strait Planning Scenario

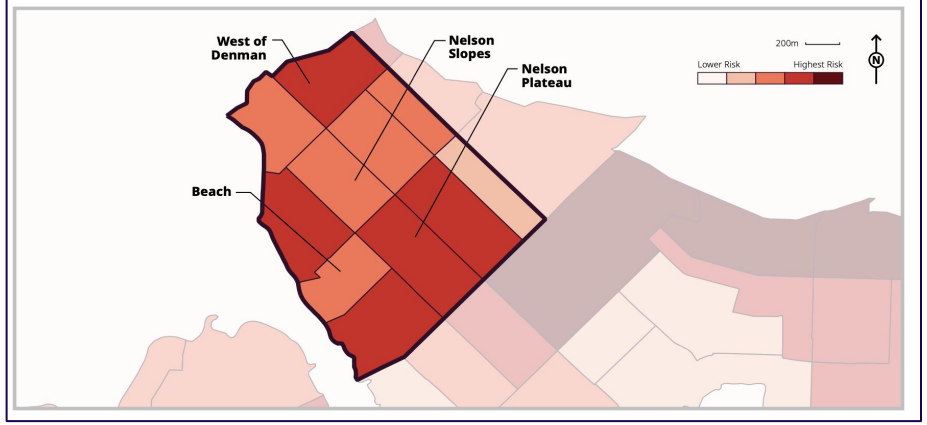
Modelling supporting this map does not include the contribution of infrastructure failure, delayed emergency response and recovery, aftershocks, and fire following earthquake. Heavily damaged buildings are red and yellow-tagged buildings. Direct financial losses include only replacement values. Severe injuries are those requiring immediate hospitalisation. Population figures are estimates only.

Understanding Seismic Risk



Risk-Driving Building Types	Approximate Count (% total buildings)
1. Concrete Mid- and High-rise Multiunit Residential Buildings	1,100 (1.2%)
2. Unreinforced Masonry Multiunit Residential Buildings	600 (0.6%)
3. Wood-framed Multiunit Residential Buildings	3,900 (4%)
4. Unreinforced Masonry, Wood, & Low-rise Concrete Commercial Buildings	2,700 (3%)
5. Concrete Mid- and High-rise Commercial Buildings	300 (0.3%)
	8,550 (9.5%)

Figure 6-2: Seismic Risk in The West End, M7.2 Georgia Strait Planning Scenario Earthquake



Highest-risk neighbourhoods contain nearly 70% renters. These renters are nearly 20% low-income, over 10% seniors, 30% identify as visible minorities, and 4% are Indigenous Peoples

Risk-driving building types contain the majority of housing units, including 80% of the purpose-built rental units

From Understanding to Action

4 Risk Reduction Actions

2025 STRATEGY TO COUNCIL

FALL 2024 COUNCIL REPORT — EARLY 2025 ENGAGEMENT

Status Quo	Capacity-Building Measures	Enabling & Encouraging Measures	Mandated Retrofit & Replacement

Potential Risk Reduction Actions

- At-risk **building inventory,** supported by **seismic screening**
- Nonmarket housing **pilots & support programs**
- Simplifications and enhancements to the **VBBL Part 11**
- **Land use planning** tools
- **Community & Owner education** programs

CITY OF VANCOUVER

R1 Seismic Risk and Risk Reduction in Existing Privately Owned Buildings

Name	In Favour	In Opposition	Declared Conflict	Abstain	Ineligible	Absent
Mayor Sim						
Councillor Carr						
Councillor Kirby-Yung						
Councillor Dominato						
Councillor Bligh						
Councillor Boyle						
Councillor Fry						
Councillor Montague						
Councillor Klassen						
Councillor Meiszner						
Councillor Zhou						
VOTE No. 10294 TOTAL	10					

4 Land Use
& Seismic Risk Reduction

2025 STRATEGY TO COUNCIL

FALL 2024 COUNCIL REPORT — EARLY 2025 ENGAGEMENT

- Within existing area plans, redevelop at-risk building sites with new, more dense buildings
- Around 40% of risk-driving building type buildings are in current rezoning-enabled areas or the Broadway Plan area
- Tenant protection is critical when considering redevelopment-based risk reduction.

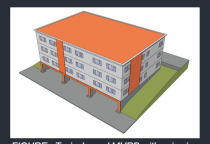


FIGURE: Typical wood MURB with seismic vulnerabilities (Ausenco, 2024)

4 Policy Option Considerations

2025 STRATEGY TO COUNCIL

FALL 2024 COUNCIL REPORT — EARLY 2025 ENGAGEMENT

Key Policy Option Development Considerations:

- Minimise tenant and small business **displacement**
- Minimise **cost** to owners, tenants, and small businesses
- Consider potential interactions with other **City priorities**
- Consider the **roles** of senior levels of government

Earthquakes pose 'significant' risk to city

Computer modelling suggests 6,300 older Vancouver buildings would be heavily damaged

GORDON HOEKSTRA

A major earthquake would be devastating and deadly for Vancouver, according to the latest in a long line of warning reports.

The computer modelling in a new City of Vancouver report estimates that a magnitude 7.2 earthquake in the Georgia Strait could heavily damage 6,100 buildings in the city, leading to more than 1,350 deaths and severe injuries.

It would also lead to the estimated displacement of more than one third of city residents and workers for more than three months and result in $17 billion in financial losses.

As a result of the report, Vancouver city councillors will consider Tuesday a recommendation to have staff come up with a plan by 2025 to reduce the significant seismic risk that exists in privately owned buildings in Vancouver.

That starts with consulting owners of rental buildings and condos, landlords, tenants, renter groups, and Indigenous agencies.

The report said the highest risk is with older brick, wood and concrete buildings in the West End, the Downtown Eastside, Chinatown, Strathcona, the downtown, Kitsilano, Fairview, and Mount Pleasant neighbourhoods.

It is the latest report calling for steps to reduce the seismic risk of privately owned buildings. This effort started after a 2016 investigation by Postmedia News revealed the city had failed to create a plan to reduce the seismic hazard of the city's older private buildings, numbering in the thousands, despite identifying a need to do so as far back as 1994, now 30 years ago.

Carlos Ventura, a professor in structural and earthquake engineering at the University of B.C., said Friday he is familiar with the city report, and the findings reflect reality.

Ventura said the million-dollar question is whether the city will have the energy and political will to create and implement a plan that will cost the city, building owners and others a lot of money.

Ventura, who heads UBC's earthquake engineering research facility, said that in the past, reports have been made public, they have been commented on, and then interest dies down.

"I am more hopeful this time," said Ventura, pointing to the city's hiring of former San Francisco seismic planner Micah Hilt in 2017 as the city's lead seismic planner. Hilt was one of the two authors of this report.

Keith Porter, the chief engineer for the Institute for Catastrophic Loss Reduction, who has been involved in efforts to mandate seismic retrofits of privately owned buildings in San Francisco and Los Angeles, said unless there is widespread buy-in from the ground up, there is little likelihood of a city making significant progress.

The key issue is cost, which will need public support if the city is to order mandatory retrofits, he said.

The new city report offers no solution to the cost problem, and city staff said provincial and federal help will be needed.

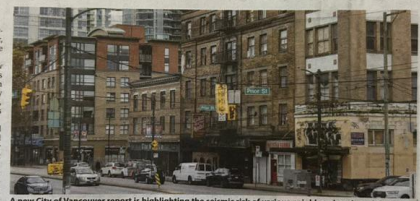
Porter said cities like Vancouver have to confront the fact that either there is a reasonable cost now or one 10 times or higher after a catastrophe.

"An earthquake represents a nearly existential threat to a city, one which it may not recover from," said Porter.

Ventura echoed that view, saying you only have to look to the devastation in Turkey in 2023 or Christchurch, New Zealand, in 2011 to see the consequences of not adequately dealing with the seismic risk to private buildings. Christchurch is still rebuilding.

The staff report to council noted that a major earthquake is "one the most significant risks to public safety Vancouver faces."

One of the concerns is people who would be most affected by a major earthquake are those least able to prepare and reduce the risk. The report noted the most-at-risk buildings contain nearly all of the city's purpose-built rental units; including for low-income tenants and seniors, and small businesses serving neighbourhoods.



A new City of Vancouver report is highlighting the seismic risk of various neighbourhoods and the path forward in mitigating that risk. Older brick buildings are especially vulnerable. JASON PAYNE/FILES

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